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Evaluation of Some Egyptian Cotton Cultivars for Yield Constancy and Adaptability

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ABSTRACT

In order to investigate seven cotton varieties i.e. Giza 86, Giza 94, Giza 87, Giza 88, Giza 92, Giza 93 and Giza 96 under 14 environments (seven locations i.e. Alexandria, Damnhour (El-Beheira), Edko (El-Beheira), Kafr El-Sheikh, Sedi Salim (Kafr El-Sheikh), Kafr Saad (Damietta), Kafr El-Batekh (Damietta) under two successive seasons, 2013 and 2014 to study the evaluation, adaptability and stability in the performance of different environmental conditions for seed cotton yield. the variety x environment mean square was significant, indicating different response of the varieties in different environments. Regression of seed cotton yield on the ecological index depicted changes betweenthe verified varieties for yield stability and flexibility. Varieties Giza 87, Giza 92 and Giza 96 produced the highest seed cotton yield with regression coefficient did not differ unity (b_i-1) and were documented as highly modified to all the environments. Also, genotypes had deviation from regression equal zero (S^2d_i=0). Furthermore, Giza 94 was lowly adapted to all the environments where regression coefficient apart from one and ($S^2d_i \neq 0$) so, it is more sensitive to any change in the environmental conditions, considered as high yielding environments and unstable.
Keywords: Evaluation, adaptability, stability, Egyptian cotton.

INTRODUCTION

Cotton is considered of one of important fiber crops. It is affected by seasonal and environmental fluctuations. The interaction between varieties and environment interaction takes a chief position for cotton breeders since the phenotypic reply to a change in environment is not the same for all genotypes. Breeding for stable cultivars has conventional much attention. Numerous means have been planned to describe the stability of yield recital when numerous genotypes were verified at many sites. Eberhart and Russell (1966) optional that the regression of the varietal mean presentation on an environmental index and that the nonconformities from regression may be careful as two strictures for gaging the varietal phenotypic stability. Tai (1971) labeled another statistical approach for approximating stability strictures for each cultivar. He stated that his method is alike to method of Eberhart and Russell (1966) in that both examination exertion to adjust the linear response of cultivar to the environmental properties. Liu and Sun (1993) assessed 17 statistics optional for account of cultivar stability, and favored the use of Eberhart and Russell (1966) regression model in yield stability analysis of cultivars. Kang and Magari (1995) depending only on Shukla (1972) planned a combined yield and stability of performance statistical (Ysi) for concurrent selection for yield stability.

Many workers have conducted studies on stability parameters for comparing Egyptian cotton cultivars and lines. Abo El-Zahab *et al.* (2003), found that yield – stability statistic (Ysi) for G.83 in seed cotton yield. Abdalla *et al.* (2005) evaluated seven Egyptian cotton genotypes under seven locations. The results presented that G.85 and G.86 were stable genotypes for yield. Hassan *et al.* (2006) evaluated five Egyptian cotton genotypes under nine environments. The results showed that the profitable cultivar G.88 ranked the first in stability for seed cotton yield. Allam *et al.* (2008) study stability analysis for some extra-long staple genotypes concluded that three promising strain exhibited high yield potentiality and average degrees of phenotypic and genotypic stability. Shaker (2009) evaluated nine long and extra-long staple Egyptian cotton genotypes under 14 environments. He found that the interaction between varieties and environment were highly significant for all the studied traits. The results showed that G.86 was stable for seed cotton yield. Hassan *et al.* (2012) evaluated eleven long and extra-long staple Egyptian cotton genotypes. The results showed that the interaction between varieties and environment were highly significant for all the studied traits. Shaker (2013) studied stability for three genotypes from long stable cotton category two promising line 10229 x G. 86, (G. 89 x G.86) and the one commercial variety (G.86) at 14 environments and he found that genotype, environment and genotype x environment interaction were highly significant for seed cotton yield. The phenotypic stability showed that three genotypes were average stable for cotton yield. Singh *et al.* (2014) studied stability for 8 genotypes with their 56 F1s hybrids over three sites and they create that genotype, genotype x environment contact mean squares were significantly affected seed cotton yield.

The present investigation is an effort to assess, adaptability and phenotypic stability for yield of 7 cultivars under 14 environments. Though, Eberhart and Russell method (1966) was secondhand to measure phenotypic stability of seed cotton yield.

