Egypt. J. Plant Breed.21 (5): 642 – 653 (2017)

SELECTING HIGH YIELD AND QUALITY COTTON GENOTYPES USING PHENOTYPIC AND GENOTYPIC STABILITY STATISTICS

H.S. Abd El Samad*, A.A. El Hosary**, El.S. M.H. Shokr**, M.E. El-Badawy**,
A.E.M. Eissa*, A.A.A. El Hosary**
* Cotton Res.Inst. Agric.Res. Center
**Agronomy Dep. Fac. Agric. Moshtohor, Benha Univ.

ABSTRACT

The present investigation aimed to determine stability parameters of some Egyptian cotton genotypes i.e. Giza 80, Giza 90, L1 (G.90 x Australy) , Giza 95, L2 [G.80 x Australy] x G.83, L3 [G.83 Raid x Australy] x G.91, L4 [G.83 x (G .80 x G .75)] x Karashenky and L5 [G.83 x (G .80 x G .89)] x Australy under 4 environments (two locations and two successive years, 2015 and 2016) . The experimental design was a randomized complete block design with three replications in each trail. Four traits were studied i.e. seed cotton yield (K/F), Lint cotton yield (K/F), Seed Index (g) and Micronaire reading. All traits showed significant mean squares for environments, also significant for genotypes x environment interaction for all traits were detected . All traits showed significant mean squares for all genotypes. The two genotypes L2 [G.80 x Australy] x G.83 and L5 [G.83 x (G .80 x G .89)] x Australy exhibited high seed cotton and lint yield than the other genotypes. The genotype L2 [G.80 x Australy] x G.83 for seed and lint yield, Giza 95 seed index and Giza 90 and L1 (G.90 x Australy) for for microniar reading had above average stability. Therefore, these genotypes can be recommended to be released as stable high yielding and fiber quality genotypes and/or be incorporated as breeding stock in any future breeding program aiming for producing stable high yielding with high fiber quality.

Key Words: *Stability parameters, Genotype-environment interaction, Egyptian cotton.*

INTRODUCTION

Cotton (*Gossypium barbadense* L.) is an important crop in Egypt as well as all over the world. Cotton crop is mainly cultivated for fiber and oil. It provides row material for the Egyptian textile industry. The total cultivated area decreased from two million to 120 thousand fedden in the growing season of 2016.

In Egypt improvement of earliness, yield and its components as well as fiber quality traits are important objectives in cotton breeding. It is known that all cultivated Egyptian cotton varieties (2n = 52) are descended from the original Ashmouni of 1860, a fact which indicates the narrow genetic base within all past breeding efforts operated. Some foreign varieties belonging to (*G. barbadense* L.) posses a number of characteristics which, if transferred to Egyptian barbadense would be a great gain.

Now, cotton area extends longitudinally about 1000 km from north to south in Egypt, because environmental conditions vary or likely to vary from one location to another and / or from year to year in these extended area. The evaluation process of the commercial varieties as well as the newly released or promising strains over different locations and over different years is of great importance for the breeder. It is essential to develop new varieties characterized by high yielding ability and better fiber quality to replace old ones or those which run out. Before any clear–cut decision, breeders have to evaluate promising strains which could be desirable for their genetic and commercial work of the same category by testing their phenotypic performance and genotypic stability.

Cotton, as other field crops, is greatly influenced by season and location. Variations in the environments can be divided into two sorts: predictable and unpredictable. The first category includes all permanent characters of the environment such as general features of the climate and soil type, as well as those characteristics of the environment, which fluctuate in a systematic manner, such as day length. The second category includes fluctuations in weather, such as the amount and distribution of temperature. Under an inefficient agricultural system it may also include variations in agronomic practices which appears in more advanced agriculture might be help reasonably constant (**Allard and Bradshaw, 1964**). All genotypes do not respond in a similar way to changes in the environment, therefore screening of genotypes for stability under varying environmental conditions become an essential part of modern breeding programs. Statistical methods are available for estimating homeostatic on newly developed crop varieties. Nine stability parameters have been proposed (**Lin *et al.*, 1986**), but these stability statistics have been grouped into three concepts based on their commonality (i) a genotype is considered stable if its among environmental variance is small, if its response to environments is parallel to the mean response of all genotypes in the trial and if the residual mean square from the regression model on the environmental index is small.

Therefore, the main objectives of this research were to: 1) Estimate the effect of environmental elements interaction on yield as well as Micronaire reading. 2) Evaluate some of the cotton genotypes at different environments to recommend the best genotypes for each location, **and 3)** Determine the stability in yield and Micronaire reading of cotton genotypes evaluated at various environments.

