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ESTIMATES OF GENETIC PARAMETERS USING SIX POPULATIONS IN EGYPTIAN COTTON((*Gossypium barbadense* L.).

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Abstract: The six populations P1 , P2 , F 1, F 2, BC1 and BC2 of four cotton crosses were established during summer 2004 to 2005 and evaluated in 2006 summer season at Assiut .The experiment was grown in a randomized complete blocks design (R.C.B.D) with three replications. The means of the six generations recorded for plant height , days to flowering , no.of open bolls, no. of unopened bolls ,boll weight ,lint yield/plant and cotton yield/plant, , were subjected to scaling test, and six parameters method to detect epistasis and estimates of m, d, h, i, j and L parameters. Results revealed the epistatic gene effect cannot be ignored when establish a new breeding programe to improve cotton populations for economic traits. The inheritance of all traits studied was controlled by additive and non-additive genetic effects, with greater values of dominance gene effect than the additive one in most cases. Among the nonadditive effect, the other fixable component, i.e., additive x additive (i) type of interaction, was also significant and constituted a major portion of the gene effects. The signs of (h) and (L) were opposite in the case of plant height, days to flowering , no.of open bolls, no. of unopened bolls ,boll weight, lint yield and cotton yield/plant, in most crosses suggesting duplicate type of non-allelic interaction in these traits. The coincidence of sign and magnitude of heterosis and inbreeding depression was detected for most traits .

INTRODUCTION

Cotton is a warm climate crop grown in approximately 60 countries worldwide. It is cultivated from 45 North latitude to 32 South latitude by over 20 million farmers. Over 90 percent of cotton grown in the world is *Gossypium hirsutum* L or Upland cotton, while about ten percent of cotton in the world is related to the species *G. barabadense* L.. The choice of selection and breeding procedures for genetic improvement of cotton or any other crop is largely depends on the knowledge of type and relative amount of genetic component and the presence of non-allelic interaction for different characters in the plant materials under investigations. The genetic control of a given trait cannot be definitively characterized because it depends on the genetic material, the test system inter-action for different characters in the plant materials under generation means and the environmental conditions, **(Goldringer *et al* (1997)**. Plant breeders and geneticists frequently use generation mean analysis to obtain information on gene action controlling the economic traits in cotton(**Jagtap, 1986, EL-Okkia, et al., 1989, Gomaa, and Shaheen, 1995 ,Esmail *et al* .,1999,Ahmad, *et al.*, 2003 and AbdeL Hafez *et al.* , 2007).**

Therefore, the present study was carried out to obtain information about gene action on yield and its components in the cotton. Heterosis, inbreeding depression, , phenotypic and genotypic coefficient of variability were also investigated .

MATERIALS AND METHODS

The experimental materials comprised seven genotypes namely G88 ,G90,G87,G89, Promising hybrid,G83 and Dandara. For Fl G88 xG90(cross I), G87xG89(cross 2), Promising hybrid xG83(cross 3) and Promising hybrid x Dandara(cross 4) .The name, pedigree, origin of these parents are presented in Table (1).

Table (1). The name , pedigree and origin of these parents.

Genotypes	Pedigree	Origin
Giza.88	(G.77 x G.45)B	Egypt
Giza.90	(G.83 x Dendera)	Egypt
Giza.87	(G.77 x G.45)A	Egypt
Giza.89	(G.75 x R.6022)	Egypt
Promising hybrid	(G.81 x G.83)	Egypt
Giza.83	(G.72 x G67)	Egypt
Dandara	Selected from G 3	Egypt

The present investigation was carried out during 2004 to 2006 seasons . A field experiment was conducted at Al- Ghoraeb Farm for Assiut University, at Assiut during three seasons (2004 to 2006) using seven cotton genotypes . In the summer 2004 the seven parental lines were crossed to produce four F1 crosses. In 2005 season, F1 plants of each cross were selfed and backcrossed to their two parents to obtain F2, BC1 and BC2 generations, respectively. Hand emasculation and pollination techniques were applied to obtain a hybrid seeds.

Six population P1 , P2 , F 1, F 2, BC1 and BC2 were planted during 2006 in a randomized complete block design with three replicates in rows with 3m long and 60 cm width. Sowing was done in hills spaced 25cm apart and two plants were left per hill after thinning. Each parent and F were represented by three rows, F2 and the two back cross gènerations (BC and BC) 20 rows. The means of the six populations were recorded for plant height , days to flowering , no. of open bolls, no. of unopened bolls ,boll weight, lint yield and cotton yield/plant .

