COMPARATIVE STUDIES OF SOME LONG STAPLE COTTONS AT DIFFERENT LOCATIONS

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Abstract

Comparative studies for thirty eight genotypes descending from twenty one crosses and the two check varieties Giza 90 and Giza 80 were included in Trial A at Seds Agricultural Experimental Station in 2012 season, eighteen genotypes descending from sixteen crosses and the two check varieties Giza 90 and Giza 80 were grown in Trial B at five locations in Middle and Upper Egypt in the same season. The results obtained from Trial A showed that the strains $H^5$118/2011 and $H^5$124/2011 of the cross (G 83 Rad. x Aust.) x G 91, $H^5$128/2011 and $H^5$129/2011 cross [(G 80 x Aust) x G 83], $H^5$150/2011 cross (G 83rad x Kar) x [(G 83 x G 80) x G 89], $H^6$198/2011 cross[[(G 83 x G 80) x G 89] x (G 83 x Delta Pine)]], $H^7$215/2011 cross [(G 83 x G 80) x G 89] x Aust, $H^8$238/2011 cross (Dand. Rad x Karsh), $H^9$244/2011cross [G 90 x Pima S62 (24240)], $H^9$253/2011 cross [G 91 x Pima S62 (24240)], H^{10}268/2011 [G 83 x (G 72 x Dand.) x G 91], H^{11}281/2011[G 83 x (G 72 x Dand.) x G 85] and Breeder1 of the promising cross [G 83 x (G 72 x 5844)] x G 80] recorded significant higher seed cotton yield (SCY) and lint cotton yield (LY) compared with the check varieties Giza 90 and Giza 80. While the crosses [(G 85 x G 83) x G 90], [(G 83 x G 80) x G 89] x Aust, C.B 58 x G 90, $H^8$249/2010 descending from the crosses G 91 x Pima S62 (24202), [G 83 x (G 75 x 5844) x G 91], [(G 83 x G 72) x Dand] x G 85 respectively and breeder2 of the promising cross (Giza90 x Aus) had higher seed and lint cotton yield (SCY and LY) compared with the check varities Giza 90 and Giza 80 in Trial B. The mean squares of the genotypes in Trial A were highly significant for all yield components traits. Combined mean squares results in Trial B of the genotypes (G) were highly significant and significant for all yield traits except for lint index (LI). Environments (E) mean squares were highly significant for all studied yield traits. Genotypes-environments interactions (G x E) mean squares were highly significant for all yield traits except for lint percentage (L%) which showed significant combined mean squares, indicating change in performance of genotypes from one location to another. In other words, the rank of a genotype differed from one location to another. High heritability estimates in broad sense ($h._{b.s}$ %) were computed for all yield traits in Trial A, indicated that the environment had slightly influence on these traits. Broad sense heritability estimates ($h._{b.s}$ %) for yield traits in Trial B were low for seed cotton yield (SCY), lint yield (LY) and boll weight (BW), indicated that the environmental factors had effect on these traits. On the other hand, lint percentage (L %), seed index (SI) and lint index (LI) recorded high heritability estimates in broad sense ($h._{b.s}$ %) (more than 50%), indicating that environment had considerable effect on these traits.. The G.C.V %

values ranged from 2.54% for lint index (LI) to 61.65% for lint yield (LY) in Trial A and ranged from 3.98% for lint percentage (L %) to 50.0% for lint yield (LY) in Trial B. These values indicated variable environmental effects on all studied traits.

INTRODUCTION

The progress of any breeding programme depends on available genetic variation to produce new superior cotton varieties that can replace the existing ones. Introduction of new varieties are the most important objective of the cotton research programme carried out in the Cotton. Research Institute using artificial hybridization between the desired genotypes, followed by the pedigree method of selection.

The promising and desired families in the fifth generation of the different crosses were tested in the preliminary strain test (Trial A), along with the cultivars Giza 90 and Giza 80. The families selected in Trial A were tested through the advanced strain test Trial B beside the cultivated varieties Giza 90 and Giza 80 for comparison at different locations to study their performance under different environments. The superior crosses over cultivated varieties will be grown in another programme for increasing enough seeds to produce the breeder seed.

Several workers studied the performace of cotton genotypes under different environments, i.e El-Faki *et al* (2002), Mohamed *et al*. (2003), Nazmy *et al*. (2005), El-Adly *et al*. (2010) and Samia, E. Ali *et al*. (2012).

