

Abstract:

The scarcity of water resources indicates a critical need for the optimum use of the water in the agricultural field. Application of the modern irrigation systems such as T-Tape irrigation system is one of the ways to achieve this goal. The present study, deals with the evaluation of surface and subsurface drip irrigation systems on the cotton yield, a field experiment conducted in the Agricultural and Natural Resource Research Institute of Orzoueyeh, located in the Kerman province. The experiments were conducted in a split plot design based on the Randomized Complete Block Design (RCBD) with three replications. The treatments were comprised of three levels of the crop water requirements (i.e. irrigation based on 100, 80 and 60 percent of crop water requirement) in main plot and with the two irrigation systems, surface one and subsurface one. All treatments were assessed for productivity, water consumption along with its efficiency, and economical criteria of benefit to cost as well. The results showed, according to the same amount of water treatments applied in each sub-main treatment, in comparison with 100 percent of crop water requirement, 80 percent of water requirement caused parsimony of water usage equal to $1500 \text{ m}^3 \text{ ha}^{-1}$, and yield, number of bolls per plant and bolls weight decreased 15.6%, 9.5% and 3%, respectively, but water use efficiency increased 0.7%. Also 60% of water requirement treatment compared with 100 percent of water requirement caused parsimony of water usage equal to $3200 \text{ m}^3 \text{ ha}^{-1}$, and yield, number of bolls per plant and bolls weight decreased 37.2%, 37% and 24.5%, respectively. The water use efficiency assumptions are the same for both 60 and 100 percent of crop water requirement. The yield, water use efficiency, number of bolls per plant and bolls weight in subsurface drip irrigation increased 11%, 11.3%, 21.5% and 15%, respectively, comparison with surface drip irrigation. From the economical point of view, the benefit to cost ratio in the subsurface system is 8 percent higher than that surface system. Therefore, for cotton cultivation in Orzoueyeh area, application of the subsurface drip irrigation system with 80 percent of water requirement pattern is the best way to increase the water use efficiency for the drought years.

Keywords: Drip Irrigation, Yield Components, Water Use Efficiency, Deficit Irrigation.



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**Evaluation of Surface and Subsurface Drip
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