The data were first subjected to test the differences between parental genotypes by applied "t"test for the studied characters before considering the biometrical analysis, as well as. the scaling test(A, B and C) were applied to detect the presence of epistasis according to **Mather and Jinks(1982)**. In the presence of nonallelic interaction the analysis was proceeded to estimate the inter-action types involved using the six parameters genetic model i.e., (m, d, h, i, j, and l) m = the origin of the scale, which reflects the contribution due to the overall mean plus the locus effects and the interaction of fixed loci ,d = sum of the additive effects of the genes ,h = sum of the dominance effects of the genes, i = sum of the additive x additive effects of the genes, j = sum of the additive x dominance effects of the genes and l = sum of the dominance x dominance effects of the genes according to **Hayman (1958)**. Heterosis, inbreeding depression , phenotypic and genotypic coefficient of variability calculated according to **Singh and Chaudhary (1977)** as follows:

a) Heterosis from the mid-parents:

$$H(\overline{M.P})\% = \frac{\overline{F1} - \overline{M.P}}{\overline{M.P}} \times 100$$

$$\text{Heterosis deviation} = \overline{F1} - \overline{M.P}$$

$$\text{Variance of heterosis deviation} = \overline{V}\ F1 + \tfrac{1}{4}\,(\overline{V\ P1} + \overline{V\ P2})$$

b) Heterosis from the better-parent:

$$H\,(\overline{B.P})\,\% = \frac{\overline{F1} - \overline{B.P}}{\overline{B.P}} \times 100$$

$$\text{Heterosis deviation} = \overline{F1} - \overline{B.P}$$

$$\text{Variance of heterosis deviation} = V\,\overline{F1} + V\,\overline{B.P}$$

The t- test was used to test the significance of the above estimates from zero as outlined from the following equation:

$$t = \frac{\text{Deviation} - \text{Zero}}{(\text{Variance of deviation})^{1/2}}$$

Inbreeding depression; its values were measured from the following equations:

$$\text{Inbreeding depression of } \mathbf{F1} = \frac{\overline{\mathbf{F1}} - \overline{\mathbf{F2}}}{\overline{\mathbf{F1}}} \times 100$$

Variance of inbreeding depression (V.I.D) for F1 = V F1 + V F2

$$t.I.D = \frac{\overline{\mathbf{F1}} - \overline{\mathbf{F2}}}{(V.I.D)^{1/2}}$$

Estimation of phenotypic and genotypic coefficient of variability:

The Phenotypic Coefficient of Variability (PCV) and Genotypic Coefficient of Variability (GCV) calculated according to **Singh and Chaudhary (1977)** as follows:

$$PCV = \frac{(VF2)^{1/2}}{\overline{F2}} \quad , \quad GCV = \frac{(VF2 - VE)^{1/2}}{\overline{F2}}$$

RESULTS AND DISCUSSION

Means of the six populations for all the studied traits are presented in Table (2) The analysis of variance show significant differences among the six population means for most the studied traits. The results indicated that (P1) in all crosses was higher in all traits compared with P2, while in crosses the means of parents gave different values from one to another for the studied traits . The differences in the means may suggest the presence of adequate genetic variation. Means of F2 ,s values were higher than parents and F1,s values in most crosses for all the studied traits .

Results of the scaling tests (A, B and C) reveled the presence of non-allelic gene interaction for all traits studied in both crosses except boll weight in three crosses , Table (3). **Abdel-Hafez *et al* (2007) and Esmail (2007)** found similar results.

Estimates of genetic effects in six parameter model are presented in Table (3). Highly significant for the estimated values of mean effects (m) indicated that all the studied characters were quantitatively inherited. The additive gene effects (d) were significant for all traits in all crosses except boll weight in two crosses suggesting the potential for obtaining further improvement of these traits. Dominance gene effects (h) were found to be highly significant for most studied traits. The magnitude of additive gene effects (d) were small relative to the corresponding dominance effects (h) in most cases ,suggesting pedigree selection method is a useful breeding program to improve these populations. However, the negative value of (h) observed for most traits studied indicated that the alleles responsible for less value of the trait were dominant over the alleles controlling high value.