MATERIALS AND METHODS

Three Egyptian cotton varieties, in addition to five Egyptian promising strains (*G. barbadese L.)* belonging to the Egyptian cotton long staple grown at Upper Egypt were used in this study **(Table1)**. The new materials were developed by Cotton Breeding Section, Cotton Research Institute, Agricultural Research Center at Giza, Egypt. These materials were tested in regional yield trials at two different locations, Sids Agricultural Research Station, Beni -Suef and Dar EL- Salam, Sohag – Egypt, during the two successive seasons of 2015 and 2016.

Table 1. Pedigree of genotypes and year of released.

	Genotypes	Pedigree	Year released
1	Giza 80	G.66 x G.73	1981
2	Giza 90	G.83 x Dandara	1999
3	Line 1	G.90 x Australy	Not released
4	Giza 95	[G.83 x (G.75x 5844)] x G.80	2016
5	Line 2	[G.80 x Australy] x G.83	Not released
6	Line 3	[G.83 Raid x Australy] x G.91	Not released
7	Line 4	[G.83 x (G .80 x G .75)] x Karashenky	Not released
8	Line 5	[G.83 x (G .80 x G .89)] x Australy	Not released

1- Cultural practices:

Four field experiments were carried out to evaluate and estimate the stability of eight genotypes at two different locations in Middle and Upper Egypt i.e., Beni –Suef and Sohag during the two growing seasons 2015 and 2016. The experimental design was a randomized complete block design with three replications at each location. The sowing dates were between 1st and 3rd April in 2015 season and 30th march and 10th April in 2016 season, While the harvest date was between 25th and 27th September in 2015 season and 20th and 23 september in 2016 season **(Table 2).**

Table 2. sowing and harvest dates for all locations grown under two seasons (2015 and 2016) at Middle and Upper Egypt.

Locations	First season (2015)		Second season (2016)	
	The sowing date	the harvest date	The sowing date	the harvest date
(Dar El-Salam) Sohag	1 April	27 September	10 April	23 September
(Sids Agric. Res., Station)Beni – Soueif	3 April	25 September	30 March	20 September

Each experiment contained 24 plots, and each plot contained three rows, four m length and 0.65 m width. Hills were spaced 25 cm apart to give 10 hills /row, and thinned at two plants per hill. All agricultural practices were done as recommended for cotton growing in Egypt (Cotton Research Institute) and were properly applied in both seasons at all locations.

The cotton was picked two times to estimate seed cotton yield. Fifty open sound bolls were picked from each plot before the first pick to estimate, boll weight, lint%, seed index. **Seed cotton yield (K/F): w**as obtained from the plot and was converted to kentar per feddan (kentar = 157.5 k.g). **Lint cotton yield (K/F):** calculated by using the following formula : (weight of seed cotton yield per feddan × lint percentage), where a Kentar = 50K.g. **Seed Index (g):** weight of 100 seeds in grams **w**as obtained from the seeds of fifty bolls sample.

Fiber tests were performed at the laboratories of Cotton tecnology Research Division, Cotton Research Institute at Giza, Egypt, under controlled conditions of 65 ± 2% of relative humidity and 70 ± 2F^o temperature. **Micronaire reading** measured by using **High Volume Instrument (HVI)** according to **(A.S.T.M. D-4605-1986).**

2- Statistical analysis:

Regular variance analysis of RCBD at each environment was done according to **Gomez and Gomez (1984)**. Bartlett test was performed prior to combined analysis for testing the homogeneity of variance for individual error mean squares. The analysis indicated the presence of homogeneity of variance. Accordingly, the combined analysis of variance for the eight tested cotton genotypes across four environments was done. Stability analysis across four environments was performed according to **Eberhart and Russell (1966)** to estimate the regression coefficient (b_i) and deviation from regression (S^2d_i) and **Tai's (1971)** environmental effects (α_i) and deviation from the linear response (λ_i).

RESULTS AND DISCUSSION

The combined analysis of variance for seed cotton yield, Lint cotton yield, Seed Index and Micronaire reading are presented in Table (3). Bartlett's test of homogeneity of error variances showed that the variance estimates were homogenous for all traits. Highly significant differences among genotypes were detected for all traits studied, indicating the presence of genetic variability among these genotypes. Also a highly significant mean square of genotypes x environments, was detected indicating that genotypes carried genes with different additive and additive by additive gene effects, which seemed to be inconstant from environment to another.

Table 3.Combined analysis for all traits under study.

