

## ORIGINAL ARTICLE

# Evaluation of Water Deficit and Cycocel Spraying on Yield Element and Morphological Characterizes of two Cultivar Safflower

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### ABSTRACT

*The present study was aimed investigating the effect water deficit and cycocel sparing on yield element of two cultivar of safflower, The experiment was carried out as a split split plot based on randomized complete block design with three replication. The result show that a most number of boll number related to without stress treatment(24.4) and a lost number related to cut of Irrigation in beginning of flowering stage(16.72). In without stress level a maximum of seed number rate of cut of Irrigation in beginning of flowering stage with means (37.068). padideh cultivar rate of Esfehan Local a most of seed number and cycocel spraying caused of increase in seed number(29.5372). also cycocel sparing caused of a most lateral branches (11.6561). the means compares shows that a maximum seed weight related to without stress level(32.399 Kg). Water stress caused of decrease yield in safflower herb, but cycocel spraying is growth regulator caused of decrease effects negative of water stress in our experiment plant and increase traits amount, also suggested that padideh cultivar in water deficit condition rate of Esfehan local cultivar toleranter, we can be with attention Damghan Climate condition, there Cultivate padideh cultivar. Also cycocel spraying caused decrease pressure of water deficit and increase yield, the resulted increase tolerance safflower in stress condition.*

**Keyword:** water stress, cycocel spraying, cultivar, safflower

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### INTRODUCTION

Among the environmental stresses, drought stress is one of the most adverse factors of plant growth and productivity, More than 70% of Total area of Iran is arid and semi arid [7]. Safflower (*Carthamus tinctorius* L.) is important plants of tolerant and positive with wides application in countries word, safflower oil with over 80% unsaturated fatty acid is highly regarded [4]. Safflower plant in region warm and dry and stress environment contain drouht, salt tolerante.Total word of safflower production with amount 1.3 milion in hectar and crop yield 790,000 ton in important countries production that contain : India, Mexico, USA, China and Canada. Cycocel is branche colin of 3,methyl-amin reaction and 1, aliphatic halid with name 1,2-cl methan a product. The produced method a form crystal, reported that application cycocel caused of increase growth and tolerance water stress [2,3].Cycocel is growth regulator, because, not effect negative in plants, reported treatment with cycocel in number plants [2,5,6].Application cycocel caused of growth plant and performant sub branches and increase number branches and amount crop, also, cycocel spraying caused of increase yield in plant [3].

### MATERIAL AND METHODS

The study effect cycocel spraying on yield element of cultivar two of safflower in water deficit condition, experiment was carried out as a split factorial based on randomized complete block design with three replications. Field studies were conducted during the 2011-2012, Damghan Branch, Iran.

In based plot one size 4\*3 m that contain 6 cultivate row with 50 cm in done. Water treatment, including three levels: Irrigation complete (Without stress), cut of Irrigation in beginning of

flowering and seedling, cultivars used: padideh , Esfehan local. Cycocel spraying in two level: without spraying, cycocel spraying with concentration 150 ppm. Were allocated as main, sub plots and sub-sub plots, respectively.

### Statistical analysis

Data were subjected to analysis of variance (ANOVA), and means were compared using Duncan's range test at P = 0.05. All calculations were performed in Statistical analysis Version SAS, 9.1(2009) software for Windows program.

## RESULT AND DISCUSSION

The mean comparison that shows amount number of boll number related to without stress (24.2) and a lost number related to treatment cut of irrigation in beginning of flowering stage with means (16.72), also, a most boll number in padideh cultivar rate of esfehan local cultivar. A maximum of seed number related to without stress with means (37.068) and a minimum seed number related to cut of irrigation in beginning of flowering stage with means(19.892). padideh cultivar rate of Esfehan local a most of seed number. Also, cycocel spraying caused of increase in seed number with means (29.5372). the between treatment stress, a maximum lateral branches related to without stress level with means(12.805) and a minimum lateral branches in cut of irrigation in beginning of flowering stage with means(9.955), padideh cultivar rate of Esfehan local a most number lateral branches and cycocel spraying caused of a most number lateral branches(11.6561). the means comparison shows that a maximum seed weight related to without stress level with mean(32.399kg).

cut of irrigation in beginning of flowering stage caused of decrease cytokinin hormone and performed Endosperm cells, resulted decrease weight potential [1]. In safflower plant of yield element a important contain of seed weight, because, stress environment cased of decrease seed weight and resulted decrease yield in plant. The most mount plant height related to without stress level with mean(99.25 cm) and aminimum amount relate to without cycocel spraying with mean(86.056 cm). water deficit caused of decrease osmotic potential and resulted decrease growth and cell development specially in shrub and leave [8].

