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EFFECT OF FIRST AND LAST IRRIGATION CONSIDERING IRRIGATION INTERVALS ON YIELD, YIELD COMPONENTS AND SOME CHEMICAL CONSTITUENTS OF GIZA 89 X 86 HYBRID COTTON

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ABSTRACT

Four experiments were carried out at Sakha Agric. Res. Station, Agricultural Research Center. These experiments were divided into two series, each contained two experiments. One experiment of each series was conducted in 2004 and the second one in 2005 growing season. The experiments of the first series were performed to investigate the effect of the first irrigation (after 14, 21 and 28 days after sowing) and irrigation intervals (15 and 21 days after the first irrigation) on yield and its components of hybrid cotton Giza 89 x 86. The experiments of the second series were conduced to study the optimum flowering stage for applying the last irrigation (termination irrigation at the end of 7th, 9th and 11th week of starting of flowering) on yield and its components of hybrid cotton Giza 89 x 86.

The results could be summarized as follows:

1. When the first irrigation was applied 28 days after sowing it gave the highest number of final plant height and number of nodes per plant, however, highest number of sympodia, number of open bolls per plant, boll weight and seed cotton yield per plant and feddan were obtained when the first irrigation was applied 21 days after sowing, while earliness percentage was reduced by delaying the first irrigation.
2. The irrigation every two weeks gave the tallest plants and more number of node on the main stem, number of sympodia per plant, number of open bolls per plant, boll weight, seed cotton yield per plant and feddan and earliness percentage than the irrigation every three weeks.
3. Seed index, lint percentage, all fibre properties and chemical constituents in leaves except carbohydrate content were not significantly affected by the date of the first irrigation but all these traits were significantly increased by close irrigation intervals. On the other hand, most of chemical constituents under study were significantly increased as irrigation intervals increased in 2005 season but oil and protein % in seed were reduced.
4. There was a tendency of increase for growth characters, yield, yield components, seed index, lint percentage, fibre properties and chlorophyll contents while the reverse trend was detected with respect to carbohydrates, oil and protein %.
5. The interaction between the days of the first irrigation and irrigation intervals did not affect all characters studied herein.

INTRODUCTION

Irrigation is one of the main factors that affects crop production. The importance of irrigation due to its role in the availability of soil moisture which is considered as a solvent for nutrients, and also necessary for the building of

plant tissues and compensation for water loss by evaporation and transpiration. El-Gahel *et al.* (1989) found that final plant height, number of open bolls and average boll weight were insignificantly affected by date of the first irrigation intervals, but both number of fruiting branches and harvested bolls per plant as well as seed cotton yield/fed gave higher values with delaying the first irrigation up to 28 days. Delaying the first irrigation depressed the yield (El-Khawaga, 1983). In contrast, Ali *et al.* (1986) found that applying the 1st irrigation after 21 days from sowing increased both number and weight of bolls and seed cotton yield. Gomaa *et al.* (1981) found that decreasing irrigation intervals significantly increased both boll number and weight, number of sympodia and seed cotton yield, but decreased earliness. El-Shahawy and Abd El-Malik (1999) improved that irrigation cotton every two weeks throughout the season resulted in higher number of main stem internodes, sympodia, number of open bolls, boll weight and seed cotton yield (kentar/fed).

Regarding to the date of last irrigation, it has a great effect on the yield of seed cotton. Ray and Hazlitt (1960) reported that late irrigations resulted in excessive moisture which late bolls might not mature or infested. Hagan and Vaddia (1960), cleared that moisture deficits at late season are not harmful and may have a beneficial effect by holding vegetative growth to a minimum without measurable decreases in yield. Abd El-Aal *et al.* (1995) irrigated Giza 75 cotton plants up to 2, 3 and 4 weeks from sowing, reported that last irrigation had little effects on growth characters, while yield components and yield were increased in favour of 11th week of beginning of flowering irrigation for early sowing. Ali *et al.* (1997) using the two extra long staple varieties (Giza 45 and Giza 70) found that final plant height (cm), number of nodes per plant and number of sympodia per plant, boll weight (g), number of open bolls per plant and seed cotton yield in kentars per feddan for both cultivars tended to increase as continuing irrigation till 11th an 12th weeks of beginning of flowering for early and late sowing, respectively. Therefore, this investigation was carried out to study the effect of date of the first and last irrigation and irrigation intervals for determine the optimum flowering stage in order to apply the last irrigation using the hybrid cotton Giza 89 x 86.