Sov	df	Seed cotton yield (K/F.)	Lint yield (K/F.)	Seed index (g)	Micronaire reading (Mic.)
genotypes ss	7	3.11**	5.25**	0.11**	0.04**
Environment+ G*E	24	4.96**	8.63**	1.32**	0.09**
En ss	3	34.65**	60.52**	9.48**	0.62**
Ge ss	21	0.72**	1.22**	0.16**	0.01**
a) Env . (linear)	1	103.96**	181.56**	28.43**	1.86**
b) V x Env. (linear)	7	0.34**	0.77**	0.10**	0.01**
c) Pooled deviations	16	0.79**	1.26**	0.17**	0.01**
Genotypes					
Giza 80	2	0.66**	1.42**	0.07**	0.01**
Giza 90	2	1.93**	3.00**	0.53**	0.02**
L1	2	1.59**	2.23**	0.02**	0.03**
Giza 95	2	0.09**	0.25**	0.01**	0.01**
L2	2	0.92**	1.63**	0.18**	0.00**
L3	2	0.06**	0.12**	0.08**	0.00**
L4	2	0.65**	0.67**	0.14**	0.02**
L5	2	0.41**	0.79**	0.29**	0.02**
Poled error	56	0.003	0.025	0.0023	0.001

**** significant at 0.01 levels of probability.**

The significant GxE effects demonstrated that genotypes responded differently to the variation in environmental conditions at multiple environments. This shows the difficulties in selecting new genotypes for release. These difficulties arise mainly from masking effects of variable environments. Thus, it is important to study adaption patterns, genotypes response and their stability in multi-planting dates and years.

Significant difference were exhibited among genotypes for all traits studied and genotypes responded differently at the different studied environments. This may lead to the conclusion that it is essential to determine the degree of stability of each genotype across the studied environments. These results emphasize that the environments had stress and non-stress conditions. The significance of genotypes × environments interaction is in agreement with **Abdel-Hafez et al. (2000), Hassan et al. (2006), El-Adly and Eissa (2008), and Deshmukh et al. (2015).**

Effect of the environments on studied traits:

Results in Table 4 showed the average values of the studied cotton traits as affected by different growing environments. For seed cotton yield and lint yield the plants grown in environment E2 gave the highest value of 13.98 and 17.57 kentar/ fed for seed cotton and lint yield; respectively followed by E3 and E4 while, E1 showed the lowest value for these trait. Seed index in the environment 1 exhibited the heaviest seed index followed by E2 and E3. Meanwhile, the environment E4 gave the lowest seed index. Regarding to micronaire reading the environments E1, E2 and E3 was the highest readings for this trait. These results are in agreement with those reported by**, Badr (2003), Mohamed et al. (2005), Hassan et al. (2006) and Shaker (2009) and Shaker (2013).**

Table 4. Mean values of all studied traits as affected by environments.

Traits **Environments**	Seed cotton yield (K/F.)	Lint yield (K/F.)	Seed index (g)	Micronaire reading (Mic.)
(Dar El-Salam) Sohag 2015 E1	9.19	11.25	10.40	4.08
(Sids Agric. Res., Station)Beni – Soueif 2015 E2	13.98	17.57	9.86	4.07
(Dar El-Salam) Sohag 2016 E3	10.22	12.53	9.06	4.12
(Sids Agric. Res., Station)Beni – Soueif 2016 E4	10.54	13.09	7.90	3.53
Mean	10.98	13.61	9.30	3.95
LSD 5%	0.91	0.089	0.79	0.05

Effect of genotypes across environments interaction:

Results in Table 5 indicated that the two genotypes L2 [G.80 x Australy] x G.83 and L5 [G.83 x (G .80 x G .89)] x Australy exhibited high yield in seed cotton and lint than the other genotypes. The genotype Giza 95 recorded the highest seed index across environments . Meanwhile, the genotype L3 [G.83 Raid x Australy] x G.91 give the lowest one across environments. The two crosses **Giza 80 and L4** give the lowest values for Micronaire reading indicating that these genotypes have finer lint more and have small spacing between lent . On the contrary, three genotypes Giza 90, L1 (G.90 x Australy) and L5[G.83 x (G .80 x G .89)] x Australy gave the highest values for micronaire reading less quality. These results are in agreement with those reported by **Abo-El-Zahab et al (1992), Badr (2003) and Shaker (2009).**

Table 5. Mean values of all studied traits as affected by genotypes.

Traits **Genotypes**	Seed cotton yield (K/F.)	Lint yield (K/F.)	Seed index (g)	Micronaire reading (Mic.)
Giza 80	11.04	13.34	9.31	3.81
Giza 90	9.54	11.92	9.44	4.03
L1	11.38	14.20	9.10	4.05
Giza 95	11.78	14.66	9.54	4.00
L2	11.83	14.73	9.45	3.98
L3	10.40	12.85	9.08	3.93
L4	10.08	12.38	9.26	3.80
L5	11.81	14.82	9.23	4.01
Mean	10.98	13.61	9.30	3.95
LSD 5%	0.098	0.0125	0.038	0.031

Stability analyses

Stability was applied to identify stable genotypes to be incorporated in the breeding programs of cotton. The used stability measures using regression model approach (**Eberhart & Russell (1966) and Tai (1971)**), enable breeder to choose the stable genotypes if its response to environmental index is parallel to the mean response of all genotypes in addition to its deviation from regression model is as minimum as possible.

