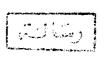
A STUDY ON AN APPROPRIATE DESIGN FOR BUBBLER IRRIGATION SYSTEM

BY

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B.Sc. (Ag. Mech.) Ain Shams University, 1991

A thesis submitted in partial fulfillment of the requirements for the degree of



,7675

MASTER OF SCIENCE

in

AGRICULTURE

(AGRICULTURAL MECHANIZATION)

Department of Agricultural Mechanization

Faculty of Agriculture

Ain Shams University

1998



Approval Sheet

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ACKNOWLEDGMENT

The author wishes to thank "Allah" for allowing him to the completion of this work.

He wishes to express his greatest appreciation and deepest gratitude to his Principal Supervisor: **Prof. Dr. Mohamed Nabil El Awady**, Prof Emerit. of Agricultural Engingeering, Fac. of Agric., Ain Shams Univ., for suggesting this research, and also for kind guidance and encouragement.

He wishes also to express his deep gratitude to **Prof. Dr. Ahmed Farid El-Sahrigi** Prof. Ain Shams Univ. and consultant of Agricultural Engineering Research Institute (AEnRI), in addition to **Dr. Hassan A. Abdel Mawla** Head of Section; AEnRI, for their advices and continuous help to fulfill this work.

Special thanks are to be given to **Dr. Ibrahim Yehia El Sayed**, AEnRI, in addition to **Mr. Mohamed Tyssir El-Lithy, Mr. Haitham Nabih** and **Mr. Mohamed Nabih** for continuos help during laboratory and field tests.

Special thanks also to **Dr. Mohamed Montasser Ibrahim**, for his kind guidance and continuos encouragement.

Thanks to all who have helped, to complete this work.



ABSTRACT

Ahmed Maher El-Lithy. A study on an appropriate design for bubbler irrigation system. Unpublished Master of Science, University of Ain Shams, Faculty of Agriculture, Department of Agricultural Mechanization, 1997.

The aims of this study is to get the greatest lateral line length with the best uniformity distribution, through extending it into multi stages with different emitter sizes on each stages.

The main results in this study are summarized in the following:

I- Laboratory experiments.

(1) The effect of pressure head and tube diameter on discharge.

- The discharge of tube increased from "19.59" to " 74.35 L/h" by increasing pressure head from "0.025" to "1 bar" at tube diameter of "3 mm". The discharge increased from "27.97" to "54.07 L/h" by increasing tube -diameter from "3" to "4 mm" at pressure head of "0.25 bar".

(2) The effect of pressure and diameter of nozzle on discharge.

- The relationships between nozzle discharge (q) and pressure head (h) different nozzle-diameters were conducted in the following where k and x are constant. equation: q = khx

(3) The effect of pressure and type of screw emitter on discharge.

- The discharge of screw emitter decreased by increasing number of screw thread teeth and screw length into tube at all pressure heads. And the discharge increased by increasing pressure heads.

(4) The effect of valve-emitter angle on discharge.

- It was noticed that there was a wide variation of discharge trying to adjust valves as emitters in field. Thus this part of experiment was cancelled.

II- Field experiments.

- It was found that the lateral length (concerning pressure drop within 10 %) increased by increasing the nozzles spacings. The lateral lengths were "120", "150" and '168 m" at nozzles spacings of "4", "5" and "6 m" $\,$ respectively at pressure heads of "1 bar" and "1.4 bar".

(5) Extending the maximum allowable lateral length through multistaging with wider emitters downstream.

- It was notice that the discharge distribution along lateral-line is similar to saw teeth that indicate a good discharge-variation within 5 % along the lateral-line. The lateral length was thus extended by a number of times crossponding to the number of stages.

(6) The effect of nozzles spacing and pressure head on uniformity distribution.

- The uniformity coefficients were "98.24", "98.69", and "98.36 %" at nozzles spacings of "4", "5", and "6 m" respectively and pressure head of "1 bar". These data indicated that there was no remarked effect of nozzles spacings on uniformity- distribution.
- It was found that the uniformity coefficients were "98.24" and "97.68 %" at pressure heads of "1" and "1.4 bar" respectively and nozzle spacing of "4 m". These data indicate that there was no remarked effect of pressure head on uniformity of distribution.

(7) Economical view.

- As a result of using three stage of nozzle orifice-diameters along lateral than with using one nozzle oriface-diameter, save of "120.2 L.E." which is equivalent to "362%" was obtained at the same length and conditions

KEYWORDS: Bubbler - irrigation system - lateral line - nozzle - valve uniformity distribution - manufacturing coefficient of variation - pressure head - tube with screw -head loss.

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