# Heterosis and some Genetic Parameters in Two Intraspecific Crosses of Egyptian Cotton

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## ABSTRACT

The main objectives of the present research were to estimate heterosis, inbreeding depression, potence ratio and some genetic parameters, i.e., gene action, and heritability in both broad and narrow senses. The six populations $P_1$, $P_2$, $F_1$, $F_2$, $BC_1$ and $BC_2$ were grown during 2005 season in randomized complete block design. The results could be summarized as follow : (1) Cross I ( Giza 45x Giza 70) revealed significant heterosis relative to mid-parent for no. of harvested bolls/plant, seed cotton yield/plant and lint yield/plant whereas relative to better parent for boll weight ,lint yield/plant lint index and no. of seeds/boll. Cross II(Giza 76 x Giza 75) showed also significant heterosis relative to mid parent or to better parent for all studied traits except int percentage, seed index and no. of seeds/boll , (2) Inbreeding depression recorded significant values in five traits for cross I whereas differed significantly in all studied traits except one i.e., lint percentage for cross II, (3) Potence ratio values showed that over dominance control for the no. of harvested bolls/plant, in cross I. Also, this over dominance was observed in cross II for all studied characters, Six traits recorded positive potence ratios exceeded the unit(4) Scaling test parameters differed significantly for most studied traits in two intraspeciific crosses. A parameter differed significantly for all studied traits except lint percentage, lint index and no. of seeds/boll in cross I and except seed cotton yield/plant and lint yield/plant for cross II. B parameters deviated significantly than zero in cross I for all studied traits except, lint percentage in cross I and except boll weight and lint percentage for cross II, (5) Dominance effect differed significantly for all traits, except lint percentage in cross I and no. of seeds/boll in cross II, (6) Additive effect showed highly significant values in four traits in cross I in addition to boll weight and seed index in cross II, (7) Gene interaction recorded significant positive or negative values for most traits of both crosses, (8) Heritability values in broad sense, were over 50% for all studied traits in cross I, except both lint index and no. of seeds/boll. With regard to cross II no. of harvested bolls/plant, boll weigh , seed cotton yield /plant exceeded 50%. Narrow sense values were differed from low values, moderate to 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.

In cotton many investigators indicated that most of genetic variance in quantitative traits inheritance is due to additive variance in some traits i.e.,

total no. of bolls/plant, no. 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 four cultivars described as follow:

* Giza 45: An extra long staple Egyptian cotton variety (37 mm) initiated from cross( Giza 7x Giza 28).
* Giza 70: An extra long staple Egyptian cotton variety (36 mm) initiated from cross (Giza 59A x Giza 51B).
* Giza 76: An extra long staple Egyptian cotton variety (35 mm) initiated from cross (menofi x Bima).
* Giza 75: A long staple Egyptian cotton variety (31 mm) initiated from cross (Giza 67 x Giza 69).

The four cultivars Giza 45, 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 2003. The two intraspecific crosses were made as follow:

- Cross I (Giza 45 x Giza 70).
- Cross II (Giza 76 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 2004 in order to obtain $F_2$ generation seeds by selfing $F_1$ plants. Also, parent's 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 2005 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 all 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 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 scaling test (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). Heritability 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).

Heterosis as percent deviation from the mid parent.

$$H\ (MP)\ \% = \frac{\bar{F}_1 - \bar{M}P}{MP} \times 100$$

Heterosis as percent deviation from the better parent.

$$H\ (B.P)\ \% = \frac{\bar{F}_1 - \bar{B}.P}{B.P} \times 100$$ (Mather and Jinks, 1971)

Inbreeding depression:

$$(I.D)\ \% = \frac{\bar{F}_1 - \bar{F}_2}{F_1} \times 100$$ (Mather and Jinks, 1971)

Polenc ratio (P) = ( F1 – M.P) / ½ ($P_2 - P_1$). (Smith, 1952)

Where:

$F_1$ : First generation mean.

M.P: mid parent value ½ ($P_1 + P_2$)

$F_2$ : Second generation mean.

$P_1$ : The mean of smaller parent.

$P_2$ : The mean of larger parent.