MATERIAL AND METHODS

Four experiments were carried out at Sakha Agricultural Research Station during 2004 and 2005 seasons using the hybrid cotton Giza 89 x 86 which characterized by high yield and its components. These experiments were divided into two series, each contained two experiments. Split plot design was used for the experiments of the first series, but the experimental design of the second series was complete randomized blocks. The preceding crop was rice in the two seasons. The size of each plot was (5 x 4.2) m^2 i.e. 21 m^2 including seven rows which were 60 cm apart, whereas the two outer rows were used as a belt. Deep canals of 2.0 m width were digged intra plots to avoid water movement from plot to another. The seeds were planted in the

last week of March in both seasons. Nitrogen fertilizer was added in bands and divided in two equal portions, the first one was applied after thinning just before the second irrigation and the second part before the third irrigation. Other cultural practices were done as recommended in cotton production that is involved a basic dose of 150 kg calcium superphosphate (15.5% P_2O_5) during land preparation besides 50 kg potassium sulphate (48% K_2O) per feddan before the fourth irrigation for all plots. Soil samples were taken in the two seasons before planting cotton to estimate the soil characters using the standard methods as described by Chapman and Parker (1981). The results of soil chemical analysis presented in Table 1.

Table (1): Chemical analysis of soil samples which were taken at the depth of 0-30 cm from the surface in 2004 and 2005 seasons.

Soil characteristics	2004	2005
Texture	Clay	Clay
% organic mater	1.87	1.90
ECe (soil paste 25°C)	8.74	8.81
pH	8.1	8.2
Available N (K-sulphate ext.)	17.9 ppm	18.2 ppm
Available P (Olsen ext.)	24.2 ppm	23.9 ppm
Available K (Amm. acetate ext.)	214.9 ppm	215.1 ppm

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Experiments of the first series:

Two field experiments were performed to investigate the effect of date of the first irrigation and irrigation intervals on yield and its components of hybrid cotton Giza 89 x 86. Split plot design with four replications was used. The main treatments were the date of first irrigation (Mohayah) i.e. 14, 21 and 28 days after sowing, while irrigation intervals (14 and 21 days after 1st irrigation) were arranged in the subplots.

Experiments of the second series:

Two experiments were conduced to study the optimum flowering stage for applying the last irrigation of cotton plants of Giza 89 x 86. The experimental design was randomized complete blocks with four replications. The size of each plot was (5 x 4.2) m^2 i.e. 21 m^2 including seven rows which were 60 cm apart. Each experiment included three treatments i.e. termination irrigation at the end of 7th, 9th and 11th week from starting flowering. The first irrigation (Mohayah) was applied after 21 days form sowing, while the following irrigations were added every two weeks till the end of season.

Recorded data:

Ten guarded plants were chosen at harvest by random from each plot to determine the following characters; final plant height (cm), number of nodes per plant, number of sympodia per plant, number of open bolls per plant, boll weight (g), seed cotton yield per plant (g), seed index and lint percentage. Seed cotton yield per feddan in kentars was estimated from the yield of each plot. Yield earliness was estimated as the percentage of first pick to total yield.

The following properties were determined at the Cotton Research Institute, Giza, Egypt:

a. Fibre fineness was tested by micronaire.
b. Fibre strength was tested by pressely apparatus at zero gauge length.
c. Fibre length: fibre 2.5% span length measured one digital fibrograph according to standard method of testing fibre length.
d. Fibre elongation %: measured by the stelometer.

