J. Agric. Sci. Mansoura Univ., 28(4): 2477 - 2485, 2003

DIALLEL ANALYSIS IN SOME INTERVARIETAL CROSSES OF COTTON AT DIFFERENT LEVELS OF NITROGEN FERTILIZER

Lasheen, A.F.
Cotton Research Institute, Agricultural Research Center

ABSTRACT

A number of Egyptian and Russian cotton cultivars were grown during the two successive seasons of 2000 and 2001 at Sakha Agricultural Research Station for a preliminary study. Observations and data were recorded for yield and its components, and fiber properties. Accordingly six cultivars comprised five Egyptian and one Russian all belong to *Gossypium barbadense* L., were chosen for the present study.

It is clearly evident that significant differences were existed among parents and resultant crosses. This indicated that these populations were greatly differed in most studied characters at 30 (I) and 60 (II) unit of nitrogen fertilization.

General combining ability mean squares were significant for all studied characters except for lint yield/plant in the two doses of nitrogen and in the first dose for boll weight. Specific combining ability revealing significant mean squares for all lint yield characters and for boll weight and seed index in second dose of nitrogen fertilization only.

Concerning pressley index and lint length at 50% and 2.5% span length, Karsh (P_1) and Giza 86 (P_6) had significant positive and desirable g.c.a. effects at the two levels of nitrogen. The parental cultivars: Giza 80 (P_4) and Giza 86 (P_6) gave significant positive g.c.a. for seed index. Giza 80 and Giza 89 showed the same trend for micronaire reading and Giza 89 for pressley index.

The most desirable inter-and intra-allelic interactions were represented in the combinations, (Karsh x Giza 83), (Karsh x Giza 80), (Giza 85 x Giza 83) and (Giza 80 x Giza 86) for micronaire reading and length at 50% and 2.5%, (Karsh x Giza 89) and (Giza 85 x Giza 89) for fineness, (Giza 85 x Giza 80), (Giza 83 x Giza 80) and (Giza 80 x Giza 89) for length (50% and 2.5% span length), (Karsh x Giza 85) and (Giza 83 x Giza 86) for pressley index and boll weight, (Giza 85 x Giza 89), (Giza 83 x Giza 89) and (Giza 80 x Giza 86) for pressley index and (Giza 83 x Giza 89) and (Giza 83 x Giza 86) for seed index over the two levels of nitrogen fertilization.

INTRODUCTION

Cotton is an important source in the Egyptian economy. Accordingly, improving cotton is of great significance for plant breeders who need more information about the genetic behaviour of the economic characters of cotton.

During the last decades, there has been an increase in the number of cotton varieties, which are available for production. These varieties were morphologically similar and in their yielding productivity, due to the insufficient genetic variation among them. Therefore, cotton breeders could utilize new variability from the available natural resources or increasing it through hybridization.

al. (1983), Jatagtap and Kolhe (1987) showed that both additive and dominance genetic effects were controlling to the inheritance of lint percentage, Abo-Arab *et al.* (1992) noticed that dominance genetic variance was the major component of genetic variance for lint fineness and strength. Also, Abo-Arab (1999) found that additive genetic variance was the predominant variance component controlling the inheritance of both boll weight and lint percentage.

The main purpose of this investigation was to determine the nature of the genetic components controlling the inheritance of some characters in cotton.

MATERIALS AND METHODS

A. Field procedures:

A number of Egyptian and Russian cotton cultivars were grown during the two successive seasons of 2000 and 2001 at Sakha Agricultural Research Station for a preliminary study. Observations and data were recorded for yield and its components and fiber properties. Accordingly six cultivars comprised five Egyptian i.e. Giza 85, Giza 83, Giza 80, Giza 89 and Giza 86 and one Russian i.e. Karshenskey, all belong to *Gossypium barbadense* L., were chosen for the present study.

In the 2000 season, the six parental cultivars sown at Sakha Agricultural Research Station, were intercrossed according to a diallel cross mating design to obtain all the possible F_1 hybrids. Artificial self pollination for each parent was also carried out to get new selfed seeds. In 2001 season, two experiments were carried out at 30 and 60 units of nitrogen fertilization. In each experiment, the six parents and their 15 F_1 hybrids were grown in a randomized complete block design with three replications. Each plot consisted of five rows 4.5 meters long and 60 cm a part. Hills were spaced at 50 cm apart within each row and thinned to two plants. Cultural practices were applied as usually recommended for ordinary cotton fields.