The regression model suggested by **Eberhart & Russell (1966)** provides the linear regression coefficient, b, as indication of the genotype response to the environmental index and the deviation from regression mean square, S^2d, as a criterion of stability

If the regression coefficient (b value) is not significantly different from unity, the genotype is considered to be adapted in all environments. Genotypes with $b > 1.0$ are more responsive to high yielding environments, whereas any genotype with b less than 1.0 is adapted to low yielding environments. In the expression of (S^2d), we did not subtract S^2e/r (pooled error).

The second statistic Tai method can be described as α that measure the linear response of environmental effects while λ that reflects the deviation from linear response in terms of magnitude of the error variance. The two components are defined as genotypic stability parameters. In fact, the parameters of α and λ can be regarded as modified form of b and S^2d, respectively. A perfectly stable genotype would not change its performance from one environment to another. This is equivalent to stating $\alpha = -1$ and $\lambda = 1$. Because the perfect stable genotypes rarely exist, the plant breeder will have to be satisfied with statistically admissible level of stability. The values ($\alpha = 0$ & $\lambda = 1$) will be referred to as average stability, whereas the values ($\alpha > 0$ & $\lambda = 1$) will be as below average stability, and the values ($\alpha < 0$ & $\lambda = 1$) will be referred to as above average stability.

Seed and lint cotton yield (k/f):

The results in Table 6 indicated that the mean performance of seed and lint cotton yield the two genotypes L2 [G.80 x Australy] x G.83 and L5 [G.83 x (G .80 x G .89)] x Australy exhibited high yield in seed and lint than the other genotypes that produced 11.83, 14.73 and 11.81, 14.82 (k/f) for seed and lint cotton yield, respectively.

The results of phenotypic stability indicated that the values of regression coefficient did not significantly differ from unity (b=1) for the studied genotypes for both seed and lint cotton yield except for Giza 80, Giza 90 and L5 [G.83 x (G .80 x G .89)] x Australy . Also values of deviation from regression (S^2d) were not significantly different from zero ($S^2d = 0$) for all genotypes for seed and lint cotton yield. It is evident that the genotype which exhibited greater production and had regression coefficient and deviation from regression did not significantly differ from unity and zero, respectively, is stable genotype according to **Eberhart and Russell (1966)**. Therefore the genotype L2 [G.80 x Australy] x G.83 had above average stablility for seed and lint cotton yields, because it had high seed and lint cotton yield greater than grand mean and ($b = 1$ and $S^2d = 0$). So, it could be recommended as stable genotype for seed and lint cotton yield. These results are in agreement with those reported by **Hassan *et al.* (2000), Mohamed *et al.* (2005), Hassan *et al.* (2006), Allam *et al*. (2008), Shaker (2009)** and **Hassan *et al*. (2012).**

Table 6 and figs 1 and 2 showed that, genotypes number 2, 3 and 5 for seed yield/ fad. and number 1,2,3 and 5 for lint yield/ fad. were unstable according to Tai (1971) because the value of $\lambda \neq 1$. Genotypes number 4 and 7 showed average stability whereas, ($\alpha = 0$) and ($\lambda = 1$). Genotype number 1 had a degree of above average stability ($\alpha < 0$) and ($\lambda = 1$) with probability 90% and Giza 80 has above average stability with probability of 99%. While the other genotypes have a below average stability ($\alpha > 0$) and ($\lambda = 1$) with probability of 90% for the mentioned traits, These lines may be recommended to be released for commercial cotton production which they performed better under all environments.

Table 6. Mean and parametric stability statistics for all studied traits in eight cotton genotypes averaged over four environments

Traits		Seed cotton yield							Lint yield						
Genotypes		MEAN	b i	Tb=0	Tb=1	S^2 di	α	λ	MEAN	b i	Tb=0	Tb=1	S^2 di	α	λ
1	**Giza 80**	11.04	0.73	3.253	-1.185	0.657	-0.27	2.9	13.34	0.66	2.645	-1.354	1.414	-0.34	4.06
2	**Giza 90**	9.54	0.81	2.099	-0.499	1.923	-0.2	8.57	11.92	0.79	2.173	-0.579	2.993	-0.21	8.67
3	**L 1(G.90 x Australy)**	11.38	1.07	3.069	0.211	1.588	0.08	7.09	14.2	1.1	3.517	0.326	2.223	0.1	6.45
4	**Giza 95**	11.78	0.99	11.605**	-0.142	0.091	-0.01	0.42	14.66	1.02	9.670*	0.213	0.249	0.02	0.74
5	**L2 [G.80 x Australy] x G.83**	11.83	1.06	3.99	0.232	0.917	0.06	4.1	14.73	1.09	4.059	0.326	1.624	0.09	4.72
6	**L3[G.83 Raid x Australy] x G.91**	10.4	1.19	17.858**	2.913	0.055	0.2	0.24	12.85	1.14	16.027**	1.999	0.111	0.14	0.33
7	**L4[G.83 x (G .80 x G .75)] x Karashenky**	10.08	0.97	4.340*	-0.122	0.65	-0.03	2.91	12.38	1	5.807*	-0.007	0.667	0	1.95
8	**L5[G.83 x (G .80 x G .89)] x Australy**	11.81	1.17	6.562*	0.943	0.409	0.17	1.82	14.82	1.2	6.389*	1.046	0.79	0.2	2.29

