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The Thesis Submitted for the Degree of M.Sc (in the field of Agronomy Science)

The effect of drought stress and, jasmonic acid spraying on yield and quantitative characteristics of safflower

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Abstract

In order to study the effects of spraying jasmonic acid under limiting irrigation conditions on qualitative and quantitative characteristics of safflower, an experiment was designed in the crop year of 1393-94 in which three repetitions were randomly done in 36 split plots in the shape of complete blocks in the research farm of agricultural department in Chahnimeh. The preliminary factor of drought tension involved watering once every 15 days (extreme tension), watering once every 10 days (mild tension), and watering once every 5 days (no tension). The subsidiary factor was spraying jasmonic acid in four different amounts (0, 5, 10 and 15) micromolar. Different features of the bush such as height of it, the number of smaller branches and further small, the stem diameter, the receptacle diameter, the number of receptacle in the bush, chlorophyll a, chlorophyll b, carotenoids, the weight of one thousand seeds, the weight of the flower, the performance of seed, the biological performance, the harvest index, proline, the solved carbohydrates in the seed, and the percentage of oil were measured. The results showed that the drought tension reduced all the parameters except proline and hydrate carbon of the seed. The greatest and poorest seed performance belonged to no tension and extreme tension, respectively. The observed decrease in the performance of the seed was 57.86. Moreover, the decreasing rate of drought tension on the biological performance was 32.83 percent. Drought tension made an increase in the percentage of proline by 6.87 percent and in the percentage of the solved carbohydrates in the seed by 50.6 percent. The effect of spraying jasmonic acid on all the measured features of except the weight of one thousand seeds, chlorophyll indices and carotenoids had a meaningful increase. The greatest and poorest performance of the seed belonged to the amount of 0 and 5 micromolar, respectively. The performance of the seed was increased by 16.99 percent. The interaction of drought tension and the spraying solution of jasmonic acid on the number of smaller branches, characteristics of chlorophyll, carotenoids and the meaningful percentage of oil, and other features were not substantial. According to the results, the spraying solution of jasmonic acid with the levels of 5 and 10 micromolar and no drought tension are the most appropriate conditions for planting and harvesting the seeds of safflower in the region.

Key words: Drought tension, Jasmonic acid, Proline , Performance of seed, Safflower