J. Agric. Sci. Mansoura Univ., 27(1): 105 - 115, 2002.

EFFECT OF FIRST IRRIGATION AND THINNING DATE ON COTTON PRODUCTIVITY

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ABSTRACT

Field experiments were conducted at Sakha Agricultural Research Station in 1999 and 2000 seasons. The experimental design was randomized complete blocks design with four replicates. The first experiment was designed to study the effect of first irrigation at five times; 3 , 4 , 5 , 6 and 7 weeks after sowing date WAS using cotton cultivar Giza 70 (extra long staple). The preceding crop was rice (Oryza sativa, L.) in the two seasons. The results of this experiment indicated that delaying the first irrigation significantly decreased plant height, number of internodes of the main stem, leaf area and number of sympodia per plant, while number of monopodia per plant and internode length were insignificantly decreased . Delaying the first irrigation also, significantly delayed the maturity, whereas, delayed the formation of first sympodium and delayed the appearance of the first flower and cracking the first boll as well as reduced the earliness percentage, number of open bolls per plant, boll weight, lint percentage, seed index, seed cotton yield per plant and feddan. The first irrigation at 4 (WAS) gave the best result and highest heavy bolls in the two seasons. The maximum reduction in seed cotton yield per feddan was 20 % when the first irrigation was applied after 7 weeks from the sowing date while, the minimum was 5.4 % when the first irrigation was done after 3 weeks as compared with the first irrigation applied after 4 weeks in both seasons. The second experiment was designed to study the effect of thinning date at four physiological ages; when cotton plant formed the two cotyledon leaves, the second true leaf, the fourth true leaf and the sixth true leaf. The results revealed that thinning date significantly affected the growth traits, earliness parameters, yield and its components in the two seasons. The thinning when cotton plants formed the second true leaf gave the best result in the two seasons. Delaying thinning date significantly increased plant height, the internode length, position of first sympodium, days from sowing date to appearance of the first flower and cracking the first boll while, the reverse was true for number of internodes on the main stem, number of monopodia and sympodia / plant, earliness percentage, number of open bolls / plant, boll weight, lint % and seed cotton yield per plant and feddan in the two season. The maximum reduction in seed cotton yield was 21 % when the cotton plants were thinned after formation the sixth true leaf (about 40 days after sowing), while the minimum reduction was 6.6 % when the cotton plants were thinned after formation of the two cotyledons (about 20 days after sowing). Generally, Delaying the first irrigation upto 7 weeks and delaying the thinning date until cotton plants formed the sixth true leaf caused a reduction in seed cotton yield about 41 % from the total yield as compared with thinned cotton plants after formation of the second true leaf and giving the first irrigation after 4 weeks in case of the preceding crop was rice.

INTRODUCTION

Recently, in Egypt, sowing date of cotton was expanded about two months from mid March to mid May. So, the first irrigation and thinning date were critical practices during early stage of plant development specially many farmers do these important practices delayed more than its normal times causing a great injury to cotton plants. In addition to the growth factors specially temperature during this period were differ from moderate to hot. The