The determinations of some chemical constituents were done during 2005 season only on leaves of the fourth node down the apex, whereas it taken at random at harvest. Total chlorophyll were determined as described by Arnon (1949). Total soluble sugars were determined using enthrone methods (Cerning, 1975), and reducing sugars were determined also according to the method described by A.O.A.C. (1965). Nitrogen percentage was determined according to A.O.A.C. (1975). Phosphorous percentage was determined by the method described by Trough and Mayer (1929). Seed oil content (in seed) was determined according to A.O.A.C. (1975) method. Protein content (in seed) was determined using the method described by A.O.A.C. (1965).

Analysis of variance was performed on all data according to Snedecor and Cochran (1967), and treatment averages were compared at 0.5 and 0.1 levels of probability using L.S.D.

RESULTS AND DISCUSSION

The experiments of the first series:

A. Effect of the first irrigation and irrigation intervals on growth, earliness and yield of hybrid cotton Giza 89 x 86:

The results presented in Table 2 indicate that the time of first irrigation had a significant effect on most growth traits in both seasons. When the first irrigation was applied 28 days after sowing, it gave the highest number of final plant height and number of nodes on main stem per plant but the highest number of sympodia, number of open bolls per plant, boll weight, seed cotton yield per plant and feddan were obtained when the first irrigation was applied at 21 days after sowing. These results may be due to that the optimum moisture content through root zone to gain maximum yield components was valid when cotton plants were irrigated firstly at 21 days after sowing. On the other hand, earliness percentage was reduced by delaying the first irrigation. These results may be due to insufficient moisture in the effective roots zone which reduced the uptake of water and delayed the maturity. This finding were in agreements with those obtained by Guinn *et al.* (1981) and Ali (2002).

With respect to irrigation intervals, the result illustrated in Table 2 clear that most growth traits, earliness, yield and yield components traits under study were significantly increased as irrigation intervals decreased in the two growing seasons. The irrigation every two weeks gave the tallest plants and more number of nodes on the main stem, number of sympodia per plant, number of open bolls per plant, boll weight, seed cotton yield per plant

and feddan comparing with the irrigation every three weeks. These results may be due to the sufficient water irrigation supply which was necessary to provide the cotton plants with its requirements of water to activate vital processes such as metabolism which reflected on growth, yield and its components. The data presented in the same table indicate that earliness percentage was significantly influenced by irrigation intervals in favor of close irrigation every two weeks. These results may be due to the water stress decrease over all metabolism and the leaf cuticle thickness in response to more limited water availability resulting in less uptake caused more rapid drying (Guthrie *et al.,* 1993). El-Shahawy and Abd El-Malik (1999) and El-Sayed (2005) came to the similar conclusion.

Table 2: Effect of date of the first irrigation, irrigation intervals and their interactions on growth, earliness, yield and its components of hybrid cotton Giza 89 x 86 in 2004 and 2005 seasons.

Characters	Seasons	First irrigation (I) (days after sowing)			F. test sig.	L.S.D.	Irrigation intervals days (R)		F. test sig.	I x R
Treatments		**14**	**21**	**28**			**14**	**21**		
Final plant height (cm)	2004	95.20	100.70	106.80	**	3.52	103.70	98.25	*	NS
	2005	98.10	101.20	108.20	*	2.10	104.80	100.20	*	NS
Number of nodes per plant	2004	20.00	20.20	21.82	*	1.10	20.70	20.82	*	NS
	2005	21.35	22.75	23.10	*	0.25	22.70	22.10	*	NS
Number of sympodia per plant	2004	12.35	14.55	13.80	*	0.62	14.79	12.36	*	NS
	2005	13.10	14.60	13.00	*	0.06	14.65	12.50	*	NS
Number of open bolls per plant	2004	13.70	16.00	14.25	*	0.42	15.20	14.10	*	NS
	2005	12.85	15.35	13.72	**	0.52	14.95	12.98	*	NS
Boll weight (g)	2004	2.85	2.85	2.75	NS	-	2.95	2.75	NS	NS
	2005	2.78	2.80	2.68	NS	-	2.82	2.68	NS	NS
Seed cotton yield per plant (g)	2004	39.05	45.60	39.19	**	0.13	44.84	38.78	*	NS
	2005	35.72	42.98	36.67	**	0.85	42.16	34.69	*	NS
Seed cotton per feddan (kentar/fed.)	2004	10.54	12.31	10.58	*	1.20	12.11	10.47	*	NS
	2005	9.64	11.60	9.90	*	0.12	11.38	9.31	*	NS
Earliness percentage	2004	62.15	60.60	58.35	*	1.25	59.60	61.14	*	NS
	2005	65.80	63.70	60.15	*	2.35	62.20	64.20	*	NS

