Bull. Fac.Agric.,Cairo Univ., 63: 226-235. (2012)

CLASSIFICATION OF ENVIRONMENTAL EFFECTS ON SOME EGYPTIAN COTTON GENOTYPES

(Received:11 .7 .2012)

By
H. A. Idris

Cotton Research Institute, Agriculture Research Center, Giza, Egypt.

ABSTRACT

The present investigation aimed to classify environmental effects on some Egyptian cotton (*Gossypium barbadense* L.) genotypes. Genotypes (G.80, G90, (G83 x (G75 x 5844)) x G80 and G90 x Australian) were evaluated in six environments with respect to yield, boll components, indices and fiber properties. Environments consisted of three seasons (2009, 2010 and 2011) x two locations (Beni Souf and Minya) in Upper Egypt. A randomized complete block design with four replications was used. The results of classification of the environments revealed that the genotypes were more strongly influenced by different environments and components (locations and seasons) with respect to seed and lint yield and indices, seed index and lint percentage except G90 x Australian (seasons) was non-significant for lint percentage. G90 x Australian was the best genotype (more stable) for boll components because the variance of this genotype was non-significant under different environments and components (locations and seasons). The genotypes were not affected by locations with respect to fiber properties except G80 for fiber length and G90 x Australian for Pressely index the variance of genotypes was not significant. The present study is very important for the regional program to evaluate the genotypes.

Key words*: cotton, environments, genotypes, locations, sample analysis, seasons.*

1.INTRODUCTION

Genotype x environment interaction continues to be a challenging issue for plant breeders, geneticists and production agronomists who conduct crop performance trials across diverse environments. A universally acceptable selection criterion that takes the genotype x environment interaction into consideration does not exist. Whenever an interaction is significant, the use of main effects (*e. g*, means overall genotype across environments) is questionable (Kang and Magari, 1995). Abd El Bary (1999) found that locations and genotypes mean squares were highly significant for seed cotton per boll and lint percentage, seed index and lint index. El Oraby (1998) and El Ameer (1999) evaluated some Egyptian cotton genotypes under different environments. They reported that the mean squares of genotypes with respect to seed cotton per boll, seed index and lint percentage indices differed significantly. Baker (2001) evaluated some cotton genotypes under different environments. He found significant variations due to environments and genotypes with respect to yield (seed and lint). Idris (2002) evaluated some Egyptian cotton cultivars under different locations. He found that both the first analysis (locations, cultivars and the interaction between them) and the second analysis (environments, cultivars and the interaction between them) mean squares were significant with respect to seed and lint yield, seed cotton per boll, seed index and lint percentage. Mohamed *et al.* (2003) evaluated twenty-four cotton genotypes at six locations in Upper Egypt using the randomized complete block design. They found that genotypes x locations mean squares were highly significant for yields (seed and lint), seed cotton per boll and indices (seed index, lint index and lint percentage). The results showed that ((G83 x G80) x G89)) was a promising cross due to its high performance for yield components and fiber quality. Hassan *et al.* (2012) evaluated some Egyptian cotton genotypes in different environments. They found that environments and genotype mean squares were highly significant for yields (seed and lint), seed cotton per boll, indices (seed index, lint index and lint percentage) and for fiber properties (fiber length, and micronaire reading).

Researchers need a statistical measure to Evaluate genotypes from environments and its components (locations and seasons). Thus, the objective of this study was to measure the response of some genotypes to different environments and their classification in two components (locations and seasons).

2. MATERIALS AND METHODS

Four long - staple Egyptian cotton (*Gossypium barbadense* L.) genotypes were evaluated in six environments in Upper Egypt. Environments consisted of three seasons (2009, 2010 and 2011) x two locations (Beni Souf and Minya) in Upper Egypt. Two of the genotypes were cultivars, *viz.* G.80 and G90. The other genotypes were hybrids (Bulk families) *viz.*, (G83 x (G75 x 5844)) x G80 and G90 x Australian. A randomized complete block design with four replications was used. Two samples were obtained from each plot. Planting was during the last week of March. All agricultural practices were done as recommended.