## RESULTS AND DISCUSSION

### A- Mean performance:

The mean performance and standard errors of six generations for no. of harvested bolls/plant, boll weight(gm), seed cotton yield/plant(gm), lint yield/plant(gm), lint percentage(%), lint index, seed index (gm) and no. 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 45x Giza 70) revealed significant heterosis relative to mid-parent for no. of harvested bolls/plant, seed cotton yield/plant and lint yield/plant whereas relative to better parent for boll weight ,lint yield/plant lint index and no. of seeds/boll. Cross II(Giza 76 x Giza 75) showed also significant heterosis relative to mid parent or to better parent for all studied traits except lint percentage, seed index and no. of seeds/boll

Inbreeding depression (ID) recorded significant values in five traits for cross I whereas differed significantly in all studied traits except one i.e., lint percentage for cross II, The 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 no. of harvested bolls/plant in cross I .Also this over dominance was observed in cross II for all studied characters no. of harvested bolls/plant, boll weight, seed cotton

yield/plant, lint yield/plant, seed index and no. of seeds/boll in cross II. Whereas negative potence ratios (exceeded the unit) were obtained from 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) ,El-Okkia *et al.* (1989) and EL- Mansy(2005) revealed importance of additive x additive type of epistasis in genetic control for yield characters and earliness ,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 eight studied traits of the two cross are presented in Table (3).

The three parameters A, B, C deviated significantly from than zero of both crosses for the most traits. A parameter differed significantly for all studied traits except lint percentage, lint index and no. of seeds/boll in cross I and except seed cotton yield /plant and lint yield /plant for cross II . Also, parameter B deviated significantly from than zero for all traits in cross I, except lint percentage but in cross II, B parameter deviated significantly from than zero 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) Ismail *et al.* (1991) and EL-Mansy (2005) 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 traits. It is clear that, additive gene action (D) were highly significant positive values for boll weight and seed index whereas negative significant in lint percentage and lint index, in cross I, and positive significant additive gene action (D) for boll weight in cross II.

On the other hand, dominance gene action effects (h) were highly significant positive values in all studied traits in cross I except lint percentage. Meanwhile, in cross II these effects were positive highly significant for four traits i.e. no. of harvested bolls/plant, seed cotton yield/plant, lint yield/plant and lint percentage.

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), Al-Enani and Ismail (1986) EL- Mansy (2005).

**IV- Heritability estimates and genetic advance:**

Heritability estimates in broad and narrow senses, 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 six characters in cross I. Similarly, in cross II three traits exceeded 50%, i.e., no. of harvested bolls/plant, boll weight, seed cotton yield/plant. In cross I, lint index value was moderate from 30% to 50%. In cross II, lint yield/plant, lint percentage, and no. 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 no. of harvested bolls/plant and seed cotton yield/plant in cross I . So, selection for these traits should be effective, while, selection for the other characters would be less effective.

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**Table (1):** Mean performance and standard errors of six populations in two intraspecific crosses for the studied characters.

| Characters | Statistics | Cross I (Giza 45 x Giza 70) | | | | | | Cross II (Giza 76 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 | 16.10 | 17.00 | 17.57 | 17.00 | 16.00 | 20.5 | 12.20 | 21.00 | 21.20 | 19.05 | 20.65 |
| | $\bar{S}$ | 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 |
| | $\bar{S}$ | 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 | 38.20 | 64.76 | 59.30 | 56.18 | 60.65 |
| | $\bar{S}$ | 1.39 | 1.80 | 4.38 | 36.89 | 2.05 | 2.33 | 144.69 | 26.30 | 74.65 | 318.30 | 289.90 | 313.01 |
| 4- Lint yield/plant (gm) | $\bar{X}$ | 14.08 | 11.68 | 13.43 | 12.76 | 13.15 | 12.19 | 14.53 | 10.80 | 19.26 | 16.55 | 16.96 | 16.75 |
| | $\bar{S}$ | 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 (%) | $\bar{X}$ | 36.48 | 35.15 | 35.55 | 34.12 | 36.03 | 35.13 | 33.66 | 34.5 | 32.71 | 32.81 | 32.87 | 32.18 |
| | $\bar{S}$ | 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 |
| | $\bar{S}$ | 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 (gm) | $\bar{X}$ | 10.02 | 9.51 | 9.98 | 9.81 | 9.94 | 9.51 | 8.08 | 7.87 | 8.47 | 9.43 | 9.30 | 8.60 |
| | $\bar{S}$ | 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 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 |
| | $\bar{S}$ | 0.32 | 0.13 | 0.24 | 0.31 | 0.20 | 0.13 | 4.17 | 4.67 | 3.04 | 3.56 | 2.30 | 2.49 |

X = Means value. S = standard error..