Traits		seed index							Micronaire reading						
Genotypes		MEAN	b i	Tb=0	Tb=1	S^2 di	A	λ	MEAN	b i	Tb=0	Tb=1	S^2 di	α	λ
1	**Giza 80**	9.31	0.87	6.174*	-0.888	0.071	-0.13	3.84	3.81	0.73	4.001	-1.501	0.008	-0.27	2.52
2	**Giza 90**	9.44	1.28	3.323	0.737	0.531	0.29	28.6	4.03	0.99	3.764	-0.043	0.016	-0.01	5.28
3	**L 1(G.90 x Australy)**	9.10	0.95	11.389**	-0.663	0.024	-0.06	1.32	4.05	0.92	2.62	-0.242	0.028	-0.08	9.34
4	**Giza 95**	9.54	1.12	21.894**	2.308	0.009	0.12	0.5	4	1.26	6.020*	1.247	0.01	0.26	3.35
5	**L2 [G.80 x Australy] x G.83**	9.45	3.463	-1.042	0.175	-0.23	-0.23	9.43	3.98	0.66	17.213**	-8.758	0	-0.34	0.1
6	**L3[G.83 Raid x Australy] x G.91**	9.08	6.488*	-0.148	0.08	-0.02	-0.02	4.35	3.93	1.08	7.610*	0.587	0.005	0.08	1.55
7	**L4[G.83 x (G .80 x G .75)] x Karashenky**	10.08	4.469*	-0.505	0.143	-0.1	-0.1	7.74	3.8	1.11	3.822	0.38	0.02	0.11	6.46
8	**L5[G.83 x (G .80 x G .89)] x Australy**	9.23	3.936	0.463	0.294	0.13	0.13	15.86	4.01	1.25	4.614*	0.924	0.017	0.25	5.61

***and** refer to significant at 0.05 and 0.01 levels of probability, respectively.**

Seed index

Results in Table (6) indicated that the seed index for all genotypes did not differ significantly, except for yhat of L2 [G.80 x Australy] x G.83. The regression of average mean performance of variety on the environmental index resulted in regression coefficient (b_i) values which did not deviate significantly from unity except for that of, L3 [G.83 Raid x Australy] x G.91 and L4 [G.83 x (G .80 x G .75)] x Karashenky. Therefore, the genotype Giza 95 was average stable because it had heavier seed index and ($b = 1$ and $S^2d = 0$). These results are in agreement with those obtained by **Abo El-Zahab *et al*. (1992), Ashmawy et al. (2003), Abdalla et al. (2005) , Allam *et-al*. (2008) and Hassan *et al*. (2012)**

Fig 3 gives a graphic summery that useful in identifying the genetically stable genotypes. It could be noticed that all genotypes under study divided-into three groups. The first group that include genotypes number 4, 2, 8, 7, 5 and 3 were unstable according to Tai (1971) because the value of $\lambda \neq 1$, the second group that include Giza 80 had above average stability because the value of α below zero ($\alpha < 0$) and the third group that includes line 3 were below average stability ($\alpha > 0$).

Micronaire reading:

Results in Table 6 indicated that the Micronaire reading for all genotypes did not differ significantly, except for that of L2 [G.80 x Australy] x G.83. The regression of average mean performance of variety on the environmental index resulted in regression coefficient (b_i) values which did not deviate significantly from unity except for Giza 80 and L2 [G.80 x Australy] x G.83. Also, values of deviation from regression (S^2d) were not significantly different from zero ($S^2d = 0$) for all genotypes for this trait. Therefore, the genotypes Giza 90 and L 1(G.90 x Australy) were moderately stable because they had finest fiber and ($b = 1$ and $S^2d = 0$). These results are in agreement with those obtained by **Ashmawy et al. (2003), Abdalla et al. (2005) , Allam *et-al*. (2008) and Hassan *et al*. (2012)** The graphic analysis fig (4) showed that genotypes number 4, 6, 3, 2, 5, 1 and 7 were unstable according to Tai (1971) because the value of $\lambda \neq 1$. Genotype number 4 showed below average stability where, ($\alpha = 0$) and ($\lambda = 1$). This genotype may be recommended to be released for commercial cotton with fine fiber

The previous promising lines are likely to be candidate to replace the present alternative varieties as they gave superior traits (seed and lint yield, seed index and micronere reading).

