Assiut J. Agric. Sci., (46) No. (4) 2015 (25-37) *ISSN: 1110-0486*
Website: http://www.aun.edu.eg/faculty_agriculture/arabic *E-mail: ajas@aun.edu.eg*

Yield Performance of Some Egyptian Cotton Genotypes in Different Environments

Ahmed Mostafa Mohamed Soliman
Cotton Research Institute, Agricultural Research Center, Giza, Egypt
E-mail: Amsoliman95@yahoo.com

Abstract:

This study aimed to evaluate yield performance of cotton genotypes in different environments to know the best genotypes for produce the new variety. Thirty-eight new cotton lines descending from fifteen Egyptian cotton crosses were included in Trail A, and eighteen lines descending from thirteen crosses were included in Trail B in 2014 season using two commercial varieties Giza 80 and Giza 90 as checks. Trail A was raised at Seds, whereas Trail B was held at five locations (Seds, El-Fayoum, El-Menia, Assuit and Sohag) in Middle and Upper Egypt. The results of Trail A showed that the most of genotypes belonging to crosses exceeded significantly the check variety Giza 80 in both yield and its contributing variables. While, Trial B showed the superior of the nine crosses i.e. No. 1([{(G.83XG.80) x Dendara}x(G91xG90)]), 5(G.80 x (G.91 x G.90)), 6(G.80 x (G.91 x G.90)), 7(G.80 x (G.91 x G.90)), 8(G.80 x (G.91 x G.90)), 9([G.83 Radiator x Aust.) x G.91), 14([{(G.83 x G.80) x G.89}x (G.83 x Deltbain 703)), 15([{(G.83 x G.80) x G.89} x Aust.]) and No. 17([{G.83 x (G.75 x 5844)} x G.80]) surpassed significantly the check variety Giza 90 in seed cotton yield and lint yield, moreover one of them No. 14([{(G.83 x G.80) x G.89}x (G.83 x Deltbain 703)) significantly exceeded Giza 90 in boll weight across five locations. High heritability estimates in broad sense were recorded for most studied traits in Trail A and Trial B indicating that phenotypic selection for these strains could be highly effective. High gcv estimates were observed in seed cotton yield (9.66 and 30.08%), lint yield (10.93 and 33.17%) and number of bolls (3.16 and 2.21%) in Trial A and Trial B, respectively. The significant genotypes x locations interaction indicated that, such materials were affected by the environment and it should further be evaluated for several years at different locations.

Keywords: *Gosssypium barbadense,L., Promising lines, Seed cotton yield, Fiber characters, Heritability, Trial A and Trial B.*

Received on: 7/9/2015 **Accepted for publication on:** 13/9/2015

Referees: Prof. Gamal R. Abd Elrahman Prof. Elmahdy A. Teama

Introduction:

Several factors influence the success of cotton production, where the environmental conditions is one of the main factors that affect cotton production where these conditions differ between locations. The main objective for the cotton breeder is producing new superior cotton varieties that can replace the existing ones. The cotton research institute uses artificial hybridization between the desired genotypes. Hybridization among genotypes, followed by conventional pedigree selection is a predominant method utilized for cotton breeding. In such pedigree system the best F_2 plants and the best plants within the best lines in the following segregating generations are visually selected. Many investigations stated that visual selection in early segregating generations for yield is insufficient and that the evaluation of some strains in such programmes begins from F_5 generation and continue until satisfactory genetic stability is achieved. Many investigators (Mohamed 1991, Awaad and Moustafa 1996, Mohamed *et al*., 2003, El_Adly and Eissa 2010, Samia *et al*., 2012, El Adly *et al.* 2013 and El-Hoseiny 2013) evaluated some strains via two tests, the first test is called preliminary strain test (Trial A), and the second test is the advanced trail is called (Trial B) in the next season. It should be noted that the Trial B is carried out at several locations to study the interaction of these genotypes under different environments.

The present investigation was carried out to evaluate Thirty-eight lines of fifteen crosses in Trial A and eighteen lines descending from thirteen crosses in Trial B at different locations, in order to select the best lines for developing new cotton varieties of high lint yield and desirable fiber characters.

Materials and Methods:

Breeding section, the Cotton Research Institute carried out tow field experiments in the season of 2014. Trial A and the advanced Trial B. Trial A consisted of forty genotypes, thirty-eight lines descending from fifteen crosses and two check varieties Giza 80 and Giza 90, Table (1). It was planted at Seds Experimental Station, Agricultural Research Center, Beni-Sweef governorate, Egypt. While trial B was planted at five locations in Middle and Upper Egypt i.e. Seds, El-Fayoum, El-Menia, Assuit and Sohag. Each trial consists of eighteen lines descending from thirteen crosses and two check varieties Giza 80 and Giza 90, Table (2).