MATERIALS AND METHODS

Resources used in this education contained of the seven genotypes of Egyptian cotton which were grown in lower Egypt at 14 environments (seven locations; Alexandria, Damnhour (El-Beheira), Edko (El-Beheira), kafr El-Sheikh, Sedi Salim (Kafr El-Sheikh), Kafr Saad (Damietta) and Kafr El-Batekh (Damietta) and two successive seasons; 2013 and 2014) with seven Egyptian cotton varieties i.e. Giza 86, Giza 94, Giza 87, Giza 88, Giza 92, Giza 93 and Giza 96. Data of the yield was gotten from the yield miniature experiments showed by Local Assessment Research Section of the Cotton Research Institute.

A randomized complete block design with four replications at each environment was used. The plot size was 52 m^2 containing 10 ridges of eight meters long and

65 cm wide. Space between hills was 25 cm separately and each hill was later thinned to two plants per hill after six weeks. Cultural performs were approved out as optional in cotton fields. Data were composed for the following traits: Seed cotton yield (k/f): got from the weight of seed cotton yield per plot and transformed to kentar per feddan (kentar = 157.5 kg).

Statistical analysis:

Analysis of variance of separate environment was carried out for each trait. A combined analysis of variance was computed overall the environments. Before calculating the combined analysis, a Bartlett Test, 1937 for the homogeneity of error mean square for the 14 environments. Separate estimates of the components of variation were calculated to evaluate the magnitude of the different effects according to Sendecor and Cochran (1969). Least significant difference test (LSD) was rummage-sale to detect differences between genotypes overall the studied environments. Confidence intervals (C.I) were calculated to compare between each genotype mean and the grand mean of all genotypes over the 14 environments.

Phenotypic stability:

Stability analysis was computed according to Eberhart and Russell (1966) to detect the phenotypic stability. In the analysis of the data, the genotypes were treated as fixed variables, while environments and replications were considered as random variables. A genotype having unit regression coefficient (b=1), the deviation is not significantly different from zero (S2di = zero) and above yielding ability is considered to be stable one.

a) The regression coefficient which is the regression of the interaction between varieties and environment is estimated as follows:

$$b_i = \sum_j y_{ij} I_j / \sum_j I^2_j \text{(Finaly and Wilkinson,1963)}$$

$$Ij = (\sum_i y_{ij} /_v) - (\sum_i \sum_j y_{ij} /vn), \sum_j I_j = 0.$$

Where:

b_i= Regression coefficient

y_{ij}= mean performance of character on i^{th} variety in j^{th} environment j,

I_j = the environmental index,

v = number of varieties,

n = number of environments.

b) The deviations from regression can be summarized to provide an estimate of another stability parameter.

$$S^2 d_i = \left[\sum_j \delta^2_{ij} / n - 2 \right] - S^2 e/r,$$

$$\sum_j \delta^2 ij = \left[\sum_j y^2_{ij} - \frac{y^2_{i.}}{n} \right] - \left[\sum_j y_{ij} I_j \right]^2 / \sum_j I^2_j.$$

Where:

S^2d_i = deviations from regression of each variety,

S^2e/r = the estimate of pooled error,

Y_i = total of the i^{th} variety of all environments.

RESULTS AND DISCUSSION

The weather of Egypt varies from site to additional and inside the area as well. The cotton crop acts otherwise below dissimilar environmental conditions; therefore, assessment and stability in performance is one of the most desirable physiognomies of any genotype to be released for profitable farming. The genotype × environment interaction notices dissimilar designs of reply between the genotypes across environments.

Concerning results presented in Table (1), the combined analysis of variance for stability for seed cotton yield. Mean squares were highly significant among cultivars. This could be due to high environments and the interaction between varieties and environment of seed cotton yield, indicating that genotypes considerably varied across different environments. The mean squares of genotype × environment interactions shown in Table (1) were significant for seed cotton yield indicating the presence of variability among the genotypes as well as environments under which the experiments were conducted. Partition of the genotypes x environments interaction into linear response and the deviation from that linearity. Finally, and Wilkinson (1963) considered the genotypes which had (bi<1) behaved as less sensitive to any change in the environments and would be more adapted to low (poor) yielding environments. They further pointed out that genotypes having (bi>1) would show more sensitively to environmental change and adaptability to high (rich) yielding environment (Table 4). Also, genotypes having bi=1 and S2di=0 would indicate average stability and when this is associated with high mean yield, such genotypes would have general adaptability.