first irrigation depends on sowing date, preceding crop and soil structure, while thinning cotton plants depends on physiological age of cotton plants. In this respect, Amemiya *et al.* (1963) stated that although cotton plants may extract water from depths blow their primary root zone, the rate of water extraction from these depths may not be sufficient to maintain optimum plant growth during periods of peak demand. Marani and Levi (1973) stated that the adequate irrigation during the early part of the season ensures a satisfactory rate of vegetative growth which is necessary for the production of high lint yield. Guinn *et al.* (1981) found that delaying the first irrigation delayed growth, square production and leaf area development and slightly reduced the number of bolls set. Seed cotton yields were 4.28, 4.88, 2.90 and 2.89 t / ha for cotton plants received the first post sowing irrigation when first square become visible (E) or 14 days later(L)and was irrigated at normal (N) or 0.6 normal(D)for the rest season. El-Khawaga (1983) stated that delaying the first irrigation depressed the yield. Ali *et al.* (1986) found that applying the first irrigation after 3 weeks from sowing increased both number and weight of boll and seed cotton yield. El-Gahel *et al.* (1989) stated that final plant height, position of first fruiting branch, days to first appearance flower, number of unopened bolls per plant, average boll weight were insignificantly affected by date of the first irrigation (14 , 21 and 28 days). However, both number of fruiting branches and harvested bolls per plant as well as seed cotton yield per feddan gave higher values with delaying the first irrigation up to 28 days. Husman *et al.* (1993) found that there were no significant lint yield differences between irrigation treatments, when the first irrigation occurred at 36, 53 and 63 day after sowing for wet, medium and dry treatments. Palamo and Godoy (1981) reported that with thinning at 20 , 30 , 40 or 50 days after sowing and irrigation starting at 45 , 55 , or 65 days after sowing, there were a highly significant difference in plant height with the date at which irrigation began. Also there were significant differences in boll yield between thinning dates, the yield with thinning 20 – 40 days after sowing significantly was higher than that with thinning 50 days after sowing Abd El-Malik and Abd El-Aal (1998) found that positing date of thinning increased position of first sympodium and days to both first opened flower and boll / plant, while decreased number of both sympodia and monopodia per plant, earliness percentage number of open bolls / plant, boll weight, seed cotton yield (Kent / fed). Final plant height was not affected by this factor. So this investigation was conducted to study the effect of first irrigation and thinning date on growth, earliness, yield and yield components of cotton plant caltivar Giza 70.

MATERIALS AND METHODS

Field experiments were conducted at Sakha Agricultural Research Station in 1999 and 2000 seasons to study the effect of first irrigation and thinning date using cotton cultivar Giza 70. The experimental design in each experiment was randomized complete blocks design with four replicates. The first experiment was designed to study the effect of first irrigation at five times; 3, 4, 5, 6 and 7 weeks after sowing (WAS) on some growth and

earliness traits, seed cotton yield per plant and feddan and yield components. The second experiment was designed to study the effect of four thinning dates according to the physiological ages as follows :-
(A) when cotton plants formed the two cotyledon leaves.
(B) when plants formed the second true leaf.
(C) when plants formed the fourth true leaf.
(D) when plants formed the sixth true leaf.

The preceding crop was rice (*Oryza sativa L*.) in the two seasons. Sowing was done in hills 25 cm apart on 28th and 30th March in 1999 and 2000 seasons respectively. The size of experimental plot was 18 m² (6m length and 3m width). All other practices were done as usual in cotton production. Soil samples from four depths (0-15, 15-30, 30-45 and 45-60 cm.) were taken by auger before and after each irrigation to estimate the soil moisture (Table 1). Ten guarded plants were chosen at random from each plot to study the following characters from each experiment :- Plant height (cm), internode length, number of internodes on the main stem, number of monopodia and sympodia per plant, position of first sympodium, days to the first flower appearance, days to first cracking boll, earliness percentage, number of open and unopen bolls per plant, boll weight, lint percentage, seed index and seed cotton yield per plant. Actual number of plants at harvest and seed cotton yield in kentar per feddan were taken from the whole plot. Data were collected and analyzed according to Le Clerg *et al.* (1966)and means were compared by using Duncan's Multiple Range and Multiple F-test (Duncan, 1955).

Table (1) : The soil moisture percent from the different depths at the first irrigation dates .