Data were recorded on ten guarded hills randomly sampled from each plot. The study covered seven characters which could be grouped into two categories as follows:

I. Yield and its components:

1. Lint yield per plant; average total weight of lint yield from each plant in grams.
2. Boll weight; average weight of five bolls in grams taken at random from each plant.
3. Lint percentage; the relative amount of lint in a seed cotton sample, expressed in percentage.
4. Seed index; the weight in grams of 100 seeds taken at random from each plant.

II. Fiber properties:

1. Fiber fineness; the air flow method was follows using the micronaire instrument.

2. Fiber strength; was measured by the pressley fiber strength tester at zero gauge.
3. Fiber length; the digital fibro graph was use to measure; 50% and 2.5% span length for this concern.

B. Statistical procedures:

The data obtained for each character were analysed on individual plant mean basis. An ordinary analysis of variance was separately made for each level of nitrogen fertilization.

General and specific combining ability estimates were obtained by employing Griffin's (1956) diallel crosses analysis designated as method 2 model 1.

RESULTS AND DISCUSSION

Mean performance:

The first step in any biometrical analysis is to calculate means from which all other statistics derived, the importance of means arises from its simplicity and reliability. Table 1 shows significant or high significant differences among the genotypes, suggesting the presence of considerable amount of variation among them for most yield component characters and for all lint yield properties under study.

Table (1): The genotype mean performances for all studied characters.
I.Yield and yield components

Characters	Lint yield/plant		Boll weight		Lint percentage		Seed index	
Genotypes	I	II	I	II	I	II	I	II
Karsh.	20.1	22.9 a	2.6 b-e	2.8 cd	36.0	36.1 a-e	9.2 de	9.7 h
Giza 85	11.4	14.7 bcd	2.7 a-e	2.8 cd	36.5	36.5 a-d	10.0 abc	10.4 cd
Giza 83	6.4	10.0 d	2.4 de	2.5 ef	36.5	36.5 a-d	9.2 de	9.7 h
Giza 80	11.9	15.2 bc	2.8 a-d	3.0 a-c	37.4	37.4 a	9.7 a-d	10.2 ef
Giza 89	12.2	15.2 bc	3.1 a	3.2 a	33.9	34.0 fgh	9.8 abc	10.2 ef
Giza 86	11.6	14.9 bc	2.7 a-e	2.9 bcd	36.2	36.2 a-d	9.9 abc	10.3 de
Karsh. x Giza 85	11.9	15.0 bc	2.8 a-d	2.9 bcd	35.0	35.1 b-h	9.5 cde	10.0 g
Karsh. x Giza 83	10.4	13.6 bcd	2.3 e	2.5 ef	36.9	36.9 ab	9.1 e	9.6 h
Karsh. x Giza 80	13.0	16.1 bc	2.3 e	2.4 f	35.6	35.8 a-f	9.6 b-e	10.0 g
Karsh. x Giza 89	9.5	12.8 cd	2.3 e	2.5 ef	34.0	34.1 e-h	9.2 de	9.7 h
Karsh. x Giza 86	10.1	13.2 bcd	2.5 cde	2.7 d	36.5	36.6 abc	9.6 b-e	10.1 fg
Giza 85 x Giza 83	10.9	13.9 bcd	2.4 de	2.5 ef	34.7	34.8 c-h	9.7 a-d	10.1 fg
Giza 85 x Giza 80	12.4	15.7 bc	2.6 b-e	2.7 d	36.4	36.4 a-d	9.9 abc	10.3 de
Giza 85 x Giza 89	10.6	13.6 bcd	2.5 cde	2.7 d	33.1	33.2 h	9.8 abc	10.2 ef
Giza 85 x Giza 86	13.0	15.9 bc	2.5 cde	2.7 d	34.4	34.5 d-h	9.9 abc	10.3 de
Giza 83 x Giza 80	10.6	13.7 bcd	2.8 a-d	3.0 abc	34.8	34.9 b-h	10.1 ab	10.56 bc
Giza 83 x Giza 89	13.9	16.9 bc	3.0 ab	3.1 ab	33.6	33.7 gh	10.1 ab	10.5 bc
Giza 83 x Giza 86	14.5	17.6 b	2.9 abc	3.1 ab	36.2	36.2 a-d	10.2 a	10.7 a
Giza 80 x Giza 89	13.9	16.9 bc	2.9 abc	3.0 abc	34.0	34.1 e-h	10.2 a	10.6 ab
Giza 80 x Giza 86	15.5	17.5 bc	2.8 a-d	2.9 bcd	35.6	35.7 a-g	10.0 abc	10.4 cd
Giza 89 x Giza 86	12.4	15.8 bc	2.6 b-e	2.8 cd	35.8	35.9 a-f	9.8 abc	10.3 de