Regarding to results presented in Table (1) the interaction between varieties and environment, the source of variation was partitioned into environment (linear), genotype x environment (linear) interaction (sum of square due to regression, b_i) and unexplainable deviation from regression (pooled deviation mean square; S^2d_i). The data in Table (1) indicated that the genotype × environment linear was non-significant for seed cotton yield (k/f). The non-significant interaction indicated that genotypes did not response differently to different environments. It could be noticed that the major components for changes in stability strictures were may be due to the deviation from the linear function. Consequently, it could notice that the comparatively unpredictable component is additional significant than the predictable one (linear response). These results agreed with those reported by Gill and Singh (1982). The pooled deviations were significant for seed cotton yield, indicating that the major components for differences in stability were due to deviation from linear function.

Combined ANOVA for the seed cotton yield was significantly affected by environment, which explain 75.57% of the total (G. $\pm$ E. $\pm$ GEI) variation, whereas genotype (G.) and genotype x environment interaction (GEI), which were significant accounted for 13.21 and

11.22%, respectively (Table 1), and showed the influence of changes in environment on the yield performance of the genotypes which evaluated by Dehghani *et al*. (2006). Hamoud (2008), reported multi environment yield trait, environment accounted for about 80% for the total variation, while genotype and genotype by environment interaction each account for 7.5 and 12.23%, respectively. A large sum of squares for environment indicated that the environments were diverse, with large differences among environmental means causing most of the variation in seed cotton yield. Mora *et al*. (2007) reported a high magnitude of the genotype-environment interaction were detected. In the same time, Campbell and Jones (2005) indicated the importance of implementing direct analysis of genotype-environment interaction as they related to genotype performance and classification of tested environments.

Table 1. Combined analysis of variance for seed cotton yield (k/fad.) of seven varieties grown at seven locations.

SOV	df	SS	MS	SS%
Environments	13	2064.30	158.838** (MSE)	75.57
Block/(Env.)	42	257.522	6.131 (MSB)	
Genotypes	6	360.99	60.166** (MSG)	13.21
Geno. x Env.	78	306.72	3.932** (MSGE)	11.22
Error (B)	252	445.02	1.766	
Analysis of variance for stability				
Env. ± (G. x Env.)	91		26.06**	
Env. linear	1		2064.9**	
G. x Env. linear	6		2.732	
Pooled deviation	84		3.24*	
Pooled error	294		2.388 (MSE)	

Effect of the environments on seed cotton yield (k/fad.):

Data in Table (2) vacant the regular values of seed cotton yield as affected by different growing environments. Plants grown at Alexandria and Edko in Y2 and Kafr Saad in two seasons recorded the highest seed cotton yield (k/fad.) 12.74, 11.32 and (12.01 and 12.63) k/fad., respectively. From the previous results the environments (years and locations) were large ranging reflects on yield production where it differs from 12.74 at Alexandria in the second season to 5.86 k/fad. at Kafr El-Batekh in the first season across all environments from environment to another. These results are in agreement with those reported by Shaker (2009 and 2013) and Abd El-Salam *et al*. (2014).

Effect of genotypes x environment interaction:

Data in Table (3) presented the variety Giza 94 at Kafr Saad in two seasons, Edko and Alexandria in the second season recorded the highest seed cotton yield shared with Giza 86 significantly at Edko in the second season where yield ranging from 13.83 to 15.77 k/fad.. While the varieties Giza 88 and Giza 93 recorded the lowest seed cotton yield at Alexandria and Kafr El-Sheikh in the first season, also, Sedi Salim at the second season. Also, Kafr El-Batekh location in two seasons recorded the lowest values for most varieties. The seed cotton yield ranging from 3.83 to 15.77 k/fad. this large ranging reflects role environmental conditions effects on yield production and genotypes extent on green expression under this environmental conditions. Similarly, results are in good accordance with those reported by Hamoud (2008) and Shaker (2009 and 2013).

