Assessment of phenological characteristics and drought tolerance of *Isatis cappadocica* due to use in Isfahan landscape

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Abstract

About one-third of world lands have rainfall deficit and Iran with approximately 250 mm rainfall in a year is classified as arid area. Insufficient and non uniform rainfall in growth season in arid and semiarid area like our country cause that plant water requirement doesn't secure.So utilization of correct method of irrigation and agriculture is usefull.*Isatis cappadocica* is herbaceous and two-year plant which its height is 0.8 to 1.2 meters.This plant has straight and green stem which has a lot of branches.It's flowers are androgynous and yellow which have 5-15 centimiteres punicul inflorescence.It is necessary to study this plant as a drought resistance plant. So the goal of this research is discussion about the drought effect on morphological and physiological chractristics of *Isatis cappadocica*.This research was done in two vegetative and flowering PHase of this plant.Treatment and methods were same but were done in two pot and field cultivation in first and second year.This treatments were involved %100,%75 and %50 of field capacity among each others which in pot cultivation ,each pot in each treatment received water amout equivalent of 720, 540 and 320 mililitre.Treatments were studied in Randomized complete block designed and each experimental unit had four pots.Treatments in field cultivation were included %100, %75, %50 field capacity and natural situation which irrigated just with rainfall.Treatments were done with changing in irrigation cycle as one, three and seven days. Results showed that drought stress had not significantly affected plants crown cover area. The least and highest shoots fresh and dry weights were recorded in treatments 100 and 50-75% field capacity respectively. Roots fresh and dry weight and proline content was much more in 50% field capacity than two others treatments. The shoots soluble carbohydrates content and root length were high in treatment 50% field capacity followed by 75 and 100%. Also there was an increasingly trend in antioxidant enzymes activity from the second to forth weeks. In field capacity of 50%, activity of enzymes ascorbat peroxidase, peroxidase and catalase was much more than other treatments and this accounted four highest values for superoxide dismutase in two treatments of 50 and 75% field capacity.Results of field cultivation showed that there is significant difference between %100-%75 field capacity with %50 field capacity and natural situation treatment in plant crown cover area. Drought stress had significantly affected height of plants.The diagnol of flowering stem had not affected by drought stress but the numbers of them changed significantly.Drought stress had affected number and diagnol of flowers such that there was a difference between %100-%75field capacity with %50 field capacity and natural situation treatments.Drought stress doesn't affected the time of formation of flowering stem, time of starting flowering, flowering diuration and time of establishment of fruiting.Proline and soulable carbohydrate increased significantly. As a result this plant has optimum growth in %100 and %75 field capacity.Although its growth limited in %50 field capacity and natural situation but it doesn't disappread.

Key words: *Isatis cappadocica*, drought stress, proline, antioxidant enzymes, soulable carbohydrate.