Heterosis, Inbreeding Depression, Potence Ratio and some Genetic Parameters in Two Intraspecific Cross of Egyptian Cotton

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ABSTRACT

This research was carried out at Experimental Farm of Faculty of Agriculture (Saba Basha), Alexandria University, during the successive seasons of 1993, 1994 and 1995 on two intraspecific crosses belong to *Gossypium barbadense,* L. These crosses were cross I (Giza 76 x Giza 70) and cross II (Giza 70 x Giza 75). The main objective of the present research was to estimate heterosis, inbreeding depression, potence ratio and some genetic parameters, i.e., gene action, genetic advance upon selection and heritability in both broad and narrow senses. The six population P_1, P_2, F_1, F_2, BC_1 and BC_2 were grown during 1995 season in randomized complete block design for yield and its components. The results could be summarized as follow : (1) Cross I (Giza 76 x Giza 70) revealed a significant or highly significant heterosis relative to mid-parent or better parent for all traits except lint percentage and seed index. Cross II showed also significant heterosis for (Giza 70 x Giza 75) number of seeds/boll and number of vegetative branches/plant, (2) Inbreeding depression value recorded significant or highly significant values in six traits for cross I whereas did not differ significantly in three traits, i.e., lint percentage, number of fruiting and vegetative branches/plant for cross II, (3) Potence ratio values showed that over dominance control for these number of harvested bolls/plant, number of fruiting and vegetative branches/plant in cross I. Also, this over dominance was observed in cross II for all studied characters except number of vegetative branches/plant, (4) Scaling test parameters differed significantly for all traits in cross I and II except lint percentage in cross I, B parameters deviated than zero in cross I for three traits, lint percentage, number of vegetative branches/plant and number of seeds/boll, (5) Dominance effect differed significantly for all traits, except both lint percentage in cross I and number of seeds/boll in cross II, (6) Additive effect showed highly significant values in six traits in cross I in addition to boll weight and lint percentage in cross II, (7) Gene interaction recorded significant positive or negative values for most traits of both crosses I and II, (8) Hertiability values in broad sense, were over 50% for all studied traits in cross I, except both lint percentage and number of vegetative branches/plant which recorded moderate values. With regard to cross II boll weight, lint index, number of fruiting branches/plant and number of seeds/boll exceeded 50%. Narrow sense values were moderate for most traits, and (9) The expected genetic advance values revealed small, moderate or high values for all studied traits.

INTRODUCTION

Yield and most yield components inheritance belong to quantitative inheritance theory which indicated to breeders requirements to determine the genetic parameters for these traits in order to achieve their goals from breeding programs in all plants generally, and cotton plant especially.

Many investigators indicated to the importance of genetic variance in quantitative traits inheritance most of these genetic variance due to additive variance in some traits i.e., total number of bolls/plant, number of harvested

bolls/plant, boll weight, lint percentage and seed index, such as Abul-Naas *et al.* (1983).

Gomma and Shaheen (1995) showed that dominance effect as well as additive x additive effects were the most effects which control the yield and yield components. In this concern, Kassem *et al.* (1981) reported that the additive, dominance, and epsitatic gene effects were involved in the inheritance of most yield and yield component. On the other hand, Atta *et al.* (1982), El-Okkia *et al.* (1989) and Hendawy (1994) reported that both additive and non additive effect were important in the inheritance of seed cotton yield, total number of bolls/plant, boll weight, seed index and lint percentage beside sometimes non additive and environmental variance was larger portion than additive for all traits.

So, the objectives of this present research to study heterosis, inbreeding depression, potence ratio and some genetic parameters in two intraspecific cross of Egyptian cotton.

MATERIALS AND METHODS

Plant material consisted of the three cultivars described as follow :

- Giza 70: An extra long staple Egyptian cotton variety (36 mm) from cross (Giza 59A x Giza 51B).
- Giza 76: An extra long staple Egyptian cotton variety (35 mm) from cross (menofi x Bima).
- Giza 75: An long staple Egyptian cotton variety (31 mm) from cross (Giza 67 x Giza 69).

The three cultivars Giza 70, Giza 76 and Giza 75 were sown at Experimental Farm of Faculty of Agriculture (Saba Basha), Alexandria University during the first season of 1993. The two intraspecific crosses were made as follow :

- Cross I (Giza 76 x Giza 70).
- Cross II (Giza 70 x Giza 75).

