STABILITY ANALYSIS OF EARLINESS, YIELD AND FIBER TRAITS FOR SOME EXTRA-LONG STAPLE GENOTYPES OF COTTON (*Gossypium barbadense*)

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Abstract

In 2004 season, twenty one cotton genotypes were selected including seventeen strains along with four commercial cultivars as check varieties were grown in a randomized complete block design with six replications in six trials (B) at six different locations. Nine traits which included earliness index, seed cotton yield, lint yield, weight of 50 bolls, lint percentage, upper half mean, uniformity ratio, micronaire reading and fiber strength were estimated. The studied traits showed highly significant mean squares for genotypes, environment and genotypes and genotypes x environment interaction except micronaire reading which was insignificant for genotypes and interaction between genotypes x environment. The genotypes varied for the estimate (λ) while the estimate (α) did not differ from a = 0 which may suggest that the relatively unpredictable components of the (G x E) interaction variance may be important than other components. It could be concluded that the promising strain F_5 1112/2002 and F_6/1193, F_6/1208 and G.84 x (G 74 x G 68) exhibited high yield potentiality and average degrees of phenotypic and genotypic stability. The average phenotypic and genotypic stability was recorded by G.88 for weight of 50 bolls traits. While the hybrid G.84 x (G 74 x G 68) exhibited average degree of genotypic and phenotypic stability for lint percentage. For fiber length 2.5%, the two strains F_5 1153/2002 and F_6 1193/2002 exhibited average degree of phenotypic and genotypic stability. While, the two cultivars G.45 and G.87 exhibited average degree of genotypic and phenotypic stability for pressely index. The results indicated that the best strains were: F_{11} 1257/2002 which was derived from the cross G.77 x Pima S_6 x G.87 x G.77 x G.70) and F_{12} 1292/2002 which was derived from G.87 x G.77 x G.70) which recorded average level of stability for most traits.

INTRODCTION

Cotton is the most important fiber crop in the world as well as in Egyptian cotton. Genotype x environment interaction is of a major importance for the cotton breeder because phenotypic stability response to change in the environment is different among genotypes. Several techniques have been proposed to characterize the stability of yield performance when the genotypes are tested at number of environments: Eberhart and Reussell (1966) reported that regression at the mean performance of a genotype on an environmental index and the deviation from regression are two parameters to measure phenotypic stability of the tested genotypes. Another statistical procedure was described by Tai (1970) who suggested partitioning the genotype x environment interaction into components namely: α statistic that measures the linear response to environmental effects and λ that measures the deviation from linear response in terms of magnitude of error variance. Several studies were carried out to estimate stability parameters to compare the genotypes of Egyptian cotton. El-Kadi *et al.* (1978) evaluated 13 Egyptian cotton cultivars and lines, which showed different degrees of genotypic stability. El-Marakby *et al.* (1986) found that cotton varieties Giza 69, Giza 67 and Giza 80 were the most stable varieties over six environments. El-Feki and Moustafa (1990) reported that the most stable varieties over nine environments were Giza 83 and Dandara followed by Giza 80 variety. Results of a study conducted by Abdel-Hakim and Gad El-Karim (1994) indicated that three cultivars (Giza 80, Giza 69 and Giza 75) out of fourteen strains showed phenotypic and genotypic stability. The other studied cultivars exhibited different degree of stability. The stability of 27 genotypes of Egyptian cotton was evaluated by El-Feki *et al.* (1994). They revealed that the best genotypes were F_5-873190 and F_5- 899190 which were more productive and showed average stability for most traits. Badr (1999) found that Giza 86, Giza 87 and Giza 88 showed an average degree of genotypic stability for seed and lint cotton yields, Also, stability of an average degree was exhibited by Giza 85 and Giza 87 for boll weight and by Giza 85, Giza 86 and Giza 89 for seed index. Eight cotton genotypes were evaluated under six locations by Hassan *et al* (2000) who found that phenotypic and genotypic stability were exhibited by Giza 89 for both seed and lint yield Giza 85 for lint percentage Giza 83 showed phenotypic stability for seed cotton and lint cotton yield whereas Giza 70 and Giza 77 were genotypically stable for seed and lint cotton yield. Abo El-Zahab *et al.* (2003) found that stability statistics (Ysi) for G.83 in seed cotton yield and two genotypes (G.83 and G.85) in lint yield were stable. However, for Pima cotton all Four genotypes (EarliPima, Ps-4, Ps-6 and Ps-7) of seed cotton yield and three strains (ps-4, Ps-6 and Ps-7) were stable in lint cotton. Ashmawy *et al.* (2003). Evaluated 20 cotton genotypes under seven different environments. They found that genotype No. 14 (H_{12} 1347/99) was phenotypically and genotypically stable for lint yield using four stability methods, namely: phenotypic stability of Eberhart and Russel (1966), genotypic stability (Tai 1977), stability variance of Shukla (1972) and yield stability statistic of Kang and Magari (1995). Mohamed *et al.* (2005) started that the promising strain (G.89 x Pima S6) and the commercial cultivar G.83 recorded phenotypic and genotypic stability for earliness%, while G.83 recorded phenotypic stability for seed cotton yield and lint yield (K/F).

The present study aims to determine the phenotypic and genotypic stability of some extra long Egyptian cotton genotypes using two methods of estimating, phenotypic stability of Eberhart and Russel (1966) and genotypic stability of Tai (1971).

MTAERIALS AND METHODS

Seventeen advanced promising strains of extra long staple cotton categories and four check commercial Egyptian cotton cultivars were used in this study (Table 1). The seventeen strains were evaluated in a preliminary trial in 2003 season at the Agricultural Research station of Sakha, Kafr El-Sheik Governorate. In 2004 season, the strains in addition to the check cultivars were planted at six different locations. The locations were Kafr Saad, Sakha, Kafr El-Dawar, Meet Ghamer, Abo-Kebeer and Monof. Planting date was during the last week of March for each location. The design used was randomized complete block design with six replications.

Data were recorded to study the following traits:

1- Earliness % = (weight of first harvesting/total of the two harvestings x 100
2- Weight of 50 bolls. (gram)
3- Seed cotton. (S.C.Y) (g/plot)
4- Lint cotton yield. (L.C.Y) (g/plot)
5- Lint percentage. (L.%)
6- Uniformity ratio.(U.R.)
7- Fiber length at 2.5 % span length. (L. 2.5%) ASTM- D-(1447-67)
8- Micronaire reading. (Mic) ASTM- D-(1448-59)
9- Pressely index. (P.I) ASTM- D-(1445-67)

Statistical analysis

Analysis of variance

Analysis of variance was done according to Gomez and Gomez (1984) ana applied on each individual environment. Bartlett (1937) test of Homogeneity was adapted indicating no statistical evidence for heterogeneity. Thus, combined analysis of variance for the 21 studied genotypes over five locations was stabliched out. Genotypes and environments were considered as fixed and random variables, respectively. Least significant difference test (LSD) was used to detect differences between genotypes over all the studied environments. Confidence intervals (C.I) were calculated to compare between each genotype mean and the grand mean of all genotypes over the five environments.

Phenotypic stability

Stability analysis was computed according to Eberhart and Reussell (1966) to detect the phenotypic stability. Analysis of the data showed that genotypes were treated as fixed variables, while locations were considered as random variables.

A genotype has unit regression coefficient (b=1), the deviation is not significant different from Zero (S^2d = zero) and above yielding ability is considered to be stable one.

Genotypic stability

The statistical analysis was conducted according to the method described by Tai (1971). A combined analysis of variance was carried out for each character with fixed variety effects and random replicate and environmental effects. Two stability parameters, alfa (α) and lamda (λ), were estimated for each genotype separately by the method described by Tai (1971). Parameter (α) measures the linear response to environmental effects and (λ), measures the deviation from linear response in terms of the magnitude of error variance. The value ($\alpha = -1, \lambda = 1$) will be referre to perfect stability. However, the value ($\alpha = 0, \lambda = 1$)) will referre to average stability, whereas the value ($\alpha < 1, \lambda = 1$) will referre to above average stability and the value ($\alpha > 1, \lambda = 1$) will referre as below average stability.

