Graduate Management
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Thesis for obtaining a master's degree in irrigation and drainage

Determination of infiltration equations in surface irrigation based on scaling method

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ABSTRACT

Abstract Surface irrigation methods are one of the most common methods of water use in farms in Iran and other parts of the world. Proper design, evaluation and simulation of surface irrigation requires sufficient information on soil infiltration and water advance in the field. Since the infiltration characteristics are a function of time and place, a relatively large number of field measurements are required to express the average field conditions. The purpose of this study is to evaluate one-, two- and multi-point methods in surface irrigation and to compare the infiltration equations obtained using scaling. In this study, first, six methods for determining infiltration equations including Elliott and Walker (Kostiakov-Lewis equation and two-point method), Shepard (Philippe infiltration equation and one-point method), Ebrahimian (Philippe infiltration equation and using two-point method) E) Valiance (soil protection equation), infiltration (Kostiakov-Lewis equation and optimization method), (Kostiakov-Lewis equation and one-point method) are evaluated. The results showed that the two-point method and the Ebrahimian method are more accurate than other methods. In order to scale an infiltration curve is considered as a reference curve and then using the time it takes for water to reach the middle of each bar, the scale factor of that bar is obtained. Finally, using the reference penetration curve and the scale factor, the parameters of the diffusion equation and the advance time for each of the bands or grooves can be obtained. The results showed that the use of points increases the accuracy of the scaling method in estimating the parameters of the diffusion equation. The results showed that the two-point method and the method of Ebrahimian et al. Are more accurate.

Keywords: Surface Irrigation, Water Advancement, Surface Irrigation, Philip Penetration Equation, Scaling