The main objective of this investigation was to evaluate the genotypes of 21 crosses in Trial A and 16 crosses in Trial B to recognize the promising cross which surpassed the commercial varieties for some major yield components and fiber quality traits.

MATERIALS AND METHODS

This investigation was conducted during 2012 season through the two experimental designs preliminary yield trait of trial A and the advanced yield trial B. Trial A consisted of 40 genotypes, 38 lines descended from 21 crosses and the two check varieties, Giza 90 and Giza 80. It was grown at Seds Experimental Station, Agricultural Research Center (Table 1). While Trial B was cultivated at five locations represented Middle and Upper Egypt regions i.e Seds, El-Fayoum, El-Menia, Assuit and Sohage. Each Trial consisted of 20 genotypes, 18 lines descending from 16 crosses and the two commercial varieties Giza 90 and Giza 80 (Table2).

Experimental design of Trial A and Trial B in all locations were 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. Standard cultural practices were applied as recommended for growing cotton. The hills were thinned to two plants each. The middle three rows of each plot were hand harvested to determine seed cotton yield (SCY) in Kentar / feddan and lint yield (LY) in Kentar / feddan. A random sample of 50 bolls was harvested to estimate boll weight (BW), lint percentage (L %), seed index (SI) and lint index (LI).

The following traits were investigated:

A. Yield components:

1. Seed cotton yield (SCY.Kan/fed). estimated as weight of seed cotton yield in Kantar / faddan.
2. Lint cotton yield(LY. Can/fad).measured as average weight of lint yield in Kantar / faddan.
3. Boll weight (BW). the average weight estimated from 50 bolls picked at random from the first and fifth row of each plot.
4. Lint percentage (L%). calculated as the relative amount of lint in a seed cotton sample, expressed in percentage.

$$L\,\% = \frac{\text{weight of lint cotton in sample}}{\text{weight of seed cotton}} \text{ x } 100$$

5. Seed index (SI). estimated as average weight of 100 seeds in grams.
6. Lint index (LI). estimated as average weight in grams of lint born by 100.seed.

$$LI = \frac{SI \text{ x } L\%}{(100 - L\%)} = \frac{\text{seed index x lint percentage}}{(100 \text{ - lint percentage})}$$

B- Fiber properties.

Fiber physical properties:

1- Upper half mean length (m.m) UHM and, Fiber uniformity index (UI) were determined using the fibrograph 630 according to (ASTM D: 1447-67).

2- Fiber strength and elongation percentage (Y.St) were determined on the Stelometer Tester according to the standard methods of (ASTM D: 1445-67).

3- Micronaire reading (Mic). was estimated using Micronaire 275 instrument according to [ASTM D: 1448-2006].

All fiber properties were tested in Cotton Technology Research Division labs; Cotton Research Inst. (C.R.I.) under constant conditions of temperature (20± 2°c) and relative humidity (65 ± 5%) according to HVI Instrument.

The analysis of variance was calculated by using the methods mentioned by Sendecor (1965) and Le Clerg *et al*. (1962).

RESULTS AND DISCUSSION

The main objective of this study was to evaluate 38 new strains descended from 21 crosses in Trial A and 18 strains belonging to 16 crosses in Trial B. The check varieties were Giza 90 and Giza 80 as control through Trial A and Trial B. Differences between the tested strains were detected for yield, yield components and fiber properties compared with the check varieties Giza 90 and Giza 80.Table (1) showed that the mean squares of the genotypes in Trial A were highly significant for all yield components traits. These results are in agreement with those obtained by El-Feki *et al*. (2005), Mohamed *et al.* (2005) and El-Adly *et al.* (2006).

The results of the combined analysis of variance for all yield component traits in Trial B are shown in Table (2). Mean squares of the genotypes (G) were highly significant and significant for all yield traits except for lint index (LI), indicated the presence of large variations among these traits. Environments (E) mean squares were highly significant for all studied yield traits. Genotypes-environments interactions (G x E) mean squares were highly significant for all yield traits except for lint percentage (L%) which showed significant combined mean squares, indicating change in performance of genotypes from one location to another. In other words, the rank of a genotype differed from one location to another. These findings agree with those obtained by El-Amen *et al*. (2004) and El-Adly *et al.* (2010).

Table 1 Mean squares of genotypes for yield components under study.