Genotypes were evaluated for yields (seed and lint (kentar / feddan)), boll components (dry weight (g), seed cotton (g) and number of seeds), indices (harvest index per boll, seed index (g), lint index (g) and lint percentage) and fiber properties (length (mm), micronaire and pressely index).

2.1. Statistical analysis

2.1.1. Analysis of individual environments

The analysis of the randomized complete block design was carried out for the data of individual environments to estimate the variance among genotypes in individual environments. Statistical analysis of randomized complete block design followed Little and Hills (1978) and Roger (1994).

2.1.2. Analysis of combined environments

Homogeneity test of variances (Bartlett test) was applied according to the procedures reported by Bailey (1994) before starting the analysis of combined. The combined randomized complete block design was carried out with the data of the six environments to estimate the environmental effects on genotypes (Table 1). Statistical analysis followed to Gomez and Gomez (1984). Treatment means were compared by the least significant difference (L.S.D.) test as given by Steel and Torrie (1980). All comparisons were done at 0.05 level of significance.

Table(1):Analysis of variance of environmental effect on genotypes

Source of variation	df
Environments	(e - 1)
Replications / Environments	e (r-1)
Genotypes	(g-1)
Genotypes x environments	(g - 1) (e - 1)
Experimental error	e (r - 1) (g - 1)
Total	r g e - 1

2.1.3. Classification of environments

The data in (Table 2) show the classification of environmental effects on individual genotypes. Statistical analysis of classification of environmental effect on individual genotypes (Table 3) was followed Fowler *et al.* (1998). The means were compared by Tukey test as given by the same author. All comparisons were done at 0.05 level of significance.

3. RESULTS AND DISCUSSION

3.1. Analysis of individual environments

The analysis of variances in individual environments with respect to yield, boll components, indices and fiber properties revealed the presence of significant differences among the genotypes (Table 4). Non significant differences among the genotypes were noticed for yields (seed and lint) in six environments except one and two environments for seed cotton yield and lint cotton yield, respectively.

The results of boll components showed that significant variations due to genotypes were observed in five environments for dry weight per boll and number of seeds per boll. In contrast, the differences were insignificant for seed cotton per boll in six environments.

Significant variation due to genotypes was detected for indices (harvest index, seed index, lint index and lint percentage) in six environments except two environments with respect to harvest index and one environment for both seed index and lint percentage.

The analysis of variance of fiber properties revealed the presence of significant differences among genotypes for micronaire reading, fiber length and pressely index in four, three and two environments, respectively.

3.2. Analysis of combined environments

Homogeneity of variance test (Bartlett test) was not significant for boll components (dry weight per boll, seed cotton peer boll and number of seeds per boll), indices (harvest index, seed index, lint index and lint percentage) and fiber properties (fiber length, micronaire reading and pressely index). In contrast, Bartlett test was significant for yields (seed and lint). The analysis of variance showed significant variation due to environments, genotypes and their interaction (Table 5).

Table (2): Two - way ANOVA of classification of the environmental effect on individual genotypes

		Seasons		
		2009	**2010**	**2011**
Locations	**(L_1)**	**Environment (1)** Plot size = 52 m^2 10 rows x 8 m x 0.65 m Number of plots = 4 Number of samples = 8 Sample size = 50 bolls	**Environment (2)** Plot size = 62.4 m^2 12 rows x 8 m x 0.65 m Number of plots = 4 Number of samples = 8 Sample size = 50 bolls	**Environment (3)** Plot size = 52 m^2 10 rows x 8 m x 0.65 m Number of plots = 4 Number of samples = 8 Sample size = 50 bolls
	(L_2)	**Environment (4)** Plot size = 52 m^2 20 rows x 4 m x 0.65 m Number of plots = 4 Number of samples = 8 Sample size = 50 bolls	**Environment (5)** Plot size = 62.4 m^2 24 rows x 4 m x 0.65 m Number of plots = 4 Number of samples = 8 Sample size = 50 bolls	**Environment (6)** Plot size = 52 m^2 20 rows x 4 m x 0.65 m Number of plots = 4 Number of samples = 8 Sample size = 50 bolls

Beni Souf (L_1) **Minya (L_2)**

Significant differences among environments were observed for boll components, indices and fiber properties except pressely index indicating that these traits were affected by environments. Significant variation due to the genotypes was recorded for indices, fiber properties and boll components except for seed cotton per boll.