RESULTS AND DISCUSSION

Combined analysis of variance and regression analysis for the studied characters are presented in Table (2). Mean square of cotton genotypes were highly significant for all characters. This could be due to high environments and genotypes x environments interaction for all studied traits high which indicating that genotypes considerably varied across different environments. Environment + (genotypes x environment) interaction variances were partitioned into environment (linear), genotypes x environment (linear) interaction (Sum of squares due to regression, bi (liner regression coefficient)) and an explained deviation from regression (Pooled deviation mean Squares, S^2d). Significant genotypes x environments (linear) mean squares for all studied traits except for lint percentage, 2.5 span length and Micronaire indicated that genotypes differed genetically in their response to different environment when tested by pooled divination. On the other hand, the insignificant pooled deviation for the studied characters indicated that most of the studied cotton genotypes insignificantly differed regarding the deviation from their respective average linear response mean performance, two stability parameters., degree of stability for each genotype, according to Tai (1971) as well as b = 1 S^2d two phenotypic stability are tabulated in Tables (3 to10) Also the distribution of α and λ values are shown in figures (1 to 9). Difference performances and stability among strains will be discussed separately for each trait.

I-Earliness index

Table (3) shows that the earliness index ranged from 53.72 for genotype 11 to 71.04 for genotype 2. The earliest strains were 2, 4,7,8,10,15 and 16 and they did not differ significantly from the best cultivars would have approximately, b= 1, S^2d = 0 and high mean performance. The results of phenotypic stability indicated that the values of regression coefficient did not significantly differ from unity (b-1) for the strains No 4, 7 and 10 and they had S^2d which did not significantly differ from zero and their mean performance significantly exceeded the mean of all genotypes therefore, these three genotypes were considered stable phenotypically since they had the characteristics of stable genotypes as described by Eberhart and Russell 1966.

Measurements of genotypic stability α and λ for earliness index as estimated by Tai (1971) are shows in Table (3) and are graphically illustrated in Fig (1). The results revealed that the average degree of stability was shown by 12 genotypes, namely, 5, 7 and 18 were slightly different from zero indicating that these three genotypes were responsive to poor environment. Unpredictable component of interaction was more important than the predictable component for genotypes No 17, 9, 16 and 21 where their λ statistic was greater than unity. So these genotypes were considered unstable (Fig 1)

2. Seed and lint cotton yield

The highest seed and lint cotton yield were given by genotypes. No 17, 11, 10 and 6 that produced 3770.56 and 1338.86, 3653.33 and 1239.50, 3440.97 and 1224.92 and 3657.64 and 1287.96g for seed cotton and lint yield, respectively. The results of phenotypic stability indicated that the value of regression coefficient did not significantly differ from unity (b=1) for the studied genotypes except for genotypes No. 13, 15, 16, 18 and 19 for both seed cotton and lint yield. Also values of deviation from regression (S^2d) were not significantly different from zero ($S^2d = 0$) for all genotypes except genotype No 12 and 5 for seed cotton yield and lint yield. Actually (b) measure the reaction of genotype to environmental effects, thus it is considered as parameter of response, while S^2d exhibited the degree of stability. It is evident that the genotypes which exhibited greater production and had regression coefficient and deviation from regression did not significantly differ from unity and zero respectively. Therefore the genotypes No. 17, 11, 10 and 6 had all the stability characteristic of stable genotypes according to Eberhard and Russel (1966), and could be recommended as stable genotypes for seed cotton and lint yield. These results agreed with those obtained by Abd-Hakim and Gad El-Krim 1994, Hassan *et al* 2000 and Ashmony *et al* 2003. With regard to genotypic stability the result in Table (4 and 5) and Fig (2 and 3) showed that 12 genotypes out of 21 exhibited on average degree of stability at probability 0.99 and 0.95 for seed cotton and lint yield, while the genotype number 19 exhibited above average degree of stability at probability of 0.95. The distribution of α and statistics for genotypes 3, 9, 2 and 15 were slightly different from zero suggesting that these strains were more responsive for highly favorable environment. Such genotypes may be recommended for specific environments. The results indicated equal importance for predictable (α) and unpredictable component (λ) for most genotypes except for genotype number 5 for seed cotton and lint yield and no. 12 for seed cotton and No. 17 for lint yield as they exhibited greater importance for unpredictable (λ) component. These results were in harmony with those of El-Feki *et al* 1994, Al-Ashmawy *et al* 2003.

3. Weight of 50 bolls

The results in Table (6) showed that the weight of 50 bolls did not significantly differ between the studied genotypes except the genotype No (8) which exhibited low average for boll weight The results of phenotypic stability showed that the regression coefficient were not significantly different from unity for all studied genotype except for nine out of 21. Deviation from regression (S^2d) values did not significantly differ from zero except for eight genotypes. The results showed that out of 21 genotypes only five genotypes, namely, No 6, 7, 13, 16 and 19 were phenotypically stable where these genotypes had insignificant mean performance from all genotypes, moreover regression coefficient (b) and S^2d which did not significantly differ from unity and zero respectively.

Concerning the genetic stability, the results in Table (6) and Fig 4 indicated that out of 21 genotypes only eight showed genotypic stability of average degree of stability as well as genotype No 9 which exhibited above average degree of stability at probability of 0.99 and genotype No 4 which exhibited above average degree of stability at probability of 0.95% and the genotype No. 20 which exhibited above average stability at 90%. Distribution of α = 0 and λ = 0 for genotypes 10, 14 and 11 suggested less response to the environment changes and therefore they were more adaptive for specific environment. The results showed equal importance for predictable and unpredictable components for most genotypes. Two genotypes i.e., No 5 and 21 exhibited mor importance to unpredictable component. So, these genotypes were unstable. The obtained results are similar to those reported by El-Feki, *et al* (1994), Badr 1999 and Ashmony *et al* (2003)

Lint percentage

Lint percentage varied between 30.90% for genotype No 9 to 37.84% for genotype No 21. The results indicated that the genotypes No 5, 7, 15, 17, 19 and 21 exhibited higher lint percentage than the rest of the genotypes. The value of regression coefficient did not significantly differ from unity for the studied genotypes except for genotype No 13. Values of deviation from regression S^2d were not significantly different from zero except for genotypes No 2, 4, 6, 9, 12, 18 and 19. The genotypes 5, 7, 15, 17, 20 had lint percentage significantly greater than mean of all genotypes and it was observed from the result that genotypes were phenotypically stable for lint percentage where they met the assumptions of Ebehart and Russell 1966. These results are similar to those obtained by Hassan *et al* 2000 and El-Ashmawy *et al* 2003.

With regard to genetic stability, the results in Table (7) and Fig 5 illustrated that an average degree of stability was shown for lint percentage by 11 genotypes out of 21. The strain No. 5 hade negative (α) and significantly differed from zero and unpredictable component was zero indicating that this was more responsive to poor environment. While the three genotypes, namely, No 14, 20 and 15 showed that their predictable component (α) and unpredictable (λ) were of equal importance and they did not significantly differ from zero indicating that these genotypes was less responsive to different environment and were adapted to specific environment. Six genotypes have important unpredictable component (λ) than predictable component (α). These results are similar with those obtained by El-Feki *et al* 1994 and Ashmawy *et al* 2003.

5. 2.5% Span length

Table (8) showed that the 2.5% Span length ranged between 34.82 for genotype No 17 to 37.84 for genotype No 9 however, two genotypes No 9 and 12 gave highest values for 2.5% Span length. Results of phenotypic stability showed that the regression coefficients were not significantly different from unity for all genotypes except for the genotype No 11. Deviation from regression (S^2d) value significantly differed from zero except for genotypes No 6, 4, 9, 10, 20 and 21. Mean performance of 2.5% Span length for genotypes 9 and 12 were significantly higher than mean of all genotypes. The results showed that out of 21 genotypes only No 9 was phenotypically stable where it had mean performance significantly greater than the average of all genotypes, regression coefficient (b) and diviation of coefficient (S^2d) which did not significantly differe from unity and zero, respectively.

Results on Table (8) and Fig 6 revealed that an average degree of stability was shown by eight genotypes out of 21. The distribution of α for genotype No 20 was negative and significantly different from zero indicating that this strain was responsive to poor environment while strain No 21 exhibited equal importance for two component predictable and unpredictable α and λ where its did not significantly differ from zero indicating that this strain was adapted to specific environments. [Unpredictable component (λ) was more important than predictable component (α) for genotypes, so these genotypes were considered unstable (Fig 5)].