Sources	df	Traits					
		SCY	LY	BW	L%	SI	LI
Rep.	5	2326817.0**	332308.0**	104.71	1.3300	1.0402	0.4179
Genotypes (G)	39	448740.0**	67377.67**	234.78**	2.9043**	2.414**	1.094**
Error	195	229509.9	32865.7	82.29	1.5582	0.4855	0.2931

*,** significant and highly significant at 0.5% and 0.1%levels of probability, respectively.

Table 2. Mean squares of genotypes for yield components traits over locations under study.

Sources	df	Traits					
		SCY	LY	BW	L%	SI	LI
Rep.W.	5	3949655.0**	601256.3**	154.09**	1.4	0.7**	0.4**
Genotypes (G)	19	522907.7**	95140.5**	160.10**	4.9**	1.3*	0.6
Environments (E)	4	1431669.8**	2435723.0**	10488.53**	26.5**	17.9**	5.1**
G x E.	76	312386.8**	53719.18**	150.37**	1.7*	0.7**	0.3**
Error	495	207400.8	35041.0	81.70	1.1	0.2	0.1

*,** significant and highly significant at 0.5% and 0.1%levels of probability, respectively.

The preliminary strain test (trial A).

1- **Seed cotton yield (SCY)**

Table (3) shows that the strains $H^5$118/2011 and $H^5$124/2011cross (G83Rad x Aust.) x G 91, $H^5$129/2011 cross [(G 80 x Aust.) x G 83], $H^5$150/2011 cross (G 83Rad x Kar.) x [(G 83 x G 80) x G 89], $H^6$198/2011 cross[[(G 83 x G 80) x G 89] x (G83 x Delta Pin)]], $H^7$215/2011 cross [(G 83 x G 80) x G89] x Aus, $H^7$227/2011 cross (C.B58 x G 90), $H^8$238/2011 cross (Dand.Rad x Kar), $H^9$244/2011cross [G 90 x Pima S62 (24240)], $H^9$253/2011 cross [G 91 x Pima S62(24240)], H^{10}268/2011 [G 83 x (G 72 x Dand.) x G 91], H^{11}281[G83 x (G 72 x Dand.) x G 83] and Breeder1 of the promising cross [G83 x (G 72 x 5844)] x G 80] recorded significant seed cotton yield (SCY) compared with the check varieties Giza 90 and Giza 80. However, all strains belong to the crosses in Trial A recorded significant seed cotton yield compared with the variety Giza 80 only, except the strains $H^5$103/2011 and H^5 107/2011 cross [(G 83 x Aus) x G 85], $H^5$113/2011 cross [(G 83Rad. x Kar.) x G90] and strain $H^6$183/2011 cross [(G 85 x G 83) x G 91] which showed insignificant seed cotton yield compared with Giza 80.

2- **Lint cotton yield (LY)**

Table (3) revealed that 17 out of 38 genotypes recorded significant values for lint yield (LY), these strains were $H^5$118/2011 and 124/2011cross [(G 83 Rad x Aust.) x G 91], $H^5$128/2011 and $H^5$129/2011 cross [(G 80 x Aust.) x G 83], $H^5$150/2011 cross (G83Rad x Kar.) x [(G 83 x G 80) x G 89], $H^6$198/2011 cross [[(G 83 x G 80) x G 89] x (G83 x Delta pine)]], $H^7$215/2011 cross [[(G83 x G80) x G89] x Aust.]], $H^7$219/2011 and 222/2011 cross (C.B58 x G90), $H^8$238/2011 cross (Dand. Rad. x Kar.), $H^9$244/2011 cross [G90 x Pima S6 (24240)], H^9 253/2011 and 254/2011 cross G91 x Pima S6 (24202), H^{10}268/2011 cross [(G 83 x G 72) x Dand.) x G 91], H^{11}281/2011 [(G 83 x G 72 x Dand) x G 85], Breeder 1 of the promising cross [G 83 x (G 75 x 5844) x G 80] and Breeder 2 of the promising cross (G 90 x Aust.). On the other hand G80 had the lowest lint cotton yield compared with all strains in Trial A.

3- Boll weight (B.W).