**Table1:** Analysis of variance (Mean Squares) Water deficit, cultivars and spraying cycocel on studies traits

Source of Variation	Df	Means Squares				
		Boll number	Seed number	Lateral branches	Seed weight	Height herb(cm)
Water Stress	2	168.487**	889.77**	24.363**	246.862**	2389.75**
Cultivar	1	11.834**	52.056**	3.466**	0.816 <sup>ns</sup>	121 <sup>ns</sup>
Water stress*cultivar	2	0.989 <sup>ns</sup>	0.972 <sup>ns</sup>	0.186 <sup>ns</sup>	8.153*	35.083 <sup>ns</sup>
Spraying	1	27.808 <sup>ns</sup>	72.278**	3.068**	13.493 <sup>ns</sup>	205.444*
Water stress*Spraying	2	0.977 <sup>ns</sup>	1.683 <sup>ns</sup>	0.142 <sup>ns</sup>	66.886 <sup>ns</sup>	38.861 <sup>ns</sup>
Cultivar *Spraying	1	0.194 <sup>ns</sup>	0.319 <sup>ns</sup>	0.279 <sup>ns</sup>	0.212 <sup>ns</sup>	28.444 <sup>ns</sup>
Water stress*spraying*cultivar	2	0.846 <sup>ns</sup>	0.108 <sup>ns</sup>	0.15 <sup>ns</sup>	26.317 <sup>ns</sup>	54.528 <sup>ns</sup>
Error	22	0.394	2.648	0.348	30.895	34.364

Ns,\*,\*\*:non significant, significant at p<0.05 and p<0.01, respectively .D f: Degree of freedom

**Table 2:** Effect of various treatments Irrigation, cultivar, Spraying on studied trait

Treatment	Cultivars		Spraying		Water stress Levels		
	Padideh	Esfehan Local	Control	Cycocel (150ppm)	Control	Water stress in beginning of flowering	Water stress in beginning of seedling
Boll number	95.20 <sup>a</sup>	8.19 <sup>b</sup>	5.19 <sup>b</sup>	25.21 <sup>a</sup>	20.24 <sup>a</sup>	72.16 <sup>c</sup>	83.20 <sup>b</sup>
Seed number	32.29 <sup>a</sup>	91.26 <sup>b</sup>	70.26 <sup>b</sup>	51.23 <sup>a</sup>	06.37 <sup>a</sup>	89.19 <sup>c</sup>	4.27 <sup>b</sup>
Lateral Branches	67.11 <sup>a</sup>	05.11 <sup>b</sup>	07.11 <sup>b</sup>	65.11 <sup>a</sup>	8.12 <sup>a</sup>	95.9 <sup>c</sup>	33.11 <sup>b</sup>
Height herb	85.5 <sup>a</sup>	81.83 <sup>a</sup>	86.5 <sup>a</sup>	27.81 <sup>b</sup>	25.99 <sup>a</sup>	75.71 <sup>c</sup>	80 <sup>b</sup>
Seed weight	28.59 <sup>a</sup>	28.89 <sup>a</sup>	28.12 <sup>a</sup>	29.35 <sup>a</sup>	39.32 <sup>a</sup>	66.23 <sup>b</sup>	15.30 <sup>a</sup>

Data represent the mean values of three replicates. Within a column, mean values followed by different letters are statistically different based on Duncan's range test at P = 0.05.

**CONCLUSION**

Water stress caused of decrease yield in safflower herb, but cycocel spraying is growth regulator caused of decrease effects negative of water stress in our experiment plant and increase traits amount therefore, cycocel application in agriculture. Damghan regions ingredient arid and semi arid in Iran, that padideh cultivar in water deficit condition rate of Esfehan local cultivar toleranter, we can be with attention Damghan Climate condition, there Cultivate padideh cultivar. Also cycocel spraying caused decrease pressure of water deficit and increase yield, the resulted increase tolerance safflower in stress condition.

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