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ESTIMATION OF STABILITY AND GENETIC PARAMETERS FOR SOME CHARACTERS OF EGYPTIAN EXTRA-LONG STABLE GENOTYPES.

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ABSTRACT

The main objectives of the present study were to evaluate the degree of stability for several genotypes, estimation of genetic parameters and phenotypic correlation. Twenty-four genotypes were evaluated over seven locations in 1999 season. Four traits, including seed cotton yield, lint cotton yield, boll weight and earliness index were studied. The variance for environments (E), genotypes (G) and GE interaction were highly significant for all traits. Most of genotypes did not vary for parameter (α=0) while parameter λ did not differ from "one" for all traits. There were average stability level for seven genotypes in seed cotton yield, two genotypes in lint cotton yield, nine genotypes in boll weight and eight genotypes in earliness index. One genotype (F_6 1292/97) exhibited above average stability at 90 and 95 probabilities for seed cotton yield and lint yield. The genotypes (F_6 1292/97 and F_{10} 1363/97) exhibited complete stability for lint yield. The genotypes (F_7 1298/97 and F_9 1359/97) exhibited above average stability for fifty boll weight. Giza 70 showed average stability for seed cotton yield and lint yield. Giza 80 was more productive and showed average level of stability for seed cotton yield and earliness index. Genotypes F_{10} 1363/97 had high yield and showed complete stability for lint yield and average stability for seed cotton yield and earliness.

The genetic estimates indicated the presence of substional amount of genetic variance (δ^2_g) for boll weight and earliness while the component of interaction (δ^2_{ge}) and the environment component (δ^2_e) were more than the genetic variance component for seed cotton yield and lint yield. The heritability values were moderate for boll weight and earliness and low for seed cotton yield and lint yield. Genetic gains at 5% intensity of selection were high for boll weight and earliness index and low for seed cotton yield and lint yield. There were significant and positive phenotypic correlation coefficient between seed cotton yield and earliness and highly significant positive phenotypic correlation between seed cotton and lint yield.

INTRODUCTION

The occurrence of genotypic-environment (GE) interaction has long provided to be a major challenge for understanding the genetic control of variability to aid the plant breeder in developing improved varieties or when the varieties are compared over different environments because the plant breeder prefers to produce universal varieties.

Different methods were suggested and applied to determine the varietal stability. Simpson and Duncan (1953), Finaly and Wilkinson (1963), Eberhart and Russel (1966) and Tai (1971) used the genotype-environmental interaction (GE) to estimate two genotypic stability parameters for each variety; αi (linear response to environmental effects) and λi (deviation from linear response). El-Kadi *et al.* (1978) studied the genotypic stability parameters for some Egyptian cotton genotypes and they concluded that the relatively unpredictable components (deviation from linear response) of the genotype-environment interaction variance may be more important than the relatively predictable component (linear response, α). El-Marakby *et al.* (1986), El-Feki and Moustafa (1990) and El-Shaarawy *et al.* (1994) reported the same results.

Gill and Singh (1982) indicated that LH37, RS209 and RS22 were most stable varieties with regard to seed cotton yield. El-Hariry (1986) mentioned that the most stable cotton varieties were Giza 69, Giza 67 and Giza 80. These varieties exhibited the highest number of stable characters among which were seed cotton yield and boll weight.

Nazmey (2000) reported that Tai method indicated that all genotypes were unstable for seed cotton yield and lint yield with variable degrees of stability for boll weight and earliness index.

Average genotypic stability degree was recorded by Badr (1999) for seed and lint cotton yield in Giza 86, Giza 87 and Giza 88 and for boll weight in Giza 85 and Giza 87. Hassan *et al.* (2000) concluded that Giza 70 and Giza 77 were stable according to genetic stability for seed cotton yield and lint yield.

Gupta *et al.* (1972), El-Marakby *et al.* (1980), El-Kady and El-Razaz (1983), El-Marakby *et al.* (1986) and El-Feki *et al.* (1995) reported varying estimates of genetic variability heretability and genetic gain according to materials time and place of each investigation.

Therefore, the present investigation was carried out to study stability, heritability and genetic components for twenty-four extra-long strains .

MATERIALS AND METHODS

Twenty-four genotypes were evaluated in the Advanced Strain Test Trials (B), which had been taken place in seven different locations in the Nile Delta of Egypt in 1999 season. The seven locations were; Abo-Kbeer, Talaa, Meet Ghamer, Tanta, Sakha, Kafr Saad and Kafr El-Dawar.

The genotypes (Table 1) were the promising hybrid G. 84 X (G. 74 X G. 68) and four extra-long staple varieties (G. 87, G. 88, G. 45 and G. 70) which were numbered 19-23 respectively, eighteen genotypes derived from ten crosses (No. 1-18) and the long staple variety G. 86 (No. 24).