N.S. = Not significant * = Significant at 0.05 level of probability ** = Significant at 0.01 level of probability

B. Effect of the first irrigation and irrigation intervals on seed index, lint percentage and fibre properties:

Results in Table 3 show that seed index, lint percentage and all fibre properties were not significantly affected by the date of first irrigation in the two seasons. It could be concluded that lint percentage, seed index and some fibre properties are highly correlated with genetic factors. On the other hand, the results in Table 3 show that seed index, lint percentage, fibre fineness (in the two seasons) and fibre strength (in 2004 season) were significantly increased by close irrigation intervals, while, fibre length and fibre elongation % were not significantly affected by these treatments, which was reflected on boll weight. These results might be due to that irrigation every 14 days recognized the requirement of water supply to cotton plants

during the vegetative and fruiting stages. Similar results were obtained by Ali (2002) and El-Sayed (2005).

C. Effect of the first irrigation and irrigation intervals on some chemical constituents of hybrid cotton Giza 89 x 86 in 2005 season:

The results in Table 4 show clearly that first irrigation treatments did not affect chemical constituents in leaves except carbohydrate contents (total soluble sugars, reducing sugars and non-reducing sugars). It is clear that when the first irrigation was applied 28 days after sowing, gave the highest magnitude number of carbohydrate content. With respect to irrigation intervals, the result in Table 4 clear that most of chemical constituents under study were significantly increased as irrigation intervals increased in 2005 season. On the other hand, nitrogen and phosphorus % in leaves were not significantly affected by the days to first irrigation or irrigation intervals. These results are in agreement with results obtained by Alia (1993) who found that there was more total soluble and non-reducing sugars accumulated in wilted leaves at seedling, squaring and flowering stage, while reducing sugars was higher in wilted leaves only at seedling and flowering stages. This results mean that the total soluble sugars which accumulated in wilted plant leaves are mainly due to the large increase in non reducing sugars and also due to the reduction in its translocation from leaves to other plant organs.

Table 3: Effect of date of the first irrigation, irrigation intervals and their interactions on seed index, lint percentage and fibre properties of hybrid cotton Giza 89 x 86 in 2004 and 2005 seasons.

Characters	Seasons	First irrigation (I) (days after sowing)			F. test sig.	L.S.D.	Irrigation intervals days (R)		F. test sig.	I x R
Treatments		**14**	**21**	**28**			**14**	**21**		
Seed index (g/100 seeds)	2004	9.20	9.75	9.80	NS	-	9.65	9.38	*	NS
	2005	9.35	9.60	9.85	NS	-	9.72	9.52	*	NS
Lint percentage	2004	32.45	33.95	33.99	NS	-	33.65	33.26	*	NS
	2005	32.35	33.10	33.85	NS	-	33.20	33.00	*	NS
Fibre fineness (micronaire unit)	2004	4.82	4.84	4.87	NS	-	4.85	4.82	*	NS
	2005	4.78	4.80	4.82	NS	-	4.83	4.77	*	NS
Fibre strength (PI)	2004	9.89	10.02	10.10	NS	-	10.10	10.00	*	NS
	2005	9.77	10.10	10.17	NS	-	10.15	9.85	NS	NS
Fibre length (mm) (2.5 % S.L.)	2004	32.65	32.82	32.88	NS	-	32.88	32.69	NS	NS
	2005	32.20	32.62	32.80	NS	-	32.82	32.26	NS	NS
Fibre elongation %	2004	6.40	6.65	6.72	NS	-	6.60	6.54	NS	NS
	2005	6.50	6.60	6.80	NS	-	6.65	6.55	NS	NS

N.S. = Not significant *** = Significant at 0.05 level of probability**

With regard to the effect of irrigation intervals on oil and protein % in seed, it is clear that increasing the irrigation intervals from 14 up to 21 days caused a reduction in seed oil and protein % as a result of drought conditions. Similar finding were obtained by El-Saidi *et al.* (1988) and Alia (1993). The interaction between the days to first irrigation and irrigation intervals did not affect all characters studied herein.