**Table (2):** Heterosis, inbreeding depression and potency ratio for studied characters of two intraspecific crosses.

| Estimates | | No. of harvested bolls/plant | Boll weight | Seed cotton yield/plant | Lint yield/plant | Lint percentage | Lint Index | Seed index | No. of seeds/boll |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cross I (Giza45 x Giza 70) | | | | |
| Heterosis | (M.P) | 4.91* | 0.46 | 5.21** | 4.27* | -0.73 | 0.91 | 2.20 | 0.06 |
| | (B.P ) | 1.14 | -3.15* | -2.07 | -4.61* | -2.54 | -4.34* | -0.39 | -3.60* |
| Inbreeding depression | (ID) | -0.96 | 1.39 | 1.05 | 4.98** | 4.02** | 7.63** | 1.70* | 5.04** |
| Potence ratio | (Pr) | 1.32 | 0.12 | 0.70 | 0.45 | -0.39 | 0.16 | 0.84 | 0.01 |
| | | | | | Cross II (Giza 76 x Giza 75) | | | | |
| Heterosis | (M.P) | 51.68** | 13.24* | 52.19** | 52.07** | -4.01 | -26.86** | 6.20 | 9.5 |
| | (B.P ) | 20.97* | 10.87* | 32.43** | 32.55** | -5.18 | -33.45** | 4.82 | 7.88 |
| Inbreeding depression | (ID) | 14.51** | 10.56* | 16.15** | 14.07** | -0.30 | -8.65* | -11.33** | 15.52** |
| Potence ratio | (Pr) | 2.03 | 6.2 | 3.49 | 3.55 | -3.26 | -2.71 | 4.23 | 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 45 x Giza 70) and cross II (Giza 76 x Giza 75) for the eight 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 seeds/boll |
|---|---|---|---|---|---|---|---|---|---|
| Scaling test | | | | | Cross I (Giza 45x Giza 70) | | | | |
| | A | 42.56** | 0.48** | 100.11** | 46.17** | 0.76 | 0.48 | 0.37* | -0.18 |
| | B | 21.95** | 0.61** | 73.18** | 28.85** | -0.11 | 1.96** | 0.89** | -1.71** |
| | C | 16.87* | 0.74** | 71.17** | 22.64** | -0.86 | 0.76 | 0.19 | -1.09 |
| | | | | | Cross II (Giza 76 x Giza 75) | | | | |
| | A | 8.96** | -0.56** | 9.38 | 4.34 | 1.67** | 1.77** | -0.76** | 1.89** |
| | B | 16.65** | -0.18 | 39.33** | 12.90** | 0.49 | 1.93** | -0.88** | 2.41** |
| | C | 4.88 | -0.10 | 16.48 | 5.13 | -2.18** | -0.22 | -0.48* | 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 seeds/boll |
|---|---|---|---|---|---|---|---|---|
| | | | **Cross I (Giza 45x Giza 70)** | | | | | |
| M | -9.09 | 1.77** | -42.96** | 16.79* | 35.27** | 4.13** | 6.15** | 15.40** |
| D | -0.91 | 0.20** | 4.56 | 0.15 | -1.82** | -0.22** | 0.22** | -0.19 |
| H | 146.48** | 1.56** | 390.82** | 154.25** | 2.98 | 3.77** | 5.11** | 8.90** |
| I | 49.53** | 0.34* | 102.46** | 42.17** | 1.57 | 1.31** | 1.62** | 6.70* |
| J | 19.24** | -0.21* | 38.19* | 10.12 | -0.92 | -0.62** | -1.43** | 0.71 |
| L | 113.69** | -1.23** | -298.44** | -110.81** | -2.90 | -2.44** | -1.98** | -1.38 |
| | | | **Cross II (Giza 76x Giza 75)** | | | | | |
| M | -10.11 | 2.37** | 40.13** | 13.68* | 33.91 | 11.88** | 5.26** | 19.32 |
| D | -0.78 | 0.14** | 3.12 | 0.90 | 0.40 | -0.14 | 0.07 | -0.33 |
| H | 68.25** | -1.55** | 83.94* | 31.92* | 8.19** | -7.88** | -3.08** | 1.16 |
| I | 20.99** | -0.40** | 28.19 | 8.88 | 4.03** | -3.10** | -1.08** | 0.86 |
| J | -7.89 | -0.35** | -20.37 | -8.90 | 0.94 | 0.31 | 0.41 | 0.30 |
| L | 275.05** | 14.99** | 540.18** | 210.41** | 270.13** | 74.97* | 40.77** | 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).