Every strain was sown in a plot with five rows (4 m. long and 60 cm apart). The three central rows of each plot were hand- picked twice to determine seed cotton yield (S.C.Y.), lint yield (L.C.Y.) in kentar/feddan and earliness index. A random sample of 50 bolls; picked from the outer two rows, was used to obtain average boll weight (B.W.).

Compined analysis of variance was carried out for of the seven locations with fixed genotypes effects and random replicated of environmental effects. Two stability parameters, Alfa (α) and Lamda (λ), were estimated for each genotype separately by using the method described by Tai (1971). Parameter (α) measure the linear response to environmental effects and Lamda (λ) measures the deviation from linear response in terms of magnitude of error variance. The two statistics in the regression method which equivalent meaning to (α) and (λ) are (b-1) and Dev. Ms/MSE/P, respectively (Tai, 1971). The value (α = -1, λ = 1) refers to the perfect stability. However, the value (α = 0, λ = 1) refers to the average stability, whereas the value ($\alpha < 0, \lambda = 1$) refers to the above average stability and the value ($\alpha > 0, \lambda = 1$) refers to the below average stability.

Table 1: The examined strains of all crosses along with the control varieties in 1999 season.

No.	Strains	Crosses
1	F_5 1135/97	Giza 88 X Menofey
2	F_5 1144/97	Giza 88 X Menofey
3	F_5 1153/97	Giza 87 X Karnak
4	F_5 1174/97	Giza 70 X Karnak
5	F_5 1177/97	Giza 70 X Karnak
6	F_6 1232/97	Giza 70 X Bima S_6
7	F_6 1247/97	Giza 70 X Bima S_6
8	F_6 1275/97	(G.77XBima S_6) X [G.87X (G.77XG.70)]
9	F_6 1292/97	(G.77XBima S_6) X [G.87X (G.77XG.70)]
10	F_7 1298/97	Giza 77 X Bima S_6
11	F_7 1304/97	Giza 77 X Bima S_6
12	F_7 1308/97	Giza 87 X (Giza 77 X Giza 70)
13	F_7 1332/97	Giza 87 X (Giza 77 X Giza 70)
14	F_9 1347/97	Giza 84 X Giza 45
15	F_9 1353/97	Giza 84 X Giza 45
16	F_9 1358/97	G. 77 X [G.84 X (G. 70 X G.51 B)]
17	F_9 1359/97	G. 77 X [G.84 X (G. 70 X G.51 B)]
18	F_{10} 1363/97	Giza 68 X Giza 45
19	G.84X(G.74XG.68)	Giza 84 X (Giza 74 X Giza 68)
20	Giza 87	Giza 77 X Giza 45
21	Giza 88	Giza 77 X Giza 45
22	Giza 45	Giza 28 X Giza 7
23	Giza 70	Giza 59 A X Giza 51 B
24	Giza 86	Giza 75 X Giza 81

The form of the analysis of variance in Table 2 mean products exception of variance are analogous to mean square exceptions of the analysis variance. Appropriate variance according to Miller *et al.* (1958) and Comostock and Moll (1962). Components were substituted to calculate the heritability, genetic advance (G.A.), genetic coefficient of variability (G.C.V. %) and phenotypic correlation.

Heritability in broad sense (H) = $(\delta^2 g / \delta^2 ph) \times 100$

Phenotypic correlation (r) = $\frac{\delta^2 p1.2}{\sqrt{\delta^2 g_1 \times \delta^2 g_2}}$ $\frac{covxy}{\sqrt{vx \times vy}}$

$$t = r\sqrt{\frac{n-2}{1-r^2}}$$

Table 2: Form of variance analysis and mean square exception.

Source of variance	d.f.	Mean square exception
Environments	n - 1	
Replication of environment	n (r – 1)	
Genotypes	g -1	$\delta^2_e + r\delta^2_{gn} + rn\delta^2_g$
Genotypes – environments	(g –1) (n – 1)	$\delta^2_e + r\,\delta^2_{gn}$
Error	n (r – 1) (g – 1)	δ^2_e

RESULTS AND DISCUSSION

1. Genetic stability:

The results of combined analysis of variance for all characters (Table 3) showed highly significant mean squares for environments (E), genotypes (G) and environment-genotype interactions (GE). Thus, it was important to determine the genotypic stability degree for each genotype for all traits. Mean performances, two stability parameters (Alfa and Lamda) and degree of stability for each genotype were tabulated in Table (4). Also the distribution of alfa (α) and lamda (λ) values are shown in figures (1-4).

Table 3: Mean squares of the four characters studied for degree of stability in 1999 season at seven locations.