The results of boll components exhibited that both G80 and G90 x Australian had the highest value for dry weight per boll and number of seeds per boll, respectively. They significantly surpassed all other genotypes.

The results of indices revealed that G80 was the best genotype with respect to seed and lint, occupying the first rank and significantly exceeded all other genotypes. G90 did not differ significantly from G90 x Australian for harvest index, significantly surpassed all other genotypes. In contrast, non-significant variations among genotypes were recorded for lint percentage except for G90 (Table 6).

The results of fiber properties showed that G80 was the best genotype for fiber length, it did not significantly differ from (G83 x (G75 x 5844)) x G80 but significantly surpassed all other genotypes. G90 x Australian gave the highest value with respect to micronaire reading, it significantly exceeded other genotypes except for G80. On the other hand, non-significant variations among genotypes were recorded for pressely index except for G90 x Australian (Table 6).

A significant interaction between genotypes x environments was observed for boll components (dry weight per boll, seed cotton per boll and number of seeds per boll), indices (seed index and lint percentage) and fiber properties (fiber length and micronair reading) Table 5.

3.3. Analysis of classification of environments

The results in Table (7) show the analysis of variance of classification of environmental effect on individual genotypes with respect to yield, boll components, indices and fiber properties. The data in Table (8) show the means of yields (seed and lint), boll components (dry weight per boll, seed cotton per boll and number of seeds per boll), indices (harvest index, seed index, lint index and lint percentage) and fiber properties (fiber length, micronaire reading).

The results of yields (seed and lint) reveal that genotypes were more strongly influenced by different environments and components (locations and seasons) due to the variance of genotypes were significant.

The results of boll components show that G90 x Australian was the best genotype (more stable) for three boll components because the variance of this genotype was non-significant under different environments and components (locations and seasons).

(G83 x (G75 x 5844)) x G80 was more stable for number of seeds per boll due to the non-significant variance of this genotype under different environments and locations. On the other hand, the same genotype was not affected by seasons with respect to dry weight per boll and seed cotton per boll since its variance was non-significant.

G90 was the best genotype grown under different locations with respect to three boll components due to the non-significant variance of this genotype.

G80 was not affected by seasons and locations with respect to seed cotton per boll and number of seeds per boll, respectively due to the non-significant variance of this genotype.

The results of indices exhibited different response of genotypes grown under different environments and environmental components (locations and seasons)Genotypes were more strongly influenced by different environment and components(locations and seasons with respect to seed index and lint percentage due to the variance of genotypes were significant expect the variance of G90 x Australian (seasons)for lent percentage.

Table (3): Analysis of variance of the classification of environmental effects on individual genotypes.

Source of variation	df
Environments	e - 1
Locations	r – 1
Seasons	c – 1
Locations x Seasons	(r – 1) (c - 1)
Within environments	(n – r c)
Total	n - 1

Where : e = Number of environments r = Number of rows c = Number of columns n = Number of total plots or samples

Table (4): Mean squares of traits for individual environments.