Experimental design in Trial A, and Trial B, was randomized complete block design with six replications, each plot consisted of five rows .The row was four meters long, 60 cm apart, and 20 cm between hills. Each hill was thinned to two plants per hill. The middle three rows of each plot were harvested to determine the following traits.

1. Seed cotton yield (SCY Ken/fed): estimated as average weights of seed cotton yield Ken/fed. Metric Ken = 157.5 Kg.
2. Lint cotton yield (LY Ken/fed): measured as average weight of lint yield in Ken/fed. Metric Ken = 50 Kg.
3. Boll weight (BW): as the weight of 50 bolls picked at randomly

from the first and the fifth rows of each plot.

4. Lint percentage (%): calculated from the formula:-

Lint percentage = (Weight of lint cotton yield in sample / Weight of seed cotton yield) x 100

5. Fiber fineness and maturity (Mic): measured by Micronaire apparatus in Micronaire units.
6. Fiber strength (Stel): expressed as millitex (10^{-8} /Tex).
7. Fiber length (F.L): upper half mean in mm. measured by high volume instrument (H.V.I).
8. Yarn strength (Y.St): is the product of "Lea strength x Yarn Count" (60s carded and 3.6 twist multiplier) measured by the Good Band Tester.

Table (1): Origin and pedigree of the studied cotton genotype (Trial A)

No.	Lines	Parent	Origin
1	$H_5$126/2013	H_4 68/2012	G.91 x Karshnesky
2	H_5 128/2013	"	" "
3	H_5 129/2013	H_4 72/2012	[(G.90 x Aust)x{G.83 x (G.75 x 5844)} x G.80]
4	H_5 131/2013	H_4 75/2012	" " " " " "
5	H_5 136/2013	H_4 82/2012	" " " " " "
6	H_5 144/2013	H_4 86/2012	(G.91 x G.90)x Karshnesky
7	H_5 145/2013	"	" " " " " "
8	H_5 146/2013	"	" " " " " "
9	H_5 149/2013	H_4 89/2012	" " " " " "
10	H_5 150/2013	H_4 127/2012	" " " " " "
11	H_6 157/2013	$H_5$118/2012	(G.91 x G.90)x[(G83XG80) x Dendara]
12	H_6 159/2013	"	" " " " " "
13	H_6 160/2013	"	" " " " " "
14	H_6 172/2013	H_5 130/2012	[(G83XG80) x Dandara]x (G.90 x Aust.)
15	H_6 181/2013	$H_5$138/2012	[(G.83 x G.80) x G.89]x(G.83x Aust.)
16	H_6 182/2013	H_5 140/2012	" " " " " "
17	H_6 187/2013	H_5 148/2012	(G.91 x G.90) x G.80
18	H_6 190/2013	"	" " " " " "
19	H_6 191/2013	"	" " " " " "
20	H_6 193/2013	H_5 150/2012	" " " " " "
21	H_6 194/2013	H_5 151/2012	" " " " " "
22	H_6 196/2013	"	" " " " " "
23	H_6 197/2013	H_5 152/2012	" " " " " "
24	$H_7$211/2013	H_6 174/2012	[G.83 Radiator x Aust.) x G.91
25	H_7 214/2013	H_6 181/2012	" " "
26	H_7 216/2013	H_4 86/2012	" " "
27	H_7 221/2013	H_6 205/2012	[G.83 Radiator x Karshnesky)x [(G.83xG.80) x G.89]
28	H_8 233/2013	H_7 216/2012	[(G.83xG.80) x G.75]x Karshnesky
29	H_8 248/2013	H_7 235/2012	[(G.83xG.80) x G.89]x(G.83 x Deltbain 703)
30	H_8 249/2013	"	" " " " " "
31	H_9 256/2013	H_8 240/2012	[(G.83xG.80) x G.89]xAust.
32	H_9 258/2013	"	" " "
33	H_9 259/2013	"	" " "
34	H9 261/2013	"	" " "
35	H9 269/2013	H8 247/2012	G.90 x CB58
36	H_9 270/2013	"	" "
37	Breeder 4		[{G.83 x (G.75 x 5844)} x G.80]
38	Breeder 4		G.90 x Aust
39	Giza 90		G. 83 x Dandera
40	Giza 80		G. 66 x G.73

Table (2): Origin and pedigree of the studied cotton genotype (Trial B)

