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RESEARCH ARTICLE

Performance evaluation of different types of emitters

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ABSTRACT : Drip irrigation system has gained considerable importance in the recent years in view of the need for efficient utilization of water resources. Efficiency of drip system depends directly on the uniformity with which water is discharged by the emission devices throughout the system. Emitter is one of the important components used in drip irrigation system as compared to all other components. The performances of the emission devices have major impact on the success of drip irrigation system. Eight different types of emitter's *viz.,* O-Tif02, O-Tif04, O-Tif08, O-Tif16, JSCPC02, JSCP04, JTKP08, J-Loc16 were selected for the performance tests. The study has been conducted to evaluate the parameter such as manufacturing coefficient of deviation, mean flow rate, coefficient of discharge, emitter discharge exponent, emission uniformity, absolute emission uniformity and flow rate. The study indicated that operating pressure affects flow rates of non-pressure compensating (NPC) type emitters. The relationship between pressure and discharge was linear. The manufacturing quality of all the emitter found excellent. The Otiff-16 having 16 lit/hr nominal discharge was found to be having best manufacturing quality of C_v as 0.018 among all the tested emitters.

KEY WORDS : Drip irrigation, Emitters, Emission uniformity, Flow rate index

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INTRODUCTION

Drip irrigation system has gained considerable importance in the recent years in view of the need for efficient utilization of water resources. In this system small quantities of water are applied at frequent intervals directly to the plant root zone drop by drop. Efficiency of drip system depends directly on the uniformity with which water is discharged by the emission devices throughout the system. Ideally all emitters in the system should discharge equal amount of water. Emitter is one of the most important components used in the drip irrigation system and its performance will have major impact on the success of the system as compared to all other components. Nowadays various types of emitters are available in the market and have different specific characteristics. Singh *et al.* (1997) conducted an experiment on performance evaluation of micro irrigation emitters.

The experiment was carried out at M/S Jain Irrigation System Limited, Jalgaon. Seven types of emitters *viz.,* Turbo key (TK), Turbo sc (SC), J-npc (JNPC), J-loc (JL), Drip co (DRP), K_2 (K) and J-mini in line (JML) were selected for performance test. Solomon (1979) tested the manufacturing variation (C_v) of several commercially available emitters. The C_v was a suitable measure of unit-to-unit consistency in emitters. C_v values of several types of emitter's ranges from 0.02-0.04. Dahiwalkar *et al.* (1994) developed a mathematical model for the pressure discharge sensitivity, $Q = 2.54\ H^{0.759}$ and presented the results in tabular form for turbo-key type of emitters.

It is, therefore, necessary to test the emitters, so that the drip designer can select the best emitter suitable for specific requirement. Keeping this in view, the present study of performance evaluation like manufacturing, hydraulic and operational characteristics of drip irrigation emitters, which can be used for design, operation and selection of drip irrigation

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