Seed cotton yield (k/fed.)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	3	0.818*	2.54	1.69	2.91*	1.08	0.516
Genotypes	3	0.447	0.243	2.21	3.07*	0.940	6.45
Experimental error	9	0.167	0.913	1.81	0.472	1.55	3.77
Total	15						
Lint cotton yield (k/fed.)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	3	1.29*	3.76	2.53	4.60*	1.85	0.998
Genotypes	3	1.36*	0.564	4.74	4.64*	1.64	11.87
Experimental error	9	0.237	1.78	2.89	0.810	3.69	6.22
Total	15						
Dry weight per boll (g)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.005	0.017	0.007	0.006	0.005	0.011
Genotypes	3	0.096**	0.093**	0.013	0.109**	0.071*	0.098**
Experimental error	21	0.006	0.009	0.007	0.005	0.021	0.014
Total	31						
Seed cotton per boll (g)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.023	0.046	0.044	0.023	0.035	0.126
Genotypes	3	0.052	0.136	0.172	0.149	0.063	0.122
Experimental error	21	0.049	0.078	0.057	0.065	0.040	0.056
Total	31						
Number of seeds per boll							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	1.53	2.08	2.32	1.39	2.47	3.40
Genotypes	3	31.58**	11.37*	23.36**	6.87*	1.87	12.31**
Experimental error	21	2.24	3.57	1.90	2.00	1.81	2.05
Total	31						
Harvest index per boll (%)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.027	0.057	0.026	0.039	0.011	0.139
Genotypes	3	0.540**	0.385**	0.224	0.226*	0.209	0.513**
Experimental error	21	0.042	0.070	0.084	0.063	0.074	0.060
Total	31						
Seed index (g)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.331	0.223	0.175	0.059	0.609	0.774*
Genotypes	3	5.39**	1.30**	3.54**	5.53**	0.950	3.12**
Experimental error	21	0.163	0.193	0.397	0.194	0.513	0.277
Total	31						
Lint index (g)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.165	0.111	0.187	0.133	0.164	0.301
Genotypes	3	2.80**	1.05**	1.60**	1.83**	1.02*	0.788**
Experimental error	21	0.070	0.092	0.172	0.072	0.228	0.139
Total	31						
Lint percentage							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	1.00	0.416	0.652	1.43	0.904	0.593
Genotypes	3	10.66**	5.43**	1.69	5.53**	3.68*	4.46**
Experimental error	21	0.552	0.420	0.646	0.770	0.765	0.621
Total	31						

Table (4) Cont.

Fiber length (mm)							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.206	0.062	0.514	0.523	0.364	0.758
Genotypes	3	1.26*	1.04*	2.05*	0.614	0.512	1.57
Experimental error	21	0.360	0.334	0.476	0.271	0.386	0.584
Total	31						
Micronaire reading							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.020	0.009	0.065	0.024	0.047	0.036
Genotypes	3	0.129**	0.015	0.145*	0.172*	0.096	0.194*
Experimental error	21	0.021	0.031	0.031	0.035	0.037	0.058
Total	31						
Pressely index							
Source of variation	**df**	**E (1)**	**E (2)**	**E (3)**	**E (4)**	**E (5)**	**E (6)**
Replications	7	0.517	2.22**	0.123	0.183	0.734	0.108
Genotypes	3	0.064	0.057	0.314	0.514	2.32*	0.608*
Experimental error	21	0.363	0.521	0.170	0.248	0.598	0.133
Total	31						

*** , ** Significant at 0.05 and 0.01 levels, respectively.E = Environment**

Table (5): Mean squares of traits for combined analysis.

Source of variation	df	Seed cotton yield (k/fed.)	Lint cotton yield (k/fed.)
Environments (E)	5	--	--
Replications / (E)	18	--	--
Genotypes (G)	3	--	--
G x E	15	--	--
Experimental error	54	--	--
Total	95		
Source of variation	**df**	**Dry weight per boll (g)**	**Seed cotton per boll (g)**
Environments (E)	5	0.105**	0.445**
Replications / (E)	42	0.008	0.050
Genotypes (G)	3	0.355**	0.027
G x E	15	0.025**	0.133**
Experimental error	126	0.010	0.058
Total	191		
Source of variation	**df**	**Number of seeds per boll**	**Harvest index (%)**
Environments (E)	5	23.07**	0.247**
Replications / (E)	42	2.20	0.050
Genotypes (G)	3	57.54**	1.91**
G x E	15	5.96**	0.037
Experimental error	126	2.26	0.066
Total	191		
Source of variation	**df**	**Seed index (g)**	**Lint index (g)**
Environments (E)	5	14.20**	2.29**
Replications / (E)	42	0.362	0.177
Genotypes (G)	3	16.24**	8.02**
G x E	15	0.718**	0.213
Experimental error	126	0.290	0.129
Total	191		
Source of variation	**df**	**Lint percentage**	**Fiber length (mm)**
Environments (E)	5	31.70**	52.78**
Replications / (E)	42	0.833	0.404
Genotypes (G)	3	22.67**	1.11*
G x E	15	1.76**	1.19**
Experimental error	126	0.629	0.402
Total	191		
Source of variation	**df**	**Micronaire reading**	**Pressely index**
Environments (E)	5	1.34**	1.32
Replications / (E)	42	0.033	0.647
Genotypes (G)	3	0.368**	1.15*
G x E	15	0.077*	0.545
Experimental error	126	0.036	0.339
Total	191		

*** , ** Significant at 0.05 and 0.01 levels, respectively.**
-- Not combined analysis due to Bartlett test was significant.