Table 4: Effect of date of the first irrigation, irrigation intervals and their interaction on some chemical constituents in 2005 season.

Chemical constituents	First irrigation (I) days after sowing)			F. test sig.	L.S.D	Irrigation intervals days (R)		F. test sig.	I x R
	14	2	28			15	21		
In leaves:									
Total chlorophyll	4.50	4.65	4.42	NS	-	4.70	4.35	*	NS
Carbohydrates									
RS	4.00	5.30	5.82	*	0.43	4.20	5.94	*	NS
Non. R.S	4.20	5.30	6.25	*	0.82	3.60	6.00	*	NS
T.S.S	6.40	7.36	8.20	*	0.73	6.42	8.22	*	NS
N%	2.58	2.60	2.60	NS	-	2.61	2.58	NS	NS
P%	1.18	1.19	1.20	NS	-	1.20	1.18	NS	NS
In seeds:									
Oil %	23.45	25.22	24.00	NS	-	25.00	23.40	*	NS
Protein %	21.85	22.35	21.60	NS	-	22.52	21.34	*	NS

N.S. = Not significant *** = Significant at 0.05 level of probability**

The experiments of the second series:

A. Effect of last irrigation date on growth, earliness, yield and its components:

Results presented in Table 5 show that final plant height, number of nodes per plant, number of sympodia per plant, number of open bolls per plant, boll weight and seed cotton per plant and feddan were significantly affected by the date of last irrigation. Generally, there was a tendency of increase for the previous traits by delaying the date of last irrigation. However, it is obvious that the increase of plant height by delaying last irrigation was a result for increasing the number of nodes per plant. This might be the reason for increased number of sympodia per plant on the position of new formed nodes. Therefore, it could be concluded that sufficient available water at late seasons resulted in increased plant growth through enhancing photosynthetic process which in turn resulted in more cell division and enlargement. Similar results were obtained by El-Shahawy and Makram (1995) and Ali *et al.* (1997) Hagan and Vaadia (1960), when they cleared that moisture deficits at late seasons holds vegetative growth to a minimum. The yield of seed cotton had a pronounced reflectance from the previous characters, whereas the tendency of increase of yield by more irrigations through the boll maturation period was associated with tendency of increase in number of sympodia per plant, number of open bolls per plant and boll weight depending on longer flowering stage for recognizing the optimum date for termination irrigation (Heam, 1980). Yield earliness as a percentage of first pick corresponding to total yield was increased significantly in favour of irrigation at 7^{th} week of flowering. This might be due to that termination the irrigation early resulted in holding vegetative growth and late formation of

bolls which in turn resulted in early opening of most bolls per plant. Similar results were obtained by Longencker and Thaxton (1963).

B. Effect of last irrigation date on seed index, lint percentage and fibre properties:

Lint percentage and seed index were significantly affected by last irrigation treatments (Table 6). This might be due to increase in maturity of lint and cotton seeds with more irrigation at boll maturation period. Similar results were obtained by El-Shahawy and Makram (1995).

As for fiber properties, results presented in Table (6) show that all fibre properties were significantly affected by the date of last irrigation. The highest mean values were obtained from cotton plants irrigated at the 11th week of flowering. Abd El-Salam (1980) pointed out that cotton plants suffering from water depletion and those intercepted heavy watering gave short fibres and lower fibres strength. In contrast, Abd El-Kader (1980) found that fiber length was increased as number of irrigations increased during fruiting stage of cotton fruiting stage of cotton.

These results are in agreement with those obtained by Abdallah (1976) who found that cotton plants provided with 8 irrigations recorded higher fiber strength compared with those provided with 5 irrigations.