No.	Lines	Parent	Origin
1	$H_5$118/2013	H_4 66/2011	[{(G.83XG.80) x Dendara}x(G91xG90)]
2	H_5 130/2013	H_4 76/2011	[{(G83XG80) x Dendara}x(G90 x Aust)]
3	H_5 138/2013	H_4 86/2011	[{(G.83XG.80) x G.89}x(G.83 x Aust)]
4	H_5 140/2013	" "	" " " " " "
5	H_5 148/2013	H_4 90/2011	G.80 x (G.91 x G.90)
6	H_5 150/2013	H_4 92/2011	" " "
7	H_5 151/2013	H_4 93/2011	" " "
8	H_5 152/2013	H_4 93/2011	" " "
9	H_6 174/2013	H_5 118/2011	[G.83 Radiator x Aust.) x G.91
10	H_6 181/2013	H_5 127/2011	" " "
11	H_6 186/2013	H_5 129/2011	(G.80x Aust.) x G.83
12	H_6 205/2013	H_5 150/2011	[(G.83 Radiator x Karshnesky) x{(G.83xG.80)x G.89}]
13	H_7 216/2013	H_6 176/2011	[{(G.83xG.80) x G.75} Karshnesky
14	H_7 235/2013	H_6 198/2011	[{(G.83 x G.80) x G.89}x (G.83 x Deltbain 703)
15	H_7 240/2013	H_6 215/2011	[{(G.83 x G.80) x G.89} x Aust.]
16	H_8 247/2013	H_7 222/2011	G.90 x CB58
17	Breeder 4		[{G.83 x (G.75 x 5844)} x G.80]
18	Breeder 4		G.90 x Aust
19	Giza 90		G. 83 x Dandera
20	Giza 80		G. 66 x G.73

All fiber properties were tested in the Laboratory of the Cotton Technology Research Division, Cotton Research Institute, Agricultural Research Center, Giza.

The analysis of variance was calculated according to Sendecor (1965).

Table (3): Form of the analysis of variance and expectations of mean squares for a single environment

S.O.V.	d.f	M.S	E.M.S
Replications	r-1		
Genotypes	g-1	M_2	$\sigma^2e + r\sigma^2g$
Error	(r-1) (g-1)	M_1	σ^2e

Where:

R, g, M_1, M_2, σ^2e, σ^2g : number of replications, number of genotypes, error mean squares, genotypes mean squares, error variance and genotypic variance, respectively.

Table (4): Combined analysis of variances and expectations of mean squares for all genotypes over environments

S.O.V.	d.f	M.S	E.M.S
Environments(E)	L-1		
Replications/ L	L (r-1)		
Genotypes	g-1	M_3	$\sigma^2e + r\sigma^2g\,L + rL\sigma^2g$
Genotypes x E	(g-1) (L -1)	M_2	$\sigma^2e + r\,\sigma^2g\,L$
Error	L (g-1) (r-1)	M_1	σ^2e

Where:

E, r and g : environments, replications and genotypes, respectively.

M_1, M_2 and M_3: are errors, genotypes by environments interactions and genotypic variances, respectively.

Heritability estimated, in broad sense (h^2_{bs} %) was calculated by using the formula:-

h^2_{bs} % = ($б^2g$ / ($б^2ge$ + $б^2e$)) x 100

Where: $б^2g$: genotypes variance component.

$б^2ge$: variance component due to genotypes x environment.

$б^2e$: error variance component.

The phenotypic and genotypic coefficients of variation were estimated using the formula developed by Burton (1952).

a) - The phenotypic coefficient of variability (p.c.v) = (σp / x) x 100

b) - The genotypic coefficient of variability (g.c.v) = (σg / x) x 100

Results and Discussion:

The present investigation included of 38 genotypes descending from 15 crosses in Trial A, and 18 genotypes descending from 13 crosses in Trial B. The check varieties were Giza 80 and Giza 90 as control through Trial A and Trial B. Differences between the tested genotypes were detected for yield, yield components and fiber properties compared with the check varieties Giza 80 and Giza 90.

The preliminary strain test (Trial A):-

The analysis of variance indicated significant differences among genotype, suggesting that detailed comparisons could be pursued as reported by El-Adly and Eissa (2010), El-Adly *et al.* (2013).