Depths	Field Capacity	Three weeks	Four weeks	Five weeks	Six weeks	Seven weeks
0 - 15	44.60	33.70	25.81	17.63	13.33	7.94
15-30	38.80	38.48	36.14	33.03	23.47	11.11
30-45	36.70	38.99	38.36	35.51	25.56	14.23
45-60	33.90	43.53	40.02	35.60	27.71	18.63

RESULTS AND DISCUSSION

Experiment 1 : Effect of date of first irrigation on :Growth traits:

Data presented in Table (2) indicated that the time of first irrigation had a significant effect on most growth traits in both seasons. When the first irrigation was applied 4 weeks after sowing, it gave the best results such as tallest plants, greatest length and number of internodes on the main stem , number of sympodia per plant. These results may be due to the effect of sufficient moisture in the roots zone which it was suitable to provide the seedlings with its water requirements in case of the first irrigation applied 4 weeks after sowing especially when the preceding crop was rice. The soil was dried gradually and the moisture were insufficient to provide cotton seedling with its water requirements when the first irrigation was applied at 5,

6 and 7 weeks after sowing (Table 1) which led to reduction in leaf area and its metabolism process as a result of reducing the uptake of water and minerals. Also the primary roots were pushed to grow deeply towards the increase moisture (with formed a few weakly lateral roots) while the leaf area and shoots were grown weakly when the water supply was done the plants formed more effective roots but under the suitable rich soil (zone less feeding and airing), this conditions were not suitable to grow cotton plants healthy and delaed the formation of first sympodium and blooms. Finally, it delaed the maturity and decreased the plant height causing decreased length and number of internodes as well as sympodia per plant. On the other side, the irrigation 3 weeks from sowing when the preceding crop was rice caused increased moisture in the root zone more than normal which led to injury and weakly growth as a result of reduction in the uptake of water and its contents from minerals feeding (due to unbalance between moisture and airing in the root zone) .

These findings were in agreements with those obtained by Amemiya *et al.* (1963) and Guinn *et al.* (1981) .

Table(2) : Effect of first irrigation on some growth traits in1999 and 2000 Seasons .

Treatments / Characters	Seasons	Three weeks	Four weeks	Five weeks	Six weeks	Seven weeks	Sig.
Plant height	**1999**	b 130.7	a 133.7	c 124.6	d 120.3	e 116.2	*
	2000	a 129.0	a 131.0	b 125.3	c 119.0	d 114.6	**
Internode length	**1999**	5.97	6.08	5.89	5.76	5.63	NS
	2000	6.81	6.84	6.68	6.55	6.41	NS
No of internodes per plant	**1999**	a 21.90	a 21.99	b 21.16	c 20.90	c 20.64	**
	2000	ab 18.95	a 19.14	b 18.76	c 18.16	d 17.89	*
No of monopodia per plant	**1999**	0.40	0.47	0.30	0.23	0.17	NS
	2000	0.35	0.37	0.35	0.26	0.21	NS
No of sympodia per plant	**1999**	a 15.73	a 15.83	b 14.47	c 13.63	d 12.57	**
	2000	a 13.77	a 13.90	b 12.93	c 11.63	d 10.87	**
Leaf area (Dc^2)	**1999**	a 5.62	a 5.79	b 5.20	c 4.30	d 3.80	**
	2000	b 5.60	a 6.11	c 5.31	d 5.12	e 4.11	**

Means followed by the same letter are not significantly different at 0.05 level according toDuncan's test . * , ** and NS indicated p < 0.05 , 0.01 and not significant . respectively .

Earliness parameters:

Data illustrated in Table (3) showed that delaying the first irrigation more than 4 weeks after sowing caused delaying the formation of the first sympodium and delaying the appearance of the first flower and cracking the first boll, which reflected on reducing the earliness percentage in the two seasons. These results may be due to insufficient moisture in the effective roots zone which reduced the uptake of water and delayed the maturity as a result of delaying the formation of the first sympodium, appearance of the first flower, cracking the first boll. This finding was in harmony with that concluded by Guinn *et al.* (1981).

Table (3) : Effect of first irrigation on some earliness measurements in 1999 and 2000 seasons .