Table (6): Means of boll components, indices and fiber properties for combined analysis.

Genotypes	Seed cotton yield (k/fed.)	Lint cotton yield (k/fed.)
G80	--	--
G90	--	--
(G83 x (G75 x 5844)) x G80	--	--
G90 x Australian	--	--
L. S. D.	--	--
Genotypes	**Dry weight per boll (g)**	**Seed cotton per boll (g)**
G80	1.12	2.58
G90	0.93	2.53
(G83 x (G75 x 5844)) x G80	1.00	2.56
G90 x Australian	0.95	2.58
L. S. D.	0.04	ns
Genotypes	**Number of seeds per boll**	**Harvest index (%)**
G80	15.38	2.31
G90	16.08	2.74
(G83 x (G75 x 5844)) x G80	16.15	2.56
G90 x Australian	17.95	2.73
L. S. D.	0.61	0.10
Genotypes	**Seed index (g)**	**Lint index (g)**
G80	9.95	6.85
G90	9.58	6.21
(G83 x (G75 x 5844)) x G80	9.45	6.46
G90 x Australian	8.58	5.88
L. S. D.	0.22	0.15
Genotypes	**Lint percentage**	**Fiber length (mm)**
G80	40.81	32.56
G90	39.34	32.25
(G83 x (G75 x 5844)) x G80	40.62	32.32
G90 x Australian	40.69	32.23
L. S. D.	0.32	0.26
Genotypes	**Micronaire reading**	**Pressely index**
G80	4.45	10.17
G90	4.28	10.25
(G83 x (G75 x 5844)) x G80	4.35	10.02
G90 x Australian	4.47	9.90
L. S. D.	0.08	0.24

ns : Not significant at .05 level.
-- Not combined analysis due to Bartlett test was significant.

In contrast, the genotypes were more stable for harvest index due to the variances of genotypes was non-significant under different environments and components (locations and seasons).

The results of lint index showed that the genotypes were more strongly influenced by different environments and seasons since the variance of genotypes was significant. The genotypes were not affected by locations with respect to the same trait since the variance of these genotypes were non-significant except G90 x Australian.

The results of fiber properties revealed that the genotypes were more strongly influenced by different environments and seasons with respect to fiber length and micronaire reading since the variance of genotypes was significant. In contrast, the genotypes were not affected by environments and seasons with respect to pressely index except (G83 x (G75 x 5844)) x G80 where the variance of the genotypes was non-significant.

On the other hand, the genotypes were not affected by locations with respect to the three characters except G80 for fiber length and G90 x Australian for pressely index since to the variance of genotypes was non-significant.

G80 and G90 were the best genotypes (more stable) with respect to pressely index because they were not affected by environments and environmental components (locations and seasons) since the variances of the two genotypes was non-significant.

Table (7): Mean squares of classification environmental effect on individual genotypes.