A. Yield and yield components

A.1. Seed cotton yield

Mean seed cotton yield ranged from 5.96 for line No.1 to 9.44 for strain No. 32 with an average of 7.83 ken/fed (Table 5). Table (5) shows that all genotypes except No. 1 and No. 5 were exceeded the check variety Giza 90 in seed cotton yield. The increase ranged from 0.8 to 3.25 Ken/fed. On the other hand Giza 80 had the lowest seed cotton yield compare with all strains in Trial A. The estimates were significant for 28 genotypes belonging 13 crosses which No. 3, 4, 6, 7, 9, 11, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 35, 37 and No.38 from Giza 80. The highest yield was achieved by the line No. 32, which exceeded the control variety Giza 80 by 3.25 Ken/fed. While, 19 strains which No. 4, 7, 11, 13, 17, 18, 19, 20, 21, 22, 23, 24, 27, 29, 32, 33, 35, 37 and No. 38 were significantly outyielded the chick variety Giza 90. Heritability value was (59.03), which indicated low environmental effect on this character. Ismail *et al.,* (1989) found that high heritability value of 0.76 for seed cotton yield. The genetic coefficient of variation was moderate for seed cotton yield (9.66%) these results are agreement with El-Adly *et al.* (2013).

Table (5): Mean performance for yield and its component and fiber properties of genotypes in Trial A in Seds.

NO.	Lines	Parent	Origin	YIELD (C/F)		Arr-Ange	L %	BW	color	Mic	UHM	strength	Maturity
				SCY	LY								
1	$H_5$126/2013	H_4 68/2012	G.91 x Karshnesky	5.96	7.47	**39**	39.8	168	11.7	4.1	28.2	1910	0.89
2	H_5 128/2013	"	" "	6.69	8.51	**35**	40.4	154	11.1	3.8	30.2	2195	0.88
3	H_5 129/2013	H_4 72/2012	[(G.90 x Aust)x{G.83 x (G.75 x 5844)} x G.80]	7.41	9.63	**28**	41.3	166	11.5	4.5	30.1	1940	0.94
4	H_5 131/2013	H_4 75/2012	" " " " " "	8.88	11.16	**9**	39.9	166	11.9	4.0	32.2	2135	0.89
5	H_5 136/2013	H_4 82/2012	" " " " " "	6.15	8.05	**37**	41.6	156	10.4	4.3	29.9	1950	0.91
6	H_5 144/2013	H_4 86/2012	(G.91 x G.90)x Karshnesky	7.37	8.70	**34**	37.5	151	9.5	4.0	28.6	1885	0.88
7	H_5 145/2013	"	" " " " " "	8.33	9.89	**23**	37.7	156	9.3	3.8	31.9	2140	0.89
8	H_5 146/2013	"	" " " " " "	6.99	8.26	**36**	37.5	163	9.3	3.6	31.9	2190	0.88
9	H_5 149/2013	H_4 89/2012	" " " " " "	7.38	9.50	**29**	40.9	159	12.8	4.4	31.3	2175	0.93
10	H_5 150/2013	H_4 127/2012	" " " " " "	6.85	8.74	**32**	40.5	153	12.6	4.2	27.2	1775	0.87
11	H_6 157/2013	$H_5$118/2012	(G.91 x G.90)x[(G83XG80) x Dendara]	9.37	11.56	**4**	39.2	159	12.5	4.0	32.5	2195	0.90
12	H_6 159/2013	"	" " " " " "	7.54	9.89	**22**	41.7	164	12.4	4.3	29.7	2115	0.92
13	H_6 160/2013	"	" " " " " "	8.20	11.18	**8**	43.3	164	11.9	3.9	31.0	2105	0.89
14	H_6 172/2013	H_5 130/2012	[(G83XG80) x Dandara]x (G.90 x Aust.)	7.30	9.24	**30**	40.2	157	12.3	4.2	28.3	2015	0.91
15	H_6 181/2013	$H_5$138/2012	[(G.83 x G.80) x G.89]x(G.83x Aust.)	6.89	8.74	**33**	40.3	159	12.0	4.2	27.6	1985	0.93
16	H_6 182/2013	H_5 140/2012	" " " " " "	7.91	10.22	**20**	41.0	164	11.2	3.9	29.3	2005	0.89
17	H_6 187/2013	H_5 148/2012	(G.91 x G.90) x G.80	7.98	10.85	**11**	43.2	153	11.3	3.9	31.7	2140	0.89
18	H_6 190/2013	"	" " " " " "	8.46	10.44	**17**	39.2	159	11.4	4.2	31.7	2235	0.93
19	H_6 191/2013	"	" " " " " "	8.70	11.29	**7**	41.2	156	11.4	4.2	29.6	2255	0.92
20	H_6 193/2013	H_5 150/2012	" " " " " "	8.30	11.02	**10**	42.1	158	11.8	4.1	30.1	2160	0.90
21	H_6 194/2013	H_5 151/2012	" " " " " "	8.72	11.49	**5**	41.8	165	11.9	4.2	30.0	2250	0.92
22	H_6 196/2013	"	" " " " " "	8.64	10.73	**13**	39.4	164	11.4	4.1	27.9	2025	0.92
23	H_6 197/2013	H_5 152/2012	" " " " " "	8.15	10.42	**18**	40.6	154	11.4	4.2	27.9	2015	0.91