The differences among varieties for yield character:

Data presented in Table (4) indicated that the variety G.94 surpassed significantly for seed cotton yield. Also, G.86 which recorded the highest yield did not differ significantly about grand mean, while, Giza 87 reduce about grand mean, but it did not differ significantly although this reduce, but it good where Giza 87 from Extra-Long Extra fine. Whereas, Giza 88 and Giza 93 recorded the lowest seed cotton yield. These differ in yield caused to differ gene expression across environments. A similar result are in agreement with those reported by Allam *et al*. (2008), and Shaker (2013).

Table 2. Effect of the environments on seed cotton yield (k/fad.)

Environ.	Alexandria		Damnhour (El-Beheira)		Edko (El-Beheira)		Kafr El-Sheikh		Sedi Salim (Kafr El-Sheikh)		Kafr Saad (Damietta)		Kafr El-Batekh (Damietta)		LSD
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	0.01
SCY (k/fad.)	7.92	12.74	8.69	10.16	9.65	11.32	7.33	9.47	9.04	6.17	12.01	12.63	5.86	6.03	1.79

Table 3. Effect of genotypes – environment interaction on seed cotton yield (k/fad.)

Environ.	Alexandria		Damnhour (El-Beheira)		Edko (El-Beheira)		Kafr El-Sheikh		Sedi Salim (Kafr El-Sheikh)		Kafr Saad (Damietta)		Kafr El-Batekh (Damietta)		LSD
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	0.01
G.86	8.79	13.25	8.94	8.97	8.74	13.68	8.38	9.68	8.62	7.31	10.97	12.87	7.70	5.51	
G.94	11.26	15.07	10.10	10.92	11.14	14.06	9.16	10.22	10.62	7.50	13.83	15.77	7.20	4.51	
G.87	8.01	12.25	7.60	9.08	9.57	8.67	6.79	9.98	8.68	6.91	11.63	12.38	4.73	7.71	
G.88	5.17	11.91	7.31	10.33	8.05	9.76	6.27	8.21	7.44	3.83	12.04	11.73	5.75	5.43	2.44
G.92	8.42	12.51	8.92	10.59	11.52	12.96	7.63	10.59	10.11	6.92	12.18	12.52	5.27	6.31	
G.93	4.90	11.23	8.31	10.07	8.93	9.75	5.82	8.01	7.54	4.29	10.22	10.75	4.81	4.95	
G.96	8.86	13.00	9.67	11.15	9.57	10.37	7.26	9.64	10.24	6.44	13.22	12.37	5.56	7.81	

Table 4. Averages of genotypes and estimates of stability parameters for seed cotton yield over 14 environments at Lower Egypt

Genotype	$\bar{x}$	$b_i \pm SE$	S^2d_i	Classification of genotypes
G.86	9.53	0.8921± 0.36	0.5746*	Low (poor) – yield environment
G.94	10.81	1.2551*±0.45	0.5605*	high (rich) – yield environment
G.87	8.86	0.8314±0.34	0.3396	Low (poor) – yield stability
G.88	8.09	1.0801±0.39	0.1344	High (rich) – yield stability
G.92	9.75	1.0205±0.38	-0.0749	Yield stability
G.93	7.83	0.9877±0.36	-0.0366	Low (poor) – yield stability
G.96	9.65	0.9331±0.36	-0.0061	Yield stability
G. Mean	9.22			
LSD 0.01	0.65			

Stability and adaptability:

With respect to consequences presented in Table (4) indicated that the mean performance of seed cotton yield for Giza 94 which differed significantly from the all varieties. The highest value was given by G.94 which produced 10.81 k/fad. for seed cotton yield. Although this variety had the values of regression coefficient differ significantly from unity ($b_i \neq 1$) also, values of deviation from regression (S^2d_i) differ significantly from zero ($S^2d_i \neq 0$) hence it unstable. While, the varieties Giza 87, Giza 92 and Giza 96 had higher mean performance ($\bar{x}$ = high), regression coefficient equal unity (b_i = 1) and deviation from regression equal zero (S^2d_i = 0) hence, they average stable varieties. It is evident that the variety which exhibited greater production and had regression coefficient and deviation from regression did not significantly differ from unity and zero, respectively, is stable variety according to Eberhart and Russel (1966). Cultivars of Giza 92 and Giza 96 had high mean performance and regression equal unity because they general adaptability for all environments also, Giza 86, Giza 87 and Giza 93 behaved as less sensitive to any change in environment and would be more adapted to low (poor)- yielding environments. On the other side, Giza 94 and Giza 88 would show more sensitive to environmental change and adaptability to high (rich) – yielding environments.