Sources	d.f.	Seed cotton yield	Lint cotton yield	Boll weight	Earliness %
Environment.(E)	6	1093.226**	1557.741**	22008.340**	14409.157**
Rep. R.	35	16.138**	13.293**	106.293**	386.129**
Genotypes (G)	23	22.729**	20.820**	1272.734**	768.855**
G X E	138	11.840**	9.647**	172.540**	101.028**
Error	805	6.769	1.961	50.532	47.255

For seed cotton yield, results in Table (4) and figure 1 showed that yield ranged between 5.10 K/F for Giza 45 and 9.61 K/F for Giza 88. Seven genotypes (F_6 1232/97, F_6 1275/97, F_7 1332/97, F_{10} 1363/97, Giza 87, Giza 88 and Giza 70) showed average level of stability. The genotype F_6 1292/97 exhibited above average degree of stability at propabilities 0.90 and 0.95. Three genotypes (F_6 1292/97, F_{10} 1363/97 and Giza 88) were more productive and exhibited average degree of stability. These findings disagreed with those obtained by Awaad (1989), El-Feki and Moustafa (1990), El-Feki *et al.* (1994) and Nazmy (2000) who said that the superior productive strains did not show any stability degree. Figure 1, indicated also that the distribution statistics α and λ did not significantly differ from zero for the productive strains F_9 1358/97 and F_9 1359/97 which indicated that these strains may be recommended only for highly favorable environment.

For lint cotton yield, results in Table 4 and figure 2 showed that yield ranged between 5.31 k/F for Giza 45 and 10.86 k/F for Giza 88. Two genotypes (F_6 1275/97 and F_{10} 1363/97) exhibited complete genetic stability and genotype F_7 1332/97 showed above average stability at 0.90 and 0.95 propabilities. While, two genotypes (F_6 1332/97 and Giza 70) showed average genetic stability. These results agreed with those obtained by Badr,1999 and Hassan *et al.*, 2000. The genotype (F_{10} 1363/97 was the best of the genotypes as it was highly productive and exhibited complete genetic stability. Figure 2 also indicated that the distribution statistic α and λ did not significantly differ from zero for the two genotypes (F_9 1358/97 and F_9 1359/97). These results suggested that these two genotypes were more sensitive for favorable environments.

Concerning the fifty boll weight, results in Table 4 and figure 3 indicated that the weight of 50 boll varied between 120.6 gm for the strain F_9 1358/97 and 143.4 gm for Giza 86 (a long staple variety). Meanwhile, about eleven strains showed abouve average mean performances espically the strain F_{10} 1363/97 (142.6 gm). The strain (F_7 1298/97) exhibited abouve

Table 4: Mean performance and stability parameters for different genotypes studied over six environments in 1999 season.

Genotype	Seed cotton yield K/F						Lint cotton yield K/F					
	Mean	Alfa	Lamda	Stability degree			Mean	Alfa	Lamda	Stability degree		
	Performance	α	λ	99%	95%	90%	Performance	α	λ	99%	95%	90%
1	8.25	0.2804	0.4294				9.09	0.3037	0.7623			
2	7.83	0.2557	1.1095				8.59	0.2541	1.3535			
3	7.39	0.1296	2.6140				7.66	0.0523	2.8079			
4	8.11	0.1525	3.0034				8.90	0.1176	3.5336			
5	6.84	0.0221	2.3907				7.17	-0.0458	2.5475			
6	7.88	0.0613	0.5895	++	++	++	8.69	0.0177	1.1639	++	++	++
7	7.87	-0.2661	3.7120				8.39	-0.3014	2.6753			
8	7.54	-0.1356	1.1042	++	++	++	8.63	-7.5400	1.6087	+++	+++	+++
9	8.03	-0.4461	1.7211	++	+++	+++	7.92	-0.4079	1.9997			
10	7.33	-0.2036	2.4811				8.29	-0.1272	3.0263			
11	8.96	0.1087	4.4123				9.78	0.1253	4.5106			
12	7.68	0.1736	3.7889				8.00	0.1715	3.4636			
13	7.02	-0.1631	1.6694	++	++	++	6.86	-0.2626	1.5270	++	+++	+++
14	8.00	0.1180	4.1496				8.37	0.0399	3.7090			
15	7.82	-0.3103	3.0362				8.17	-0.3396	2.3405			
16	8.51	0.0303	0.5011				9.33	0.0580	0.4053			
17	8.37	0.0892	0.5503				9.04	0.0999	0.3144			
18	8.99	-0.1087	1.4864	++	++	++	10.10	-7.9000	1.4523	+++	+++	+++
19	9.34	-0.1451	6.0389				10.28	-0.0892	6.6469			
20	7.42	0.0930	1.8603	++	++	++	7.66	0.0229	2.1381			
21	9.61	0.1864	1.1596	++	++	++	10.86	0.2673	0.5135			
22	5.10	-0.2166	4.0096				5.31	-0.2510	3.1367			
23	7.40	-0.0726	1.4052	++	++	++	8.37	-0.0230	1.3400	++	++	++
24	8.44	0.3682	17.5953				10.42	0.4012	28.2676			
Mean	7.90						8.58					
L.S.D. 0.05	0.01						0.015					
L.S.D. 0.01	0.02						0.02					