To obtain the seeds of F_1 hybrids and selfed parents seeds. Parents and F_1 hybrid seeds were planted in the second season of 1994 in order to obtain F_2 generation seeds by selfing F_1 plants. Also, parents plants were selfed. Part of F_1 plants from each cross were back crossed to both parents and named as back cross (BC_1) and (BC_2). Therefore, the six populations P_1, P_2, F_1's, F_2's, BC_1 and BC_2 seeds were grown in 1995 season in a randomized complete block design with four replicates. Each block consisted of 49 rows: 7 rows for each the P_1, P_2, F_1, Bc_1 and BC_2 and 14 rows for F_2 of every cross. Rows were 7.0 meters long and row width was 60 cm approximately.

Hills spaces were 40 cm, standard cultural practices for growing cotton were made during the three growing seasons.

Data were recorded from ten guarded plants of the six populations in each cross.

The following studied characters as follow :

1- Number of harvested bolls/plant: recorded as an average number of harvested bolls/plant.
2- Boll weight (gm): determined as an average weight of bolls in gram.
3- Seed cotton yield/plant (gm): measured as the weight of seed cotton yield in gram.
4- Lint yield/plant: measured as an average weight of lint yield in gram.
5- Lint percentage (%): calculated as the relative amount of lint in a seed cotton sample expressed in percentage.

= Weight of lint in sample / Weight of seed cotton x 100

6-Lint index (gm): estimated as an average weight of lint born by 100 seeds in grams.
7-Seed index (gm): estimated as an average weight of 100 seeds in gram.
8-Number of fruiting branches/plant.
9-Number of vegetative branches/plant. Both fruiting and vegetative branches/plant were measured in ten guarded plants.
10-Number of seeds/boll: estimated as an average number of boll sample.

Statistical and Genetical Analysis :

According to the scaling tests illustrated by Mather and Jinks (1971) genetical analysis, of recorded data were made to estimate A. B and C values; mean effect (M); additive (d); dominance (h); additive x additive (I); additive x dominance (J) and dominance x dominance (L) in order to test the adequacy of additive dominance model as well as percentage of heterosis, inbreeding depression (ID) and potence ratio (P). Hertiability in broad and narrow senses (Allard, 1960), genetic advance under 5% selection intensity (Johanson *et al.*,1955). Phenotypic and genotypic correlation coefficients were calculated according to Burton (1951).

RESULTS AND DISCUSSION

A- Mean performance :

The mean performance and standard errors of six generations for number of harvested bolls/plant, boll weight, seed cotton yield/plant, lint yield/plant, lint percentage, lint index, seed index, number of fruiting branches/plant, number of vegetative branches/plant and number of seeds/boll are presented in Table (1) for the two intraspecific crosses.

B- Genetic parameters :

1- Heterosis, inbreeding depression and potence ratio :

Heterosis values relative to mid-parent (M.P) and to better parent (BP), inbreeding depression (ID) and potence ratio (P) are given in Table (2) for the two studied crosses. With, respect to cross I (Giza 76 x Giza 70) significant or highly significant differences of heterosis (M.P) and (BP) were observed for all traits except lint percentage and seed index which did not reach the significance level.

Table 1. Means and variances of six populations in two intraspecific crosses for the studied characters.