6- Uniformity ratio UR%

Table (9) showed insignificant differences between all genotypes for uniformity ratio. The results also showed that the regression coefficients were not significantly different from unity for all genotypes while the deviation from regression (S^2d) values differed significantly from zero for all genotypes except for genotypes No 6, 7, 11, 16, 19 and 20. As for phenotypic stability, the data indicated that out of 21 genotypes only six, namely, 6, 7, 11, 16, 19 and 20 were phenotypically stable where they had mean performances which did not differ significantly from the average of all genotypes, regression coefficient (b) and deviation from regression (S^2d) which did not differ significantly from unity and zero, respectively. With respect to the genotypic stability, the results in Table (9) and Fig 7 illustrated that nine genotypes out of 21 exhibited average stability degree namely genotypes No 3, 5, 6, 7, 10, 11, 15, 18, and 19. The rest of 21 genotypes exhibited more importance for the unpredictable component (λ) than the predictable one (α) so these genotypes were considered unstable. El-Feki *et al* (1994) obtained similar results.

7- Micronaire reading

Table (10) revealed that the mean performance of Micronaire reading ranged between 3.48 for genotype No 8 and 4.27 for genotype No 21. The results showed that genotypes 4, 8, 12, 16, 18, and 20 were the finest genotypes. For phenotypic stability parameters, only three genotypes out of 21, namely, No 16, 18 and 20 exhibited phenotypic stability as they met the assumptions of Ebrhart and Reusell (1966) and could be recommended as stable genotypes. With respect to genotypic stability, Table 10 and Fig 8 indicated that out of 21 genotypes, only 13 showed genotypic stability of an average degree, as well as the genotype namely 11 showed average degree of genotypic stability at probability of 0.95 and above average of genotypic stability at probability of 90. While the genotype N 19 exhibited above average degree of stability at two probabilities 0.90 and 0.95. The distribution of $\alpha = 0$ and $\lambda = 0$ for genotypes No 8 and 17 indictined less response to the environmental change and therefore, they were more adaptive for specific environment. Moreover, the distribution indicated that λ statistic was greater than unity for genotypes No 4, 5, 10 and 21 suggesting the importance of unpredictable component of genotypic x environment interaction (Fig 8) and these four genotypes were judged to be unstable. Similar results were obtained by El-Feki *et al* (1994).

8- Pressely index

Table (11) showed that all genotypes exhibited insignificant differences for pressely index. The value of regression coefficients did not differ significant by from unity (b-1 = 0 for studied genotypes except for genotypes No 1, 8, 10, 12, and 16 as well as insignificant values of deviation from regression (S^2d) which were exhibited by genotypes No 4, 5, 6, 9, 11, 13, 14, 19 and 20. It was observed from these results that the genotypes 4, 5, 6, 13, 14, 19 and 20 were phenotypically stable for pressely index as they met the assumptions of Ebehart and Russell (1966) for stable genotypes. These results are similar to those obtained by El-Feki *et al* (1994).

Concerning the genotypic stability results in Table (11) and Fig (9) indicated that an average degree of genotypic stability was shown for pressely index by 10 genotypes out of 21. Unpredictable component, (λ) was more importance than predictable component (α) for 11 genotypes which were considered unstable genotypes (Fig 9).

CONCLUSION

From the previous results of this study its worthy to determine that the strain of G.84 x (G.74 x G.68), $F_5$1193/2002, $F_5$1137/2002, $F_5$1143/2002 and $F_6$1208/2002 competent of the yield were highest yield and exhibited average genotypic stability while $F_7$1213/2002 exhibit height mean performance of quality traits and average genotypic stability.

Table. 1 Codes and origins of the studied genotypes

No	Genotypes	Origin
1	F_5 1097/2002	G.70 x [(84 x G.45) x G.45]
2	F_5 1110/2002	G.70 x [(84 x G.45) x G.45]
3	F_5 1116/2002	// // //
4	F_5 1112/2002	G.77 x [(84 x G.45) x G.45]
5	F_5 1137/2002	G.87 x [84 x (G.70 x G.51B)]
6	F_5 1143/2002	// // //
7	F_5 1153/2002	G.45 x [84 x (G.70 x G.51B)]
8	F_5 1156/2002	// // //
9	F_6 1180/2002	(G.68 x G.45) x [(84 x G.45) x G.45]
10	F_6 1193/2002	(G.84 xF.108) x [(84 x G.45) x G.45]
11	F_6 1208/2002	// // //
12	F_7 1213/2002	(G.84 x G.70) (G.45 x S.I)
13	F_7 1236/2002	(G.76 x G.77) x G.87
14	$F_8$1241/2002	G.87 x (G.71 x G.74)
15	F_{11}1257/2002	G.77 x Pima S_6 x [G.87 x (G.77 x G.70)]
16	F_{12} 1292/2002	G. 87 x (G.77 x G.70)
17	G. 84 x (G.74 x G.68)	G. 84 x (G.74 x G.68)
18	G. 87	G.77 x G.45
19	G.88	G.77 x G.45
20	G.45	G.28 x G.7
21	G.70	G.59A x G.51B

Table. 2 Mean squares of the earliness index, boll weight, seed and lint cotton yield and lint percentage for degree of stability

Sources	d.f	Earliness index	Boll weight	seed cotton yield	lint cotton yield	Lint percentage	2.5% span length	Uniformity ratio	Micronaire reading	Pressely index
Environment (E)	5	26655.80**	3124.80**	41714870**	5294295**	103.5125**	16.2188**	53.4500**	0.8542**	8.3939**
Replication (R)	30	496.7334**	54.333*	1940958**	242082.4**	2.8146	0.4323	1.9792	0.0424	0.0752
Genotypes G	20	861.9250**	82.400*	5882446**	965284.9**	93.1844**	8.0891**	7.9500**	0.7952	0.3398**
G x E	100	138.6375**	127.90**	402122.3**	50034.49**	3.5669**	2.2969**	6.5850**	0.0875	0.4136**
Error	600	52.8588	3.5.7164	278179.3	33940.05	2.0511	0.6482	2.0500	0.0427	0.1122

*,** Significant at 0.05 % and 0.01, respectively

Table. 3. Mean performance of earliness and phenotypic and genotypic stability parameters for extra long strains over environment .

	Mean	Phenotypic stability			z				
							Stability degree		
		bi	S^2d	r^2	α	λ	90%	95%	99%
F_5 1097/2002	65.64	1.09100	7.89300*	0.93972	0.0932	1.8951	++	++	++
F_5 1110/2002	71.04*	0.80627*	-4.50803	0.95666	-0.1973	0.7194	++	++	++
F_5 1116/2002	59.33	1.31192**	-6.19066	0.98676	0.3179	0.5358	-	-	-
F_5 1112/2002	69.54*	1.00182	-3.19820	0.96685	0.0067	0.8664	++	++	++
F_5 1137/2002	56.21	1.09149	-9.71654	0.99188	0.0826	0.1696	-	-	-
F_5 1143/2002	62.62	0.93925	7.66446*	0.92118	-0.0617	1.8923	++	++	++
F_5 1153/2002	67.18	0.93150	-9.45371	0.98776	-0.0806	0.0520	-	-	-
F_5 1156/2002	69.79	0.80805*	-3.79318	0.95306	-0.1959	0.8066	++	++	++
F_6 1180/2002	57.03	1.05342	9.94197*	0.92956	0.0628	2.1879	-	-	-
F_6 1193/2002	70.25*	0.88500	6.22780	0.91867	- 0.1132	1.7852	++	++	++
F_6 1208/2002	53.72	0.63778*	4.96674**	0.63450	-0.3666	5.6839	-	-	-
F_7 1213/2002	64.05	0.79379*	2.10185	0.92046	-0.2096	1.3388	++	++	++
F_7 1236/2002	60.47	1.26926*	5.32834	0.96027	0.2746	1.6836	+	+	++
$F_8$1241/2002	65.03	1.31093**	-2.77740	0.97948	0.3168	0.8664	+	+	++
F_{11}1257/2002	66.58	0.73432**	-5.25594	0.95295	-0.2683	0.6312	+++	+++	++
F_{12} 1292/2002	68.19	0.87998	10.74263*	0.89887	-0.1216	2.1814	-	-	-
G. 84 x (G.74 x G.68)	68.99	1.35462*	8.44054*	0.95902	0.3610	1.9361	-	-	-
G. 87	68.59	0.81354**	-9.35560	0.98347	-0.1894	0.2596	-	-	-
G.88	66.16	0.91826	-0.22072	0.94862	-0.0804	1.1048	++	++	++
G.45	64.31	1.03114	-2.49308	0.96631	0.0316	09439	++	++	++
G.70	65.05	1.33217	3.02434**	0.91689	0.33 79	4.0406	-	-	-
̄X	64.75								
L.S.D 0.05	4.62								
%C.V	11.19%								