Cont. Table 4:

Genotype	Weight of 50 bolls						Earliness index %					
	Mean performance	Alfa A	Lamda λ	Stability degree			Mean performance	Alfa A	Lamda λ	Stability degree		
				99%	95%	90%				99%	95%	90%
1	136.9	0.0900	2.3434				70.30	0.2634	3.7568			
2	135.3	0.1895	1.3979	++	++	++	68.62	0.1661	0.2908			
3	135.0	0.3018	1.6391				67.09	-0.0632	0.9936	++	++	++
4	132.0	-0.0010	2.7313				72.16	0.0430	2.1630			
5	133.7	-0.1587	1.5228	++	++	++	61.56	-0.0200	2.9307			
6	138.7	-0.1746	2.1818				70.36	0.2156	1.4890	++	++	++
7	133.3	-0.0125	1.3078	++	++	++	76.52	-0.1424	2.9399			
8	132.8	0.1416	1.6421	++	++	++	72.13	-0.2366	0.5993	++	+++	+++
9	131.3	-0.1795	2.9937				77.35	0.0500	0.7435			
10	127.1	-0.4028	0.7075	+++	+++	+++	69.37	0.0347	1.9686			
11	132.2	0.1939	1.1413	++	++	++	76.54	-0.1838	1.0207	++	++	++
12	131.0	0.0653	1.0554	++	++	++	74.14	-0.0025	0.6513	++	++	++
13	126.4	-0.2632	0.5333				69.78	-0.0251	0.9990	++	++	++
14	136.7	0.3641	0.7872				76.51	-0.2134	2.8959			
15	137.2	0.2484	4.3074				74.92	-0.2701	0.8473	++	+++	+++
16	120.6	-0.1569	1.0024	++	++	++	72.71	-0.1386	3.1076			
17	122.1	-0.4111	1.5912	++	+++	+++	72.00	-0.0225	2.0531			
18	142.6	0.3803	8.8926				73.58	0.0041	1.4952	++	++	++
19	137.5	0.1831	1.5733	++	++	++	77.44	-0.1619	1.0688	++	++	++
20	130.4	-0.1545	0.8576	++	++	++	68.53	0.0334	0.2456			
21	136.3	-0.1382	0.8230				71.38	0.1630	0.5859	++	++	++
22	131.4	-0.2045	3.0964				66.24	0.1250	2.6684			
23	136.1	-0.2106	2.1200				69.03	0.2174	3.2654			
24	143.4	0.3092	11.0628				63.03	0.1643	5.5333			
Mean	133.3						71.30					
L.S.D. 0.05	0.47						0.45					
L.S.D. 0.01	0.61						0.60					

++ Average stability +++ Abouve average stability average genetic stability for 0.99, 0.95 and 0.90 propabilities and the strain (F_9 1359/97) exhibited abouve average genetic stability for 0.95 and 0.90 and averages stability for 0.99 probabilities while they showed less averages of mean performances.

Meanwhile, four strains; F_5 1144/97, F_5 1177/97, F_6 1247/97 and [G. 84 X (G. 74 X G. 68)]; were exhibited abouve average mean performances and showed average level of stability. Whereas, five strains exhibited average stability level and showed less average mean performances. The distribution statistic α and λ (Fig. 3) indicates that statistic λ was greater than unit for nine strains suggesting the importance of the unpredictable (GE) component of interaction.

Regarding the earliness trait (Table 4 and Fig. 4) results indicated that the earliness index varied between 77.44% for the promising hybrid G. 84 X (G. 74 X G. 68) and 61.56% for F_5 1177/97. Two strains (F_6 1275/97 and F_9 1353/97) showed above average mean performance and exhibited above average level of stability at probability 0.90. Five genotypes [F_7 1308/97, F_7 1308/97, F_{10} 1363/97, G. 84 X (G. 74 X G. 68) and Giza 88] showed above average mean performances and exhibited average degree of stability. Meanwhile, three genotypes exhibited average level stability but they showed less mean performance.

Generally, the genotype F_6 1275/97 exhibited different degrees of stability for all traits studied and showed above average mean performance for lint cotton yield and earliness index. Meanwhile, three genotypes (F_6 1232/97, F_7 1332/97 and F_{10} 1363/97) showed different degrees of stability for seed cotton yield, lint yield and earliness. The best of them was the genotype F_{10} 1363/97 which showed above average mean performances for all traits studied. However, the best cultivar was G. 88 which showed above average mean performances for all triats and exhibited average stability for seed cotton yield and earliness.