Table (1): Continued. II. Fiber properties.

Characters	Micronaire reading		Pressley index		S.L.50%		S.L. 2.5%	
Genotypes	I	II	I	II	I	II	I	II
Karsh.	4.2 c	4.4 bc	10.4 b	10.3 cd	15.2 g	15.3 de	29.2 h	29.3 j
Giza 85	3.4 g	3.5 f	9.9 fg	9.9 ef	13.7 j	13.8 h	28.5 i	28.8 k
Giza 83	4.5 ab	4.5 b	9.9 fg	9.8 fg	14.6 i	14.5 g	29.6 g	29.7 i
Giza 80	4.6 a	4.7 a	9.8 gh	9.9 ef	13.5 k	13.6 i	26.5 j	26.7 l
Giza 89	4.4 b	4.5 b	9.7 h	9.7 g	15.3 fg	15.5 c	30.3 f	30.3 g
Giza 86	4.0 d	4.0 fg	9.9 fg	10.0 e	15.7 bc	15.7 b	30.7 d	30.8 d
Karsh. x Giza 85	4.0 d	4.2 de	10.0 ef	10.0 e	14.5 i	14.6 fg	29.5 g	29.7 i
Karsh. x Giza 83	3.8 e	3.9 gh	8.8 k	8.9 j	15.6 cd	156.8 b	30.5 e	30.7 de
Karsh. x Giza 80	4.0 d	4.1 ef	9.9 fg	9.9 ef	15.8 b	15.8 b	33.3 a	33.4 a
Karsh. x Giza 89	4.2 c	4.2 de	10.0 ef	10.2 d	15.2 g	15.4 cd	29.6 g	29.9 h
Karsh. x Giza 86	4.6 a	4.4 bc	9.9 fg	9.9 ef	15.2 g	15.3 de	30.3 f	30.5 f
Giza 85 x Giza 83	3.6 f	3.8 hi	8.8 k	8.9 j	15.3 fg	15.5 c	30.5 e	30.5 f
Giza 85 x Giza 80	4.2 c	4.3 cd	9.5 i	9.5 h	15.5 de	15.7 b	30.5 e	30.6 ef
Giza 85 x Giza 89	3.8 e	3.7 i	10.3 bc	10.5 b	13.7 j	13.8 h	29.6 g	29.6 i
Giza 85 x Giza 86	4.2 c	4.1 ef	9.1 j	9.0 ij	14.5 i	14.7 f	29.3 h	29.6 i
Giza 83 x Giza 80	4.4 b	4.5 b	9.0 j	9.0 ij	15.4 ef	15.5 c	31.5 b	31.6 b
Giza 83 x Giza 89	4.5 ab	4.4 bc	10.8 a	11.0 a	14.5 i	14.6 fg	29.6 g	29.6 i
Giza 83 x Giza 86	4.2 c	4.1 ef	10.1 de	10.4 bc	15.5 de	15.8 b	30.6 de	30.7 de
Giza 80 x Giza 89	4.6 a	41.4 bc	9.0	9.1 i	15.5 de	15.7 b	31.3 c	31.3 c
Giza 80 x Giza 86	3.8 e	3.7 i	10.2 cd	10.3 cd	16.3 a	16.4 a	31.2 c	31.3 c
Giza 89 x Giza 86	4.5 ab	4.5 b	10.0 ef	10.4 bc	15.0 h	15.2 e	29.5 g	29.6 i

I, II are 30 and 60 unit of nitrogen fertilizer respectively.

