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RESEARCH ARTICLE

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Hydraulic performance of drip irrigation system

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Abstract

The experiment was conducted at the leveled field to evaluate the hydraulic performance of drip irrigation system with two emission devices *viz.,* online dripper (8 lph) and drip-in dripper (1.3 lph) for varying pressure *viz.,* 0.75, 1 and 1.25 kg/cm^2. Experimental set up was installed for determination of uniformity coefficient, emission uniformity and coefficient of variation. The result revealed that different hydraulic measures such as uniformity coefficient, emission uniformity and coefficient of variation at different operating pressure for online drip irrigation at 0.75 kg/cm^2 was 97.05%, 95.75% and 2.94%, respectively, similarly for the operating pressure 1.00 kg/cm^2 it was 97.99%, 97.08% and 2.00% and for 1.25 kg/cm^2 it was 98.15%, 98.33% and 1.84% also for inline drip irrigation uniformity coefficient, emission uniformity and coefficient of variation for operating pressure 0.75 kg/cm^2 was 97.25%, 98.72% and 2.74% and for pressure 1.00 kg/cm^2 it was 97.30%, 99.44% and 2.69%, respectively, and at 1.25 kg/cm^2 it was 98.92%, 99.53% and 1.07 %, respectively. The above result shows that the uniformity coefficient and emission uniformity increased while coefficient of variation decreased as operating pressure increased for all emission devices.

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Key words: Hydraulic Performance, Drip irrigation, Uniformity coefficient, Emission uniformity, Coefficient of variation

INTRODUCTION

An important factor in drip irrigation design procedure, is determination of energy loss in drip lateral, emitter spacing, pipe diameter, lateral length, ground slope and emitter flow rate, however, since a lateral line has a large number of emitter, this minor loss multiplies into significant loss, pressure losses in the lateral line, which ultimately causes the emitter flow variation along the lateral depends on the length of lateral line and number of emitters and type of drip irrigation system that is online or inline drip irrigation system. Keeping this in view, study was conducted in two irrigation system such as inline and online irrigation system for variation in discharge rate and pressure head along the lateral.

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MATERIALS AND METHODS

The experiment was conducted to study the hydraulic performance of drip irrigation system at central farm of Aditya College of Agrilcutural Engingring and Technology Beed. The trial was conducted during the month of November 2010.

Experimental setup:

An isolated drip irrigation system was used under field test. Electrical operated submersible pump of 5 hp was used to pump water from open well to drip irrigation system. A screen filter and sand filter was installed between mainline and delivery pipe of the pumping set. HDPE pipes of 75mm diameter were used for mainline