2. Genetic estimates and heritability:

Results in Table 5 showed the variances components, the ratio of δ^2_g/δ^2_{ge}, genetic advance, heritability estimates and genetic coefficient of variability (G.V.C.%). The data indicated the presence of substional amount of genetic variance for boll weight and earliness comparing with environment variance. The ratio of $\delta^2 g$ / $\delta^2 ge$ (Table 5) reflects the importance of genetic variance (δ^2_g) more than the component of interaction for boll weight and earliness. These results reflect the importance of genetic component. These results agreed with those obtained by El-Feki *et al.* (1995) and Gutierrez and El-Zik (1992).

The mean G.V.C.% (genetic variability coefficient) was of considerable magnitude for boll weight and earliness (19.70 and 22.3 respectively) indicating that the scope of selection is much more for those characters. However, with genetic variability coefficient alone, it was difficult to ascertain the amount of heritable variation present. These results were in harmony with those obtained by El-Marakby *et al.* (1986). Table 5, showed that G.V.C.% for seed cotton yield and lint yield were lower indicating the genetic diversity in those characters were lower. These results agreed with the low of ratio δ^2_g / δ^2_{ge} and the insignificant δ^2_g.

Table 5: Values of the Variance components, heritability, genetic advance and genetic variability coefficient (G.V.C.).

Characters	Variance components				Heritability %	Genetic advance		G.V.C. %
	δ^2_g	δ^2_{ge}	δ^2_e	δ^2_g/δ^2_{ge}		Value	%	
S.C.Y.	0.2593	0.8452	0.1282	0.3068	11.61	1.14	14.43	3.28
L.C.Y.	0.2660	1.2810	0.3268	0.2077	14.20	1.33	15.56	3.10
B.W.	26.1951	20.3347	8.4220	1.2882	47.67	35.03	26.34	19.70
Earliness%	15.9006	8.9672	7.8708	1.7732	48.57	27.74	38.91	22.30

Concerning heritability estimates (Table 5), the results showed moderate heritability estimates for boll weight and earliness (47.67% and 48.57% respectively). This indicated that the environment had a considerable share in the inheritance of these characters. Low heritability estimates were observed for seed cotton yield and lint yield (11.61% and 14.20% respectively). This indicates that environmental fluctuation had greatest effect in the inheritance of these traits. This finding was in harmony with the greatest interaction components. Some results were obtained by El-Marakby *et al.* (1986).

3. Phenotypic correlation:

The phenotypic correlation gives an idea about the genotypic correlation, which helps in selection. If two traits are correlated, in either one positive or negative direction, the selection for one character will cause change in the other according to the degree of correlation.

The phenotypic correlation coefficients (Table 6) indicated that there was positive and highly phenotypic correlation coefficient between seed cotton yield and lint yield, while there was positive and significant coefication between seed cotton yield and earliness.

Table 6: Phenotypic correlation coefficient of various characters.

Character	Earliness	B.W.	L.C.Y.
S.C.Y	0.5025*	0.2203	0.9454**
L.C.Y	0.3080	0.3244	
B.W.	-0.0803		

t 0.05 = 0.396

t 0.01 = 0.505

CONCLUSION

The results indicated that the genotype F6 1275/97 exhibited genetic stability and average mean performance for all traits. The genotype F10 1363/97 gave the highest yield and showed average stability for seed cotton yield and earliness and complete genetic stability for lint yield.

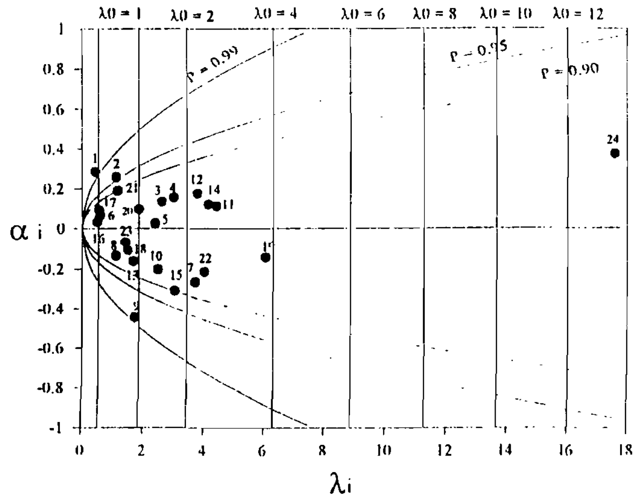

Fig (1): Distribution of estimated genotypic stability statistics of weight of seed cotton yield (k/f) of 24 genotypes.