Characters	Statistics	Cross I (Giza 76 x Giza 70)						Cross II (Giza 70 x Giza 75)					
		P_1	P_2	F_1	F_2	BC_1	BC_2	P_1	P_2	F_1	F_2	BC_1	BC_2
1- Number of harvested bolls/plant	$\bar{X}$	17.40	16.15	17.60	17.77	17.00	16.80	20.5	12.20	24.80	21.20	19.95	20.65
	S^2	0.59	0.65	0.98	16.38	0.70	0.87	18.37	13.60	22.36	50.23	40.20	2.94
2- Boll weight (gm)	$\bar{X}$	2.22	2.06	2.15	2.12	2.51	2.05	2.39	2.29	2.65	2.37	2.63	2.56
	S^2	0.01	0.003	0.006	0.07	0.008	0.002	0.06	0.07	0.08	0.10	0.07	0.08
3- Seed cotton yield/plant (gm)	$\bar{X}$	38.6	33.25	37.80	37.40	36.50	34.70	48.90	36.20	64.76	59.30	56.18	60.65
	S^2	1.39	1.80	4.38	36.89	2.05	2.33	144.69	26.30	74.65	318.30	269.90	313.01
4- Lint yield/plant (%)	$\bar{X}$	14.08	11.68	13.43	12.76	13.15	12.19	14.53	10.80	19.26	16.55	16.96	18.75
	S^2	0.12	0.23	0.27	6.05	1.56	0.98	13.95	12.69	22.09	25.72	32.56	30.30
5- Lint percentage (gm)	$\bar{X}$	36.48	35.15	35.55	34.12	36.03	35.13	33.66	34.5	32.71	32.81	32.87	32.18
	S^2	0.09	0.11	6.26	1.96	0.20	0.18	2.96	5.44	3.25	6.30	4.72	5.09
6- Lint index (gm)	$\bar{X}$	5.75	5.15	5.50	5.08	5.59	5.15	4.41	5.38	3.58	3.89	3.97	3.75
	S^2	0.32	0.17	0.20	1.23	0.87	0.45	0.22	0.17	0.16	0.26	0.18	0.22
7- Seed index	$\bar{X}$	10.02	9.51	9.98	9.81	9.94	9.51	8.08	7.87	8.47	9.43	9.30	8.60
	S^2	0.08	0.01	0.02	0.29	0.001	0.001	0.96	0.79	0.41	0.72	0.57	0.65
8- Number of fruiting branches/plant	$\bar{X}$	16.05	12.16	10.86	11.33	14.76	17.78	12.43	15.35	16.93	17.76	21.56	22.94
	S^2	0.55	0.49	0.32	0.76	0.45	0.66	0.48	0.66	0.93	0.94	0.84	0.47
9- Number of vegetative branches.plant	$\bar{X}$	4.84	3.22	2.60	2.98	3.45	2.90	1.78	1.85	1.69	2.25	2.86	2.94
	S^2	0.19	0.18	0.32	0.14	0.17	0.18	0.12	0.14	0.11	0.09	0.13	0.13
10- Number of seeds/boll	$\bar{X}$	16.65	15.45	16.05	15.24	15.75	15.45	20.3	19.70	21.9	18.50	19.90	30.0
	S^2	0.32	0.13	0.24	0.31	0.20	0.13	4.17	4.67	3.04	3.56	2.30	2.49

$\bar{X}$ = Means value. S^2 = Mean squares..

The same trend was found in cross II (Giza 70 x Giza 75), whereas cross I showed high positive significant values heterosis in number of harvested bolls/plant, seed cotton yield/plant and lint yield/plant. In the other side, cross II revealed negative highly significant values for lint index. Significant or highly significant were obtained for inbreeding depression values in the two crosses for all studied traits except both number of harvested bolls/plant and seed cotton yield/plant in cross I and lint percentage in cross II.

The same Table 2 revealed the potence ratio values as indication to degree of dominance for the two studied crosses. Positive potence ratios (exceeded the unit) were recorded for number of harvested bolls/plant in cross I and number of harvested bolls/plant, boll weight, seed cotton yield/plant, lint yield/plant, seed index and number of seeds/boll in cross II. Whereas negative potence ratios (exceeded the unit) were obtained from number of fruiting and vegetative branches/plant in cross I in addition to lint percentage and lint index in cross II. These results indicated that the main causes of heterotic effect were over dominance and epistatic gene effects. These findings are in similar with those obtained by Abd El-Baky (1979), Kassem *et al.* (1981), Abou-Zahra *et al.* (1987) and El-Okkia *et al.* (1989) and were in contrary to those of Khattab *et al.* (1982), Awad *et al.* (1987), Hanna *et al.* (1988), Ismail *et al.* (1988), Younis *et al.* (1990) and Eissa (1991).

II- Scaling test :

Regarding scaling test data for the ten studied traits of the two cross are presented in Table (3).

The three parameters A, B, C deviated significantly or high significantly from than zero of both crosses for the most traits except lint index and lint percentage in cross I. Also, parameter B deviated significantly from than zero for all traits in cross I, except lint percentage, number of vegetative branches/plant and number of seeds/boll, but in cross II, all traits parameter A deviated significantly from than zero except seed cotton yield and lint yield/plant. Parameter B deviated significantly for all traits except boll weight and lint percentage. Significant deviations indicated that the presence of non-allelic interaction. These observations were in agreement with those of Younis (1980), El-Kilany and Al-Mazar (1985), El-Okkia *et al.* (1989) and Ismail *et al.* (1991) whereas, insignificant scaling test of the traits may be due to the additive dominance effects are important for these traits.

III- Type of gene action :

Table (4) showed the type of gene action according to mather's genetic parameters for determination the different gene action in the studied trairs. It is clear that in both crosses, additive gene action (D) was highly significant positive value for boll weight but was not significant in lint percentage, lint index, seed index, number of fruiting and vegetative branches/plant in cross I only.