*p < 0.005, ** p < 0.01 by LSD test +,++,+++ at Below average stability, average stability and above average stability respectively

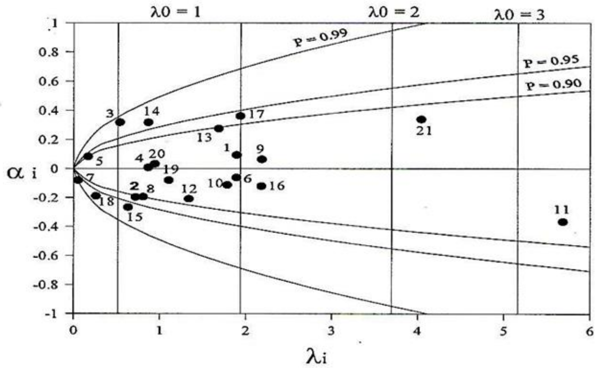

Fig. 1. Distribution of estimated genotypic stability statistics of erliness % of the 21 genotypes

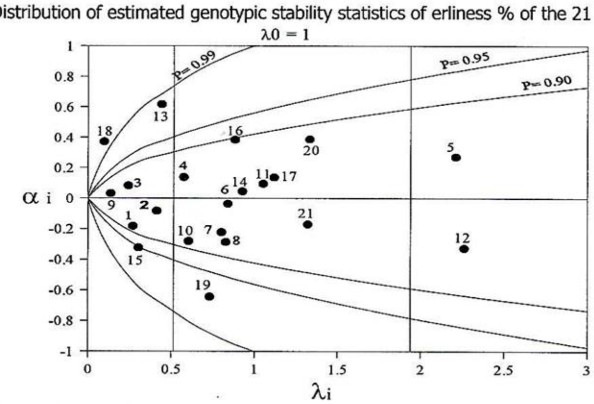

Fig. 2 . Distribution of estimated genotypic stability statistics of seed cotton yield of the 21 genotypes; where :

1	H_5 1097/2002	8	H_5 1156/2002	15	H_{11} 12571/2002
2	H_5 1110/2002	9	H_6 1180/2002	16	H_{12} 1292/2002
3	H_5 1116/2002	10	H_6 1153/2002	17	G.84 x(G.74 x G.68)
4	H_5 1112/2002	11	H_6 1193/2002	18	Giza 87
5	H_5 1137/2002	12	H_7 1213/2002	19	Giza 88
6	H_5 1143/2002	13	H_7 1236/2002	20	Giza 45
7	H_5 1153/2002	14	H_8 1241/2002	21	Giza 70

Table. 4 Mean performance of seed cotton and phenotypic and genotypic stability parameters for extra long strains over environment

Genotype	Mean (g)	Phenotypic stability			Genotypic stability				
		bi	s^2d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	2793.61	0.8199	-45041.14	0.9505	-0.1864	0.2666	-	-	-
F_5 1110/2002	3021.53	0.9167	-36487.75	0.9390	-0.0829	0.4053	-	-	-
F_5 1116/2002	2444.72	1.1093	-51242.84	0.9839	0.1188	0.1588	-	-	-
F_5 1112/2002	2705.69	1.1260	-27126.92	0.9421	0.1357	0.6052	++	++	++
F_5 1137/2002	3362.78*	1.2503	68335.42**	0.8360	-0.2662	2.3284	-	-	-
F_5 1143/2002	3657.64*	0.9589	-14022.02	0.8938	-0.0391	0.8294	++	++	++
F_5 1153/2002	3198.61	0.7878	-15943.08	0.8556	-0.2194	0.7791	++	++	++
F_5 1156/2002	3338.89	0.7230	-11415.04	0.8190	0.2854	0.8265	++	++	++
F_6 1180/2002	3035.69	1.0254	-52292.47	0.9835	-0.0303	0.1432	-	-	-
F_6 1193/2002	3440.97*	0.8364	-28046.16	0.9023	0.1697	0.5852	++	++	++
F_6 1208/2002	3653.33*	1.0826	2280.87	0.8876	-0.092	1.1092	++	++	++
F_7 1213/2002	2595.42	0.6392	57082.50**	0.5936	0.3745	2.0575	-	-	-
F_7 1236/2002	2803.06	1.5837**	-32457.21	0.9747	0.6175	0.4040	-	-	-
$F_8$1241/2002	3193.03	1.0361	-8358.77	0.8973	0.0439	0.9069	++	++	++
F_{11}1257/2002	3079.44	0.6894**	-41308.88	0.9154	0.3223	0.2932	-	-	-
F_{12} 1292/2002	3379.17	1.3602*	-6707.07	0.9358	0.348	1.0764	++	++	++
G. 84 x (G.74 x G.68)	3770.56*	1.1197	7104.31	0.8869	0.1304	1.2043	++	++	++
G. 87	3084.86	1.3598**	-52518.41	0.9909	0.3838	0.0706	-	-	-
G.88	3444.58	0.3849**	-11591.16	0.5627	-0.6417	0.724	++	++	++
G.45	2319.22	1.3555	10965.82	0.9157	0.3887	1.2689	++	++	++
G.70	2743.47	0.8349	13760.02	0.7985	0.2341	1.1256	++	++	++
X̄	3098.39								
L.S.D 0.05	247.83								
C.V%	17.03%								

*p < 0.005, ** p < 0.01 by LSD test

+,++,+++ at below average stability, average stability and above average stability respectively

Table. 5 Mean performance of lint yield and phenotypic and genotypic stability parameters for extra long strains over environment

Genotype	Mean (g)	Phenotypic stability			Genotypic stability				
		bi	S^2_d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	971.08	0.8292	-5163.269	0.9439	-0.179	0.3077	-	-	-
F_5 1110/2002	1068.0	0.9575	-4258.671	0.9404	-0.0445	0.4523	-	-	-
F_5 1116/2002	833.83	1.0425	-5710.601	0.9728	0.0446	0.2366	-	-	-
F_5 1112/2002	904.56	1.0916	-2929.747	0.9346	0.096	0.647	++	++	++
F_5 1137/2002	1221.19	1.2859	8827.864**	0.8433	0.2997	2.3654	-	-	-
F_5 1143/2002	1287.56	0.9665	788.054	0.8583	-0.0351	1.2018	++	++	++
F_5 1153/2002	1155.95	0.8777	-2377.438	0.8914	-0.1281	0.7268	++	++	++
F_5 1156/2002	1141.25	0.6882	-342.035	0.7812	-0.3267	0.9983	++	++	++
F_6 1180/2002	950.89	0.8774	-5373.440	0.9543	-0.1285	0.2818	-	-	-
F_6 1193/2002	1224.92	0.8813	-2682.767	0.8982	-0.1244	0.6816	++	++	++
F_6 1208/2002	1239.50	1.0957	-2172.852	0.9247	0.0998	0.7598	++	++	++
F_7 1213/2002	808.70	0.6279	5498.242*	0.6179	-0.3898	1.8501	++	++	++
F_7 1236/2002	978.78	1.5710**	-3497.821	0.9714	0.5984	0.4441	-	-	-
F_8 1241/2002	1096.03	0.9719	-2081.898	0.9047	-0.0294	0.7760	++	++	++
F_{11} 1257/2002	1139.86	0.7924*	-5028.426	0.9353	-0.2176	0.3226	-	-	-
F_{12} 1292/2002	1169.67	1.3929*	-1063.995	0.9423	0.4117	0.8699	+	++	++
G. 84 x (G.74 x G.68)	1338.86	1.0674	7409.260**	0.8026	0.0707	2.1839	-	-	-
G. 87	1041.22	1.3323**	-6396.335	0.9903	0.3482	0.0943	-	-	-
G.88	1288.08	0.4221**	-566.542	0.5813	-0.6056	0.8765	+++	+++	++
G.45	783.78	1.3008	1101.439	0.9136	0.3153	1.2152	++	++	++
G.70	1036.17	0.9276	3173.321	0.8117	-0.0759	1.5547	++	++	++
$\bar{X}$	1079.99								
L.S.D 0.05	90.619								
C.V%	17.06								

*p < 0.005, ** p < 0.01 by LSD test   +,++,+++ at Below average stability, average stability and above average stability respectively

