IMPACT OF GREEN-HOUSE COVER ON POTENTIAL EVAPOTRANSPIRATION AND CUCUMBER WATER REQUIREMENT

By

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B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 2003
M. Sc. Agric. Sc. (Vegetable Crops), Ain Shams University, 2007

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ABSTRACT

Fadl AbdelHamid Hashem: Impact of Green-House Cover on Potential Evapotranspiration and Cucumber Water Requirement. Unpublished Ph. D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2011.

The experiment was conducted during two successive spring seasons of 2008 and 2009 at El-Bosaily farm, El-Behira governorate at the North Coast of the Nile Delta, in Egypt. This work aimed to study the effect of green-house cover, irrigation level and soil mulch on growth and yield of cucumber (*Cucumis sativus* L. cv. Reda F_1) as well as the interaction between these factors. Three green-house covers (polyethylene sheet, white and black net) as main plot, three irrigation levels [80%, 100% and 120% of the potential evapotranspiration estimated according to class A pan equation (ET_o)] as submain plot and three soil mulch types (transparent mulch, black mulch, without mulch) as sub submain plot, were applied in split-split-plot design with three replicates. The results showed that the highest air temperatures, relative humidity and evapotranspiration were detected in polyethylene cover treatment followed by white net treatment. Plant height, number of leaves, leaf area, total fresh and dry weights and yield were increased with white net cover treatment. The highest vegetative growth and yield were obtained by 100% ET_o compared to 80% ET_o and 120% ET_o treatments. Vegetative growth and yield were increased with the treatments of transparent mulch compared to the other treatments. The effect of interaction between green-house cover, irrigation levels and soil mulch were clear with white net cover plus 100% of ET_o and transparent mulch, where the vegetative growth and yield were increased significantly during both experimental seasons.

Key words

Cucumis sativus L., Irrigation levels, Polyethylene sheet, White net, Black net, Water use efficiency, Crop yield

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1. INTRODUCTION

Agriculture is the largest water user in nearly every country. Water is also being a limited factor due to its availability **(CIHEAM, 2000)** and quality **(Vengosh *et al.*, 2004)** in the Mediterranean Region. Water allocated to irrigation is about 75% of the global water resources **(Anonymous, 2008)**. In view of increased domestic competition for resources and the need of larger agricultural production to ensure food security, such a fraction is unsustainable. Therefore water security can only be warranted by a large increase in agricultural water use efficiency (**Tuzel *et al.*, 2009**).

In recent years in Egypt, growing vegetables under protected cultivation is expanding rapidly. The common types of protected cultivation are the plastic low tunnels and the single span plastic houses. The number of single arch greenhouses reached about twenty thousand, while about 70% are used for cucumber production (**El Aidy *el al.*, 2007**). The total number of green-houses was estimated to be 26682 units of area 540 m^2 each (2009 statistics) among them 11146 green-house were devoted to cucumber cultivated in the spring season **(Anonymous, 2009)**.

Cucumber is one of the major vegetable crops grown in Egypt under plastic house conditions. It is sub-tropical vegetable crop that grows successfully under conditions of high light, humidity, moisture, temperature and fertilizers inside plastic houses **(El-Aidy, 1990)**.

Using green-house cover shade is one of the management practices that may increase water use efficiency under protected cultivation. The effects of shade on plants height, particularly with regard to photosynthetic productivity have been studied in great details throughout this century **(Farag *et al.*, 2010a)**. Three major shade categories were recognized: Shade avoiders or obligate sun plants; Shade tolerates or facultative sun/shade plants and Shade requires or obligates shade plants. Moreover, using shade screen during the spring growing