Assiut J. Agric. Sci., (46) No. (4) 2015 (25-37) *ISSN: 1110-0486*
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Con. Table (5)

NO.	Lines	Parent	Origin	YIELD (C/F)		Arr-Ange	L %	BW	Color	Mic	UHM	Strength	Maturity
				SCY	LY								
24	**$H_7$211/2013**	**H_6 174/2012**	[G.83 Radiator x Aust.) x G.91	8.04	10.23	**19**	40.4	156	11.3	4.2	31.5	1970	0.90
25	**H_7 214/2013**	**H_6 181/2012**	" " "	7.61	9.72	**25**	40.7	160	11.1	4.2	28.6	1695	0.90
26	**H_7 216/2013**	**H_4 86/2012**	" " "	7.63	9.83	**24**	40.9	157	10.4	4.1	26.5	1805	0.87
27	**H_7 221/2013**	**H_6 205/2012**	[G.83 Radiator x Karshnesky)x [(G.83xG.80) x G.89]	8.05	10.57	**14**	41.7	167	10.8	4.0	31.3	2290	0.90
28	**H_8 233/2013**	**H_7 216/2012**	[(G.83xG.80) x G.75]x Karshnesky	7.36	9.73	**26**	41.9	169	10.9	3.9	31.2	2230	0.89
29	**H_8 248/2013**	**H_7 235/2012**	[(G.83xG.80) x G.89]x(G.83 x Deltbain 703)	8.19	10.46	**15**	40.6	155	11.4	3.8	29.8	1965	0.88
30	**H_8 249/2013**	"	" " " " " "	7.86	10.07	**21**	40.7	170	11.4	3.8	30.2	2115	0.89
31	**H_9 256/2013**	**H_8 240/2012**	[(G.83xG.80) x G.89]xAust.	6.67	12.40	**3**	40.7	154	11.3	4.0	31.0	2250	0.90
32	**H_9 258/2013**	"	" " "	9.44	12.89	**1**	43.3	164	12.5	4.4	30.8	1935	0.92
33	**H_9 259/2013**	"	" " "	9.59	12.82	**2**	42.4	169	11.9	4.5	31.5	2145	0.94
34	**H_9 261/2013**	"	" " "	7.27	9.69	**27**	42.3	171	11.1	4.3	32.6	2190	0.92
35	**H_9 269/2013**	**H_8 247/2012**	G.90 x CB58	8.68	10.75	**12**	39.3	160	11.9	4.5	28.8	1995	0.92
36	**H_9 270/2013**	"	" "	7.04	8.82	**31**	39.8	154	12.0	4.2	29.5	2240	0.92
37	**Breeder 4**		[{G.83 x (G.75 x 5844)} x G.80]	8.22	10.46	**16**	40.4	161	12.3	4.2	32.0	2210	0.92
38	**Breeder 4**		G.90 x Aust	8.72	11.30	**6**	41.2	157	11.0	4.3	27.8	1840	0.88
39	**Giza 90**		G. 83 x Dandera	6.19	7.74	**38**	39.7	151	11.3	3.9	31.0	1885	0.88
40	**Giza 80**		G. 66 x G.73	5.60	7.22	**40**	40.9	155	11.8	4.0	31.7	2290	0.91
mean				**7.83**	**10.04**		**40.7**	**160**	**11.4**	**4.1**	**30.1**	**2065**	**0.90**
H2 bs %				**59.03**	**64.75**			**80**					
PCV%				**12.58**	**13.58**			**3.54**					
GCV%				**9.66**	**10.93**			**3.16**					
L.S.D. 5%				**1.75**	**2.25**			**6.98**					
L.S.D. 1%				**2.30**	**2.95**			**9.18**					

A.2. Lint yield

With respect for lint yield, Table (5) showed that means of the lint yield of the strains ranged from 7.22 to 12.89 with an average 10.04 Ken/fed. The results indicated that all of genotypes except No. 1 were exceeded the check variety Giza 90 in lint cotton yield. The increase ranged from 0.31 to 5.15 Ken/fed. The estimates were significant for 21 genotypes belonging 11 crosses. The highest yield was achieved by the line No.32, which exceeded the control variety Giza 90 by 5.15 Ken/fed. The commercial variety Giza 80 was lower in lint cotton yield compared with other genotypes. Heritability value of (64.75%), was calculated for lint cotton yield indicating high genetic variability of this trait. Similar finding were recorded by Abou-Zahra *et al.*, (1989) and El-Adly *et al.* (2013). The genetic coefficient of variation was moderate for lint yield (10.93%) these results are agreement with El-Adly *et al.* (2013).