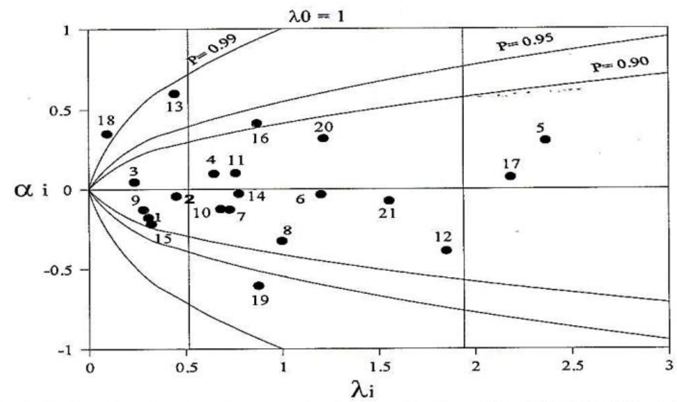

Fig. 3 . Distribution of estimated genotypic stability statistics of lint yield of the 21 genotypes

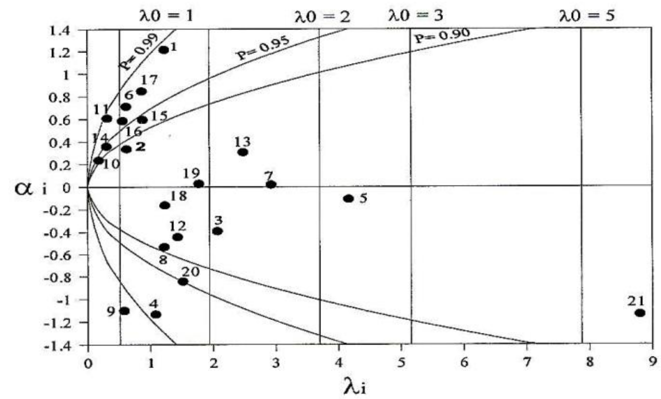

Fig. 4 .Distribution of estimated genotypic stability statistics of weight of 50 bolls of the 21 genotypes; where :

1	H_5 1097/2002	8	H_5 1156/2002	15	H_{11} 12571/2002
2	H_5 1110/2002	9	H_6 1180/2002	16	H_{12} 1292/2002
3	H_5 1116/2002	10	H_6 1153/2002	17	G.84 x(G.74 x G.68)
4	H_5 1112/2002	11	H_6 1193/2002	18	Giza 87
5	H_5 1137/2002	12	H_7 1213/2002	19	Giza 88
6	H_5 1143/2002	13	H_7 1236/2002	20	Giza 45
7	H_5 1153/2002	14	H_8 1241/2002	21	Giza 70

Table. 6 Mean performance of wight of 50 boll and phenotypic and genotypic stability parameters for extra long strains over environment

Genotypes	Mean (g)	Phenotypic stability			Genotypic stability				
		bi	S^2d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	156.0	1.8906**	6.7103**	0.9081	1.2471	1.2230	+	+	++
F_5 1110/2002	153.5	1.4775	4.6503*	0.8779	0.3345	0.6220	++	++	++
F_5 1116/2002	155.06	1.3222**	-4.6987	0.9775	-0.3937	2.0651	-	-	-
F_5 1112/2002	154.00	-0.0332**	0.6006**	0.5798	-1.1338	1.0824	+++	+++	++
F_5 1137/2002	154.95	0.7239	35.0891**	0.3110	-0.1100	4.1648	-	-	-
F_5 1143/2002	155.22	0.8002	26.6812	0.4093	0.7099	0.6158	+	+	++
F_5 1153/2002	156.47	1.1795	3.5179	0.8366	0.0179	2.9244	-	-	-
F_5 1156/2002	150.95	0.8893	-0.4635	0.8322	-0.5330	1.2170	++	++	++
F_6 1180/2002	153.11	-0.0007**	3.0784	0.0002	-1.1009	0.5779	+++	+++	+++
F_6 1193/2002	153.20	0.4971	11.1211**	0.3371	0.2347	0.1789	-	-	-
F_6 1208/2002	156.03	1.4519**	-2.3385	0.9518	0.6062	0.3141	-	-	-
F_7 1213/2002	154.20	0.7266	17.4299**	0.4431	-0.4448	1.4305	++	++	++
F_7 1236/2002	154.11	0.8129	-4.5449	0.9369	0.3039	2.4797	-	-	-
F_8 1241/2002	155.97	1.5280**	-0.5813	0.9373	0.3579	0.3039	-	-	-
F_{11} 1257/2002	155.45	1.4646**	-2.7287	0.9573	0.5929	0.8757	+	+	++
F_{12} 1292/2002	157.39	1.2521	-3.3930	0.9532	0.5829	0.5588	+	+	++
G. 84 x (G.74 x G.68)	156.36	1.8408**	-2.8411	0.9734	0.8452	0.8640	+	+	++
G. 87	155.42	0.9792	11.0982**	0.6640	-0.1623	1.2308	++	++	++
G.88	154.39	0.8430	2.1606	0.7527	0.0267	1.7728	++	++	++
G.45	153.14	0.6143	25.5415**	0.2973	-0.8441	1.5147	+++	+++	++
G.70	154.22	0.7402*	-4.7011	0.9318	-1.1373	8.8014	-	-	-
$\bar{X}$	154.72								
L.S.D 0.05	3.964								
C.V%	3.85%								

*p < 0.005, ** p < 0.01 by LSD test +,++,+++ at Below average stability, average stability and above average stability respectively

Table. 7 Mean performance of Lint % and phenotypic and genotypic stability parameters for extra long strains over environment

Genotypes	Mean %	Phenotypic stability			Genotypic stability				
		bi	S^2d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	35.04	0.50408	0.22478	0.324137	-0.4991	1.4018	++	++	++
F_5 1110/2002	35.37	1.46784	1.09755	0.61683	0.1340	2.6987	-	-	-
F_5 1116/2002	33.77	1.31799	0.07826	0.81509	0.3701	0.9807	++	++	++
F_5 1112/2002	34.17	0.93327	0.45972**	0.53816	-0.0398	1.9661	++	++	++
F_5 1137/2002	36.62	0.94297	-0.28340	0.93773	-0.0343	0.1628	-	-	-
F_5 1143/2002	35.60	1.08085	0.36843**	0.63799	0.1207	1.7109	++	++	++
F_5 1153/2002	36.88	1.15267	0.18135	0.73074	0.0432	1.2782	++	++	++
F_5 1156/2002	34.44	1.19254	-0.1770	.82332	0.2339	0.7807	++	++	++
F_6 1180/2002	30.92	0.56510	1.18119**	0.18404	-0.4362	3.7609	-	-	-
F_6 1193/2002	35.59	0.80643	0.11432	0.60338	-0.1826	1.1573	++	++	++
F_6 1208/2002	34.41	1.00337	-0.05474	0.78799	0.0339	0.7010	++	++	++
F_7 1213/2002	33.38	1.19697	2.18903**	0.37881	0.2203	6.2310	-	-	-
F_7 1236/2002	34.84	0.42103*	-0.00317	0.35745	-0.5849	0.8297	++	++	++
$F_8$1241/2002	34.42	1.16385	-0.12169	0.86641	0.1992	0.5145	++	++	++
F_{11}1257/2002	37.49*	0.70552	-0.13820	0.72002	-0.2886	0.5291	++	++	++
F_{12} 1292/2002	34.69	0.91317	0.17302	0.63377	-0.0570	1.2452	++	++	++
G. 84 x (G.74 x G.68)	36.27	1.12201	0.00183	0.79568	0.1487	0.8945	++	++	++
G. 87	34.74	1.27699	0.63463**	0.64195	0.3146	2.4337	-	-	-
G.88	37.19	0.69371	0.33924*	0.43079	-0.3131	1.9550	++	++	++
G.45	33.62	1.08783	-0.19093	0.89104	0.1189	0.3382	-	-	-
G.70	37.84	1.45181	0.01593	0.86239	0.4981	0.9123	++	++	++
$\bar{X}$	35.11								
L.S.D 0.05	0.92								
C.V%	4.08%								

***p < 0.005, ** p < 0.01 by LSD test** **+,++,+++ at Below average stability, average stability and above average stability respectively**