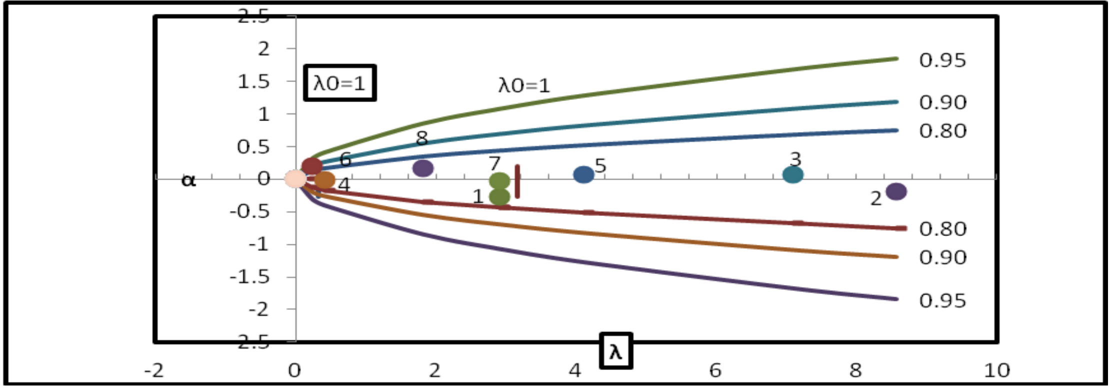

Fig (1): Distribution of genetic stability statistics of seed yield (K)/fad for cotton genotypes under study.

Where, 1,2,3,4,5,6,7 and 8 refer to Giza 80, Giza 90, Line 1, Giza 95, Line 2, Line 3, Line 4 and Line 5, respectively.

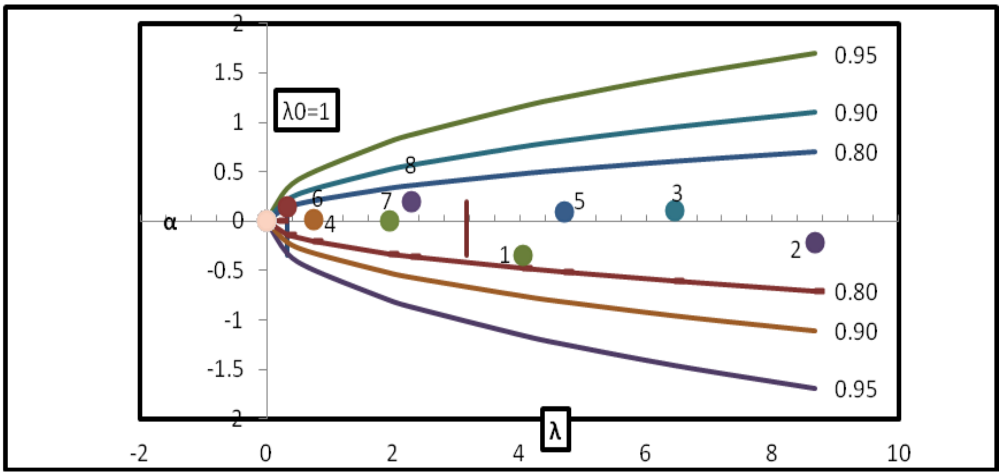

Fig (2): Distribution of genetic stability statistics of lint yield (K)/fad for cotton genotypes under study.

Where, 1,2,3,4,5,6,7 and 8 refer to Giza 80, Giza 90, Line 1, Giza 95, Line 2, Line 3, Line 4 and Line 5, respectively.