Source of variation	df	G80	G90	V_1	V_2
Seed cotton yield (k/fed.)					
Environments	5	16.99**	32.62**	26.79**	41.59**
Locations	1	50.43**	93.46**	95.32**	76.86**
Seasons	2	16.43**	34.17**	19.12**	64.80**
Locations x Seasons	2	0.83	0.66	0.19	0.75
Within environments	18	1.45	0.86	1.84	1.78
Total	23				
Lint cotton yield (k/fed.)					
Environments	5	24.00**	47.43**	41.74**	63.22**
Locations	1	67.57**	126.59**	144.01**	117.44**
Seasons	2	24.30**	53.38**	31.89**	97.46**
Locations x Seasons	2	1.91	1.89	0.46	1.86
Within environments	18	2.49	1.48	3.48	2.87
Total	23				
Dry weight per boll (g)					
Environments	5	0.087**	0.064**	0.020**	0.007
Locations	1	0.134**	0.009	0.057**	0.005
Seasons	2	0.081*	0.125**	0.011	0.010
Locations x Seasons	2	0.069*	0.031*	0.011	0.006
Within environments	42	0.016	0.008	0.004	0.011
Total	47				
Seed cotton per boll (g)					
Environments	5	0.336**	0.208**	0.205**	0.097
Locations	1	0.788**	0.004	0.391**	0.103
Seasons	2	0.180	0.278**	0.020	0.043
Locations x Seasons	2	0.266*	0.241*	0.296**	0.148
Within environments	42	0.073	0.049	0.044	0.056
Total	47				
Number of seeds per boll					
Environments	5	14.75**	15.58**	4.07	6.55
Locations	1	5.95	1.33	1.62	11.52
Seasons	2	28.63**	36.82**	7.49*	3.58
Locations x Seasons	2	5.28	1.45	1.87	7.04
Within environments	42	2.09	1.74	2.16	3.00
Total	47				
Harvest index per boll (%)					
Environments	5	0.100	0.096	0.084	0.078
Locations	1	0.005	0.066	0.010	0.030
Seasons	2	0.093	0.207	0.042	0.113
Locations x Seasons	2	0.155	0.001	0.167*	0.068
Within environments	42	0.062	0.064	0.043	0.076
Total	47				

Table (7): Cont.

Source of variation	df	G80	G90	V_1	V_2
Seed index (g)					
Environments	5	5.42**	3.40**	3.67**	3.87**
Locations	1	8.34**	2.81**	4.64**	9.77**
Seasons	2	6.52**	3.79**	2.19**	2.51**
Locations x Seasons	2	2.85**	3.31**	4.65**	2.29**
Within environments	42	0.405	0.314	0.337	0.175
Total	47				
Lint index (g)					
Environments	5	0.616*	0.731**	0.747**	0.839**
Locations	1	0.030	0.003	0.368	1.56**
Seasons	2	1.15**	1.15**	0.175	0.999**
Locations x Seasons	2	0.374	0.679**	1.51**	0.322
Within environments	42	0.206	0.128	0.128	0.101
Total	47				
Lint percentage					
Environments	5	14.75**	8.69**	6.82**	6.72**
Locations	1	38.47**	18.09**	9.48**	14.01**
Seasons	2	6.12**	4.75**	8.42**	0.190
Locations x Seasons	2	11.53**	7.93**	3.87*	9.59**
Within environments	42	0.617	0.460	0.953	0.689
Total	47				
Fiber length (mm)					
Environments	5	10.66**	22.65**	14.10**	8.04**
Locations	1	3.52**	0.060	0.075	0.054
Seasons	2	23.22**	53.74**	37.31**	19.74**
Locations x Seasons	2	1.67*	2.85**	0.149	0.339
Within environments	42	0.337	0.386	0.343	0.543
Total	47				
Micronaire reading					
Environments	5	0.256**	0.266**	0.483**	0.565**
Locations	1	0.047	0.005	0.010	0.041
Seasons	2	0.334**	0.654**	1.03**	1.34**
Locations x Seasons	2	0.283**	0.009	0.183**	0.051
Within environments	42	0.037	0.034	0.030	0.039
Total	47				
Pressely index					
Environments	5	0.309	0.325	1.14*	1.18
Locations	1	0.001	0.060	0.002	3.58**
Seasons	2	0.239	0.295	2.31*	0.781
Locations x Seasons	2	0.533	0.488	0.548	0.391
Within environments	42	0.347	0.372	0.459	0.485
Total	47				

, ** Significant at 0.05 and 0.01 levels, respectively.
V_1 = (G83 x (G75 x 5844)) x G80
V_2 = G90 x Australian

Table (8): Means of yield, boll components, indices and fiber properties for classification environments.