Table 2. Heterosis, inbreeding depression and potence ratio for studied characters of two intraspecific crosses.

Estimares		No. of harvested bolls/plant	Boll weight	Seed cotton yield/plant	Lint yield/plant	Lint percentage	Lint Index	Seed index	No. of fruiting branches/ plant	No. of vegetative branches/ plant	No. of seeds/boll
					Cross I (Giza 76 x Giza 70)						
Heterosis	(M.P)	4.91*	0.46	5.21**	4.27*	-0.73	0.91	2.20	24.76**	34.16**	0.06
	(B.P)	1.14	-3.15*	-2.07	-4.61*	-2.54	-4.34*	-0.39	-34.49**	-43.35**	-3.60*
Inbreeding depression	(ID)	-0.96	1.39	1.05	4.98**	4.02**	7.63**	1.70*	-25.05	-15.70	5.04**
Potence ratio	(Pr)	1.32	0.12	0.70	0.45	-0.39	0.16	0.843	-1.67	-2.17	0.01
					Cross II (Giza 70 x Giza 75)						
Heterosis	(M.P)	51.66**	13.24*	52.19**	52.07**	-4.01	-26.86**	6.20	16.88**	-3.65	9.5
	(B.P)	20.97*	10.87*	32.43**	32.55**	-5.18	-33.45**	4.62	12.80*	2.68	7.88
Inbreeding depression	(ID)	14.51**	10.56*	16.15**	14.07**	-0.30	-8.65*	-11.33**	-7.82	-32.45	15.52**
Potence ratio	(P)	2.03	6.2	3.49	3.55	-3.26	-2.71	4.23	-4.74	-0.63	6.33

*, ** Significant and highly significant at 0.05 and 0.01 levels of probability, respectively.

Table (3): Scaling test of the two intraspecific cross I (Giza 76 x Giza 70) and cross II (Giza 70 x Giza 75) for the ten studied characters.

Estimates	No. of harvested bolls/plant	Boll weight	Seed cotton yield/plant	Lint yield/plant	Lint percentage	Lint index	Seed index	No. of fruiting branches/ plant	No. of vegetative branches/ plant	No. of seeds/boll
Scaling test					Cross I (Giza 76 x Giza 70)					
A	42.56**	0.48**	109.11**	46.17**	0.76	0.48	0.37*	8.34**	-0.18	-0.18
B	21.95**	0.61**	73.18**	28.85**	-0.11	1.96**	0.89**	14.25**	-1.64**	-1.71**
C	16.87*	0.74**	71.17**	22.64**	-0.86	0.76	0.19	4.93	-1.32	-1.09
					Cross II (Giza 70 x Giza 75)					
A	8.96**	-0.56**	9.38	4.34	1.67**	1.77**	-0.76**	12.87**	2.01**	1.89**
B	16.65**	-0.18	39.33**	12.90**	0.49	1.93**	-0.88**	9.78**	2.52**	2.41**
C	4.88	-0.10	16.48	5.13	-2.18**	-0.22	-0.48*	8.97**	1.99**	2.23**

*, ** Significant and highly significant at 0.05 and 0.01 levels of probability, respectively.

Table 4. Type of gene effects of the two intraspecific crosses for the studied traits.

Type of Gene effect	No. of harvested bolls/plant	Boll weight	Seed cotton yield/plant	Lint yield/plant	Lint percentage	Lint index	Seed index	No. of fruiting branches/ plant	No. of vegetative branches/ plant	No. of seeds/boll
					Cross I (Giza 76 x Giza 70)					
M	-9.09	1.77**	-42.96**	16.79*	35.27**	4.13**	6.15**	-7.46**	5.01**	15.40**
D	-0.91	0.20**	4.56	0.15	-1.82**	-0.22**	0.22**	1.90**	0.71**	-0.19
H	146.48**	1.56**	390.82**	154.25**	2.98	3.77**	5.11**	60.83**	-3.96*	8.90**
I	49.53**	0.34*	102.46**	42.17**	1.57	1.31**	1.62**	20.55**	-0.51	6.70*
J	19.24**	-0.21*	38.19*	10.12	-0.92	-0.62**	-1.43**	-11.01**	1.47**	0.71
L	113.69**	-1.23**	-296.44**	-110.81**	-2.90	-2.44**	-1.98**	-40.15**	1.91	-1.38
					Cross II (Giza 70 x Giza 75)					
M	-10.11	2.37**	40.13**	13.68*	33.91	11.88**	5.26**	-0.47	-0.75	19.32
D	-0.78	0.14**	3.12	0.90	0.40*	-0.14	0.07	-0.53	0.17	-0.33
H	68.25**	-1.55**	83.94*	31.92*	8.19**	-7.88**	-3.08**	54.88**	9.02**	1.16
I	20.99**	-0.40**	28.19	8.88	4.03**	-3.10**	-1.08**	14.89**	2.46**	0.86
J	-7.89	-0.35**	-20.37	-8.90	0.94	0.31	0.41	3.12	-0.38	0.30
L	275.05**	14.99**	540.18**	210.41**	270.13**	74.97*	40.77**	131.45**	16.90**	6.42*