Cultivars with (b_i) better than one could be more modified to promising environments such as Kafr Saad, Edko and Alexandria (Fig. 1 and Table 5). While, varieties with (b_i) less than one would be adapted to unfavorable conditions such as Damnhour and Kafr El-Sheikh, but those varieties with (b_i) equal to one would have average adaptation to all environments. Genotypes with deviation from regression (S^2d_i) greater than zero, they would have low predictability. Moreover, a variety with unit regression coefficient (b_i=1) and the mean square deviation not significantly different from zero (S^2d_i=0) is said to be wide stable. Significance of S^2d_i from zero invalidates the linear prediction. If S^2d_i not significantly different from zero, the performance of the genotype for a given environment may be predicted. Accordingly, a genotype whose performance predicted is said to be stable and helps in choosing genotypes for specific adaptation.

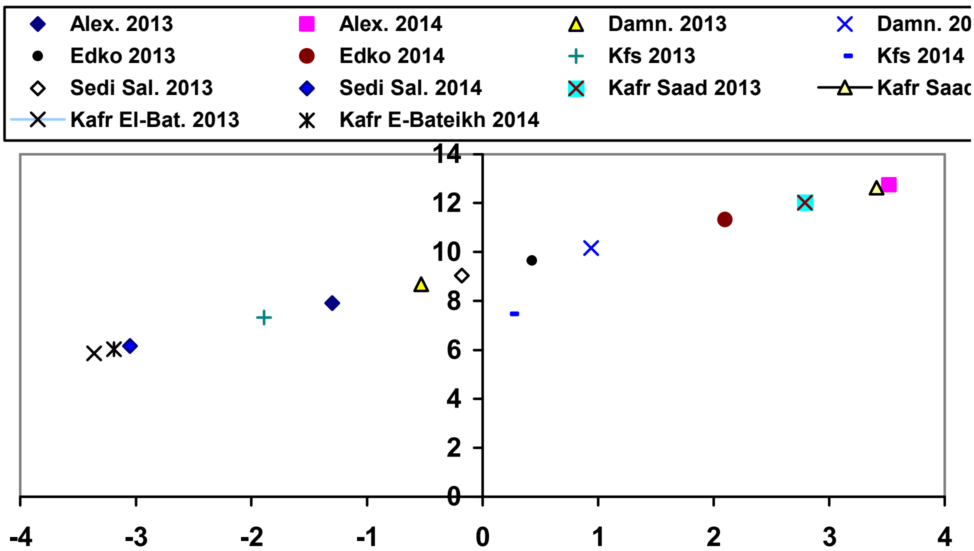

Fig. 1. Seed cotton yield average overall varieties for each environment plotted against environmental index estimated from the mean of varieties grown in each of 14 environments minus the grain mean

Regression values about one describe genotypes with higher sensitivity to environmental changes and greater specificity of adaptability to high yielding environments. Regression coefficient (b_i) below one provide a measurement of greater resistance to environment change, and therefore increasing the specificity of adaptability to low yielding environments.

Results presented in Fig. (2) cleared that varieties Giza 87, Giza 92 and Giza 96 were the highest mean seed cotton yield, non-significantly different from a unity regression coefficient (b_i=1) had small deviation from regression (S^2d_i) and thus possessed average stability. Finally and Wilkinson (1963) and Eberhert and Russell (1966) stated that genotypes with high mean yield, regression and coefficient equal unity (b_i=1) and deviation from regression as small as possible (S^2d_i=0) are considered stable. Accordingly, Giza 87, Giza 92 and Giza 96 were the most stable varieties, since its regression coefficient was almost unity and it had one of the lowest deviations from regression. In contrast, the genotypes with S^2d_i deviate significantly from zero and regression coefficients apart from one such as Giza 94, was regarded as sensitive to environmental changes and adaptability to high (rich) yielding environments. The genotypes Giza 94 tops mean performance over the environments however, the significance of deviation from linear regression makes their behavior unpredictable over the environments and one may not be able to comment on their stability from Eberhert and Russell (1966). Fig. (4) shows mean seed cotton yield (SCY) of varieties plotted against their regression coefficient. Three varieties Giza 87, Giza 92 and Giza 96 had closer to one regression coefficient with average cotton yield and could be considered widely adapted to most stable. Variety Giza 94 had regression coefficient greater apart from unity and SCY over mean yield. Therefore, this variety was subtle to environmental vicissitudes and optional for farming in high inputs environments. Such stable performance as a desirable attribute of genotype cultivars, particularly for the current character and countries such as Egypt, where environmental variations are high and unpredictable.