The ordinary analysis of variance for each nitrogen dose for yield components and lint characters are presented in Table 2.

Table (2): Analysis of variance for all studied characters. I. Yield and yield components.

Source of variation	d.F	Lint yield/plant		Boll weight		Lint percentage		Seed index	
		I	II	I	II	I	II	I	II
Replicates	2	28.9015	4.8887	0.0272	0.0058	0.7431	0.1376	0.0007	0.0146
Genotypes	20	21.3225	18.7429*	0.1651*	0.1468**	4.3887	4.2396**	0.3434**	0.2848**
Parents (P)	5	58.5156**	52.0157**	0.1596	0.1427**	4.0360	3.8782	0.3680*	0.3103**
Crosses (C)	14	9.5576	8.1282	0.1680*	0.1495**	3.9971	3.8585*	0.3394**	0.2790**
P x C	1	0.0660	0.9845	0.1523	0.1286*	11.6346*	11.3825*	0.2766	0.2395**
G.C.A.	5	21.5302	18.8276	0.1949	0.1716**	9.0625**	8.7708**	0.8260**	0.6156**
S.C.A.	15	21.2532	18.7146	0.1552	0.1385**	2.8307	2.7293	0.1826	0.1746**
Error	40	13.9196	8.3591	0.0835	0.0275	2.4979	1.5873	0.1235	0.0203
G.C.A.		1.013	1.006	1.256	1.239	3.202	3.214	4.524	3.526
S.C.A.									

Table (2): Continued. II. Fiber properties.

Source of variation	d.F	Micronaire reading		Pressley index		S.L.50%		S.L. 2.5%	
		I	II	I	II	I	II	I	II
Replicates	2	0.0005	0.0312	0.0471	0.0123	0.0018	0.0029	0.0089	0.0115
Genotypes	20	0.3500**	0.3185**	0.9177**	1.0040**	1.6294**	1.7200**	5.2053**	4.9446**
Parents (P)	5	0.5382**	0.5886**	0.1846**	0.1343**	2.4649**	2.4036**	6.8384**	6.3706**
Crosses (C)	14	0.3076**	0.2367**	1.1917**	1.3650**	1.2318**	1.2990**	3.3737**	3.2298**
P x C	1	0.0031	0.1148**	0.7487**	0.2988**	3.0169**	4.1966**	22.6838	21.8231**
G.C.A.	5	0.7045**	0.5919**	0.4725**	0.6000**	2.1615**	2.0250**	1.7083**	1.6812**
S.C.A.	15	0.2318**	0.2274**	1.0661**	1.1387**	1.4520**	1.6183**	6.3710**	6.0324**
Error	40	0.0205	0.0091	0.0218	0.0092	0.0096	0.0119	0.0049	0.0051
G.C.A.		3.039	2.0603	0.443	0.527	1.489	1.251	0.268	0.279
S.C.A.									

I, II are 30 and 60 unit of nitrogen fertilizer respectively.

It is clearly evident that significant differences were existed among various genotypes, including parents and resultant crosses. This indicated that these populations are greatly differed in most studied characters in both 30(I) and 60(II) unit of nitrogen which might be due to their partially different genetic backgrounds and origins.

Parents versus crosses mean squares as an indication to average heterosis over all crosses were found to be significant for all characters under investigation except for lint yield/plant in the two doses of nitrogen and for boll weight, seed index, micronaire reading and 2.5% span length in the first dose of nitrogen fertilization. Okasha (1989), showed that the interaction of parents and crosses with two nitrogen levels during two years were significant for boll weight and seed index. Al-Zanati (1993), noticed that the interactions of nitrogen levels with general and specific combining abilities mean squares were highly significant for most yield component characters.

Variances of general and specific combining abilities have been determined and related to the possible types of gene action involved (Sprague and Tatum, 1942). The variance of general combining ability includes the additive genetic portion while specific combining ability is usually including the non additive genetic portion of the total variance arising largely from dominance and epistasis deviations.

