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Saffron Irrigation Regime

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Abstract

Saffron is grown in arid and semi-arid regions in Iran in late autumn, winter and late spring with rainy season. It should be irrigated by supplemental basin irrigation. Since rainfall is usually delayed in autumn, therefore, a pre-flowering irrigation of about 100 mm is needed. In areas with a seasonal rainfall of 600 mm a post- flowering irrigation of about 50 mm is adequate for economical yield. In areas with seasonal rainfall of 400 and 200 mm continuous supplemental irrigation is needed with intervals of 24 and 15 days or irrigation regimes of 50% ET_p and 75% ET_p, respectively. In these areas, irrigation regimes can be planned based on crop water stress index (CWSI) of 0.60 and 0.27, respectively. Monthly values of crop coefficient (K_c) and pan coefficient (K_p) for saffron are presented with the highest values of 1.10 and 0.84, respectively, that occurred in January. For the three-, four-and five-year old fields with higher amount of corm intensity the optimum irrigation water is zero for about 300 mm of rainfall. While for the six-and seven-year old fields the optimum irrigation water is zero for about 500 mm of rainfall. Flower production decreased 49% by using irrigation water with salinity level of 1.7 dS m^{-1} and no flower produced at salinity level of 4.0 dS m^{-1}, while leaf growth occurred in this salinity. Furthermore, 50% flower yield is produced at soil water salinity of 3.6 dS m^{-1}.

Keywords: Irrigation interval; Irrigation scheduling; Supplemental irrigation; Rain-fed; Crop water stress index; Crop and pan coefficients; Irrigation salinity; Optimum irrigation water.

Introduction

Traditional agriculture in Iran is based on development of cropping systems with low water requiring crops such as saffron (*Crocus sativus* L.). However, not much research has been conducted on this crop to improve technology for its production.

Saffron belongs to Iridaceae family and it is mostly distributed in Irano-Touranian region and west of Asia with low annual rainfall, cold winters and hot summers. At present, saffron is cultivated in Iran and a few countries with old civilization. Iran is leading country in saffron production with 47200 ha cultivated area and 160 ton annual production (3.4 kg ha^{-1} yield) (Kafi et al., 2006). The main saffron production areas in Iran are located in Khorasan, Fars and Kerman provinces. Its cultivation area increased by an annual rate of