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التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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ENGINEERING FACTORS OF IRRIGATION SYSTEMS IN GREENHOUSES TO MAXIMIZING PRODUCTION OF SOME VEGETABLE CROPS

By

ESRAA MOHAMED IBRAHEM MOHAMED
B.Sc. Agric. Eng., Fac. of Agric., Ain Shams Univ. 2016

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Approval sheet

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ABSTRACT

Esraa Mohamed Ibrahim Mohamed: Study of Engineering Factors of Irrigation System in Greenhouses to Maximizing Production of Some Vegetable Crops. Unpublished M. Sc. Thesis, Department of Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2022.

The study aimed to maximize crop production of cucumber and zucchini under greenhouse conditions, reducing irrigation water requirements by using different drip irrigation systems and optimizing water unit productivity. A field experiment was carried out at the experimental greenhouses, Agriculture Research Centre, located at Doki, Giza Egypt. The greenhouse experiment was made of wooden frames and covered with transparent plastic roof polyethylene (PE) 120µm thickness plastic film protected with meshes of 20 x 10 threads/cm^2 and wight net without warming and no air ventilation was given. The greenhouse was named low innovation greenhouse. The dimensions of each experimental treatment were 3.2 m high, 16 m wide, and 40 m. The first parameter was irrigation systems surface irrigation (SDI) and sub-surface irrigation (SSDI). The second parameter that was examined was water regimes (100% of ET_C, 80% of ET_C, and 50% of ET_C), the third was the emitter's flow rate (2 l/h and 4 l/h), on different crop yields (cucumber and zucchini). The greenhouse field was divided into three plots every plot is considered an irrigation regime, and every plot has two different irrigation lines as a surface and sub-surface built-in line. The results indicated that the highest cucumber production happened under T_2 (80% ET_C) using 2 l/h dripper flow rate in two periods which was (575, 560) Kg/m^2 for subsurface (SSDI) irrigation at the first and second cultivation season respectively, although the production under full ET_C was (475, 560) Kg/m^2 for the first and second season respectively so the highest water use efficiency happened under 80% irrigation regime which was 52 Kg/m^3 as an average under cucumber crop. The highest zucchini production was (300, 320 Kg/m^2) for the first

and second season respectively under 80% ETC irrigation regime, sub-surface drip irrigation with 2 l/h flow rate dripper and also has the highest water use efficiency (WUE) value which was 43 Kg/m^3. Under conditions of shortage of water in Egypt, we can use sub-surface drip irrigation (SSDI) together with 2 l/h dripper discharge under 80% ET_C irrigation level to maximize vegetable crops production, optimizing water use efficiency under greenhouse conditions.

Keywords: Surface drip irrigation; Sub-surface drip irrigation; Greenhouse Water use efficiency; Cucumber and Zucchini

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