Irrigation scheduling for greenhouse tomato production using class A pan evaporation

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Abstract

Iran is one of the countries that is located in world's arid and semi-arid regions and is constantly subjected to water shortage. One of the effective methods for reducing water consumption and increasing production in agricultural sector is greenhouse culture. By using proper irrigation management in greenhouse, we are able to utilize water, soil and fertilizer to produce high yield and quality products. In the present study, a split-plots experiment was conducted as randomized complete blocks design with three replications, during 2010 and 2011, in Agricultural and Natural Resources Research Center, Isfahan, Iran. Irrigation frequency at 3 levels (once each 1, 2 and 3 days) was considered as the main plot and the subplots were irrigation depth at three levels (75% ET_c, 100% ET_c and 125% ET_c). Results revealed that effect of depth of irrigation was significant on yield, number of fruits per plant and mean weight of a tomato, but the effect on water use efficiency (WUE) was not significant. The highest yield (6.77 kg/m^2) and the lowest yield (4.52 kg/m^2) were observed in 125% ET_c and 75% ET_c treatments, respectively. The amount of consumed water in these treatments was 0.3 and 0.19 m^3/m^2, respectively. WUE in the treatments ranged from 25 to 28 kg/m^3. Lack of significant effect of various irrigation water depths on WUE, though the effect was significant on yield, indicates that the crops have been under-irrigated. It was found that the abovementioned traits were not significantly affected by applying irrigation frequency treatments. Soil analysis at the end of the experiment showed that salinity in the soil surface of the pots was more than lower depths, which is due to surface water evaporation and acculation of the salts. Salinity in F1 treatment was very high (8 dS/m), though the pots were irrigated once a day. This shows that everyday irrigation, but with low depth of irrigation, has not been able to leach salts to deeper depths. Based on the obtained results, water shortage, practical simplicity and labor saving, the 125% ET_c treatment with 3-day irrigation frequency are recomanded.

Keywords: : Irrigation management, Deficit irrigation, Water use efficiency.

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