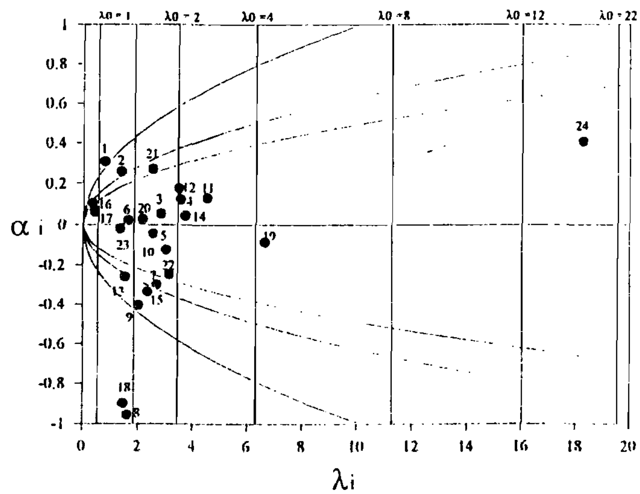

Fig (2): Distribution of estimated genotypic stability statistics of lint yield (k/f) of 24 genotypes where :

1- F_5 1135\97
2- F_5 1144\97
3- F_5 1153\97
4- F_5 1174\97
5- F_5 1177\97
6- F_6 1232\97
7- F_6 1247\97
8- F_6 1275\97
9- F_6 1292\97
10- F_7 1298\97
11- F_7 1304\97
12- F_7 1308\97
13- F_7 1332\97
14- F_9 1347\97
15- F_9 1353\97
16- F_9 1358\97
17- F_9 1359\97
18- F_{10} 1363\97
19- G.84 x (G. 74 x G. 68)
20- Giza 87
21- Giza 88
22- Giza 45
23- Giza 70
24- Giza 86

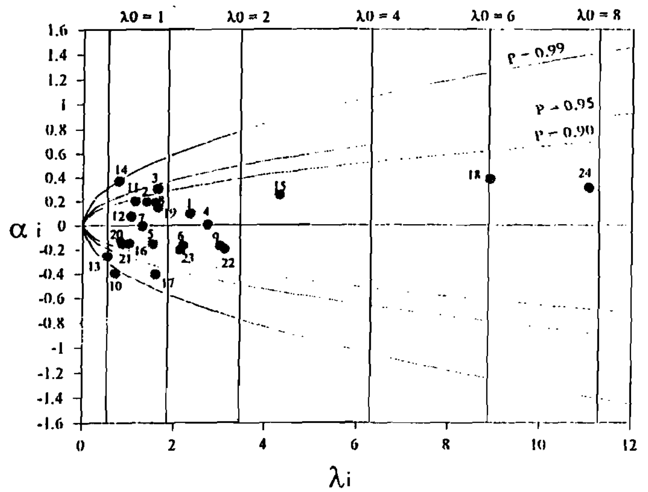

Fig (3) : Distribution of estimated genotypic stability statistics of weight of 50 bolls of 24 genotypes.

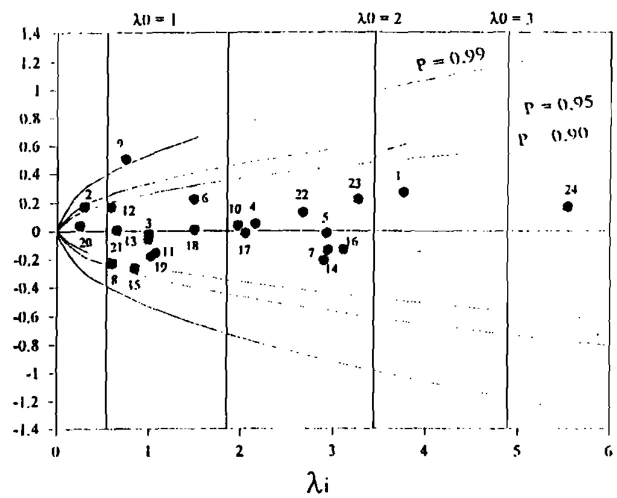

Fig (4) : Distribution of estimated genotypic stability statistics of earliness percentage 24 genotypes where :

1- F_5 1135\97	9- F_6 1292\97	17- F_9 1359\97
2- F_5 1144\97	10- F_7 1298\97	18- F_{10} 1363\97
3- F_5 1153\97	11- F_7 1304\97	19- G.84 x (G. 74 x G. 68)
4- F_5 1174\97	12- F_7 1308\97	20- Giza 87
5- F_5 1177\97	13- F_7 1332\97	21- Giza 88
6- F_6 1232\97	14- F_9 1347\97	22- Giza 45
7- F_6 1247\97	15- F_9 1353\97	23- Giza 70
8- F_6 1275\97	16- F_9 1358\97	24- Giza 86

REFERENCES

Badr, S.S.M. (1999). Genotypic stability for the new Egyptian cotton varieties Giza 85, Giza 86, Giza 89 Giza 87 and Giza 88- Egypt. J. Agric. Res., 77 (1): 331-342.

