

Simulation and evaluation of soil moisture distribution pattern in pitcher underground irrigation system.

Abstract:

Maintain and increase water productivity in dry areas with new irrigation systems is considered a necessity. One method of increasing the water efficiency is a pitcher irrigation method through porous clay pots without glaze and buried in the root zone of plants watering will be done. True design of these systems requires the enough information of manner of distributing the water flow is horizontally and vertically. This type of information on the depth installing porous pots, their distance from each other and etc will play an important role. Since the test for detecting distribution of the moisture in the soil is very hard and time consuming, Use of network analysis which by having the equations of motion and factors water in the soil it can reasonably estimate the distribution of moisture in the soil to provide, Very is useful.

This study was carried out in random complete block design with three replications. The aim of this study was to investigate the moisture distribution pattern of soil at different heights using a 1, 1.5 and 2 meters of water source for irrigation in the time period is. Measurements of volumetric soil moisture to a depth of 1 m was carried out by TDR moisture meter. Statistical analysis was performed by SPSS software. Simulation of water movement in soil by HYDRUS-2D software that can simulate the movement of water, solutes and heat in saturated and unsaturated conditions is carried out. Finally the results of the software simulation were compared with the results of field measurements by three statistical measures ME, RMSE and (R²).

Research indicated that HYDRUS-2D model the moisture profiles around jugs under water source to a height of 1, 1.5 and 2 meter with RMSE 0.0095, 0.0125 and 0.0127 respectively, relative to the observed data is well simulated. Also moisture profiles in treatment 1 meter with R² Equal to 0.95 was the best fit between treatments and It was found that the model in the early times after the start of irrigation water content greater than the actual amount is estimated. It was concluded that water moves simulation in HYDRUS-2D Has efficiency is relatively high.

Key words: simulation wetting patterns, Pitcher Irrigation, HYDRUS-2D



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