Treatments / Characters	Seasons	Three weeks	Four weeks	Five weeks	Six weeks	Seven weeks	Sig .
Position of first sympodium		d	d	c	b	a	
	1999	7.17	7.16	7.69	8.27	9.07	**
		d	d	c	b	a	
	2000	6.18	6.24	6.83	7.53	8.02	**
Days to first flower appearance		d	e	c	b	a	
	1999	91.7	90.0	93.3	95.3	96.7	**
		c	d	bc	ab	a	
	2000	90.0	88.3	93.3	95.6	96.8	**
Days to first cracking boll		c	c	b	b	a	
	1999	141.2	140.4	143.0	144.1	145.7	**
		c	c	b	a	a	
	2000	140.0	139.1	141.8	143.7	144.9	**
Earliness percentage		a	a	b	b	c	
	1999	55.2	55.7	50.4	49.1	46.3	**
		b	a	c	d	e	
	2000	54.4	57.0	52.3	50.4	47.7	**

Means followed by the same letter are not significantly different at 0.05 level according to Duncan's test . *, and NS indicated P<0.05 , 0.01 and not significant , respectively .**

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Yield and its components :

Results in Table (4) showed that number of open bolls /plant, boll weight, lint percentage, seed index and cotton yield per plant and feddan were significantly decreased by delaying the first irrigation from 4 weeks to 7 weeks after sowing in the two seasons. The average decreases of seed cotton yield in kentar per feddan were about 8.6, 13.9 and 20.2 % for the first irrigation at 5 , 6 and 7 weeks after sowing, respectively, as compared with the first irrigation at 4 weeks after sowing. These results may be due to insufficient moisture in the root zone. This conditions pushed roots to grow deeply until finding the suitable moisture resulted in a slower growth rate, smaller plants and delaying the formation of the first sympodium causing decreased number of sympodia per plant, number of open bolls per plant, boll weight(gm) and sequently decreased the seed cotton yield per plant and

feddan. While the reduction in seed cotton yield in case of the first irrigation after 3 weeks (about 5.4 %) due to the injury effect of increasing moisture in the root zone on some cotton seedling especially when the preceding crop was rice as the soil has a great content water. Similar results were obtained by Marani and Levi (1973)and Ali *et al.* (1986).

Table (4) : Effect of first irrigation on yield and its components in 1999 and 2000 seasons .

Treatments / Characters	Seasons	Three weeks	Four weeks	Five weeks	Six weeks	Seven weeks	Sig .
Number of open bolls per plant .	**1999**	ab 13.83	a 14.33	bc 12.97	c 12.37	c 11.80	**
	2000	a 3.13	a 13.67	b 11.67	b 10.67	c 10.00	**
Number of unopen bolls per plant	**1999**	d 0.30	d 0.20	c 0.47	b 0.70	a 0.97	**
	2000	b 0.39	c 0.34	b 0.42	a 0.45	a 0.48	**
Boll weight (g)	**1999**	1.83	1.89	1.84	1.81	1.78	NS
	2000	b 2.04	a 2.18	c 1.93	d 1.85	d 1.80	**
Lint percentage	**1999**	ab 32.33	a 33.20	ab 32.60	b 31.67	b 31.73	*
	2000	b 37.30	a 37.80	c 37.03	d 36.73	e 36.40	**
Seed index (g)	**1999**	8.04	8.57	8.46	8.37	7.98	NS
	2000	ab 9.57	a 9.73	ab 9.53	b 9.40	c 9.17	**
Seed cotton yield per plant (g)	**1999**	ab 25.30	a 27.07	bc 23.70	c 22.37	c 20.97	**
	2000	b 26.79	a 29.80	c 22.53	d 19.74	d 18.00	**
Seed cotton yield per feddan (Kent.)	**1999**	b 8.73	a 9.50	b 8.57	c 7.97	d 7.50	**
	2000	a 8.93	a 9.17	ab 8.50	bc 8.10	c 7.41	**
Yield as percent of 2nd treatment.	**1999**	91.89	100	90.21	83.89	78.95	--
	2000	97.38	100	92.69	88.33	80.70	--

Means followed by the same letter are not significantly different at 0.05 level according to Duncan's test . * , ** and NS indicated p < 0.05 , 0.01 and not significant respectively.

