Plant Archives Vol. 19 No. 1, 2019 pp. 217-220 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF FOLIAR APPLICATION DATES OF ETHEPHON TO YIELD CHARACTERISTICS AND YIELD COMPONENTS UNDER TWO VARIETIES OF COTTON

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Abstract

Afield experiment was carried out at the experimental farm, college of Agriculture University of Baghdad, Abu-Graib region, during the seasons 2007 and 2008 to study the effect of four foliar application dates of ethephon. (1-Non foliar 2- at flowering buds formation 3- at flowering stage 4- at boll formation) and two varieties of cotton Ashoure and Lashatea on yield traits and components. The results showed that the foliar application dates, varieties and interaction between them, have a significant effect on field traits. yield components and yield excluding some traits for both season. Increase in rate lint of cotton yield applying at flowering stage for both seasons , because of increased number of open bolls perplant, 28.50, 30.33 number of total bolls per plant 33.16, 36.66, boll weight, number of seed bolls, seed index, and lint percentage 35.73.36.88%. Significant effect of Lashatea of number of open bolls per plant, number of total bolls, lint percentage, number of seed bolls, boll weight, seed index and lint cotton yield in both season. There is a significant effect of interaction between varieties of Lashatea, flowering stage and all the properties.

Key words: foliar application dates, yield components, cotton, flowering stage

Introduction

Cotton represents the first rank among fiber crop in terms of cultivated area, yield and higher quality fibers. Fiber represented about 35% and seeds 65% of cotton the percentage of oil in seeds about 18-26%. For the purpose of cotton development by using the modern means to raise the yield per Fadden and improve the properties of the fiber quality and overcome many of the problems of cotton including fall flowers and bolls talk resulting from the lack of light due to shading vegetative growth for copious boll formed in the lower and moderation of the plant growth regulator Ethephon on growth regulator was used for its amenability to the ability of change in the pathen of plant growth which reduces plant height and an increase in the thickness of the stem and organization of flowers and affect pollinen germination, reduce fall flowers And then increase in cotton yield (Pettigrew and others,1993). Dick (1980) found that the addition of obstacle's growth lead to decrease in the elongation of stems, but accompanied by often an increase in the thickness of the stems The treated stems are shorter because of the owner ship of shorted internodes shorter and not less in number and the treated nature cells in internodes treatment fewer and shorter in length, AL-jubouri (2002) found that the use of obstacles to growth caused an increase in the number of leaves, Attia and Jadou (1999) found that the impediments obstacles to growth reduces leaf area and aided in other cases or do not appear influential and this depends on several factors including the environment and type of plant the varieties nature of the growth regulator and way of application. As indicated by Ma and Smith (1992) that growth regulators change the pattern of distribution of dry matter within the plant for parts of the plant that has been harvested. As pointed out by Attain and Degestani (2000), AL- joubouri (2002) there are many treatment to ethephon either added foliar on leaves at different stages or put seeds in a thephon while stressing Chris and Richard (2002) that the use of ethephon highly effective if it used

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in right way in terms of, focus and later added A accordingly the study aims to determine the best date foliar of application of ethephon which gives the highest yield and the best varieties.

Materials and methods

Two field experiments were conducted at college of Agricultures university of Baghdad Abu- Graib , during the seasons of 2007 and 2008 to study effect of four foliar application date of. Ethephon (1- NON foliar 2- at flowering buds formation 3- at flowering stage 4- at boll formation) in growth and yield of two varieties of cotton (Ashoure and Lashateas). The experimental design was spilt plot in RCBD with three replicates. The mean plot were varieties and date of application in sub plot. The size of each plot was 12m² (3 × 4) including 4 rows, with 0.75 m in distance between them sowing of seeds was on 4 April 2007 and 7 April 2008. All the agricultural practices were carried out as usual. Phosphors fertilizer (% 45 P_2O_5) at rate of (240 kg\ha) was applied before planting Nitrogen fertilizer (46% N) at a rate of (400 kg. ha) was applied in two doses first at thinning and the second at flowering stage .Potassium fertilizer as K_2SO_4 (K_2O 50%) at rate of 60 kg. ha was applied in two equal doses first at flowering buds formation and the second at flowering stage. Foliar application of Ethephon in concretion 1000 ppm in the early moving by pressing sprayer Sowing of seeds was conducted on 4 Apr: 2007 and 7 April 2008. The other cultural practices went done as usual A random sample of five plants was chosen from each plot at harvest in order to estimate the following characters. Number of open bolls per plant, number of total bolls per plant, boll weight, number of seeds, seed index, lint percentage and the yield of lint cotton. The data collected were subjected to analysis of variance out lined by the mean values were compared by L.S.D. at 5% level of significance.