Environments	Seed cotton yield (k/fed.)				Lint cotton yield (k/fed.)			
	G80	G90	V_1	V_2	G80	G90	V_1	V_2
(1)	7.01	6.42	7.04	6.47	9.27	8.03	9.16	8.51
(2)	8.88	8.91	9.21	9.39	11.57	11.21	12.01	11.97
(3)	10.18	9.97	10.39	11.63	12.74	12.34	13.15	14.82
(4)	10.05	9.73	11.37	9.35	12.46	11.69	14.08	11.91
(5)	12.34	13.33	13.10	13.40	15.98	16.82	17.38	17.29
(6)	12.38	14.08	14.13	15.48	15.22	16.86	17.57	19.37
Tukey	2.70	2.08	3.05	3.00	3.54	2.74	4.19	3.80
Environments	Dry weight per boll (g)				Harvest index per boll (%)			
(1)	1.08	0.81	0.95	0.93	2.25	2.85	2.44	2.65
(2)	1.21	1.06	0.97	0.98	2.20	2.64	2.55	2.68
(3)	0.93	0.88	0.98	0.91	2.45	2.83	2.70	2.78
(4)	1.17	0.92	1.03	0.93	2.45	2.79	2.67	2.82
(5)	1.18	1.00	1.09	0.98	2.24	2.57	2.49	2.60
(6)	1.17	0.92	0.99	0.98	2.27	2.73	2.54	2.84
Tukey	0.19	0.13	0.10	--	--	--	--	--
Environments	Seed cotton per boll (g)				Seed index (g)			
(1)	2.42	2.29	2.32	2.46	9.27	8.99	8.83	7.43
(2)	2.65	2.79	2.47	2.63	9.15	9.19	8.92	8.31
(3)	2.28	2.49	2.63	2.53	10.18	9.85	9.66	8.64
(4)	2.87	2.56	2.73	2.63	11.05	10.47	10.67	9.14
(5)	2.61	2.57	2.72	2.51	9.32	8.89	9.15	8.53
(6)	2.63	2.49	2.51	2.76	10.73	10.11	9.45	9.42
Tukey	0.40	0.32	0.31	--	0.94	0.82	0.85	0.62
Environments	Number of seeds per boll				Lint index (g)			
(1)	15.04	15.38	15.54	19.27	6.80	5.94	6.06	5.36
(2)	16.93	18.33	16.33	18.89	6.47	6.02	6.24	5.62
(3)	13.11	15.04	16.01	17.14	7.19	6.69	6.80	6.11
(4)	15.85	15.21	15.62	17.33	7.10	6.37	6.82	6.02
(5)	16.43	17.33	17.48	17.36	6.61	5.93	6.48	5.94
(6)	14.90	15.21	15.89	17.67	6.90	6.31	6.34	6.21
Tukey	2.12	1.94	--	--	0.67	0.53	0.53	0.47
Environments	Fiber length (mm)				Lint percentage			
(1)	33.53	33.64	33.15	32.76	42.30	39.78	40.70	41.92
(2)	33.65	33.06	33.30	32.80	41.43	39.62	41.18	40.34
(3)	31.31	30.15	30.61	31.02	41.38	40.47	41.32	41.44
(4)	32.24	32.70	32.89	32.70	39.10	37.72	38.99	39.70
(5)	33.49	33.81	33.43	33.20	41.52	40.02	41.38	41.02
(6)	31.14	30.13	30.51	30.89	39.12	38.44	40.16	39.73
Tukey	0.85	0.91	0.86	1.08	1.15	1.00	1.44	1.22
Environments	Micronaire reading				Pressely index			
(1)	4.44	4.18	4.16	4.25	10.30	10.35	10.21	10.42
(2)	4.23	4.19	4.16	4.26	10.06	10.08	10.04	10.23
(3)	4.78	4.51	4.74	4.81	10.15	10.21	9.81	9.88
(4)	4.43	4.10	4.14	4.26	10.10	10.35	10.45	9.89
(5)	4.40	4.20	4.39	4.45	10.48	10.53	10.20	9.36
(6)	4.43	4.51	4.54	4.79	9.91	9.98	9.38	9.64
Tukey	0.28	0.27	0.25	0.29	--	--	1.00	--

V_1 = (G83 x (G75 x 5844)) x G80 V_2 = G90 x Australian --: Not significant at .05 level.

4. REFERENCES

Abd El Bary A. M. (1999). Inheritance of quantitive traits of Egyptian cotton (*Gossypium barbadense* L.). M. Sc. Thesis, Mansoura Univ., Egypt.