Table 5: Effect of last irrigation date on growth, earliness, yield and its components of hybrid cotton Giza 89 x 86 in 2004 and 2005 season.

Characters	Seasons	Weeks after first flowers opening			F-test Sig.	L.S.D
		7	9	11		
Final plant height (cm)	2004	110.00	112.22	117.50	*	2.10
	2005	113.10	114.50	118.70	*	1.10
Number of nodes per plant	2004	12.10	13.60	15.25	*	1.21
	2005	13.20	14.35	17.20	*	1.02
Number of sympodia per plant	2004	16.36	16.52	16.72	*	0.15
	2005	17.45	18.22	19.35	*	0.62
Number of open bolls per plant	2004	12.10	13.60	14.85	*	1.13
	2005	13.50	15.70	17.22	*	1.20
Boll weight (g)	2004	2.72	2.82	2.87	*	0.03
	2005	2.65	2.78	2.83	*	0.04
Seed cotton yield per plant (g)	2004	32.91	38.35	42.62	*	3.36
	2005	30.81	37.50	39.82	*	2.12
Seed cotton per feddan (kentar/fed.)	2004	10.03	11.69	12.80	*	0.83
	2005	9.85	10.91	12.000	*	0.45
Earliness percentage	2004	71.00	68.00	66.35	*	1.32
	2005	72.10	67.95	65.27	*	1.25

*** = Significant at 0.05 level of probability**

C.Effect of last irrigation date one some chemical constituents of hybrid cotton Giza 89 x 86:

Results in Table 7 show that last irrigation timing had significant effects on chlorophyll, carbohydrates contents (total soluble sugars and reducing sugars) in leaves as well as oil and protein % in seeds. It is obvious

that there was a tendency of decrease for the previous traits by delaying the date of last irrigation. These results may be due to the total soluble sugars which accumulated in wilted plant leaves which mainly due to the large increase in non reducing sugars besides the reduction in its translocation from leaves to other plant organs (Alia, 1993). The results in Table 7 indicate that none reducing sugars, N and P% were not significantly affected by the last irrigation timing.

Table 6: Effect of last irrigation date on seed index, lint percentage and fibre properties of hybrid cotton Giza 89 x 86 in 2004 and 2005 season.

Characters	Seasons	Weeks after first flowers opening			F-test Sig.	L.S.D
		7	9	11		
Seed index (g/100 seeds)	2004	9.42	9.75	9.95	*	0.18
	2005	9.51	9.70	9.89	*	0.09
Lint percentage	2004	32.22	33.72	33.98	*	0.19
	2005	31.70	33.00	33.95	*	0.82
Fibre fineness (micronaire unit)	2004	4.73	4.82	4.89	*	0.03
	2005	4.70	4.80	4.87	*	0.05
Fibre strength (PI)	2004	9.75	9.82	9.97	*	0.02
	2005	9.70	9.80	9.92	*	0.09
Fibre length (mm) (2.5% S.L.)	2004	32.58	32.72	32.85	*	0.08
	2005	32.48	32.70	32.86	*	0.15
Fibre elongation %	2004	6.72	6.92	7.00	*	0.007
	2005	6.91	6.86	7.10	*	0.004

Table 7: Effect of last irrigation date on some chemical constituents in 2005 season.

Chemical constituents	Weeks after first flowers opening			F-test	L.S.D
	7	9	11	Sig.	
In leaves:					
Total chlorophyll	4.60	4.72	4.78	*	0.03
Carbohydrates:					
R.S.	9.42	9.35	9.10	*	0.06
Non. R.S.	4.25	4.20	4.10	Ns	-
T.S.S	13.95	13.78	13.50	*	0.15
N%	2.60	2.60	2.62	NS	-
P%	1.17	1.18	1.20	NS	-
In seeds:					
Oil %	24.50	23.20	21.10	*	1.80
Protein %	23.90	22.70	21.32	*-	1.12

N.S. = Not significant *** = Significant at 0.05 level of probability**

Concerning oil and protein %, it is clear that delaying the date of last irrigation caused increase in seed oil and protein % as a result of drought condition. similar results were reported by El-Saidi (1988) and Alia (1993).

