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Hydraulic Performance of Three Types of Imported Drip Emitters Used in Gezira Clay Soils, Sudan

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Abstract : A drip or Trickle irrigation system is designed to apply a precise amount of water near the plant with a certain degree of uniformity. This study was conducted at the Experimental Farm of the Faculty of Agricultural Sciences, University of Gezira, in March 2018. The study aimed to design and evaluate the hydraulic performance of three drip emitter types using: average discharge (Qavg), discharge variation (Qvar %), coefficient of uniformity (CU %), coefficient of manufacturer variation (CV %), distribution uniformity (DU %), statistical uniformity (Us %), clogging (%) wetted diameter (cm) and wetted depth (cm). The emitter types used are regular gauges (RG), high compensating pressure (HCP) and low compensating pressure (LCP). The treatments were laid out in a randomized complete block design (RCBD) with four replications. Results showed that there were significant differences ($P \leq 0.05$) in all tested parameters except clogging, wetted diameter and wetted depth. Discharge variation (Qvar %) values were 12.71, 15.57 and 19.17 for RG, LCP, and HCP, respectively. The variation is quite good and within the acceptable range. Results of coefficient of manufacture variation (CV %) were 10.9, 27.8 and 52.7 for RG, LCP and HCP, respectively. It is considered within the unacceptable range except for RG type, which is excellent. Statistical uniformity (Us %) values were 89.1, 72.2 and 45.7 for RG, LCP and HCP, respectively. It is considered good, acceptable and unacceptable, respectively. Results of the coefficient of uniformity (CU %) were 91.3, 77.7 and 56.7 for RG, LCP and HCP, respectively. It is considered excellent, fair and unacceptable, respectively. Distribution uniformity (DU %) was 90.2, 67.9 and 36.5 for RG, LCP and HCP, respectively. It is considered excellent, poor and poor, respectively. The study recommended regular gauges (RG) type emitters under the heavy clay soil conditions of the Gezira State, Sudan.

Keywords : drip irrigation, uniformity, clogging, coefficient, performance
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