

## Effect of deficit irrigation on evapotranspiration, water use efficiency, yield and growth of Hamadani pepper in greenhouse cultivation

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### Abstract

Effect of deficit irrigation on evapotranspiration, yield, water use efficiency and some growth parameters of Hamadani pepper (Bivar) using a completely randomized design (CRD) with a full irrigation treatment (FI) and three deficit irrigation treatments (85, 70 and 55% application of water requirement; DI<sub>85</sub>, DI<sub>70</sub>, and DI<sub>55</sub>, respectively) in five replications was examined. Evapotranspiration in the FI, DI<sub>85</sub>, DI<sub>70</sub>, and DI<sub>55</sub> treatments during the 66 days of the deficit irrigation application, were 337.8, 307.5, 281.1 and 244.2 mm and in the whole growth period were 396.2, 365.9, 339.5 and 302.6 mm, respectively. The plant's morphological characteristics were decreased with decreasing the soil water content. However, in 79% of the cases, the difference between FI and DI<sub>85</sub> treatments was not significant. Whereas, in all the cases, the difference between DI<sub>55</sub> treatment and FI and DI<sub>85</sub> treatments was significant. Applying deficit irrigation decreased the number of good-shaped fruits from 33.0/plant in the FI treatment to 15.6/plant in the DI<sub>55</sub> treatment and similarly increased the number of bad-shaped fruits from 5.4 to 18.0 per plant. Crop yield and water use efficiency in the FI treatment were 18.98 ton/ha and 4.79 kg/m<sup>3</sup>, which did not have significant difference with the DI<sub>85</sub> treatment (which had a yield of 17.75 ton/ha and a water use efficiency of 4.85 kg/m<sup>3</sup>). While there is not a statistically significant difference between the crop yields of FI and DI<sub>85</sub> treatments, the DI<sub>85</sub> treatment uses less water and gives crop yield very close to that of full irrigation treatment. Hence, the DI<sub>85</sub> treatment can be recommended in the cultivation of Hamadani pepper. In the severe water-scarce conditions, the DI<sub>70</sub> treatment could be used to yield 13.48 ton/ha, which is 29% less than the FI treatment. Also, water use efficiency in the DI<sub>70</sub> treatment was decreased by 17% compared to the FI treatment. Irrigation efficiency was 61.9, 65.3, 69.6 and 73.4% in the FI, DI<sub>85</sub>, DI<sub>70</sub>, and DI<sub>55</sub> treatments, respectively.

**Keywords:** Water stress, Bivar pepper, Irrigation water use efficiency, Irrigation efficiency.

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