Significantly positive of additive x additive epistatic type of gene effects (i) was detected for plant height (two crosses) ,days to flowering (two crosses) no. of open bolls (one cross) ,no. of unopened bolls (one cross) ,lint yield /plant (three crosses) and seed cotton yield/plant (four crosses) , while it was negative for plant height (two crosses) , days to flowering (two crosses) , no. of open bolls (three crosses) , no. of unopened bolls (three crosses) , boll weight (four crosses) and lint/plant in one cross under investigation. Additive x dominance epistatic type of gene effects (j) was found to be significant for all traits in all crosses studied except boll weight. The dominance x dominance epistatic effect (L) played major role in the inheritance of all traits studied.

Table (2) Mean performance of parents, F1,F2 and backcross populations for all the studied traits in cotton.

Traits Populations	Plant height	Days to 50% flowering	No. of open bolls	No. of unopened bolls	Boll weight (gm)	Lint yield / plant / gm	Cotton yield /gm
Cross 1 (G88xG90)							
P1	45.145	57.25	18.622	2.75	1.28	12.184	28.697
P2	33.312	57.25	27.375	2.4	1.395	18.53	39.345
F1	41.655	56.75	9.5	1.687	1.497	5.347	14.937
F2	46.662	57.335	10.115	3.145	1.655	3.41	10.107
BC1	52.357	56.375	10.757	3.915	1.452	6.317	20.997
BC2	57.622	55.5	17.182	3.782	1.752	10.617	28.255
L.S.D at 5%	18.672	N.S	5.13	0.64	N.S	6.27	15.76
Cross 2 (G89xG87)							
P1	62.675	57.25	12.357	2.987	1.32	5.775	18.582
P2	54.847	56	17.625	2.95	1.56	12.065	27.845
F1	53.315	58.25	8.315	2.5	1.455	5.675	15.442
F2	59.662	57	12.81	3.947	1.545	4.29	12.532
BC1	62.75	56.375	11.187	3.377	1.302	5.872	15.45
BC2	60.987	56.5	7.042	3.027	1.507	6.047	13.882
L.S.D at 5%	N.S	N.S	4.56	N.S	0.178	3.12	9.626
Cross 3 (G83xPromising hybrid)							
P1	57.375	58	12.9	2.6	1.56	10.105	21.38
P2	52.225	59.25	16.35	2.85	1.575	11.532	27.412
F1	38.855	57.25	4.95	1.98	1.25	3.855	9.75
F2	56.05	56.167	11.59	4.16	1.612	7.08	10.792
BC1	53.245	56.75	7.52	2.865	1.282	5.81	13.882
BC2	48.027	57.125	10.485	3.187	1.365	10.385	24.985
L.S.D at 5%	12.405	N.S	4.33	0.76	N.S	5.048	11.37
Cross4 (Dandara x promising hybrid)							
P1	57.375	58	12.9	2.6	1.56	10.102	21.38
P2	48.79	58	12.3	1.8	1.402	8.332	19.657
F1	48.45	58.75	5.3	2.367	1.377	3.002	7.902
F2	67.387	56.417	11.152	3.86	1.56	8.185	10.192
BC1	50.482	57.25	7.85	2.777	1.392	4.84	12.147
BC2	49.35	56.875	10.505	2.445	1.447	7.37	15.967
L.S.D at 5%	17.237	N.S	3.54	0.75	N.S	N.S	11.175

Table (3) resting for A, B and C along with six parameter gene effects for yield and its contributing traits in cotton

