RESEARCH ARTICLE

Evaluation of hydraulic characteristics of different micro and mini sprinklers

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ABSTRACT : The study was conducted to evaluate the hydraulic characteristics of different micro and mini sprinklers in the department of Irrigation and Drainage Engineering at College of Agricultural Engineering, Raichur. The results reveal that the average discharge was found in rate for micro sprinkler at 0.5 kg/cm^2 was 24.47 lph, at 1 kg/cm^2 it was 41.58 lph but for mini sprinklers the average discharge was increased 26 lph to 45.42 lph as pressure increases from 0.5 to 1 kg/cm^2 . The coefficient of uniformity for micro sprinkler was found to be 40.4 per cent at an operating pressure of 1.0 kg/cm^2, but it was 48.4 percent in mini sprinkler. The moisture distribution pattern for both micro and mini sprinklers of different make found to be excellent, the moisture content of soil can be increased only to a depth of 25 cm when operated the mini sprinkler for 2 hours at a operating pressure of 1.0 kg/cm^2 and having discharge rate of of 65 lph in deep black cotton soil.

Key words : Micro sprinkler, Mini sprinkler, Pressure, Discharge, Coefficient of uniformity

INTRODUCTION

The availability of adequate, timely and assured supply of water is an important determinant for agricultural productivity. Irrigation is thus critical to the agricultural development of the country. The development of major and minor irrigation projects with huge investments has quite extent release agriculture from the dependence on monsoon. But, as the quantity of water available for irrigation is decreasing at faster rate, there is a need for the scientist to design a system of irrigation which manages the available water to the crop so as to maximize the yield and hence profit.

Micro and mini sprinkler irrigation system was originally introduced for irrigating highly productive crops, orchards and lawns in areas where water is scarce and expensive. Now a day's micro and micro mini sprinklers are used for irrigating a wide range of crops, orchards in areas where water is abundant. However, micro and mini sprinkler irrigation are profitable when used in areas with hilly topography, poor soils and /or scarcity of water.

EXPERIMENTAL PROCEDURE

Study was carried out in the department of Irrigation and Drainage Engineering at College of Agricultural Engineering, Raichur. This place is situated in the North-eastern dry zone (Zone-2, Region-1) of Karnataka state at 160 15' N latitude and 770 20' E longitude at an elevation of 389 m above the mean sea level. A single lateral was used for the experiment; to this three micro sprinklers were attached to accomplish the experiment one at a time. The same experiment was followed by the mini sprinkler attachment. The discharge of micro and mini sprinklers were measured at three different pressures beginning at 0.5 kg/cm^2 increased to 1.0 kg/cm^2 and further increased to 1.5 kg/cm^2. Lower pressures were used to micro and mini sprinklers because of their sensitivity to pressure for the discharge rate. The experiments were done simultaneously for pressure-discharge and coefficient of uniformity to have accurate readings. Pre experiment set up was made by adjusting the required pressure in the lateral line. After one hour the water collected in the

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