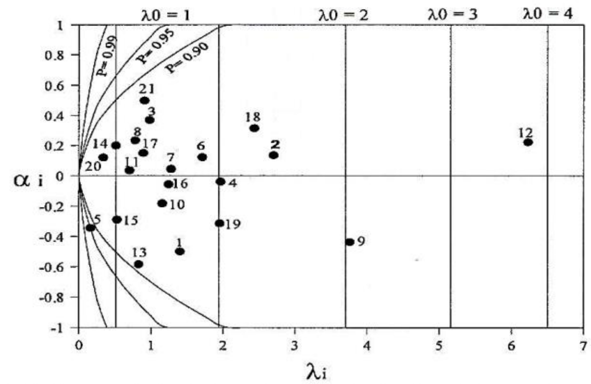

Fig. 5 . Distribution of estimated genotypic stability statistics of lint percentage of the 21 genotypes

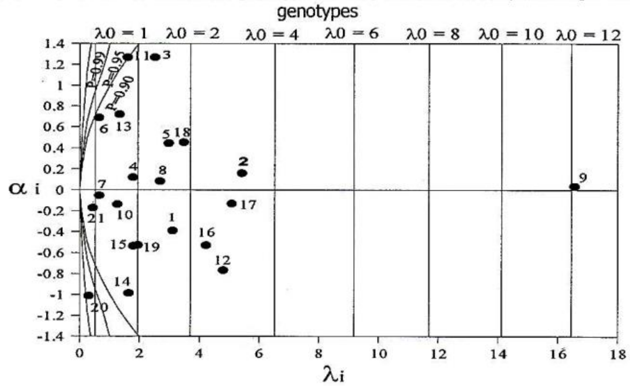

Fig. 6. Distribution of estimated genotypic stability statistics of 2.5 % span length of the 21 genotypes; where :

1	H_5 1097/2002	8	H_5 1156/2002	15	H_{11} 12571/2002
2	H_5 1110/2002	9	H_6 1180/2002	16	H_{12} 1292/2002
3	H_5 1116/2002	10	H_6 1153/2002	17	G.84 x(G.74 x G.68)
4	H_5 1112/2002	11	H_6 1193/2002	18	Giza 87
5	H_5 1137/2002	12	H_7 1213/2002	19	Giza 88
6	H_5 1143/2002	13	H_7 1236/2002	20	Giza 45
7	H_5 1153/2002	14	H_8 1241/2002	21	Giza 70

Table. 8 Mean performance of length at 2 .5% and phenotypic and genotypic stability parameters for extra long strains over environment.

Genotypes	Mean	Phenotypic stability			Genotypic stability				
		bi	S^2d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	35.91	0.6279	0.5863**	0.1367	-0.3905	3.1025	-	-	-
F_5 1110/2002	36.18	1.1574	1.1855**	0.2352	0.1603	5.34233	-	-	-
F_5 1116/2002	37.14	2.2313	0.4582**	0.7044	1.2673	2.5130	-	-	-
F_5 1112/2002	36.88	1.1253	0.2422**	0.4720	0.1206	1.7752	+	+	+
F_5 1137/2002	36.02	1.4375	0.5531**	0.4642	0.4441	2.9725	+	+	+
F_5 1143/2002	36.29	1.6690	-0.0411	0.8394	0.6859	0.6381	-	-	-
F_5 1153/2002	35.88	0.9554	-0.0467	0.6391	-0.0532	0.6491	++	++	++
F_5 1156/2002	36.42	1.0816	0.4803**	0.3515	0.0828	2.6822	++	++	++
F_6 1180/2002	37.84*	1.0261	4.0577	0.7331	0.0374	16.5623	-	-	-
F_6 1193/2002	35.95	0.8690	0.1114	0.4282	-0.1376	1.2540	++	++	++
F_6 1208/2002	36.82	2.2299*	0.2219**	0.7862	1.2662	1.5946	++	++	++
F_7 1213/2002	37.53*	0.2562	1.0279**	.0167	-0.7656	4.7954	++	++	++
F_7 1236/2002	36.00	1.7062	0.1299*	0.7319	0.7187	1.3212	-	-	-
$F_8$1241/2002	35.66	-0.0316	0.2796**	0.0007	-0.9844	1.6329	++	++	++
F_{11}1257/2002	35.89	0.4881	0.2492**	0.1421	-0.5354	1.7866	++	++	++
F_{12} 1292/2002	36.74	0.4959	0.8751**	0.0676	0.5285	4.2215	-	-	-
G. 84 x (G.74 x G.68)	34.82	0.8771	1.0951**	0.1588	-0.1313	5.0831	-	-	-
G. 87	36.24	1.4504	0.6791**	0.4310	0.4525	3.4782	-	-	-
G.88	36.02	0.4969	0.2867**	0.1371	-0.5274	1.9331	-	-	-
G.45	36.39	0.0121*	-0.1219	0.0005	-1.0105	0.3004	-	-	-
G.70	36.09	0.8384	-0.1012	0.6704	-0.1712	0.4305	-	-	-
X̄	36.32								
L.S.D 0.05	1.02								
C.V%	2.21%								

*p < 0.005, ** p < 0.01 by LSD test +,++,+++ at Below average stability, average stability and above average stability respectively

Table. 9 Mean performance of U.R% and phenotypic and genotypic stability parameters for extra long strains over environment

Genotypes	Mean %	Phenotypic stability			Genotypic stability				
		bi	S^2d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	90.05	-0.5226	2.4403**	0.0846	-1.5750	3.7324	-	-	-
F_5 1110/2002	89.64	0.4314	1.2515**	0.0923	-0.5881	3.3615	-	-	-
F_5 1116/2002	91.39	0.9291	0.4463*	0.4472	-0.0735	1.3851	++	++	++
F_5 1112/2002	92.08	1.6601	2.8337**	0.4531	0.6830	4.3055	-	-	-
F_5 1137/2002	90.51	1.4966	0.7331**	0.6260	0.5138	1.7273	++	++	++
F_5 1143/2002	91.01	1.1554	0.2915	0.5919	0.1607	1.1947	++	++	++
F_5 1153/2002	90.98	0.2136	0.0710	0.0602	-0.836	0.8968	++	++	++
F_5 1156/2002	90.69	0.7405	2.2763**	0.136	-0.2684	3.6319	-	-	-
F_6 1180/2002	91.15	-0.0916	1.5054**	0.0040	-1.1293	2.6336	-	-	-
F_6 1193/2002	91.89	1.2389	0.4291*	0.5937	0.2473	1.3624	++	++	++
F_6 1208/2002	91.53	1.1207	0.2468	0.5886	0.1248	1.1396	++	++	++
F_7 1213/2002	91.15	0.4707	2.3775**	0.0711	-0.5477	3.7479	-	-	-
F_7 1236/2002	91.27	3.0491	5.8170**	0.6018	2.1198	7.7999	-	-	-
$F_8$1241/2002	91.62	1.5581	2.0438**	0.4849	0.5773	3.3352	-	-	-
F_{11}1257/2002	90.95	1.2721	0.3525	0.6233	0.2816	1.2667	++	++	++
F_{12} 1292/2002	92.56	1.2759	0.9033**	0.5205	0.2855	1.9443	-	-	-
G. 84 x (G.74 x G.68)	91.26	0.9519	1.0429**	0.3571	-0.0498	2.1180	-	-	-
G. 87	91.24	1.8217	0.2179	0.7959	0.8498	1.0748	++	++	++
G.88	90.87	0.5418	1.0962**	0.1486	-0.4740	2.1753	-	-	-
G.45	91.72	0.9780	.2680	0.5157	-0.0229	1.665	++	++	++
G.70	91.76	0.7086	2.1684**	0.1570	-0.3015	3.4987	-	-	-
$\bar{X}$	91.21								
L.S.D 0.05	1.65								
C.V%	1.57%								

*p < 0.005, ** p < 0.01 by LSD test   +,++,+++ at Below average stability, average stability and above average stability respectively

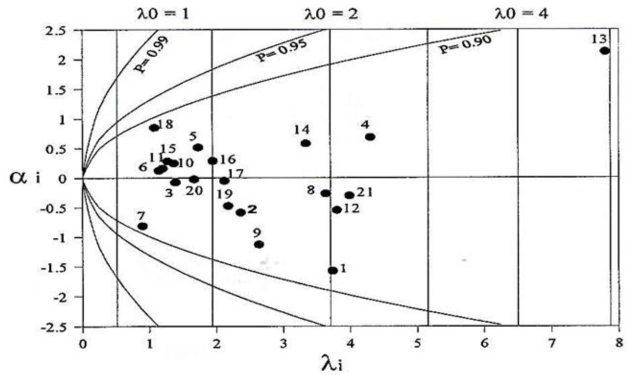

Fig. 7. Distribution of estimated genotypic stability statistics of length uniformity ratio of the 21 genotypes