Comstock, R.E. and R.H. Moll (1962). Genotype-environmental interaction, pp. 164-196. In Hanson W.D. and Roibinson, H.F. ed. Statistical Genetics and Plant Breeding.

Eberhart, S.A. and W.A. Russel (1966). Stability parameters for comparing varieties. Crop Sci., 6: 36-40.

El-Feki, T.A., and F.S. Moustafa (1990). Genotypic stability parameters for several genotypes of two species of cotton. Egyptian Society of Applied Science in Callaboration with Zagazig Univ., vol. 5 (7).

El-Feki, T.A., Hanaa F. Fahmy, Sayeda S. El-Helw and G. M.I. Emam (1995). Genetic analysis of lint yield and lint quality characters for Egyptian extra-long staple genotypes. Egypt. J. Appl. Sci. 10 (9): 575-587.

El-Feki, T.A.; Hanna F. Fahmy, Hassan A. Abd-Al Naby and Sayeda S. El-Helw (1994). Stability parameters of Egyptian extra-long genotypes for yield and yield components. Proc. 6th Conf. Agron., Al- Azhar Univ., Cairo, Egypt, vol. 1.

El-Hariry, S.H.M. (1986). Genetic analysis of yield characters and fiber properties for some cotton varieties under different sowing dates. Ph. D. Thesis, Fac. of Agric., Ain Shams Univ.

El-Kadi, D.A.; A.A. Abo-El-Zahab and S.A. El-Shaarawy (1978). Genotypic stability parameters for comparing Egyptian cotton cultivars. Res. Bull. 873, Ain Shams Univ., Fac. of Agric.

El-Kady, D.A. and El-Razaz, M.A. (1983). Genetic estimates and correlation studies for economic characters in Egyptian cotton (*Gossypium barbadense*) Bull. Fac. of Agric. Cairo Univ., 34 (2): 1065-1083.

El-Marakby, A.M.; A.M. Abou-Alam and S.H.M. El-Hariry (1986). Genotypic stability analysis for som G. barbadense and G. hirsutum genotypes of cotton. Annal. of Agric. Sci. Moshtohor. vol. 3: 1307-1347.

El-Marakby, A.M.; K.A. El-Shouny; A.M. Abou Alam and S.H.M. El-Hariry (1986). Estimation of genetic parameters for some agrnomic and fiber characters of diverse cotton genotypes under varying environments. Annals of Agric. Sci. Moshtohor. Vol. 24 (3).

El-Shaarawy, S.A.; I. Haikal; M.R.A. Rahoumah; A. Zena and A. El- Nazzer (1994). Genotypic stability of Egyptian cotton strains for lint yield and yield components. Proceeding cotton conferences, Jan 5-8 San Diego, C.A., 2: 679-682.

'Finlay, K.W. and G.I. Willkinson (1963). The analysis of adaptation in plant breeding programme. Aust. J. Agric. Res., Ir 5: 742-754.

Gill, S.S. and T.H. Singh (1982). Stability parameters of yield components in Upland cotton G. Hirsutum. Egypt. J. Genet. Cytol., 11: 9-13.

Gupta S.P.; T.H. Singh and P.S. Phul (1972). Analysis of quantitative variability in upland cotton. Indian J. Agric. Sci., 42 (3) 128-215.

Gutierrez, J.C. and K.M. El-Zik (1992). Genotype-environment interaction of upland cotton yield, earliners and fiber quality traits in Spain. Beltwide Conference Cotton Improvement Conf., 589-590.

Hassan I.S.M.; A.M. Abdel Aziz and E.M. Ghoneim (2000). Balanced response for genotype environmental interaction in some Egyptian cotton genotypes. J. Agric. Sci. Mansoura Univ., 25 (1): 23-32.

Miller, P.A., J.C. Williams, H.F. Ribomsom and R.E. Comostock (1958). Estimate of genotypic and environmental variances and covariance in Upland cotton and their implications in selection. Agron. J. 50: 126-131.

Nazmey, M.N. (2000). A comparative study among some methods for evaluating stability in Egyptian cotton. Ph. D. Thesis. Fac. of Agric. at Moshtohor. Zagazig Univ. Egypt.
Simposon, D.M. and E.N. Duncan (1953). Stability of cotton varieties. Agron. J., 45: 448-450.
Tai, G.C.C. (1971). Genotypic stability analysis and its application in potato regonait traits. Crop. Sci. 11: 184-189.