Table 5. Mean and cotton yield and values of environmental index of various locations of the cotton yield.

Location		Seed Cotton yield	Values of environmental index
Alex. 2013	S_1L_1	7.92	-1.3
Damn. 2013	S_1L_2	8.69	-0.53
Edko 2013	S_1L_3	9.65	0.43
Kfs 2013	S_1L_4	7.33	-1.89
Sedi Sal. 2013	S_1L_5	9.04	-0.18
Kafr Saad 2013	S_1L_6	12.01	2.79
Kafr El-Bat 2013	S_1L_7	5.86	-3.36
Alex. 2014	S_2L_1	12.74	3.52
Damn. 2014	S_2L_2	10.16	0.94
Edko 2014	S_2L_3	11.32	2.1
KFS 2014	S_2L_4	9.47	0.25
Sedi Sal. 2014	S_2L_5	6.17	-3.05
Kafr Saad 2014	S_2L_6	12.63	3.41
Kafr El-Bat. 2014	S_2L_7	6.03	-3.19
Mean		9.22	
LSD		1.79	

The data presented in Table (5) and Fig. (1) revealed that SCY of seven cotton varieties varied among environments and ranged from (5.86) K/fad. for the environment S_1L_7 to (12.74) k/fad. for the environment S_2L_1. The wide range of environmental index for seed cotton yield (SCY) ranged from (-3.36 to 3.52) indicated significant variation between environments. The environmental index covered a wide range and displayed a good distribution within the range.

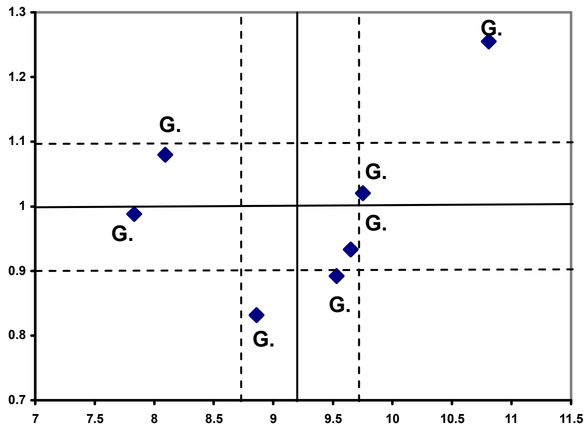

Fig. 2. Average yield of varieties plotted compared to their regression coefficient.

CONCLUSION

The varieties Giza 87, Giza 92 and Giza 96 are considered as stable across a wide range of environments. The variety Giza 94 was more sensitive to any change in the environment and considered as high yielding environments

REFERENCES

Abd El-Salam, M.E.; S.E. Shaker; A.E.I. Darwesh and S.S.M. Badr (2014). Evaluation of some cotton lines under different environmental conditions. J.Agric.Res. Kafr El-Sheikh Univ., 40(4): 804-818.

Abdalla, A.; I.S.M. Hassan and A.M. Abdel-Aziz (2005). Assessing the responses to natural environments (G × E) of Egyptian cotton cultivars grown in Delta cotton zone. The 11th Conf. of Agron. Assiut Univ., Nov. 15-16 PP 325-341.

Abo El-Zahab, A.A.; H.Y. Awad and K.A. Baker (2003). Comparative performance of Pima and Egyptian cotton cultivars: 111. Tolerance to late planting stress. Egypt J. Agric. Res., 81(1): 205-220.

Allam, M.A.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* L.). Egypt. J. Agric. Res., 86 (3): 1039-1067.

Bartlett, M.S. (1937). Properties of sufficiency and statistical tests. Proceedings of Royal Statistical Society, Series A. 160, 268-282.

Bilbro, J.D. and L.L. Ray (1976). Environmental stability and adaptation of several cotton cultivars. Crop Sci. 16: 821-824.