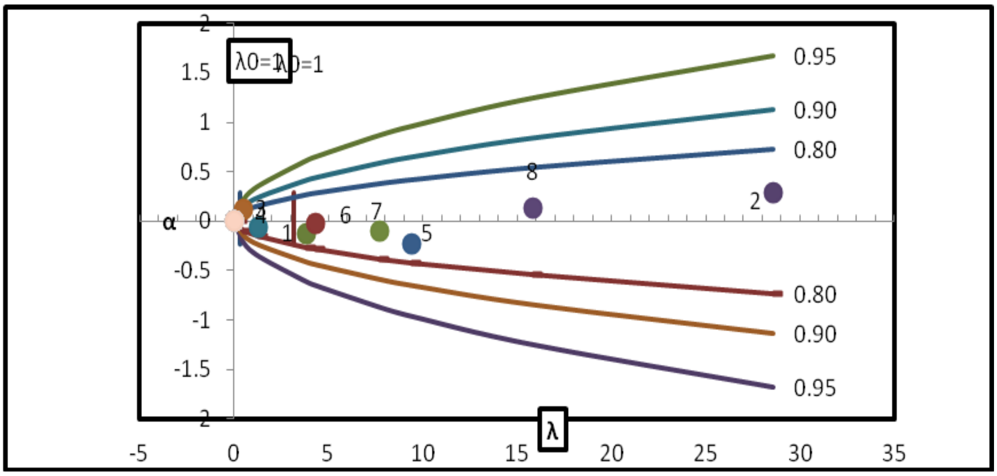

Fig (3): Distribution of genetic stability statistics of seed index (g) for cotton genotypes under study.

Where, 1,2,3,4,5,6,7 and 8 refer to Giza 80, Giza 90, Line 1, Giza 95, Line 2, Line 3, Line 4 and Line 5, respectively.

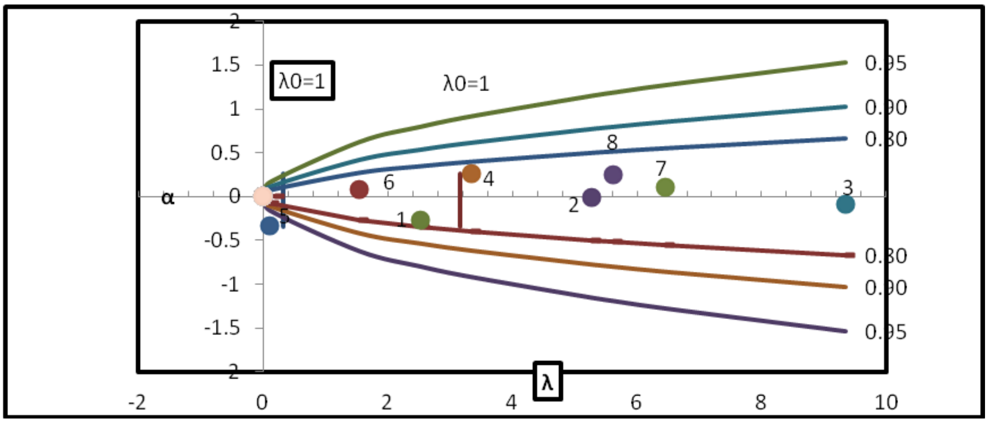

Fig (4): Distribution of genetic stability statistics of microneare reading for cotton genotypes under study.

Where, 1,2,3,4,5,6,7 and 8 refer to Giza 80, Giza 90, Line 1, Giza 95, Line 2, Line 3, Line 4 and Line 5, respectively.

REFFERENCES

A.S.T.M. (1986). American society for testing materials, D-3818 and D-4605. U.S.A.

Abdalla, I.S., M. Hassan and A.M. Abdel-Aziz (2005). Assessing the responses to natural environment (GxE) of Egyptian cotton cultivars grown in Delta cotton zone.Pro.11th Conference of Agronomy, Agron. Dept., Fac. Agric., Assiut Univ., Nov. 15-16 Pp 325-341 .

Abdel-Hafez, A.G., H.A. El-Harony, M.A. El-Hity and M.E. Abd El-Salam (2000). Variety × environment interaction in Egyptian cotton for yield, yield components and fiber properties. J. Agric. Sci. Mansoura Univ. 25 (7): 3781-3792.

Abo-El-Zahab, A.A, F.F. Soad, M.A. El-Kilany, and A.A. Abd El-Ghani, (1992). Cultivar x environment interaction in Egyptian cotton.II- Fiber quality. Proc. 5th conf. Agron., Zagazig 13-15 sept., 2: 783-788.

Allam, M.A.M., M.A. Abd El-Gelil, Y.A.M. Soliman and M.A. Abou El-Yazied (2008). Stability analysis of earliness, yield and fiber traits for some extra-long staple genotypes of cotton (*Gossypium barbadense*). Egypt. J. Agric. Res. 86 (3): 1039-1067.

Allard, R.W. and A.D. Bradshaw (1964). Implications of genotype-environmental interactions in applied plant breeding. Crop Sci. 4: 503-507.

Ashmawy, F., A.A.A. Al-Akhadar, A.M.S.A. El-Taweel and Hanem A. Mohamed (2003). Stability statistics of some Egyptian cotton genotypes. Egypt. J. Plant Breed. 7 (2): 143-164.

Badr, S.S.M. (2003). Comparative evaluation of promising hybrid Giza 84 × (Giza 74 × Giza 68) and extra-long staple cotton varieties grown in North Delta. Egypt. J. Agric. Res., 81 (3): 1149-1169.