Experiment I I : Effect of thinning date on : Growth traits .

Results for some growth traits were presented in Table (5), the differences in plant height between thinning date treatments were significant in the two seasons. Plant height was increased gradually as thinning date was delayed until the formation of the sixth true leaf on plant. These results may be due to the great competition among seedlings in each hill for sunlight,

moisture, feeding and other growth factors .As the period of competition among seedling was longer the internode length was more weakly and longer than in case of early thinning when the second true leaf was formed on the seedling. The number of internodes on the main stem and number of monopodia and sympodia per plant were decreased as thinning date was delayed from the second true leaf stage to the sixth true leaf stage in the two seasons. Similar finding was obtained by Abd E l-Malik and Abd El-Aal (1998).

Table (5) : Effect of thinning date on some growth traits in 1999 and 2000 seasons .

Treatments / Characters	Seasons	A	B	C	D	Sig .
Plant height (cm.)	**1999**	c 124.7	c 127.0	b 132.0	a 139.7	**
	2000	c 125.3	b 131.0	ab 133.3	a 135.0	**
Number of internodes per plant	**1999**	22.15 a	22.10 a	20.40 b	19.77 b	NS
	2000	26.80	27.00	26.13	25.97	**
Internode length (cm.)	**1999**	c 5.63	c 5.76	b 6.47	a 7.07	**
	2000	c 4.78	c 4.85	b 5.11	a 5.20	**
Number of monopodia per plant	**1999**	0.39 a	0.39 a	0.27 b	0.23 c	NS
	2000	0.28	0.27	0.21	0.19	**
Number of sympodia Per plant	**1999**	a 15.83	a 16.10	b 13.97	c 13.20	*
	2000	a 21.57	a 21.63	b 19.80	c 19.23	**

Means followed by the same letter are not significantly different at 0.05 level according to Duncan's test * , ** and NS indicated p< 0.05 , 0.01and not significant respectively.

Earliness parameters :

Data presented in Table(6) show that the position of the first sympodium, days from sowing date to appearance of the first flower, and days to cracking boll were increased as thinning date was delayed, while the earliness percentage was decreased by delaying the thinning date. These results may be due to the effect of long period of competition among seedlings in each hill before thinning. The competition led to reeducation in the metabolism process as a result of reducing the growth factors such as sunlight, moisture and nutrients in the root zone. According to these factors, the position of first sympodium was raised gradually as thinning date was

delayed and sequently delayed the appearance of first flower as well as cracking first boll , while the earliness percentage was decreased by delaying the thinning date. These results were in agreement with those obtained by Abd El-Malik and Abd El-Aal (1998) .

Table (6) : Effect of thinning date on some earliness measurements in 1999 and 2000 seasons .

Treatments Characters	Seasons	A	B	C	D	Sig .
Position of first Sympodium	**1999**	b 7.07	b 7.00	a 7.43	a 7.57	**
	2000	b 6.97	b 6.97	ab 7.33	a 7.73	**
Days to first flower Appearance	**1999**	c 94.0	b 94.3	b 96.7	a 98.3	**
	2000	b 90.0	b 90.7	a 93.0	a 94.7	**
Days to first cracking Boll	**1999**	b 142.7	b 142.3	a 145.7	a 146.7	**
	2000	b 139.6	b 140.0	a 142.0	a 143.7	**
Earliness percentage	**1999**	a 59.0	a 59.3	b 56.3	c 53.7	**
	2000	a 66.0	a 66.7	b 58.3	c 55.0	**

Means followed by the same letter are not significantly different at 0.05 level according toDuncan's test . * , and NS indicated p < 0.05 , 0.01 and not significant respectively.**

Yield and its components :

Data presented in Table (7) cleared that the early thinning at formation of the second true leaf significantly increased number of open bolls per plant, boll weight, lint percentage, seed index, and seed cotton yield per plant and feddan, but the differences between the first and the second dates was not significant as most yield components was concerned. On the other side, the second thinning date yielded more than the first one because the losses in plant population at harvest was bigger in case of the first .