Characters scaling test	Plant height				Days to 50% flowering				No. of open bolls				No. of unopened bolls			
	Cross 1	Cross2	Cross 3	Cross 4	Cross 1	Cross2	Cross 3	Cross 4	Cross 1	Cross2	Cross 3	Cross 4	Cross 1	Cross2	Cross3	Cross 4
A	3844.76**	4354.18**	1760.09**	454.762**	2646.88**	2787.42*•	2982.43**	2977.48**	181.136"	101.027"	-39.894"	8.197"	-24.168"	12.251"	-5.778"	1.139
B	8610.453**	9073.511**	4656.579**	4083.935**	5332.806**	5535.361**	5547.028**	5506.472**	-23.746"	58.062**	260.923**	222.692**	56.484"	32.325"	30.854"	15.876**
C	769.263**	1568.173**	1149.972**	1274.189**	1451.361	1454.389**	1507.056**	1511.861**	229.755"	86.942"	86.802"	62.662"	2.837"	5.684"	3.291"	3.4250"
m	46.662**	59.662"	56.05**	67.387"	57.335"	57"	56.167"	56.417"	10.115"	12.81"	11.59"	11.152"	3.145"	3.947"	4.16"	3.86"
d	-5.265**	1,762"	5.217"	1.132"	0.875**	-0.125**	-0.375"	0.375"	-6.425"	4.145"	-2.965"	-2.655"	0.132"	0.35"	-0.322"	0.332"
h	35.736"	3.378**	-37.6**	-74.517"	-6.09"	-0.625"	1.706"	3.33"	1.921"	-21.4563"	-20.025**	-15.2"	1.927"	-3.448"	-5.28"	-4.827"
·	33.31**	8.825**	-21.655"	-69.885"	-5.59"	-2.25"	3.08**	2.58"	15.42"	-14.78"	-10.35"	-7.9**	2,815"	-2.98"	-4.535"	-4.995"
J	-11.181**	-2.151"	2.642"	-3.16"	0.875"	-0.75"	0.25"	0.375"	-2.048"	6.778"	-1.24"	-2.955"	-0.042"	0.331"	-0.197"	-0.067"
·	-91.502**	-32.147**	6.42**	73.258"	9.84"	6.25"	0.92"	2.67"	-6.302"	24.932"	13.49"	6.99"	-9.685"	1.107"	1.84"	3.685"

Table (3) Conti.

Characters scaling test	Boll weight / gm				Lint yield / plant / gm				Cotton yield /plant(gm)			
	Cross 1	Cross2	Cross 3	Cross4	Cross 1	Cross2	Cross3	Cross 4	Cross 1	Cross2	Cross 3	Cross 4
A	-2.305*	-1.468	-0.939	-1.439	-161.405**	-68.219**	-38.885**	7.102"	-1133.06"	-323.136"	-707.722"	-459.971"
B	5.882**	3.358**	2.597**	3.538**	6.294**	27.468"	88.832**	123.266"	602.932"	62.243"	630.549**	482.607"
C	0.900	0.955	0.976	0.946	84.304**	36.143**	46.100**	27.337"	461.208"	219.278**	248.098"	155.704"
m	1.655	1.545	1.612	1.56	3.41**	4.29**	7.08**	8.185"	10.107"	12.532	10.792"	10.192"
d	-0.3	-0.205**	-0.082	-0.055**	-4.3**	-0.175**	-4.575**	-2.53"	-7.257"	1.567	-11.102"	-3.82"
h	-0.05**	-0.545**	-1.472**	-0.663**	10.218**	3.165**	[illegible]92"	-14.535"	38.991"	0.763	19.918**	2.843"
1	-0.21**	-0.56**	-1.155**	-0.56**	20.23**	6.68**	[illegible]07"	-8.32"	58.075"	8.535	34.565"	15.46"
J	-0.242	-0.085	-0.075	-0.133	-1.128**	3.24**	-3.36"	-3.415"	-1.933"	6.198	-8086"	-4.681"
1	-0.53**	0.73**	1.495**	0.597**	-12.687**	-0.79**	[illegible]115"	8.34"	-58.662"	10.112**	-44.007"	-14.847"

These results are in agreement with those obtained by **Okaz (1974) Bhardwaj and Kapoor (1998), Esmail *et al.* (1999), El-Disouqi and Ziena (2001) Ahmad *et al*, (2003),Abdel- Hafez *et al.*(2007*) and* Esmail (2007)** . The signs of (h) and (L) were opposite in the case of plant height, days to flowering , no. of open bolls, no. of unopened bolls ,boll weight, lint yield and cotton yield/plant, in most crosses suggesting duplicate type of non-allelic interaction in these traits.