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

| Characters | Heritability | | Genetic advance | |
|---|---|---|---|---|
| | Broad sense | Narrow sense | (Δg) | (Δg%) |
| | | Cross I (Giza45 x Giza 70) | | |
| 1- Number of harvested bolls/plant | 85.49 | 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 seeds/boll | 28.02 | 36.77 | 0.29 | 8.00 |
| | | Cross II (Giza 76 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 seeds/boll | 31.79 | 58.39 | 0.08 | 0.36 |

# الملخص العربى

# قوة الهجين 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 ٤٥ × جيزة ٧٠) ، والهجين الثانى (جيزة ٧٦ × جيزة ٧٥) خلال المواسم الثلاثة ٢٠٠٣، ٢٠٠٤، ٢٠٠٥ وذلك بهدف دراسة تقدير قوة الهجن 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 $F_1$, $F_2$ على الترتيب ، والهجن الرجعية $BC_1$, $BC_2$ فى قطاعات كاملة العشوائية لتقدير المحصول وبعض مكوناته.

ويمكن تلخيص بعض النتائج فيما يلى :

١- أظهر الهجين الأول (جيزة ٤٥ × جيزة ٧٠) قوة هجين معنوية نسبة إلى متوسط الأبوين لصفات عددالوز/النبات ومحصول القطن الزهر/النبات ومحصول الشعر/النبات بينما قوة الهجين نسبة الى الاب الاعلى كانت لصفات وزن اللوزة ومحصول الشعر/النبات ومعامل لشعر وعدد البذور /اللوزة. أيضاً أظهر الهجين الثانى (جيزة ٧٦ × جيزة ٧٥) قوة هجين معنوية نسبة الى متوسط الابوين اوالاب الاعلى لكل الصفات المدروسةعدا ثلاث صفات هى النسبة المئوية للشعرومعامل البذرة وعدد البذور/اللوزة

٢- سجلت قيم الإنخفاض الراجع للتربية الداخلية إختلافاً معنوياً وذلك فيخمسة صفات للهجين الأول ، وفى كل الصفات اختلفت معنوياً فى للهجين الثانى عدا صفة واحدة هى النسبة المئوية للشعر .

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

٤-إختلفت ثوابت C,B,A Scaling test معنوياً فى معظم الصفات للهجنين الأول والثانى. قيمA اختلفت معنوياً فى الهجين الاول لكل الصفات ماعدا النسبة المئوية للشعر ومعامل الشعر وعدد البذور

/ اللوزة وكذلك ماعدا كل من محصول القطن الزهر والشعر /النبا ت كذلك قيمB إنحرفت معنوياً عن الصفر لكل الصفات ،ماعدا النسبة المئوية للشعر في الهجين الأول بالاضافة لوزن اللوزة فى الهجين الثانى.

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

٦-التأثير الجينى المضيف، أظهر قيماً عالية المعنوية في الربعة صفات فى الهجين الأول ، بينما لم يختلف معنوياً سوى فى وزن اللوزة و معامل البذرة فى الهجين الثانى.

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

٨-قيم معامل التوريث بامعنى العام تجاوزت ٥٠% فى كل الصفات للهجين الأول عدا صفة معامل الشعر ، التى حققت قيمةً متوسطة من ٣٠-٥٠%. بينما فى الهجين الثانى٣ صفات فقط تجاوزت ٥٠% هى عدد اللوز المحصود/نبات ، ووزن اللوزة ، محصول القطن الزهر/نبات ، وسجل معامل التوريث بالمعنى الخاص (الضيق) قيماً معتدله لمعظم الصفات وتباينت قيم التحسين الوراثى المتوقع من صغيرة إلى متوسطة لعالية لمعظم الصفات.