Date than that of the second one or other thinning dates. The maximum reduction in seed cotton yield was 21 % when cotton plants were thinned after formation of the sixth true leaf, while the minimum was 6.6 % when cotton plants thinned after formation of the two cotyledons as compared with plants thinned after formation of the second true leaf. These results may be due to the late formation of the first sympodium and reduced number of sympodia per plant as well as reduced number of heavy bolls per plant as a result of late thinning time more than normal. Similar results were

obtained by Palamo and Godoy(1981) and Abd El –Malik and Abd El- Aal (1998).

Table (7) : Effect of thinning date on yield and yield components in 1999 and 2000 seasons .

Treatments / Characters	Seasons	A	B	C	D	Sig .
Number of open bolls per plant	1999	A 12.30	a 12.20	b 10.53	C 9.20	**
	2000	a 18.77	a 13.80	b 12.57	b 12.07	**
Number of unopen bolls per plant	1999	b 0.36	b 0.32	a 0.40	a 0.44	*
	2000	b 0.43	b 0.37	a 0.70	a 0.87	**
Boll weight (g)	1999	a 1.90	a 1.91	b 1.73	b 1.70	**
	2000	a 2.15	a 2.14	b 2.00	b 1.96	**
Lint percentage	1999	a 32.50	a 32.90	b 31.33	b 31.03	**
	2000	b 36.30	a 37.20	c 35.67	d 35.28	**
Seed index (g)	1999	9.00	9.14	8.87	8.94	NS
	2000	b 9.60	a 9.96	bc 9.40	c 9.13	**
Seed cotton yield per plant (g)	1999	a 23.37	a 23.30	b 18.22	c 15.64	*
	2000	a 29.61	a 29.53	b 25.14	c 23.60	**
Seed cotton yield per feddan (Kent.)	1999	b 7.13	a 7.70	c 6.80	d 5.90	*
	2000	b 8.20	a 8.70	c 7.66	d 7.07	*
Stand of plants at harvest .	1999	b 44.23	a 50.73	a 50.80	a 50.92	**
	2000	b 45.43	a 51.67	a 51.63	a 51.81	**
Yield as percent of Treatment (B)	1999	92.60	100	88.31	76.62	--
	2000	94.25	100	88.05	81.26	--

Means followed by the same letter are not significantly different at 0.05 level according to Duncan's test . * , and NS indicated p < 0.05 , 0.01 and not significant . respectively .**

CONCLUSION

Generally , from the two previous experiments the results indicated that delaying of first irrigation to 7 weeks after sowing and delaying thinning date until the formation of the sixth true leaf caused reduction in seed cotton yield about 41 % from the total yield of the best treatment (the first irrigation was applied after 4 weeks and plants were thinned after formation of the second true leaf).

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تأثير رية المحاياة وميعاد الخف على إنتاجية القطن

سـيف ا لا سـلا م عبـد الحـي علـى
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أقيمت تجر بتان حقليتان فى محطة البحوث الزراعية بسخا خلال موسمى ١٩٩٩ و٢٠٠٠ وكان التصميم الإحصائي المستخدم في كل تجربة هو القطاعات كاملة العشوائية في أربعة مكررات ٠

التجربة الأولى.