The inheritance of all traits studied was controlled by additive and non-additive genetic effects, with greater values of dominance gene effect than the additive one in most cases. Among the nonadditive effect, the other fixable component, i.e.,additive x additive (i) type of interaction, was also significant and constituted a larg portion of the gene effects, therefore, it may be possible to exploit it. The same findings was also reported by **Tandon *et al.*(1968). Ahuja and Dhayal(2007)** found preponderance of non-additive gene action in the inheritance of cotton yield per plant and majority of its components. **Jagtab (1986)**, stated that when additive effects are larger than the non-additive, it is suggested that selection in early segregating generations would be effective, while, if the non-additive portion are larger than additive, the improvement of the characters need intensive selection through later generation, when epistatic effects were significant for traits, the possibility of obtaining desirable segregates through inter-mating in early generations by breaking undesirable linkage or it is suggested to adopt recurrent selection for handling the above crosses for rapid improvement. **Abo El-Zahab and Amein(2000) and Esmail (2007)** reported the same conclusion. However, **Ramalingam and Sivasamy (2002)**stated that the predominance of additive x dominance epistatic effect (highest magnitude) for the trait suggesting delayed selection and inter-mating the segregates followed by recurrent selection for improvement of this trait.

Heterosis, inbreeding depression (%),phenotypic (PCV)and genotypic (GCV)coefficient of variability and genetic advance in four cotton crosses for all traits studied are presented in **Table (4).** Heterosis relative to mid-parent and better parent was found to be significantly positive for plant height in one cross no. of unopened bolls in one cross and boll weight in two crosses while, it was negative in all other traits .These results are in harmony with those obtained by **El-Disouqi and Ziena (2001)**. Concerning inbreeding depression, positive and highly significant

Table(4): Heterosis, inbreeding depression (%) and phenotypic (PCV)and genotypic (GCV)coefficient variability in four cotton crosses for all studied traits.

character	Cross	Heterosis		Inbreeding depression (%)	Phenotypic coefficient variability (PCV)	Genotypic coefficient variability (GCV)
		M.P	B.P			
Plant height	Cross1	6.184	25.043**	-12.021**	67.752	32.517
	Cross2	-9.268	-2.794	-11.905**	68.278	16.014
	Cross3	-29.096**	-25.600**	-44.254**	67.563	30.071
	Cross4	-8.726	-0.696	-39.086**	67.479	41.804
Days to 50% flowering	Cross1	-0.873	-0.873	-1.030	66.668	5.449
	Cross2	2.869	4.017	2.145	66.678	0.0
	Cross3	-2.345	-1.293	1.890	66.6[illegible]7	0.0
	Cross4	1.293	1.293	3.970*	66.669	0.0
No. of open bolls	Cross1	-58.693**	-65.296**	-6.473**	114.122	0.0
	Cross2	-44.534**	-52.822**	-54.058**	96.313	63.072
	Cross3	-66.153**	-69.724**	-134.141**	99.161	58.061
	Cross4	-57.936**	-58.914**	-110.425**	99.215	69.322
No. of unopened bolls	Cross1	-34.466**	-29.687**	-86.370**	70.204	45.380
	Cross2	-15.789**	-15.254**	-57.90**	70.020	35.426
	Cross3	-27.339**	-23.846**	-110.101**	68.479	52.79[illegible]
	Cross4	7.613**	31.527**	-63.041**	73.112	55.194
Boll weight(gm)	Cross1	11.962**	7.347**	-10.517**	66.678	34.050
	Cross2	1.0416**	-6.730**	-6.185**	66.668	21.022
	Cross3	-20.255*	-20.634**	-29.00**	66.674	26.276
	Cross4	-7.004**	-11.698**	-13.248**	67.566	26.019
Lint yield/plant (gm)	Cross1	-65.182**	-71.141**	36.231**	66.714	0.0
	Cross2	-38.248**	-54.978**	24.405**	69.543	0.0
	Cross3	-64.363**	-66.572**	-83.657**	98.735	23.488
	Cross4	-67.426**	-70.279**	-172.606*	95.971	71.624
Cotton yield/plant (gm)	Cross1	-56.093**	-62.034**	32.334**	66.673	0.0
	Cross2	-33.476**	-44.541**	18.844**	68.301	0.0
	Cross3	-60.034**	-64.432**	-10.692**	66.735	0.0
	Cross4	-61.486**	-63.037**	-28.978**	66.810	0.0

values was obtained for days to flowering in three crosses, lint yield per plant in the two crosses and cotton yield/plant in two crosses however, it was significantly negative in all the other traits. The coincidence of sign and magnitude of heterosis and inbreeding depression was detected for most traits in four cotton crosses. This is logic and expected since the expression of heterosis inF1 will be followed by a considerable reduction in F2 due to homozygosity. The contradiction between heterosis and inbreeding depression for boll weight ,lint yield/plant (gm) and cotton yield/plant could be due to the presence of linkage between genes in these plant materials. Cotton has a relatively low inbreeding depression, **Abdalla(2007)**.