*, ** Significant and highly significant at 0.05 and 0.01 levels of probability, respectively.

M = The constant mean.
D = Pooled additive effects.
H = Pooled dominance effects.
I = Pooled interaction between (D) and (D).
J = Pooled interaction between (D) and (H).
L = Pooled interaction between (H) and (H).

On the other hand, dominance gene action effects (h) were highly significant positive values in all studied traits in cross I except lint percentage and number of vegetative branches/plant. Meanwhile, in cross II these effects were positive highly significant for five traits.

Regarding additive x additive (I), additive x dominance (J) and dominance x dominance (L) recoded positive or negative highly significant values for most traits in cross I and cross II except (J) in cross II regarding boll weight trait. From the previous data, it could be concluded that additive (D), dominance (h), additive x additive (I),additive x dominance (J) and dominance x dominance (L) gene effects play an important role in inheritance of those characters.

In this respect many authors obtained similar results as Bedair (1971), Meredith and Bridge (1972), Younis (1980) and Al-Enani and Ismail (1986).

IV- Heritability estimates and genetic advance :

Heritability estimates in broad and narrow senses, the expected genetic advance from selection (Δg) and genetic advance as percentage upon selecting the highest 5% for studied traits are presented in Table (5). The values of heritability (over 50%) in broad sense in eight characters in cross I. Similarly, in cross II four traits exceeded 50%, i.e., number of harvested bolls/plant, boll weight, seed cotton yield/plant and number of fruiting branches/plant. In cross I, lint index and number of vegetative branches/plant, their values were moderate from 30% to 50%. In cross II, lint yield/plant, lint percentage, number of vegetative branches/plant and number of seeds/boll their values ranged from 30% to 50%. Narrow sense heritability differed in the two crosses from low values, moderate to high values for all studied traits.

Genetic advance under selection (Δg%) showed high values in seed cotton yield/plant and number of vegetative branches/plant in cross I. Whereas, high estimates were recorded for both number of fruiting and vegetative branches/plant. So, selection for these traits should be effective, while, selection for the other characters would be less effective.

Table 5. Hertiability estimates, genetic advance (Δg) and genetic advance expressed as percentage upon selecting the highest 5% for studied traits.

Characters	Hertiability		Genetic advance	
	Broad sense	Narrow sense	(Δg)	(Δg%)
	Cross I (Giza 76 x Giza 70)			
1- Number of harvested bolls/plant	85.48	56.51	5.57	31.60
2- Boll weight	61.44	27.19	0.32	8.70
3- Seed cotton yield/plant	82.11	43.17	8.97	25.12
4- Lint yield/plant	54.22	31.14	2.43	7.59
5- Lint percentage	72.93	51.87	1.75	5.32
6- Lint index	32.91	48.32	1.00	8.72
7- Seed index	88.10	73.01	2.23	19.56
8- Number of fruiting branches/plant	72.94	8.65	7.45	15.64
9- Number of vegetative branches.plant	43.83	39.12	27.12	63.12
10- Number of seeds/boll	28.02	36.77	0.29	8.00
		Cross II (Giza 70 x Giza 75)		
1- Number of harvested bolls/plant	61.79	39.94	0.76	4.13
2- Boll weight	70.13	56.17	0.01	0.09
3- Seed cotton yield/plant	67.94	39.38	6.84	10.54
4- Lint yield/plant	45.54	29.70	0.46	3.73
5- Lint percentage	36.33	45.08	0.08	0.33
6- Lint index	28.94	59.45	0.01	0.16
7- Seed index	12.00	30.22	0.02	0.09
8- Number of fruiting branches/plant	60.82	56.14	26.12	54.11
9- Number of vegetative branches.plant	40.76	24.37	36.11	48.28
10- Number of seeds/boll	31.79	58.39	0.08	0.36