A.3. Lint percentage (L %).

Mean lint percentage ranged from 37.5% for lines No. 6 and No.8 to 43.3% for line No. 32 with an average 40.7% (Table 5). The results indicated that 31 lines which No. 1, 2, 3, 4, 5, 9, 10, 12, 13, 14, 15, 16, 17, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37 and No. 38 were exceeded the check variety Giza 90 in lint percentage.

A.4. Boll weight.

Looking for boll weight (BW), Table (5) showed that some sort of genetic differences between all studied genotypes, which ranged from 151 to 171 gm for 50 bolls with an average 160 gm. 31 strains from 38 lines which No. 1, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 37 and No.38 were surpassed the best check variety Giza 80 in boll weight. Only 15 lines which No. 1, 3, 4, 8, 12, 13, 16, 21, 22, 27, 28, 30, 32, 33 and No. 34 belonging to ten crosses showed that significant values for boll weight from the better variety Giza 80. The heritability value was (80%) indicating that this trait was slightly affected by the environmental condition. The present results somewhat varied with the finding of Sallam *et al.*, (1987) who reported the low heritability estimates were obtained for boll weight, and agreement with El-Adly *et al.* (2013) who found that high heritability estimates in broad sense for all yield traits in Trial A. The genetic coefficient of variation was low for boll weight (3.16%) these results are agreement with El-Adly *et al.* (2013).

B. Fiber properties:

All the genotypes of all crosses could be considered in long staple category, Table (5). The ranges of these traits were from 27.2 to 32.6 mm for upper half mean (UHM), from 3.6 – 4.5 for micronaire reading and values of yarn strength ranged from 1695 to 2290. All genotypes were of white color.

The advanced strain test (Trial B):

Trial B is the advanced line test for the promising genotypes that were selected from Trial A. Trial B was carried out at five locations in Middle and Upper Egypt in order to evaluate the genotypes stabilities in different locations. Table (6) presenting means of combined data across five locations indicated that the lines differed significantly. Mean squares of the interaction between (G) and environments (E) were significant. Abdel-Rahman *et al*., (1994), Bader *et al*., (1999) and Aziza (2012) studied some Egyptian cotton genotypes and four commercial varieties at three locations and found high significant (G x E) interactions for yield and its components.

Seed cotton yield:

Mean seed cotton yield ranged from 8.61 for genotypes No. 13 to 11.33 for genotypes No. 8 with an average of 9.64 Ken/Fed. Table (6) showed that 18 out of genotypes included in Trial B surpassed the check variety Giza 80 in seed cotton yield. These genotypes No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and No. 18, the same genotypes significantly exceeded the check variety Giza 80. And showed that 17 out of genotypes included in Trial B surpassed the check variety Giza 90 in seed cotton yield. These genotypes No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17 and No. 18, Nine of them that No. 1, 5, 6, 7, 8, 9, 14, 15 and No. 17 significantly surpassed the check variety Giza 90 in seed cotton yield.

Heritability value for seed cotton yield was (85.81%) which indicating that environment had considerable effect on these character.

The genetic coefficient of variability (GCV%) is important in plant breeding because it helps in the assessment of the range of genetic variability in traits, this parameter helps in comparing variance of various traits. The GCV% value which record for seed cotton yield was 30.08 %.

Lint cotton yield (L.C.Y.):

Mean lint cotton yield ranged from 10.82 for genotypes No. 13 to 14.34 for genotypes No. 8 with an average of 12.14 Ken/Fed. Table (6) showed that 18 out of genotypes included in Trial B surpassed the check varieties Giza 80 and Giza 90 in seed cotton yield, these genotypes No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and No. 18, these genotypes significantly exceeded the check variety Giza 80. But 14 out of them genotypes significantly surpassed the check variety Giza 90 in lint cotton yield, these genotypes No. 1, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17 and No. 18.

Heritability values estimates from combined data for this trait was (88.10%) indicating that the environmental conditions low affected on this trait. Moreover, the genotype x environment interaction for lint cotton yield was highly significant. The same results were obtained by Abdel-Rahman *et al*., (1994) and Samia (2012). The GCV% value which record for lint cotton yield was 33.17 %.