Deshmukh, S. B., I. M. Kubade, D. G. Kanwade, P. W. Nemade (2015). Genotype - environment interactions of newly developed American cotton genotypes. Annals of Plant Physiology. 29(2):62-66.

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

El-Adly, H.H. and A.E.M. Eissa (2008). Genetic stability analysis for some long staple cotton strains (*Gossypium barbadence* L.). Egypt. J. Agric. Res. 86 (5): 1931-1943.

Gomez, K.A. and A.A. Gomez (1984). Statistical Procedures for Agricultural Research. John Wiley and Sons, Inc. London, UK (2nd Ed.) 13-175.

Hassan, I. S. M, H. B. Abou-Tour and S. M. Seyam (2006). Evaluation and stability parameters of the hybrid G.84 (G.74 x G.68) four Egyptian extra long staple cotton cultivars grown at North Delta Egypt. J . of Appl. Sci., 21 (8 A): 59 - 73 (2006).

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

Hassan, I.S.M., O.D. Nour and S.A.M. Hassan (2012). Effect of different environments on yield, yield components and fiber quality of some Egyptian extra-long staple cotton genotypes. Egypt. J . of Appl. Sci., 27 (12): 477 – 492 .

Lin, C.S., M.R. Binns and L.P. Lefkovitch (1986). Stability analysis: where do we stand. Crop Sci. 26: 894:900.

Mohamed, Samia. G. A., Hassan, I. S. M, and Somaia. A.M Barakat (2005). Stability parameters for comparing some Agronomic Egyptian cotton genotypes. Egypt. J. Plant Breed 9 (2): 161 – 180 .

Shaker S. (2009). Genotypic stability and evaluation of some Egyptian cotton genotypes. Ph. D. Thesis, fac. of Agric. Kafr El-Sheikh Univ., Egypt.

Shaker S. (2013). Evaluation and stability parameters of some Egyptian long staple cotton genotypes. The 8th plant breeding International Conference 14-15 may – Faculty of Agriculture Kafr El- Sheikh Unvi. Egypt J. plant Breed. 17 (2): 390-406.

Tai, G.C.C. (1971). Genotypic stability analysis and its application to potato regional trials. Crop Sci., 11: 184–190.

انتخاب بعض التراكيب الوراثية من القطن للمحصول العالى و الجودة باستخدام الثبات المظهرى و الوراثى

حسين سلامه عبد الصمد*، على عبد المقصود الحصرى، السيد محمد حسن شكر**، محمود الزعبلاوى* البدوى**، أنور عيسى مسعود عيسى*، احمد على الحصرى****
*معهد بحوث القطن – مركز البحوث الزراعية

**قسم المحاصيل كلية الزراعة – جامعة بنها

تهدف الدراسة الى دراسة التفاعل بين التراكيب الوراثية(Giza 80, Giza 90, L1 (Giza 90 x Australy) , Giza 95, L2 [Giza 80 x Australy] x Giza 83, L3 [Giza 83 Raid x Australy] x Giza 91, L4 [Giza 83 x (Giza 80 x Giza 75)] x Karashenky and L5 [Giza 83 x (Giza 80 x Giza 89)] x Australy) والبيئة (4 بيئات موقعين فى عامى 2015 و 2016) حيث اقيمت التجربة فى كل بيئة بتصميم قطاعات كاملة العشوائية بثلاث مكررات وتم تقدير قيم الثبات المظهرى والوراثى وفقاً لطريقة Eberhart and Russell (1966) وطريقة tai(1971) محصول القطن الزهر و الشعر و دليل البذره و قراءة الميكرونير وكانت اهم النتائج المتحصل عليها ما يلى:

1- **كان التباين الراجع الى البيئات والتراكيب الوراثية والتفاعل بينهما معنوياً فى جميع الصفات المدروسة. وأعطت السلالتين المبشرتين رقم 2 [G.80 x Australy] x G.83 و رقم 5 [G.83 x (G .80 x G .89)] x Australy اعلى التراكيب الوراثية لصفات محصول القطن الشعر و الزهر.**

2- **اظهرت السلالة رقم 2 [G.80 x Australy] x G.83 اعلى التراكيب الوراثية لصفة دليل البذره**

3- **تميز الصنف جيزه 90 و السلالة رقم 1 (G.90 x Australy) بأنهم اكثر التراكيب الوراثية ثباتا للمحصول و قراءة الميكرونير**

4- **ينصح بأستخدام تلك السلالات المتميزة فى الانتاج حيث انها ثابته مظهريا و وراثيا الى جانب التميز بصفات الجوده**

المجلة المصرية لتربية النبات: 21 (5) : 642 - 653 (2017)
قام بتحكيم البحث:
ا.د/ عبد العزيز جلال كلية الزراعة – جامعة كفر الشيخ
ا.د/ عزت المهدى كلية الزراعة – جامعة اسيوط