

Climatic Potentials Assessment for Saffron Cultivation In Marvdasht

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Extended abstract

1- Introduction

Climate is numbered amongst the most significant factors which have been considered throughout the history and almost most of agricultural activities deal with a few meteorological factors diurnally (Mohammadi and Moghtaderi, 2005; 163. Therefore, one of the most important and effective factors in human activities especially in the agrarian section, is climate so that nearly all cultivations should be done in connection with climatic conditions, otherwise it might simply fall through the cultivation process. Limitation and boundaries of the agricultural crop productions is highly depends on the climatic conditions (Mohammadi, 2007; 89). This research aims to examine the climatic conditions for Saffron cultivation in Marvdasht city.

Saffron is a semi-tropical plant and regions with mild winters and warm-dried

summers are appropriate to cultivate the Saffron (Kafi, 2003 and Sepaskhah & Kamgar, 2009). Saffron with a common name of Saffron and a scientific name of *Crocus Sativus* is the most invaluable cultivatable plant existing in the globe, and that is the only plant which intercourses based on milligram in lieu of Kilo and/or Tonne (Rashed et al, 2006).

2- Methodology

In order to carrying out the present research, the daily temperature data and total precipitation of Marvdasht weather station for a period of 20 years (1986-2005) have been selected. To evaluate the climatic conditions of Marvdasht city for Saffron cultivation, we tried to make a correlation between temperature and rainfall parameters of this city with other Saffron-raise cities in Iran i.e. Torbat-e-Heidarieh and Qaein. In continuation, thermal conditions of Marvdasht - in regard to thermal demands of Saffron plant - as well as in comparison with Birjand and Qaein were investigated. It has been used a thermal index of GDD, for investigating the required energy

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value of Saffron plant and also growth and blooming. In this research, we used the thermal index of GDD to evaluate the degree-day which is computed as follows:

$$GDD = \sum_{n=1}^{\infty} \left(\frac{T_{max} + T_{min}}{2} \right) - T_0$$

Here, GDD indicates the degree-day gathered for N days. Tmax: daily maximum temperature, Tmin: daily minimum temperature, to: basic temperature and/or physiologic zero of plant, N: number of days for a given time.

In this research, it has been used a normal distribution to determine the probability of frost occurrence in the time of Saffron's blossoming. As well as, aquatic demand of Saffron in the process of growing was evaluated by potential evapotranspiration (ETO) and plant coefficient of Saffron (Kc). We also used Belani-Keridle method to estimate the potential evapotranspiration.

3- Discussion

Based on the carried out researches, we found that climatic condition of Marvdasht is relatively similar with those of Qaein and Torbat-e-Heidarieh saffron-raise cities. Like saffron-raise cities of Khorasan province, parameters of average temperature, min temperature, max temperature and precipitation in the growth' months of Saffron in Marvdasht are relatively in a satisfactory circumstances. There is no limitation of frost and freezing days for cultivation of Saffron plant, which can affects the Saffron's performance in the time of flowering in Marvdasht. In the city under study, the first frost occurs in the late

December with 95% probability whereas the last frost happens in the late February. In Marvdasht city, the amount of degree-day and the required energy for Saffron in the times of cultivation to producing flowers are in appropriate situation. The last date to cultivate the Saffron is almost 19th of September in Marvdasht. Since, precipitation mostly happens in the winter season in the city under study, it is necessary sometimes to irrigate the Saffron plant in the times of principle growth and producing flowers. In fact, the primary development of Saffron takes place in Fall Season in Marvdasht. And the amounts of Fall's precipitation are not adequately enough to support the Saffron's aquatic needs. In Marvdasht, the amount of needed water for Saffron is approximately 760 mm in which a large amount of this related to the ending of producing flower and then harvesting.

4- Conclusion

Saffron is a plant which grows in arid and semi-arid areas. In this research, the climatic conditions of Marvdasht were taken into account in order to cultivating the Saffron plant. According to the results, we can express that the climatic parameters required for Saffron cultivation relatively are available and can provide a suitable condition for growth and harvesting such plant in that region. In relation to the existing fertilized soils and significant water resources in the city, it is highly possible to cultivate the Saffron especially in the hilly places.

Key Words: Climatic Conditions, Saffron, Degree Day, crop Coefficient, Water requirement, Marvdasht.

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