General combining ability mean squares are significant for all studied characters except for lint yield/plant at the two doses of nitrogen and at the low dose for boll weight, while specific combining ability mean squares revealing significance for all lint yield characters, boll weight and seed index at high dose of nitrogen fertilization. Hence, GCA/SCA ratio was used as a measure to reveal the nature of genetic variance involved high values of more than unity were obtained for all studied characters except pressley index, and S.L. 2.5%, indicating that the largest part of the total genetic variability was associated with these characters showing traits was the importance of additive and additive by additive gene action. The greatest role of the n on additive was noticed in the inheritance of pressley index and S.L. 2.5%. El-Helw (1990), found that both general and specific combining ability variances were highly significant for boll weight, lint percentage and seed index. Also, Dagaonkar and Malkhandale (1993), showed the same result for lint yield./plant, boll weight and lint percentage, indicating that the magnitude of SCA variance was greater than GCA variance for these characters.

Estimates of general combining ability effects ($\widehat{g}_i$) for individual parental lines in each trait are presented in Table 3. Significant departure from zero, where ever the direction, would indicate that the line is much better or much poorer than the overall average of the parental lines involved in the test. High positive values would be of interest under all characters in question except micronaire reading.

Table (3): Estimates of parental general combining ability effects for all studied characters. I.Yield and yield components.

Characters / Genotypes	Lint yield/plant		Boll weight		Lint percentage		Seed index	
	I	II	I	II	I	II	I	II
Karesh P_1	1.2097	1.1958*	-0.1306*	-0.1208**	0.2986	0.3056	-0.3458**	-0.2958**
G 85 P_2	-0.4778	-0.4250	-0.0472	-0.0458	-0.1472	-0.1444	0.0792	0.0542*
G 83 P_3	-1.5444*	-1.4208**	-0.0389	-0.0375	0.1736	0.1639	-0.0708	-0.0625*
G 80 P_4	0.4764	0.4042	0.0569	0.0542	0.4403	0.4389	0.1292*	0.1083**
G 89 P_5	-0.0819	-0.1000	0.1236*	0.1167**	-1.1764**	-1.51569**	0.0667	0.0583*
G 86 P_6	0.4481	0.3458	0.0361	0.0333	0.4111	0.3931	0.1417*	0.1375**
L.S.D. Gi-Gj	2.1766	1.6867	0.1686	0.0968	0.9220	0.7350	0.2049	0.0831

Table (3): Continued. II. Fiber properties.

Characters / Genotypes	Micronaire reading		Pressley index		S.L.50%		S.L. 2.5%	
	I	II	I	II	I	II	I	II
Karesh P_1	-0.0292	0.0389*	0.1333**	0.0764**	0.1792**	0.1792**	0.1222**	0.1569**
G 85 P_2	-0.3208**	-0.2861**	-0.1042**	-0.1278**	-0.5250**	-0.5208**	-0.5028**	-0.4847**
G 83 P_3	0.0458	0.0639**	-0.150**	-0.1361**	0.0208	0.0292	0.1597**	-0.1403
G 80 P_4	0.1292**-	0.1431**	-0.1500**	-0.1528**	0.0375*	0.0292	0.306**	0.0319*
G 89 P_5	0.1542**	0.1056**	0.1500**	0.2097**	-0.0792**	-0.0542**	-0.0528**	-0.0931**
G 86 P_6	0.0208	-0.0653**	0.0958**	0.1306**	0.3667**	0.3375**	0.2431**	0.2486**
L.S.D. Gi-Gj	0.0835	0.0556	0.0861	0.0559	0.0570	0.0635	0.0408	0.0414

I, II are 30 and 60 unit of nitrogen fertilizer respectively.

Concerning pressley index and lint length at 50% and 2.5% span length, Karsh (P_1) and Giza 86 (P_6) had significant positive and desirable G.C.A. effects at the two levels of nitrogen. The parental cultivars Giza 80 (P_4) and Giza 86 (P_6) gave significant positive G.C.A. for seed index and Giza 80 and Giza 89 appeared the same trend for micronaire reading and Giza 89 for pressley index. Therefore, these cultivars could be considered as an excellent parents for the previous characters and may be used in developing new Egyptian cotton varieties characterized by high values for pressley index, lint length and seed index. On the other hand, Giza 85 (P_2) gave significant negative G.C.A. effects for all lint characters, while, Karsh (P_1) gave similar estimates for boll weight and seed index, Giza 83 (P_3) for lint yield/plant and pressley index, Giza 80 for pressley index and Giza 89 for lint percentage and lint length, at the two doses of nitrogen fertilization.