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الملخص العربى

قوة الهجين ومعامل التربية الداخلية والسيادة وبعض الثوابت الوراثية فى هجينين من الهجن الصنفية للقطن المصرى

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أجرى هذا البحث بالمزرعة التجريبية لكلية الزراعة (سابا باشا) جامعة الإسكندرية ، على هجينين من الهجن الصنفية تنتمى للقطن المصرى (*Gossypium barbadense*, L.) ؛ الهجين الأول (جيزة ٧٦ × جيزة ٧٠) ، والهجين الثانى (جيزة ٧٠ × جيزة ٧٥) خلال المواسم الثلاثة ١٩٩٣، ١٩٩٤، ١٩٩٥ وذلك بهدف دراسة تقدير قوة الهجن والإنخفاض الراجع للتربية الداخلية ودرجة السيادة وبعض الثوابت الوراثية مثل الفعل الجينى والتحسين الوراثى المنتظر وكذلك المكافئ الوراثى بالمعنى العام والمعنى الخاص.

ولقد زرعت العشائر الستة الأب الأول (P_1) ، والأب الثانى (P_2) ، وكل من الجيل الأول والثانى F_2, F_1 على الترتيب ، والهجن الرجعية BC_2, BC_1 فى قطاعات كاملة العشوائية لتقدير صفات المحصول وبعض مكوناته. ويمكن تلخيص بعض النتائج فيما يلى :

١- أظهر الهجين الأول (جيزة ٧٦ × جيزة ٧٠) قوة هجين معنوية أو عالية المعنوية نسبة إلى متوسط الأبوين أو الأب الأفضل لكل الصفات عدا صفتى النسبة المئوية للشعر ووزن الـ١٠٠ بذرة . أيضا أظهر الهجين الثانى (جيزة ٧٠ × جيزة ٧٥) قوة هجين معنوية في صفات عدد اللوز المحصود/نبات ، محصول القطن الزهر/نبات ، ومحصول الشعر/نبات.

٢- قيم الإنخفاض الراجع للتربية الداخلية سجلت إختلافا معنويا أو عالية المعنوية وذلك فى ستة صفات للهجين الأول ، بينما لم تختلف معنويا فى ثلاث صفات للهجين الثانى هى النسبة المئوية للشعر ، عدد الفروع الخضرية والثمرية/نبات.

٣- أظهرت درجة السيادة Potence ratio وجود سيادة متفوقة معنوية over dominance لصفة عدد اللوز المحصود/نبات ، وعدد الفروع الخضرية والثمرية/نبات للهجين الأول ، كما لوحظ وجود سيادة متفوقة فى الهجين الثانى لكل الصفات عدا صفة عدد الفروع الخضرية/نبات.

٤- إختلفت ثوابت C,B,A Scaling test معنويا فى معظم الصفات للهجينين الأول والثانى عدا النسبة المئوية للشعر فى الهجين الأول ، وكذلك B إختلف معنويا منفردا عن الصفر لثلاث صفات فى الهجين الأول هى معامل الشعر ، عدد الفروع الخضرية/نبات ، وعدد بذور اللوزة.

٥- دراسة الفعل الجينى أوضحت أن التأثير السيادى إختلف معنويا لكل الصفات عدا النسبة المئوية للشعر فى الهجين الأول ، وعدد البذور/لوزة فى الهجين الثانى.

٦- التأثير الجينى المضيف أظهر قيما عالية المعنوية لستة صفات فى الهجين الأول ، بينما لم يختلف معنويا سوى فى وزن اللوزة والنسبة المئوية للشعر فى الهجين الثانى.

٧- أظهر التداخل الجينى للصفات تحت الدراسة قيما سالبة أو موجبة لمعظم الصفات فى الهجينين الأول والثانى.

٨- قيم معامل التوريث بالمعنى العام تجاوزت ٥٠% فى كل الصفات للهجين الأول عدا صفتى معامل الشعر ، عدد الفروع الخضرية/نبات التى حققت قيما متوسطة من ٣٠-٥٠%. بينما فى الهجين الثانى ٤ صفات فقط تجاوزت ٥٠% هى عدد اللوز المحصود/نبات ، ووزن اللوزة ، محصول القطن الزهر/نبات ، وعدد الفروع الثمرية/نبات ، وسجل معامل التوريث بالمعنى الخاص (الضيق) قيما معتدله لمعظم الصفات.

٩- تباينت قيم التحسين الوراثى المتوقع من صغيرة إلى متوسطة لعالية لمعظم الصفات.