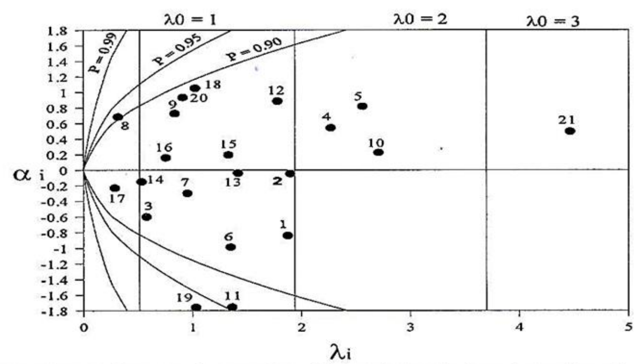

Fig. 8. Distribution of estimated genotypic stability statistics of micronaire reading of the 21 genotypes; where :

1	H_5 1097/2002	8	H_5 1156/2002	15	H_{11} 12571/2002
2	H_5 1110/2002	9	H_6 1180/2002	16	H_{12} 1292/2002
3	H_5 1116/2002	10	H_6 1153/2002	17	G.84 x(G.74 x G.68)
4	H_5 1112/2002	11	H_6 1193/2002	18	Giza 87
5	H_5 1137/2002	12	H_7 1213/2002	19	Giza 88
6	H_5 1143/2002	13	H_7 1236/2002	20	Giza 45
7	H_5 1153/2002	14	H_8 1241/2002	21	Giza 70

Table. 10 Mean performance of micronaire reading and phenotypic and genotypic stability parameters for extra long strains over environment

Genotypes	Mean	Phenotypic stability			Genotypic stability				
		bi	S^2d	r^2	α	λ	Stability degree		
							90%	95%	99%
F_5 1097/2002	3.761	0.2034	0.0180**	0.0213	-0.8396	1.8750	++	++	++
F_5 1110/2002	3.744	0.9559	0.0179**	0.3252	-0.0475	1.8977	++	++	++
F_5 1116/2002	3.717	0.4279	-0.0042	0.2327	-0.6099	0.577*	++	++	++
F_5 1112/2002	3.489*	1.5132	0.0244**	0.5013	0.5424	2.2696	-	-	-
F_5 1137/2002	3.972	1.7782	0.0297**	05497	0.8179	2.5619	-	-	-
F_5 1143/2002	3.856	0.0629	0.0091*	0.0028	-0.9876	1.3496	++	++	++
F_5 1153/2002	3.783	0.7153	0.0020	0.3482	-0.3003	0.9524	++	++	++
F_5 1156/2002	3.572*	1.6488*	-0.0085	0.8891	0.6840	0.3169	-	-	-
F_6 1180/2002	3.728	1.6894	0.0003	0.7687	0.7265	0.8356	++	++	++
F_6 1193/2002	3.922	1.2158	0.0317**	0.3531	0.2254	2.7105	-	-	-
F_6 1208/2002	4.178*	-0.6688*	0.0144*	0.2285	-1.7565	1.3631	+++	++	++
F_7 1213/2002	3.650*	1.83.89	0.0165**	0.6513	0.8847	1.7797	++	++	++
F_7 1236/2002	3.806	0.9628	0.0098*	0.3953	-0.0403	1.4169	++	++	++
$F_8$1241/2002	3.756	0.8556	-0.0053**	0.5790	-0.1507	0.5323	++	++	++
F_{11}1257/2002	3.61	1.185	0.0083	0.5137	0.1943	1.3299	++	++	++
F_{12} 1292/2002	3.672*	1.1514	-0.0014	0.6368	0.1576	0.7557	++	++	++
G. 84 x (G.74 x G.68)	3.839	0.7810	-0.0093	0.6780	-0.2308	0.2864	-	-	-
G. 87	3.617*	1.9987	0.0040	0.7879	1.0514	1.0241	++	++	++
G.88	4.222*	-0.6711**	0.0058	0.264	-1.7587	1.0318	+++	+++	++
G.45	3.78*	1.8857	0.0019	0.7892	0.9338	0.9093	++	++	++
G.70	4.272*	1.4700	0.0616**	0.3257	0.4951	4.4653	-	-	-
$\bar{X}$	3.804								
L.S.D 0.05	0.18								
C.V%	5.43%								

$p < 0.005$, ** $p < 0.01$ by LSD test   +,++,+++ at Below average stability, average stability and above average stability respectivelyt*

Table. 11. Mean performance of pressely units and phenotypic and genotypic stability parameters for extra long strains over environment

Genotypes	Mean	Phenotypic stability			Genotypic stability				
							Stability degree		
		bi	S^2d	r^2	α	λ	90%	95%	99%
F_5 1097/2002	10.79	0.0889*	0.0922**	0.0101	-0.9192	2.8742	-	-	-
F_5 1110/2002	10.96	1.2641	0.1662**	0.5671	0.2661	4.5556	-	-	-
F_5 1116/2002	11.15	0.5591	0.2685**	0.1456	-0.4445	6.8476	-	-	-
F_5 1112/2002	10.74	1.0768	.0054	0.8204	0.0777	0.9505	++	++	++
F_5 1137/2002	11.03	0.8429	0.0207	0.6728	-0.1587	1.2890	++	++	++
F_5 1143/2002	10.94	0.1359	0.4689	0.0061	-0.8711	11.3330	-	-	-
F_5 1153/2002	11.13	1.4516	0.1028**	0.7153	0.4556	3.1265	-	-	-
F_5 1156/2002	10.81	0.5525*	-0.0038	0.6065	-0.4514	0.7343	++	++	++
F_6 1180/2002	10.93	1.4907	0.1362**	0.6814	0.4951	3.8747	-	-	-
F_6 1193/2002	11.11	1.4630*	-0.0092	0.9280	0.4667	0.6135	+	++	++
F_6 1208/2002	10.85	1.2600	0.1885**	0.5398	0.2621	5.0560	-	-	-
F_7 1213/2002	11.03	2.0033*	0.1007**	0.8293	1.0116	3.0559	-	-	-
F_7 1236/2002	11.01	1.2599	0.0200	0.8230	0.2618	1.2756	++	++	++
$F_8$1241/2002	11.12	1.1570	0.0068	0.8365	0.1590	0.9765	++	++	++
F_{11}1257/2002	11.05	1.0548	0.0313*	0.7311	0.0551	1.5303	++	++	++
F_{12} 1292/2002	11.02	1.7089*	0.0345*	0.8721	0.7146	1.5836	++	++	++
G. 84 x (G.74 x G.68)	10.74	0.4063	0.0666**	0.2099	-0.5987	2.3105	-	-	-
G. 87	10.92	0.8971	0.0706**	0.550	-0.1034	2.4137	-	-	-
G.88	10.71	0.8745	0.0032	0.7611	-0.1266	0.8938	++	++	++
G.45	10.86	0.7427	-0.0067	0.7528	-0.2590	0.6754	++	++	++
G.70	10.84	0.7101	0.0947**	0.3895	-0.2926	2.9493	-	-	-
X̄	10.94								
L.S.D 0.05	0.41								
C.V%	3.06%								

*$p < 0.005$, ** $p < 0.01$ by LSD test   +,++,+++ at Below average stability, average stability and above average stability respectively

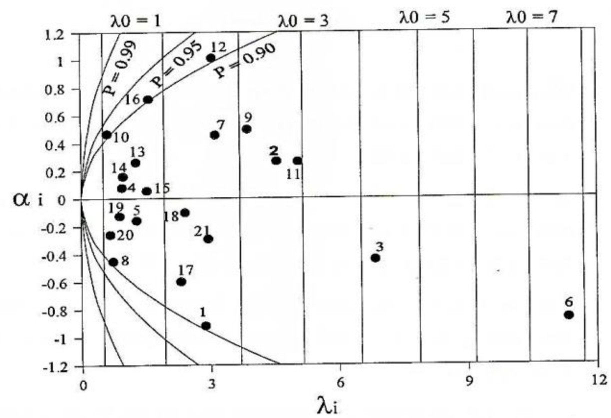

Fig. 9. Distribution of estimated genotypic stability statistics of pressley index of the 21 genotypes; where :