The specific combining ability effects of fifteen F_1's for all studied characters are shown in Table 4.

The performance of each parent and the magnitude of heterosis would depend on the value of the specific combining ability effect. The most desirable inter-and intra-allelic interactions were represented by the combinations, (P_1 x P_3), (P_1 x P_4), (P_2 x P_3) and (P_4 x P_6) for micronaire reading and length at 50% and 2.5% (P_1 x P_5), (P_2 x P_5) for fineness (P_2 x P_4), (P_3 x P_4) and (P_4 x P_5) for length (50% and 2.5% span length), (P_1 x P_2) and (P_3 x P_6) for pressley index and boll weight, (P_2 x P_5), (P_3 x P_5) and (P_4 x P_6) for pressley index and (P_3 x P_5) and (P_3 x P_6) for seed index over the two levels of nitrogen fertilization, while P_6 with P_1, P_2 and P_5, revealing undesirable estimates of S.C.A. effect for most studied characters.

Table (4): Estimates of specific combining ability effects for the crosses for all studied characters.

I. Yield and yield components.

Characters	Lint yield/plant		Boll weight		Lint percentage		Seed index	
Crosses	I	II	I	II	I	II	I	II
$P_1 \times P_2$	-1.0351	-1.0232	0.3000*	0.2714**	-0.5054	-0.5119	0.0286	0.0607
$P_1 \times P_3$	-1.5018	-1.4940	-0.1417	-0.1369	1.0405	1.013	-0.2214	-0.1893**
$P_1 \times P_4$	-0.9226	-0.7524	-0.3042*	-0.2952	*-0.4929	-0.4286	0.0786	0.0399
$P_1 \times P_5$	-3.7976	-3.6149*	-0.3042*	-0.2911**	-0.5095	-.4994	-0.2589	-0.2101**
$P_1 \times P_6$	-3.6976*	-3.6274*	-0.0500	-0.0411	0.4363	0.4173	0.0661	0.0774
$P_2 \times P_3$	0.74524	0.4601	-0.1917	-0.1786*	-0.7137	-0.7036	-0.0464	-0.1060
$P_2 \times P_4$	0.2315	0.4018	-0.0875	-0.0702	0.6863	0.6548	-0.0464	-0.0768
$P_2 \times P_5$	-1.0435	-1.1607	-0.1875	-0.1661	-0.9970	-0.9827	-0.0839	-0.0935
$P_2 \times P_6$	0.8565	0.7268	-0.1333	-0.1161	-1.2179	-1.1994	-0.0589	-0.0726
$P_3 \times P_4$	-0.5018	-0.6024	0.1708	0.1548	-1.1679	-1.1536	0.3036	0.2399**
$P_3 \times P_5$	3.3565	3.1018/*	0.2708	0.2589**	-0.8179	-0.7911	0.3661*	0.3565**
$P_3 \times P_6$	3.3899	3.4226*	0.2917*	0.2756**	0.1946	0.1923	0.3911**	0.4774**
$P_4 \times P_5$	1.3357	1.2768	0.0417	.0339	-0.6179	-0.6327	0.2661	0.2524**
$P_4 \times P_6$	2.3690	1.4643	0.0292	0.0506	-0.6054	-0.5827	-0.0089	-0.0601
$P_5 \times P_6$	-0.1060	0.2351	-0.1708	-0.1786*	1.2113	1.1798	-0.1464	-0.1101
L.S.D. :								
Sij-Sik	5.7588	4.4628	0.4460	0.2563	2.4395	1.9446	0.5424	0.2197
Sij-Skl	5.3316	4.1317	0.4129	.2373	2.2587	1.8005	0.5022	0.2035

Table (4): Continued.