CONCLUSION

According to the obvious results, it can be recommend that the first irrigation must be applied to hybrid cotton Giza 89 x 86 after 21 days from sowing and by irrigation intervals of 15 days to obtain higher seed cotton yield/fed. Also, delaying the date of last irrigation till the end of 11th week of flowering caused high yield and its components under this study.

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تـأثير موعد الريـة الأولـى والأخيـرة والفتـرة بـين الريـات علـى المحصـول ومكونـاتـه وبعض الصفات الكيميائية للقطن الهجين جيزه ٨٩ × ٨٦

محمد المنشاوى المنشاوى ، عزت عبدالسلام السيد و سامى على عبدالعال
معهد بحوث القطن مركز البحوث الزراعية الجيزه القاهرة

أقيمت أربع تجارب حقلية بالمزرعة البحثية بمحطة البحوث الزراعية بسخا ، وقسمت هذه التجارب إلى مجموعتين ، كل مجموعة تحتوى على تجربتين نفذت كل منها خلال عامى ٢٠٠٤ و٢٠٠٥م.

نفذت تجارب المجموعة الأولى لدراسة تأثير موعد الرية الأولى (الرى بعد ١٤ ، ٢١ ، ٢٨ يوم من الزراعة) ودراسة مواعيد الفترة بين الريات كل (١٤ أو ٢١ يوم وذلك بعد الرية الأولى).

وكان الهدف من إجراء تجارب المجموعة الثانية هو دراسة تأثير موعد أخر رية لنباتات القطن (فى نهاية الأسبوع السابع والتاسع والحادى عشر من بداية الإزهار) وذلك على المحصول ومكوناته وبعض الصفات الكيميائية لنباتات القطن الهجين ٨٩ × ٨٦.

وكانت النتائج المتحصل عليها كالآتى:

١-أدى تأخير رية المحاياة وحتى ٢٨ يوم من الزراعة إلى إعطاء أعلى طول نهائى وعلى أكبر عدد فى العقد على الساق الرئيسى للنبات ولكن عندما كان ميعاد الرية الأولى بعد ٢١ يوم فى الزراعة أنتجت النباتات أفضل النتائج لكل من عدد الأفرع الثمرية وعدد اللوز المتفتح على النبات ووزن اللوزة ومحصول النبات الواحد والفدان بينما أدى تأخير هذه الرية إلى انخفاض نسبة التبكير.

٢-أدى الرى كل أسبوعين إلى زيادة فى طول النبات وعدد العقد على الساق الرئيسى للنبات وعدد الأفرع الثمرية وعدد اللوز المتفتح على النبات ووزن اللوزة ومحصول النبات والفدان ونسبة التبكير وذلك بالمقارنة بالرى كل ٣ أسابيع.

٣-لم تتأثر صفات وزن الـ ١٠٠ بذرة وتصافى الحليج وكل صفات التيلة والمكونات الكيميائية للورقة والبذرة فيما عدا الكربوهيدرات معنويا بميعاد الرية الأولى للنباتات بينما زادت كل هذه الصفات معنويا بانخفاض فترات الرى. بينما أدت زيادة فترة الرى إلى الزيادة المعنوية فى المكونات الكيميائية للبذرة والورقة وإلى نقص النسبة المئوية للبروتين والزيت فى البذرة.

٤-كان هناك إتجاه إلى الزيادة فى صفات النمو والمحصول ومكوناته ووزن الـ ١٠٠ بذرة وتصافى الحليج وصفات التيلة والكلوروفيل فى الأوراق ولكن كان هناك إتجاه بالنقص فى الكربوهيدرات فى الأوراق ونسبة الزيت والبروتين وذلك بتأخير الرية الأخيرة لنباتات القطن.

٥-لم يكن للتفاعل بين تأثير ميعاد أول رية وبين فترات الرى أى تأثير معنوى على كل الصفات المدروسة فى هذا البحث.