The phenotypic coefficient(PCV) of variability values were higher than (GCV) for all traits in the four crosses (Table 4). Results indicated also that both PCV and GCV values were much close, this revealed the major proportion of the observed variation was contributed by the genetic factor in additive genetic variance in most values for phenotypic and genotypic coefficient of variability. Therefore, these traits were highly affected by environmental factors. This indicating high genetic gain suggesting the probable role of additive gene effects for these traits. These results are in harmony with those obtained by **El-Hashash(2004)**

These information of great importance for cotton breeder to improve yield potential and release a new cotton genotypes

REFERENCES

Abdalla, A.M.A., (2007). Inter and intraspecific cotton crosses 1- Heterosis performance and generations correlation targeted growth, earliness and yield variables of F1and F2. Egypt. J. Plant Breed., 11(2): 793-811.

AbdeL-Hafez, A.G., M.A. EL-Hity, H.A. ELHarony and M.A. Abdel-Salam, (2007). Estimates of genetic parameters using six populations and biparental crosses in cotton (*Gossypium barbadense* L.). Egypt.J. Plant Breed., 11(2): 669-680.

Abo El-Zahab, A.A. and M.M.M. Amein, (2000). Prospectives for breeding short season cotton.1-Combining ability for cotton yield and its contributing variables. Proc.9th Conf. Agron.,Minufiya Univ., 1-2 Sept., : 305-329.

Ahmad, S., M.Z. Iqpal, S. Ahmad, M.A. Sadiq and N. Khan, 2003. Genetic analysis of morphological chatacteristics and seed oil content of cotton (*Gossypium hirsutum* L.). J. of Biol. Sci.,3(4): 396-405.

Ahuja, S. and L. Dhayal, (2007). Combining ability estimates for yield and fiber quality traits in 4x13 line x tester crosses of (*Gossypium hirsutum* L.). Euphytica, 153(1-2): 87-98.

Bhardwaj, R.P. and C.J. Kapoor, (1998). Genetics of yield and its contributing traits in upland cotton (*Gossypium hirsutum* L.). Proc. of the World Cotton Research Conference 2- Athens. Sept. 6-12.pp: 214-216.

El-Disouqi,A.E.and A.M.Ziena (2001). Estimates of some genetic parameters and gene action for yield and yield components in cotton .Journal of Agricultural Sciences,vol26-5, 3401-3409- Egypt.

E El Hashash .E F . (2004). Possibility of improving Egyptian cotton through hybridization with Egyptian – American cotton. M. Sc. Thesis, Fac. of Agric., Al-Azhar Univ., cairo,

EL-Okkia, A.F.H., H.A. EL-Harony and M.O. Ismail,(1989). Heterosis, inbreeding depression, gene action, and heritability estimates in an Egyptian cotton cross. (*Gossypium barbadense* L.).Com. Sci. & Dev. Res., 28: 213-231.

Esmail R.M. (2007). Genetic analysis of yield and contributing traits in two intra-specific cotton crosses .J. of Applied Sci. Res., 3(12): 2075-2080.

Esmail, R.M., F.A. Hendawy, M.S. Rady and A.M. Abdel-Hamid,(1999). Genetic studies on yield and yield components in one inter- and two intra-specific crosses of cotton. Egypt. J. Agron..2: 37-51.

Goldringer, I., P. Prabant and A.Gallais, (1997). Estimation of additive and epistatic genetic variances for agronomic traits in a population of doubled-haploid lines of wheat. Heredity,79: 60-71.

Gomaa, M.A.M. and A.M.A. Shaheen, (1995). Earliness studies in inter-specific cotton crosses.Annals Agric. Sci., Ain Shams Univ., Cairo, 40(2): 629-637.

Hayman, B.I., (1958). The separation of epistatic from additive and dominance variation in generation means. Heredity, 12: 371-390.

Jagtap, D.R., (1986). Combining ability in Upland cotton. Indian J. of Agric. Sci., 56(12): 833-840.

Mather, K. and J.L. Jinks, (1982). Biometrical Genetics. 3 ed Chapman and Hall, London, pp: 396.