II. Fiber properties.

Characters	Micronaire reading		Pressley index		S.L.50%		S.L. 2.5%	
Crosses	I	II	I	II	I	II	I	II
$P_1 \times P_2$	0.1833*	0.2202**	0.2375**	0.2435**	-0.1780**	-0.2107**	-0.2179**	-0.1690**
$P_1 \times P_3$	-0.3833**	-0.3631**	-0.9750**	-0.9149**	0.3429**	0.4726**	0.1196**	0.1726**
$P_1 \times P_4$	-0.2667**	-0.2423**	0.1167	0.1018*	0.4929**	0.4726**	3.0488**	2.9810**
$P_1 \times P_5$	-0.0917	-0138**	-0.0500	0.0393	0.0429	0.1226**	-0.5679**	-0.3940**
$P_1 \times P_6$	0.4417**	0.2661**	-0.00625	-0.1482**	-0.3363**	-0.3691**	-0.0970**	-0.1024**
$P_2 \times P_3$	-0.2583**	-0.1714**	-0.7708**	-0.6440**	0.7470**	0.8393**	0.7780**	0.6476**
$P_2 \times P_4$	0.1917**	0.2827**	-0.0458	-0.0607	0.9637**	1.0393**	0.9071**	0.8893**
$P_2 \times P_5$	-0.2333**	-0.3464**	0.5208**	0.5768**	-0.7196**	-0.8107**	0.0571	-0.0524
$P_2 \times P_6$	0.3000**	0.2577**	-0.6917**	-0.8107**	-0.3321**	-0.3024**	-0.4720**	-0.3940**
$P_3 \times P_4$	0.0917	0.1327**	-0.4917**	-0.5524**	0.3179**	0.3226**	1.2446**	1.2643**
$P_3 \times P_5$	0.1667*	0.0369	1.0417**	1.0518**	-0.4988**	-0.5274**	-0.6054**	-0.607**
$P_3 \times P_6$	-0.0333	-.0589	0.3625**	0.5310**	0.0887	0.2476**	0.0988**	0.810*
$P_4 \times P_5$	0.1167	-0.0089	-0.7333**	-0.7649**	0.5179**	0.5393**	1.2238**	1.1310**
$P_4 \times P_6$	-0.4833**	-0.5381**	0.4875**	0.4810**	0.9054**	0.8476**	0.8946*	0.8560**
$P_5 \times P_6$	0.1917	0.2661**	0.0208	0.2185	-0.2780**	-0.2357**	-0.7220**	-0.7190**
L.S.D. :								
Sij-Sik	0.2209	0.1473	0.2280	0.1481	0.1510	0.1679	0.1079	0.1097
Sij-Skl	0.2045	0.1364	0.2110	0.1372	0.1399	0.1556	0.0998	0.1017

I, II are 30 and 60 unit of nitrogen fertilizer respectively.

Sakr (1974), Salam (1977) and Abo-Arab *et al.* (1992), reported that parents with high G.C.A. effects did not necessarily produce hybrids with high S.C.A. effects and vice versa.

REFERENCES

Abo-Arab, A.R. (1999). Using biparental mating system for encouraging desirable recombinations in cotton. Minufiya J. Agric. Res., 24(6): 1999-2014.

Abo-Arab, A.R.; I.A.I. Helal and H.A. El-Harony (1992). Relative magnitudes of combining ability and heterosis in some Egyptian cotton varieties and their corresponding off-types. J. Agric. Sci. Mansoura Univ., 17(6): 2145-2152.

Al-Zanati, A.M.M. (1993). Estimation of genetic variance for some quantitative traits in cotton. M.Sc. Thesis, Fac. Agric. Minufiya Univ., Egypt.

Abul-Naas, A.A.; A.M. Samra and M.A. El-Kilany (1983). Combining ability for some agronomic and fiber properties in cotton. Minufiya J. Agric. Res., 7: 127-139.

Dagaonkar, V.S. and .D. Malkhondale (1993). Diallel analysis using fixed effect model in upland cotton. Reprinted from J. Indian Soc. Cotton. Improve.,18: 1.

El-Helw, S.S.H. (1990). Diallel analysis of major yield components of cotton cultivars (*Gossypium barbadense* L.). Ph.D. Thesis, Fac. Agric., Kafr El-Sheikh, Tanta Univ., Egypt.