1	H_5 1097/2002	8	H_5 1156/2002	15	H_{11} 12571/2002
2	H_5 1110/2002	9	H_6 1180/2002	16	H_{12} 1292/2002
3	H_5 1116/2002	10	H_6 1153/2002	17	G.84 x(G.74 x G.68)
4	H_5 1112/2002	11	H_6 1193/2002	18	Giza 87
5	H_5 1137/2002	12	H_7 1213/2002	19	Giza 88
6	H_5 1143/2002	13	H_7 1236/2002	20	Giza 45
7	H_5 1153/2002	14	H_8 1241/2002	21	Giza 70

REFERENCES

1. Abdel-Hakim, A.M. and G.H.A. Gad El-Karim. 1994. Estimates of genotypic and phenotypic stability in cotton (*Gossypium barbadense*). J. Agric. Sci. Mansoura Univ. 19 (7): 2181 – 2189.
2. Abo El- Zahab, A. A., H.Y. Awad and K. A. Bakr. 2003. Comparative performance of Pima and Egyptian cotton cultivars: 111. tolerance to late planning stress. Egypt. J. Agric. Res., 81 (1): 205: 220.
3. Ashmawy, F., A. A. A. Al-Akhader, A.M.S.A. El-Taweel and Hanem A. Mohamed. 2003. Stability statistics of some Egyptian cotton genotypes. Egypt. J. plant Breed. 7(2): 142: 164.
4. A.S.T.M. 1998. Designation D. 4605-98 and 3818-98) Vol. 07. No. 1 Easton, MD, USA..
5. Badr, S. S.M. 1999. Genotypic stability for the new Egyptian cotton varieties Giza 85, Giza 89, Giza 88, Egypt. J. Agric Res. 77 (1): 331 – 342.
6. Bartlett, M. S. 1937. Praperties of sufficiency and statistical test. Proc. Roy. Soc. London, series A. 160, 268 - 282
7. Eberhart, S. A. and W. A. Russell. 1966. Stability parameters for comparing varieties, Crop Sci. 36 – 40.
8. El-Feki, T.A. and F.S. Moustafa. 1990. Genotypic stability parameters for several genotypes of two species of cotton. Egypt. J. Appl. Sci. 5 (39) 39 – 49.
9. El-Feki, T. A., Hanna. F. Fahmy., H.A. Abd Al-Naby and Sayeda. S. El-Helow. 1994. Stability parameters of Egyptian extra long genotypes for yield and yield components. Proc. 6th Conf. Agric. Al-Azhar Univ., Cairo, Egypt, Vol. 1 Sept. 1994, PP: 73 – 89.
10. El-Kadi, D. A. A., A. Abo El-Zahab and S. A. El-Shaarwy. 1978. Genotypic stability parameters for comparing Egyptian cotton cultivars. Res. Bul. 873 july 1978 Fac. Of Agric. Ain Shams univeristy.
11. El-Marakby, A. M., A. M. Abou-Alam and S. H. M. El-Hariry. 1986. Genotypic stability analysis for same G. barbadense and G. hirsutum genotypes of cotton . Agric. Sci. Moshtoor 24 (3): 1347 – 1367.
12. Gomez, K. A. and A.A. Gomez. 1984. Statistical procedures for agricultural research. 2nd ed, john wiely and Sons, New york, U.S.A.

13. Hassan, I.S.M., A.M. Abdel-Aziz and E.M. Ghoneim. 2000. Balanced response for genotypes. Agric. Sci. Mansoura Univ. 25 (1): 23 -32.

14. Kang, M.S. and R. Magari. 1995. Stable: a basic program for calculating stability and yield-Stability statistics Agron. J. 87 (2): 276 – 277.

15. Mohamed S. G. A.,I.S. M. Hassan and S.A.M. Barakat. 2005. Stability parameters for comparing same agronomic Egyptian cotton genotypes. Egypt. J. plant breed 9 (2): 161 – 180.

16. Shukla, G. K. 1972. Same statistical aspects of partitioning genotype-environmental components of variability. Heredity 29: 237 – 245.

17. Tai, G.CC. 1971. Genotytpic stability analysis and its application to potato regional traits. Crop Sci. 11: 184 – 190.

تحليل الثبات لصفات التبكير والمحصول والتيلة لبعض سلالات القطن المصري فائق الطول

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معهد بحوث القطن– مركز البحوث الزراعية – الجيزة

تهدف هذه الدراسة الى تقييم بعض التراكيب الوراثية في القطن فائق الطول باستخدام طريقتين من طرق الثبات وهما الثبات المظهري والثبات الوراثي. وفي موسم ٢٠٠٣ تم تقييم السلالات في تجربة اولية بسخا كفر الشيخ وفي موسم ٢٠٠٤ تم انتخاب سبعة عشر سلالة بجانب أربع اصناف تجارية للمقارنة، تم زراعتها في تجربة قطاعات كاملة العشوائية في ست مكررارت في ٦ مناطق، الأولى كفر سعد بمحافظة دمياط، وسخا بمحافظة كفر الشيخ، وكفر الدوار بمحافظة البحيرة وميت غمر بمحافظة الدقهلية، ابو كبير بمحافظة الشرقية، ومنوف بمحافظة المنوفية.

وكانت النتائج المتحصل عليها كما يلي:

١- تشير النتائج إلى وجود تأثيرات معنوية بين البيئات والسلالات والتفاعل بينهما في جميع الصفات المدروسة ماعدا صفة قراءة الميكرونير.

٢- أظهرت النتائج وجود تباين كبير في تقدير الانحرافات عن الاستجابة الخطية للبيئات وهذا يشير إلى ان المكون الذي التي لا يمكن التنبؤ بتأثيره من تفاعل بين البيئات والتراكيب الوراثية قد يكون أكثر أهمية من المكون الذي يمكن التنبأ بتأثيره وهو معامل الاستجابة الخطية في تقدير ثبات الأصناف.

٣- أظهرت كل من السلالة هـ٢ ٢٠٠٢/١١١٢، هـ ٦ ٢٠٠٢/١١٩٣وكذلك الصنف جـ ٨٨ ، جـ ٤٥ درجات ثبات متوسطة بالنسبة للثبات المظهري والوراثي في صفة التبكير.

٤- أظهرت ثلاثة سلالات هـ ٦ ٢٠٠٢/١١٩٣ ، هـ ٦ ٢٠٠٢/١٢٠٨، جـ٨٤ × (جـ٧٤ × جـ ٦٨) قدرة إنتاجية عالية بجانب درجات ثبات متوسطة في صفات المحصول.

٥- أظهر الصنف جيزة ٨٨ درجة ثبات وراثي ومظهري في صفة وزن ٥٠ لوزة.

٦- أظهر الهجين جـ٨٤ × (جـ٧٤ × جـ ٦٨) درجة ثبات مظهري وو راثي متوسط بالنسبة لصفة تصافى الحليج.

٧- السلالتين هـ ٥ ٢٠٠٢/١١٥٣ والسلالة رقم هـ ٦ ٢٠٠٢/١١٩٣أظهرت درجة ثبات مظهرية ووراثية بالنسبة لصفة الطول عند ٢,٥%

٨- الصنف جيزة ٤٥، جيزة ٨٧ اظهر درجة ثبات مظهري ووراثى بالنسبة لصفة المتانة.

٩- السلالتين رقم هـ $_{١١}$ ٢٠٠٢/١٢٥٧ الناتجة من تهجين (جـ٧٧ × بيما س^{٦}) × (جـ٨٧ × (جـ ٧٧ × جـ٧٠)) والسلالة هـ $_{١٢}$ ٢٠٠٢/١٢٩٢ الناتجة من تهجين (جـ ٨٧ × (جـ ٧٧ × جـ٧٠) أظهرت درجة ثبات مظهريا و وراثيا لمعظم الصفات تحت الدراسة.

١٠- من النتائج السابقة يمكن ان نستخلص ان الهجين جـ٨٤ × (جـ٧٤ × جـ ٦٨) لـه قـدرة إنتاجية عالية مع درجة ثبات متوسطة لجميع صفات المحصول ومكوناته كما كانت السـلالة هـ $_{٦}$ ٢٠٠٢/١١٩٣ أعلا السلالات في المحصول وكذلك التيلة مع درجـة ثبـات لهـاتين الصفتين.