صممت لدراسة تأثير خمسة مواعيد لاعطاء رية المحاياة وهى بعد ٣-٤-٥-٦-٧ أسابيع من الزراعة باستخدام صنف القطن جيزة ٧٠ (فائق الطول) وكان المحصول السابق هو الأرز في الموسمين وكانت أهم النتائج المتحصل عليها هي:-

تشير النتائج إلى ان إعطاء رية المحاياة بعد ٤ أسابيع من الزراعة أعطى افضل النتائج من حيث طول النبات وعدد السلاميات وعدد الأفرع الثمرية على النبات بينما كانت الزيادة غير معنوية في عدد الأفرع الخضرية وطول السلامية .

٢- أدى تأخير رية المحاياة إلى تأخير النضج بصفة عامة والى ارتفاع عقدة أول فرع ثمرى وتاخيرظهور أول زهرة وتفتح أول لوزة على النبات ونقص نسبة التبكير معنويا٠

٣- أدى إعطاء ريه المحاباة بعد أربعة أسابيع إلى زيادة معنوية في عدد اللوز المتفتح على النبات ووزن اللوزة وتصافى الحليج ومعامل البذرة ومحصول النبات الفردي ومحصول القطن الزهر (قنطار / فدان) وكان النقص في المحصول يتراوح بين ٥٪ في حالة إعطاء رية المحاباة يعد ثلاثة أسابيع و٢٠ ٪في حالة إعطاء رية المحاباة بعد سبعة أسابيع وبالتالي يجب تجنب ما يعرف بتصويم القطن عند بعض الزراع٠

التجربة الثانية٠

صممت لدراسة تأثير أربعة مواعيد لإجراء عملية الخف على أساس العمر الفسيولوجى لنبات القطن وهى الخف عند تكوين الأوراق الفلقية- عند تكوين الورقة الحقيقية الثانية – الخف عند تكوين الورقة الحقيقية الرابعة – الخف عند تكوين الورقة الحقيقية السادسة وكانت أهم النتائج المتحصل عليها هي :

١- أدى تأخير إجراء عملية الخف إلى زيادة تدريجية ومعنوية فى طول النبات وطول السلامية ونقص معنوي فى عدد السلاميات وعدد الأفرع الثمرية و الخضرية على النبات ٠

٢- أدى الخف عند تكوين الورقة الحقيقية الثانية إلى انخفاض عقدة أول فرع ثمرى وتبكير ظهور أول زهرة وتفتح أول لوزة وزيادة نسبة التبكير معنويا.

٣- أدى الخف عند تكوين الورقة الحقيقية الثانية إلى زيادة معنوية في عدد اللوز المتفتح على النبات ووزن اللوزة وتصافى الحليج ومعامل البدرة ومحصول النبات الفردي ومحصول القطن الزهر (قنطار / فدان) ويرجع النقص في محصول القطن الزهر في حالة الخف على الأوراق الفلقية رغم تفوق محصول النبات الفردي فيها على باقي المواعيد إلى زيادة نسبة فقد النباتات في هده المعاملة مما اثر على كمية المحصول ٠كما أدى تأخير الخف حتى تكوين الورقة الحقيقية السادسة إلى نقص في محصول القطن الزهر بنسبة ٢١ ٪ بالمقارنة بالخف عند تكوين الورقة الحقيقية الثانية ٠

** بصفة عامة يمكن القول أن تأخير رية المحاياة إلى ما يعرف بالتصويم حوالي ٥٠ يوم من الزراعة أدى إلى نقص جوهري في المحصول الزهر بمقدار ٢٠ ٪ وكذلك أدى تأخير الخف حتى تكوين الورقة الحقيقية السادسة إلى نقص جوهري مماثل حوالي ٢١ ٪ أي أن تأخير كل من رية المحاياة والخف أدى إلى نقص حوالي٤١٪ من محصول القطن الزهر بالمقارنة بالمعاملات الموصى بها وهى إعطاء رية المحاياة بعد أربعة أسابيع من الزراعة (المحصول السابق ارز) والخف عند تكوين الورقة الحقيقية الثانية ٠