Results and discussion

Effect of foliar application dates and interaction of yield and yield components

1- Number of open bolls/plant: The result in table (1, 2, 3) indicate that sprayed regulator at the stage of flowering had a significant effect on open boll number rate of 28.50 and 30.33 bolls per plant compared with foliar at other stage for the two season. These results agree with the results obtained by Makki (1999), Ghourab *et al.* (2000), Hassan (2007), also the results showed that there is a significant differences between varieties, varieties of Ashoure gave highest percentage in the number of open bolls by 15, 63 and 16, 80 in both season.

2- Number of total bolls / plant: The results of the tables (1,2,3) showed a significant differences between the dates of spraying and varieties in the number of total bolls plant for two years. The number of total bolls per plant was increased when the regulator sprayed at the stage of flowering and reached 33.16 and 36.66 bolls per plant for two years respectively as compared with the treatment. This result may be due that increase dry matter, number of fruiting branches leaf area Hameed (2014) or The possibility of a few bolls fall Adding in the ability to keep the number of bolls per plant more. The varieties of Lashatee gave the highest average number of total bolls per plant in both season compared with varieties of Ashoure.

3- Boll weight (g) : Result in table (1,2,3) revealed that boll weight was effected by foliar ethephon at the stage of flowering and reached 4.51, 4.52gm for both season respectively as compared with the other stages, The increase in weight due to the impact of growth regulator in an improving the interception of light through the organization of cover vegetative and increase its impact on the pigment chlorophyll in the leaves of which contribute to increasing the efficiency of the process of photosynthesis. (EL-Kholanys, Sawan,1980) This is reflected positively in increase the dry matter of the plant, there by increasing the weight the bolls, also gave the varieties of Lashatea highest boll weight reached 4.09, 4.30 for two season.

4- Number of seed / boll: Data in table (1,2,3) showed that number of seed boll increased at the flowering stage which gives 29.15, 28.26 seed per boll for the two season respectively The increase in the number of seeds in bolls after adding ethephon was probably due to pay for flowering early and prolong the duration of growth

Table 1: Effect of foliar application dates of yield and yield components

Seasons of growth	Dates foliar	No. of total bolls /plant	No. of open bolls \ plant	No. of seeds \ boll	Boll weight (g)
2007	Non foliar	18.66	9.00	20.77	3.77
	Flowering buds	21.83	17.16	22.60	3.74
	Flowering stage	33.16	28.50	28.27	4.51
	Boll formation	32.50	14.33	19.57	3.75
L.S.D		1.20	1.41	1.61	0.15
2008	Non foliar	19.50	10.50	20.75	3.86
	Flowering buds	26.00	17.66	22.72	3.78
	Flowering stage	36.66	30.33	29.15	4.52
	Boll formation	32.66	14.83	19.80	4.07
L.S.D		0.39	0.70	1.11	0.12

Table 2: Effect of foliar application dates of yield and yield components

Seasons of growth	Dates foliar	Lint cotton yield	(%) Lint percentage
2007	Non foliar	318.38	22.30
	Flowering buds	596.51	30.80
	Flowering stage	727.11	35.73
	Boll formation	751.79	29.40
L.S.D		45.42	1.65
2008	Non foliar	358.66	23.43
	Flowering buds	620.02	31.70
	Flowering stage	749.20	36.88
	Boll formation	472.75	30.08
L.S.D		42.95	0.94

Table 3: Effect of varieties of yield and yield components

Seasons of growth	varieties	No. of total bolls \ plant	No. of open bolls \ plant	No. of seeds \ boll	Boll weight (g)	Seed index	Lint cotton yield	Lint percen-tage (%)
2007	V_1	24.75	16.00	22.28	3.72	12.23	519.34	28.78
	V_2	28.33	18.50	23.32	4.17	12.58	580.97	30.33
L.S.D		0.85	1.002	1.14	0.11	N.S	30.37	1.16
2008	V_1	28.00	16.91	22.94	3.82	11.83	496.06	29.91
	V_2	29.41	19.75	23.27	4.30	12.41	550.84	31.13
L.S.D.		0.27	0.50	0.78	0.08	0.61	32.12	0.67

reproduction as well as the distribution of materials food as retard growth constraints aging securities and increase efficiency of photosynthesis and the changing pattern of distribution of materials food in side the plant and reduce abortion and thus lead to increased number of seeds, also gave the product to Lashatea highest number of seeds per bolls for the season 2007 while the varieties of Ashoure give the number of seed 22.85, 23.46 for the season 2008 compared for the varieties of Lashatea.