Table (6): Mean performance for yield and its components and fiber properties of genotypes in Trial B at five locations.

NO	Lines	Parent	Origin	YIELD (C/F)		Arr-Ange	L%	BW	color	Mic	LUR%	UHM	strength	Maturity
				SCY	LY									
1	$H_5$118/2012	H_4 66/2011	[{(G.83XG.80) x Dendara}x(G91xG90)]	9.82	12.44	**8**	40.6	148	11.3	4.0	82.3	30.3	2145	0.92
2	H_5 130/2012	H_4 76/2011	[{(G83XG80) x Dendara}x(G90 x Aust)]	9.46	11.70	**15**	39.5	143	11.3	4.0	82.4	30.1	2140	0.90
3	H_5 138/2012	H_4 86/2011	[{(G.83XG.80) x G.89}x(G.83 x Aust)]	9.00	11.43	**17**	40.9	145	12.0	4.1	82.2	30.9	2125	0.93
4	H_5 140/2012	" "	" " " " " "	9.33	11.88	**14**	41.0	143	12.3	4.4	83.4	31.0	2045	0.93
5	H_5 148/2012	H_4 90/2011	G.80 x (G.91 x G.90)	9.95	12.57	**7**	40.5	151	11.6	4.4	82.6	30.0	2105	0.92
6	**H_5 150/2012**	**H_4 92/2011**	" " "	10.43	13.27	**4**	40.9	149	12.4	4.3	82.6	30.1	2080	0.91
7	H_5 151/2012	H_4 93/2011	" " "	10.83	13.79	**2**	40.5	151	11.6	4.3	83.0	29.9	2135	0.91
8	H_5 152/2012	H_4 93/2011	" " "	11.33	14.34	**1**	40.5	147	12.2	4.2	81.6	29.2	1970	0.91
9	H_6 174/2012	H_5 118/2011	[G.83 Radiator x Aust.) x G.91	10.00	12.42	**9**	39.7	149	11.3	4.3	84.7	31.1	2220	0.92
10	H_6 181/2012	H_5 127/2011	" " "	9.40	12.08	**10**	40.8	148	11.9	4.9	83.8	30.7	2255	0.91
11	H_6 186/2012	H_5 129/2011	(G.80x Aust.) x G.83	9.49	11.89	**13**	40.0	147	10.9	4.0	83.2	31.0	2140	0.92
12	H_6 205/2012	H_5 150/2011	[(G.83 Radiator x Karshnesky) x{(G.83xG.80)x G.89}]	9.15	11.55	**16**	40.0	150	12.0	4.2	83.6	30.0	2160	0.93
13	H_7 216/2012	H_6 176/2011	[{(G.83xG.80) x G.75} Karshnesky	8.61	10.82	**18**	40.5	148	12.4	3.4	83.5	29.8	2110	0.92
14	H_7 235/2012	H_6 198/2011	[{(G.83 x G.80) x G.89}x (G.83 x Deltbain 703)	10.12	12.58	**6**	40.0	152	11.9	4.0	84.6	29.6	2095	0.91
15	H_7 240/2012	H_6 215/2011	[{(G.83 x G.80) x G.89} x Aust.]	10.28	13.30	**3**	41.6	149	11.9	4.4	84.1	30.5	2140	0.93
16	H_8 247/2012	H_7 222/2011	G.90 x CB58	9.53	11.98	**12**	39.7	146	11.7	4.3	83.7	30.2	2060	0.92
17	**Breeder 4**		[{G.83 x (G.75 x 5844)} x G.80]	10.02	12.64	**5**	40.4	147	11.4	4.1	84.2	30.6	2080	0.92
18	**Breeder 4**		G.90 x Aust	9.55	11.99	**11**	40.6	148	11.9	4.2	83.2	30.5	2100	0.93
19	**Giza 90**		G. 83 x Dandera	8.78	10.70	**19**	39.2	146	11.7	4.3	84.5	31.2	2175	0.93
20	**Giza 80**		G. 66 x G.73	7.62	9.35	**20**	39.6	148	11.2	4.2	83.9	31.1	2195	0.91
mean				**9.64**	**12.14**		**40.3**	**148**	**11.7**	**4.3**	**83.4**	**30.4**	**2125**	**0.92**
H2 bs %				**85.81**	**88.10**			**38.03**						
PCV%				**32.48**	**35.33**			**3.59**						
GCV%				**30.08**	**33.17**			**2.21**						
L.S.D. 5%				**0.85**	**1.07**			**5.18**						
L.S.D. 1%				**1.12**	**1.41**			**6.81**						

Lint percentage (L %):

With respect to lint percentage, Table (6) showed that eight lines via No. 1,2 ,3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and No. 18 exceeded the commercial variety Giza 90. The increases were ranged from 0.30 to 2.40 compared with Giza 90.