تقدير معالم الثبات الوراثى والمعالم الوراثيـة لبعض صفـات سـلالات القطـن المصرى فائقة الطول

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تهدف هذه الدراسة إلى تقدير معالم الثبات الوراثي والمعالم الوراثية لـ ١٨ سلالة من سـلالات القطن المصرى فائقة الطول بالإضافة إلى الهجين المبشر جيزة ٨٤ × (جيزة ٧٤ × جيزة ٦٨) والاصنـاف المنزرعة فائقة الطول "جيزة ٨٧، جيزة ٤٥، جيزة ٧٠" مع الصنف جيزة ٨٦ من طبقة طويل التيلة.

زرعت هذه السلالات والأصناف فى سبعة مناطق فى الوجه البحرى هى أبوكبـير، تـلا، ميت غمر، طنطا، سخا، كفر سعد وكفر الدوار في تجارب صممت بنظام القطاعات كاملة العشـوائية ذات الست مكررات ومساحة القطعة ٥ خطوط (بطول أربعة أمتار وعرض ٦٠ سم وترك ٢٠سم بيـن الجـور) وقد أخذت قراءات المحصول على نباتات الثلاثة خطوط الداخلية بينما أخذ من الخطين الخارجيين عدد ٥٠ لـوزة عشوائياً وذلك لتقدير متوسط وزن ٥٠ لوزة ، فحين قدر معامل التبكير بوزن الجنية الأولى منسـوباً لـوزن محصول القطعة (مجموع جنيتين) وتم معالجة البيانات احصائياً باجراء تحليل تجميعى للمناطق لمعرفة تـأثير البيئات والأصناف والتفاعل. بينما تم تقدير معالم الثبات الوراثى بتجزئة التفاعل بين البيئات و الأصناف إلـى الاستجابة الخطية والانحراف عن الاستجابة الخطية بالطريقة التى اقترحها Tai سنة ١٩٧١. كما تم حسـاب مكونات التباين الوراثى ومعامل التباين الوراثى ومعامل التوريث كما تم حساب قيم التحسين المتوقع فى حالة انتخاب ٥% من أفراد العشيرة كذلك تم حساب الارتباط الظاهرى بين الصفات المدروسة.

ويمكن تلخيص أهم النتائج فيما يلى:

١. تشير النتائج إلى وجود تأثيرات عالية المعنوية بين البيئات وبين الأصناف والتفاعل بينهما.
٢. أظهرت السلالة هـ٦ ٩٧/١٢٧٥ درجات متفاوتة من الثبات الوراثى لجميع الصفات المدروسة.
٣. أظهرت السلالات هـ٦ ٩٧/١٢٣٢ و هـ٧ ٩٧/١٣٣٢ و هـ١٠ ٩٧/١٣٦٣ درجات متفاوتة من الثبات الوراثى فى ثلاث صفات هى محصول القطن الزهر ومحصول القطـن الشـعر ومعـامل التبكير. وكان أحسنها السلالة هـ١٠ ٩٧/١٣٦٣ التى أظهرت تفوقاً ملحوظاً فى قيـم المظهريـة لجميع الصفات المدروسة.
٤. الصنف الجديد جيزة ٨٨ أعطى قيماً عالية فى جميع الصفات المدروسة مع ثبات وراثى متوسـط فى صفتى محصول القطن الزهر ومعامل التبكير.
٥. أظهرت النتائج أن التوزيع الاحصائى للمكون α والمكون λ لم يختلفا معنوياً عن الصفر لبعـض التراكيب الوراثية مما يعطى انطباعاً عن أن هذه التراكيب الوراثية أكثر حساسية مما يسـتوجب زراعة السلالات المتفوقة منها فى البيئات الخاصة بها حتى يمكنها إعطاء أعلى محصول ممكن.
٦. كان التباين الوراثى مكون أساسى فى صفات وزن اللوزة ومعامل التبكير بينما كان غير أساسـى فى صفتى محصول القطن الزهر ومحصول الشعر.
٧. كانت قيمة معامل التوريث متوسط بالنسبة لصفتى وزن اللوزة ومعـامل التبكـير بينمـا كـانت منخفضة بالنسبة لصفتى محصول القطن الزهر ومحصول القطن الشعر.
٨. كانت قيم التحسين الوراثى المتوقع فى حالة إنتخاب أفضل ٥% من أفـراد العشـيرة ١٤,٤٣% بالنسبة لمحصول القطن الزهر و ١٥,٥٦% بالنسبة لمحصول القطن الشعر و ٢٦,٣٤% بالنسـبة لمتوسط وزن ٥٠ لوزة و ٣٨,٩١% لمعامل التبكير.