Griffing, J.B. (1956). Concept of general and specific combining ability in relation to diallel crossing system. Australian J. Biol. Sci., 9: 463-493.

Jatagtap, D.R. and A.K. Kolhe (1987). Graphical and combining ability analysis in upland cotton. Indian J. Agric. Sci., 57(7): 456-464.

Okasha, A.A. (1989). Estimates of genetic variances of the major yield components in cotton. Ph.D. Thesis Fac. Agric. Tanta Univ., Egypt.

Salam, A.A. (1977). Diallel analysis evaluating some cotton genetic parameters. Ph.D. Thesis, Cairo Univ.

Salam, A.A.; A.A. El-Gohary and M. El-Moghazi (1981). Breeding potential of some cultivated Egyptian cotton varieties. 2-Heterosis and combining ability of lint yield and fiber properties. Agric. Res. Rev., 59(9): 19-31, Egypt.

Sakr, M.M. (1974). Heterosis and combining ability in inter varietal crosses of Egyptian cotton. Ph.D. Thesis Fac. Agric. Ain Shams Univ.

Spraque, G.F. and L.A. Tatum (1942). General vs. specific combining ability in single crosses of corn. J. Amer. Soc. Agron. 34: 923-932.

التحليل التبادلى فى بعض الهجن الصنفية للقطن عند مستويات مختلفة من التسميد الآزوتى

أنور فوزى لاشين
معهد بحوث القطن ــ مركز البحوث الزراعية

استخدم نظام الهجن التبادلية بين ستة من الأباء المتباينة وراثيا لتقدير القدرة العامة والخاصة للتآلف وتفاعلها مع مستويات التسميد الآزوتى المختلفة.

وتضمنت التجربة خمسة أصناف مصرية من القطن وهى جيزه ٨٥ ، جيزه ٨٣ ، جيزه ٨٠ ، جيزه ٨٩ ، جيزه ٨٦ وصنف روسى يتبع القطن المصرى هو كارشنسكى. بالإضافة إلى خمسة عشر هجينا تمثل الجيل الأول تحت مستويين من التسميد الآزوتى وهما ٣٠ ، ٦٠ وحدة أزوت فى تجربتين ذات تصميم القطاعات الكاملة العشوائية فى ثلاث مكررات.

وأجريت التجربة بمحطة البحوث الزراعية بسخا موسمى ٢٠٠٠ ، ٢٠٠١م ، وفيما يلى ملخص لأهم النتائج المتحصل عليها:

١- أظهر التحليل وجود اختلافات معنوية بين التراكيب الوراثية المختلفة لمعظم الصفات وذلك عند كلا من مسنوى التسميد ٣٠ ، ٦٠ وحدة أزوت.

٢- كانت القدرة العامة للتآلف معنوية لجميع الصفات المدروسة عدا صفة محصول الشعر للنبات عند مستوى التسميد ٣٠ ، ٦٠ وحدة أزوت. وكذلك صفة وزن البذره عند المستوى ٣٠ وحدة أزوت بينما كانت القدرة الخاصة للتآلف معنوية لصفات محصول الشعر ووزن اللوزة ومعامل البذره عند مستوى التسميد ٦٠ وحدة أزوت فقط.

٣- أظهرت النتائج أن أفضل الأباء فى تحسين الصفات المدروسة المحصولية هى كارشنسكى ، جيزه ٨٦ لتحسين صفات المتانة وطول التيلة. والصنف جيزه ٨٠ لمعامل البذره والصنف جيزه ٨٩ لصفات النعومة والمتانة.

٤- أعطت الهجن كارشنسكى × جيزه ٨٣ ، كارشنسكى × جيزه ٨٠ ، جيزه ٨٥ × جيزه ٨٣ ، جيزه ٨٠ × جيزه ٨٦ أفضل النتائج لصفات النعومة وطول التيلة. والهجن كارشنسكى × جيزه ٨٥ ، جيزه ٨٣ × جيزه ٨٦ لصفات وزن اللوزة والمتانة. والهجن جيزه ٨٣ × جيزه ٨٩ ، جيزه ٨٣ × جيزه ٨٦ لصفات معامل البذره وذلك عند كلا من مستوى التسميد ٣٠ ، ٦٠ وحدة أزوت.