5- Seed index : Results in table (1,2,3,4) indicated that the data of foliar ethephon as given in the flowering stage had the highest rate in the seed plants which reached 15.26 and 14.97 as compared with the other treatment for both seasons respectively. The regulator is improving the volume by increasing the source out puts representation (EL-Kholanys, Sawan, 1980). An increase efficiency in the distribution and move food A amoad to seed and increase the seed weight (Schott, 1988) As for varieties of Lashatee it could be noticed that seed index was significantly gave rates 21.41 compared of varieties Ashoure for the season 2008, there was no significant different for the season 2007.

6- Lint percentage : Lint percentage was affected by foliar application at the flowering stage which

Table 4: Effect of interaction between foliar application dates of yield and yield components

Seasons of growth	Dates foliar	varieties	No. of total bolls \ plant	No. of open bolls \ plant	No. of seeds \ boll	Boll weight (g)	Seed index	Lint cotton yield	Lint percentage (%)
2007	Non foliar	Vl	18.00	8.33	20.00	3.28	9.58	1359.12	19.66
		V2	19.33	9.66	21.53	4.26	9.85	1477.3	24.93
	Flowering buds	Vl	20.66	15.66	23.60	3.48	12.80	1918.56	31.53
		V2	23.00	18.66	21.60	4.00	13.60	1956.31	30.06
	Flowering stage	Vl	29.00	26.66	27.33	4.40	14.92	2002.97	33.73
		V2	37.33	30.33	29.90	4.62	15.60	2027.16	37.73
	Boll formation	Vl	31.33	13.33	18.20	3.71	11.63	1397.26	30.20
		V2	33.66	15.33	20.93	3.78	11.27	1681.32	28.60
L.S.D			1.58	1.90	2.03	0.21	1.13	99.99	2.67
2008	Non foliar	Vl	20.00	10.00	20.23	3.29	9.54	1400.00	20.76
		V2	19.00	11.00	21.26	3.43	9.84	1300.00	26.10
	Flowering buds	Vl	25.00	16.33	23.83	3.55	12.44	1936.66	32.86
		V2	27.00	19.00	21.60	4.00	13.50	1976.66	30.53
	Flowering stage	Vl	35.33	27.33	28.10	4.39	14.39	2026.66	35.36
		V2	38.00	33.33	30.20	4.65	15.55	2070.00	38.40
	Boll formation	Vl	31.66	14.00	19.60	4.03	10.95	1423.33	30.66
		V2	33.66	15.66	20.00	4.10	10.76	1736.66	29.50
L.S.D			0.61	1.11	1.47	0.44	1.44	63.79	1.28

it gave the highest rate 35.73, 36.88% for the two season respectively compared with the other treatments. It is clear from the data obtained that since application or athephon at the flowering stage had a significant effect on boll weight and seed index , So it will be effect on lint percentage table (1, 2). the varieties of Lashatea also gave highest lint percentage reached 30.33, 31.13 as compared the varieties of As hour for the two season respectively.

7- Lint cotton yield : Results in table (1, 2) indicated that foliar application the Ethephon at flowering stage caused increasing in lint cotton yield which recorded 727.11, 749.20 $kg.ha^{-1}$ compared with the other treatments for both season respectively. This result expected which related number of open bolls. Number of total bolls and boll weight. As for varieties it could be noticed that. Lashate gave that highest percentage lint cotton yield 11.04, 11.87% compared with other varieties of Ashoure for both season. The results in table 3 showed the interaction between foliar application at flowering stage and varieties of Lashate had a significant effect on number of open bolls per plant, number of total bolls per plant, bolls weight , number of seed bolls, seed index, lint percentage , lint cotton yield compared with the non foliar treatment and varieties of Ashoure for both season lint cotton yield and ginning turn out surpassed.

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