Campbell, B.T. and M.A.Jones (2005). Assessment of genotypes x environment interactions for yield and fiber quality in cotton performance trails. Euphytica, 144:69-78.

Dehghani, H.A. Ebadi and A. Yousefi (2006). Biplot analysis of genotype by environment interaction for barley yield in Iran. Agron. J. 98: 388-393.

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

Finaly, K.W. and G.N. Wilkinson (1963). The analysis of adaptation in a plant breeding programme. Aust. J. Agric. Res., (14): 742-754.

Gill, S.S. and T.H. Singh (1982). Stability parameters for yield components in upland cotton (*G. hirsutum* L.) Indian. J. Gent & Cytol. 11: 9-13.

Hamoud, H.M.E. (2008). Studies on genotype x environment interactions using GGE-biplot analysis for seed cotton yield in Delta Region of Egypt. Egypt. J. Agric. Res., 86(6):2351-2364.

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

Hassan,S.A.M.;S.S.M.Badr and I.S.M. Hassan (2012).Study of phenotypic stability of some Egyptiaan cotton genotypes under different environments. Egypt. J. of Apple. Sci., 27 (6); 298-315.

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

Liu, L.X. and Q.X. Sun (1993). A comparative study on different statistical measures of stability. American Society of Agron. 85th Annual Meeting. PP.92.

Mora, F.; O.F. Junior and C.A. Scapium (2007). Prediction of cultivar effects on cotton yield in the presence of genotype-environment interaction. Client Inv. Agr. 34(1): 7-16.

Sendecor, G. W. and W. G. Cochran (1969). Statistical Methods, 6th Ed. Iowa State Univ. Press, Ames Iowa, U.S.A.

Shaker, S.A. (2009). Genotypic stability and evaluation of some Egyptian cotton genotypes. Ph. D. Thesis, Fac. of Agric. Kafrelsheikh Univ., Egypt.

Shaker, S.A. (2013). Evaluation and stability parameters of some Egyptian long staple cotton genotypes. Egypt. J. Plant Breed. 17(2): 390-406.

Shukla, G.K. (1972). Some statistical aspects of partitioning genotype-environmental components of variability. Heredity 29: 237-245.

Singh,S.; V.V. Singh and A.D. Choudhary (2014). Genotype x environment interaction and yield stability analysis in multi-environment. Tropical and Subtropical Agro ecosystem, 17: 477-482.

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

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تعتبر الأقلمة والثبات لمحصول القطن وذلك خلال العديد من البيئات المتباينة مطلب كبير لمربى النبات. وقد تم زراعة سبعة أصناف من القطن المصرى وهى جيزة 86 ، جيزة 94 ، جيزة 87 ، جيزة 88 ، جيزة 92 ،جيزة 93 ، جيزة 96 فى سبع مناطق وهى الاسكندرية ، دمنهور (البحيرة) ، إدكو (البحيرة) ، كفرالشيخ ، سيدى سالم (كفرالشيخ) ، كفرسعد (دمياط) ، كفرالبطيخ (دمياط) خلال موسمين صيفيين زراعيين 2013 ، 2014 لتقييم ودراسة الأقلمة والثبات في الأداء تحت ظروف بيئية مختلفة وذلك لصفة محصول القطن الزهر. كان التفاعل بين الصنف والبيئة معنويا مما يوضح استجابة الأصناف للتغيرات البيئية. يصور انحدار المحصول على الدليل البيئي اختلافات بين الأصناف للثبات والأقلمة. الأصناف جيزة 87 ، جيزة 92 ، جيزة 96 سجلت محصولا مرتفعا ومعامل انحدار لم يختلف معنويا عن الوحدة $b_i=1$ وبالتالي فهى متأقلمة مع كل البيئات وأيضا انحرافها عن خط الانحدار لم يختلف معنويا عن الصفر ($S^2d_i=0$) من ثم فهى أيضا متوسطة الثبات خلال مختلف البيئات وذلك طبقا لـ (Eberhart and Russell, 1966) علاوة على ذلك فإن الصنف جـ94 منخفض الاقلمة وغير ثابت عبر كل البيئات لأنه أكثر حساسية للتغيرات فى الظروف البيئية رغم أنه ذو محصول مرتفع ويعتبر مناسب للبيئات الغنية أو عالية المحصول.