

Abstract

Ahmed Awny Ahmed Farag, Effect of Modified Micro-Climate in the Plastic-house on Salt Tolerance of Cucumber Plants. Unpublished Doctorate of Philosophy Dissertation, Department of Horticulture, (Vegetable Crops), Faculty of Agriculture, Ain Shams University, 2006.

This study has been conducted in El-Bosaily greenhouses during 2003 and 2004 seasons in order to study the effect of three levels of water salinity (2, 4 and 6dS/m). Four modified micro-climate were applied: normal greenhouse (control); shaded greenhouse with 40% (nominal) black shade net (shade); a greenhouse supplemented with overhead mist (mist) and a side ventilated greenhouse of 35% opening (ventilation). Yield and ion composition of cucumber plant (*Cucumis sativus* L. CV. Delta Star F1) under the different treatments were compared in relation to the prevailing microclimate. Seedlings were grown in 10-litter bags filled with clean sand. Plant growth parameters in terms of plant height, number of leaves, leaf area, total fresh and dry weights as well as yield in terms of number and weight of fruit per plant were monitored. The effect of salinity and modified micro-climate on concentration of nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg) and sodium (Na) in leaves and roots were determined. Results showed that cucumber plant growth was reduced with increasing salinity level under control and mist more than shade and ventilation. Number of leaves, leaf area, and total fresh and dry weights were inversely proportional to salt levels. Sodium accumulation was increased in control and mist under 6dS/m of saline water, while N, K and Mg were decreased in leaves and roots of plants irrigated with saline water under control and mist more than shade and ventilation. The highest fruit weight and number of fruits were obtained from shade and ventilation under 2dS/m of saline water.

CONTENTS

		Page
1-	INTRODUCTION	1
2-	REVIEW OF LITERATURE	4
2-1	Salinity effect under different modified climate conditions	4
2-2	Greenhouse microclimate	4
2-3	Effect of salinity on vegetative growth	7
2-4	Effect of salinity on yield.	12
2-5	Salinity effect on mineral nutrient	16
3.	MATERIALS AND METHODS	22
3.1	Sand Culture Technique	22
3.1.1	Sand preparation	22
3.1.2	Containers	22
3.2	Experimental layout	23
3.2.1	Nursery materials	23
3.2.2	Transplanting	23
3.3	Plastic House Preparation	23
3.4	Treatments	24
3-5	Agriculture management	24
3.6	Measurements	29
3.6.1	Climatic measurements	29
3.6.2	Growth parameters	29
3.6.3	Plant analyses	29
3.6.3.1	Nitrogen, phosphorus, potassium and Sodium	29
3.6.3.2	Calcium and magnesium	30
3.6.6.3	Chloride	30
3.6.4	Yield measurements	30
3.7	Statistical Analysis	30
4.	RESULTS AND DISCUSSION	31

4.1	Climate parameters	31
4.1.1	Air temperature	31
4.1.2	Relative humidity	31
4.2	Vegetative growth parameters	37
4.2.1	Plant Height	37
4.2.2	Number of Leaves	38
4.2.3	Leaf Area	42
4.2.4	Total fresh weight	45
4.2.5	Total dry Weight	46
4.2.6	Chlorophyll content	50
4.3.1	Early yield	53
4.3.2	Total yield	53
4.3.3	Early number of fruit	55
4.3.4	Total number of fruit	56
4.4	Nutrient Concentration	59
4.4.1	Nitrogen in leaves	59
4.4.2	Phosphorus in leaves	60
4.4.3	Potassium in leaves	64
4.4.4	Magnesium in leaves	65
4.4.5	Calcium in leaves	66
4.4.6	Sodium in leaves	72
4.4.7	Chloride in leaves	75
5.	SUMMARY AND CONCLUSIONS	78
6.	REFERENCES	84