Bailey N. T. (1994). Statistical Methods in Biology. Third Edit. Cambridge University Press, Cambridge, England.

Baker K. M. (2001). Comparative performance of Pima and Egyptian cotton under local environmental conditions. M.Sc. Thesis, Fac., of Agric., Cairo, Univ., Egypt.

El Ameer M. A. (1999). Genetical studies on types of gene effects on some crosses of Egyptian cotton (*Gossypium barbadense* L.). M. Sc. Thesis,Mansoura Univ., Egypt.

El Oraby S.H. (1998). Studies on yield of some Egyptian cotton varieties under different environments. M.Sc. Thesis, Kafr El Sheikh, Tanta Univ., Egypt.

Hassan S. A., Badr S.S. and Hassan I.S. (2012). Study of phenotypic stability of some Egyptian cotton genotypes under different environments. Egypt. J. of Appl. Sci., (6) : 298 – 315.

Fowler J., Cohen L. and Jarvis P. (1998). Practical statistics for field biology. Second Edit, John Wiley and Sons, New York, U.S.A.

Gomez K. A. and Gomez A. A. (1984). Statistical Procedures for Agricultural Research. John Wiley and Sons, New York, U.S.A.

Idris H. A. (2002). Models for evaluating Egyptian cotton responses to environmental variables. Ph.D. Thesis, Fac., of Agric., Cairo Univ., Egypt

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

Little T.M. and Hills F. J.(1978). Agricultural Experimentation Design and Analysis. John Wiley and Sons, New York., U.S.A.

Mohamed S. A., El Adly H. H. and Eissa A. E. (2003). Evaluation of some Egyptian cotton genotypes under different environments. Egypt. J . Agric. Res., 81 (4) : 1797- 1816.

Roger G. P. (1994). Agricultural Field Experiments Design and Analysis. Marcel Dekker, Inc. New York, U.S.A.

Steel R. G. and Torrie J. H. (1980). Principles and Procedures of Statistics. Second Edit., McGraw. Hill. Book Co. New York, U.S.A.

تصنيف أثر البيئات على بعض التراكيب الوراثية من القطن المصري

حاتم أحمد إدريس

معهد بحوث القطن – مركز البحوث الزراعية – الجيزة – مصر

ملخص

تم تقييم محصول القطن (الزهر والشعر) ، مكونات اللوزة (الوزن الجاف ، وزن القطن الزهر ، عدد البذور) ، المعاملات (معامل الحصاد للوزة ، معامل البذرة ، معامل الشعر ، معدل الحليج) و الصفات التكنولوجية (الطول ، الميكرونير ، بريسلى) لأربعة تراكيب وراثية من القطن المصري وهى جيزة 80 ، جيزة 90 ، (جـ83 x (جـ 75 x 5844)) x جـ80 ، جـ 90 x أسترالي فى ستة بيئات (ثلاث سنوات 2009 ، 2010 ، 2011 x موقعين هما بنى سويف و المنيا) بهدف تقدير تأثير البيئات و مكوناتها (المواقع والسنوات).

كان تأثير البيئات ومكوناتها (المواقع ، السنوات) معنويا لجميع التراكيب الوراثية بالنسبة لمحصول القطن (الزهر ، الشعر) والمعاملات (معامل البذرة ، معدل الحليج) ماعدا جـ 90 x أسترالي حيث كان تأثير السنوات غير معنوى لمعدل الحليج. تفوق التركيب الوراثى جـ 90 x أسترالي على جميع التراكيب الوراثية بالنسبة لمكونات اللوزة لأن تباينه غير معنوى بالنسبة للبيئات ومكوناتها (المواقع ، السنوات). لم تتأثر جميع التراكيب الوراثية بالمواقع بالنسبة للصفات التكنولوجية ماعدا جيزة 80 للطول ، جـ 90 x أسترالي لمعامل البريسلى. وتعتبر هذه الدراسة مهمة لبرامج تقييم أصناف وسلالات القطن من حيث هدفها وطريقة التحليل الإحصائي المستخدمة.

المجلة العلمية لكلية الزراعة – جامعة القاهرة – المجلد (63) العدد الثالث (يوليو2012):226-235.