Mather, K. and J.L. Jinks, (1982). Biometrical Genetics. 3 ed Chapman

and Hall, Londord n,pp: 396.of some economic traits in cotton. M. Sc. Thesis, Fac. of Agric., Al-Azhar Univ., Cairo,Egypt.

Ramalingam, A. and N. Sivasamy, (2002). Genetics and order effects of seed cotton yield in upland cotton (*Gossypium hirsutum* L.) triallel analysis. Indian J. Genetics, 62(4): 359-360.

Singh, R.K. and B.D. Chaudhary (1977). Biometrical method in quantitative genetic analysis. Kalyani. Pob. Ludhiene. India.

Tandon, J.P., A.B. Joshi and K.B.L. Jain,(1968).Genetic analysis of yield in a six row and two row varietal cross in barley. 1. Genetics of yield and its primary components. Indian J. 0f Genet. & Plant Breeding., 28(3): 239-251.

الملخص العربى

تقدير القياسات الوراثية باستخدام العشائر الستة في القطن المصري

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أجريت هذه الدراسة بمزرعة الغريب بأسيوط التابعة لكلية الزراعة جامعة أسيوط خلال ثلاثة مواسم زراعية (٢٠٠٤، ٢٠٠٥، و٢٠٠٦) استخدم في هذه الدراسة سبعة اباء من القطن المصري وهي جيزه٨٨، ٩٠، ٨٧، ٨٩، الهجين المبشر ، جيزة ٨٣، ودندرة وتم تكوين اربعة هجن وهي:الهجين الأول (ج ٨٨xج٩٠)،الهجين الثاني (ج ٨٧ x ج ٨٩) ، الهجين الثالث (الهجين المبشر Xج٨٣) والهجين الرابع (الهجين المبشر Xدندرة) وعند الازهار تم عمل التهجينات المطلوبة بينها للحصول علي حبوب الجيل الأول لكل هجين، ثم زرعت حبوب الآ باء والجيل الأول الهجين في الموسم الزراعي الثاني وتم التهجين بينها وبين الآباء للحصول علي حبوب الهجين الرجعي الأول لكل الأبوين وكذلك تم عمل التلقيح الذاتي للجيل الأول للحصول علي حبوب الجيل الثاني لكل هجين. وفي الموسم الثالث ٢٠٠٦تم زراعة التجربة في تصميم قطاعات كاملة العشوائية في ثلاث مكررات تشمل عشائر الآباء والجيل الأول والثاني والجيلين الرجعيين للآباء. وحللت النتائج المتحصل عليها لصفات : ارتفاع النبات ،موعد التزهير، عدد اللوز المتفتح ،عدد اللوز غير المتفتح ،وزن اللوزة ،محصول الشعر ومحصول القطن للنبات الفردي أوضحت النتائج ما يلي :

١-وجود اختلافات معنوية بين التراكيب الوراثية للآباء المستخدمة في الهجن لمعظم الصفات المدروسة.

٢- أن توارث كل الصفات المدروسة كان محكوما بالفعل الجيني من النوع المضيف وغير المضيف مع تأثير اعلي لجينات السيادة عن جينات الاضافة في معظم الحالات وقد ظهر ما بين التأثيرات الغير مضيفة خليط من المكونات منها تاثير تفاعل المضيفxالمضيف(i) حيث كان أيضا معنويا وكان تأثير الاضافة(h) متضادا مع تأثير السائدXالسائد(l) في صفات ارتفاع النبات ،أيام التزهير ،عدد اللوز المتفتح ،عدد اللوز غير المتفتح ،وزن اللوزة،محصول الشعر ومحصول القطن / النبات لمعظم الهجن مما يوحي بتأثير مزدوج للتفاعلات الغير أليلية لهذه الصفات ،كذلك فان تأثير الجينات من نوع المضيف Xالسائد(J) كان أيضا معنويا لكل الصفات ولكل الهجن ما عدا صفة وزن اللوزة.

٣- كان لتأثير الجينات من نوع السائد x السائد تأثيرا معنويا في توارث كل الصفات كما لوحظ أن تأثير جينات الاضافة كان أقل نسبيا من تأثير جينات السيادة في معظم الحالات مما يزيد من أهمية الانتخاب بطريقة تسجيل النسب كبرنامج تربية لتحسين هذه العشائر.

٤- لوحظ تضاد نتائج قوة الهجين والتربية الداخلية في معظم الصفات لكل الهجن المدروسة.