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Development and Evaluation of Estimation Models of Wetting Pattern of Drippers in a Sandy Soil with High Gravel

F. Mohamadzade, M. Gheysari* and E. Landi[1]

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Abstract

The objectives of this study were to investigate the effect of dripper discharge and irrigation time on the wetted width in the sandy loam soil with high percentage of gravel and to evaluate previously developed models of estimation of the wetted width in the previous researches. The treatments included three irrigation times (T) of 4, 8 and 12 h and three dripper discharge rates (q) of 2, 4 and 8 l/h, with three replications. The wetted width of each dripper was measured 24 hours after irrigation application. The maximum and minimum wetted widths were 159.8 and 63.5 cm for $T_{12}q_8$ and T_4q_2, respectively. A linear model was developed as a function of two variables of irrigation time and dripper discharge rate was developed to predict the wetted width in sandy loam soil with high percentage of gravel. The evaluation of recommended models of wetted width for the studied soil showed that only one of six models was accurate enough to estimate wetted width. It can be concluded that the presence of gravels in the soil has a complex effect on width and depth of wetted zone. Thus, it is necessary to measure the wetted width and wetted depth in the field.

Keywords: Emitters, localized irrigation, model, Wetting pattern.

1. Dept. of Water Eng., College of Agric., Isf. Univ. of Technol., Isfahan, Iran.
*: Corresponding Author, Email: gheysari@cc.iut.ac.ir

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