Boll weight:

Considering boll weight, Table (6) showed some sort of genetic differences between all studied genotypes, which ranged from 143 for genotype No. 4 to 152 for genotype No. 14 with an average of 148 gm/50 bolls. The broad sense heritability estimate of (38.03%) was obtained for this trait indicating that the environmental factor had high effect of boll weight than seed cotton yield and lint cotton yield. Highly significant genotype x locations interaction at different locations was recorded for this trait. The GCV% estimate of 2.21% for this trait.

Fiber properties:

The results in Table (6) indicated that the quality traits of all studied genotypes were desirable. The ranges of upper half mean (UHM) were from 29.2 to 31.1 mm, micronaire reading were from 3.4 – 4.9. Also, showed that ranged from 1970 to 2255 for yarn strength. All genotypes were white color.

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Assiut J. Agric. Sci., (46) No. (4) 2015 (25-37) *ISSN: 1110-0486*
Website: http://www.aun.edu.eg/faculty_agriculture/arabic *E-mail: ajas@aun.edu.eg*

الأداء المحصولي لبعض التراكيب الوراثية للقطن المصرى فى بيئات مختلفه

احمد مصطفى محمد سليمان
معهد بحوث القطن – مركز البحوث الزراعية – الجيزة- مصر

الملخص:

يهدف هذا البحث الى تقييم بعض سلالات القطن المصرى ومقارنتها بالصنفين المنزرعين جيزة ٨٠ و جيزة ٩٠ وذلك للوقوف على الاداء المحصولى لهذه السلالات خلال بيئات متباينه وذلك من النتائج المتحصل عليها من تجربة المحصول الاولية (أ) المنزرعة بسدس والتي تضم ٣٨ سلالة تتبع ١٥ هجين من جنس القطن الباربادنس وذلك في الموسم الزراعي ٢٠١٤. اما بالنسبة لتجربة المحصول المتقدمة (ب) فقد كانت تضم ١٨ سلالة تتبع ١٣ هجين مختلفة تابعة لجنس القطن الباربادنس ايضا والمنزرعة فى خمس مناطق مختلفة من محافظات الصعيد للموسم الزراعى ٢٠١٤م وهي بنى سويف ، الفيوم ، المنيا ، اسيوط و سوهاج.

تشير النتائج المتحصل عليها من التجربة الاولية (أ) الي تفوق معظم السلالات تفوقا معنويا في كل من صفات المحصول ومكوناته مقارنة بالصنف التجاري جيزة ٨٠ وقد كان معدل الزيادة في صفة محصول القطن الزهر يتراوح ما بين٠,٣٦ –٣,٨٤ قنطار/فدان و٠,٢٥- ٥,٦٧ قنطار/فدان لصفة محصول القطن الشعر مقارنة بالصنف التجاري جيزة ٨٠.

بينما أظهرت النتائج المتحصل عليها من تجربة المقارنة المتقدمة (ب) من خلال التحليل الاحصائي التجميعي للخمس مناطق مختلفة ان هناك زيادة معنوية لتسع هجن مقارنة بالصنف التجاري جيزة ٩٠ بالنسبة لصفتى محصول القطن الزهر والشعر بينما تفوق هجين واحد فقط معنويا عن الصنف جيزة ٩٠ فى صفة وزن اللوزة.

اعطت درجة التوريث في المدي الواسع قيم عالية لصفات المحصول ومكوناته فى تجربة المحصول الاولية (أ) و تجربة المقارنة المتقدمة (ب) مما يعني أن هناك كفاءة عالية للانتخاب المظهري. كانت هناك تقديرات عالية لمعامل التباين الوراثى فى صفة محصول القطن الزهر (٩,٦٦ و ٣٠,٠٨ %)، محصول الشعر (١٠,٩٣ و ٣٣,١٧%) وصفة عدد اللوز (٣,١٦ و ٢,٢١%) فى التجربتين أ،ب على التوالى، كما وجد تفاعل معنوى بين السلالات والمناطق مما يستنتج منه أن هذه السلالات تتأثر بالبيئة بشدة مما يجب معه أن يتم تقييم هذه السلالات تحت ظروف المناطق المختلفة لعدد من السنوات قبل الحكم على مدى التحسن فيها.