Table (3) showed that the strains $H^5$109/2011 and 113/2011cross [(G83Rad. x Kar.) x G90], $H^5$118/2011 and $H^5$122/2011 cross [(G83Rad x Aust) x G91], $H^6$166/2011 cross (G83Rad. x G91) $H^6$189/2011 cross [(G83 x G80)xG75 x G90], $H^6$197/2011and $H^6$198/2011 cross [(G83 x G80) x G89] x (G83 x Delta pine), $H^7$215/2011[(G83 x G80) x G89] x Aust.], $H^7$219/2011 and $H^7$222/2011 cross (C.B58 x G 90), ($H^7$227/2011 and $H^7$228/2011cross [(G 80 x Pima S6) x G 91], $H^8$238/2011 cross (Dand Rad. x Kar.) and Breeder 2 of the promising cross (G90 x Aust.) didn't exceeded the check varieties G90 and G80 for boll weight. On the other hand, all other strains recorded insignificant mean performance in for boll weight compared with the check varieties Giza 90 and Giza 80.

4- Lint percentage (L %).

As shown in Table (3) mean performance for (L %) ranged from 36.7% to 39.2% for the strain $H^7$222/2011 that was descending from the cross (C.B58 x G90) and $H^6$183/2011 derived from the cross [(G 85 x G 83) x G 91], respectively. On the other hand, the strains $H^5$109/2011cross [(G83Rad. x Kar.) x G90], $H^6$160/2011 cross (G 83 Rad x G 91), $H^6$189/2011 cross [(G 83 x G 80) x G 75 x G 90], $H^7$222/2011 cross (C.B58 x G 90) and H^{10}268/2011 cross [(G 83 x G 72) x Dand.) x G 91] showed lint percentage values lowest than the check variety Giza 80 while exceeded slightly Giza 90 variety.

5- Seed index (SI).

It appeared from Table (3) that means of genotypes ranged from 8.5 to 11.4 grams for the strain $H^6$188/2011 cross [((G 83 x G 80) x G75)) x G90] and the strain $H^5$109/2011 descending from the cross [(G83Rad. x Kar.) x G90]. Three strains $H^5$113/2011, $H^5$118/2011, $H^5$122/2011, $H^9$235/2011 and H^{11}281/2011 belonged to the crosses [(G83Rad. x Kar.) x G90], [(G83Rad x Aust.) x G91], [G91 x Pima S6 (24202)] and [(G 83 x G 72) x Dand.) x G 85] gaves the higher seed index compared with the check varieties Giza 90 and Giza 80, respectively. While insignificant only for the strain $H^5$113/2011 of the cross (G 83 Rad. x Kar.) x G 90 which recorded significant and highly significant seed index (SI) compared with Giza 90 and Giza 80.

6- Lint Index (LI).

Table (3) shows mean of lint index (LI) ranged from 5.3 grams for $H^6$109/2011 to 7.7 grams for $H^6$188/2011. Seven strains produced significantly higher lint index than the check variety Giza 90, the strains were $H^5$113/2011 cross (G83Rad. x Kar.) x G 90, $H^5$118/2011 and $H^5$122/2011 cross [(G83Rad. x Aust.) x G 91], $H^5$130/2011 [(G 80 x Aust.) x G 83], $H^6$183/2011 and $H^6$184/2011 [(G 85 x G 83) x G 91] and $H^9$244/2011 cross G 90 x Pima S6 (24240). On the other hand three strains recorded significant higher lint index (LI) than the another check variety Giza80, the strains were $H^5$118/2011, $H^5$130/2011 and $H^6$184/2011 belonged to the crosses [(G 83 Rad. x Aust.) x G 91], [(G 80 x Aust.) x G 83] and [(G 85 x G 83) x G 91], respectively.

Fiber properties.

1- Fiber fineness and maturity (Mic).

Fiber fineness and Maturity (Mic) reading presented in Table (4) showed that the breeder seed of the cross (G 90 x Aust) had 4.8 micronaire reading exceeded all genotypes and check varieties for these trait. Other genotypes in trial A showed micronaire values ranged from 3.7 to 4.4, while check varieties Giza 90 and Giza 80 recorded 4.0 and 4.2 micronaire values, respectively.

2- Length uniformity ratio (LUR).

It's appeared from Table (4) that means of this trait ranged from 82.3% to 88. $H^7$228/2011 that belonged to the cross [(G 80 x Pima S6) x G 91] and the strain $H^5$122/2011 descended from the cross [(G 83 Rad. x Aust.) x G 91], the check varieties Giza 90 and Giza 80 recorded length uniformity ratio (LUR) 84.2% and 85.3%, respectively.

3- Upper half mean length (UHM).

The genotypes of all crosses could be considered in long staple category (30m.m) (4), 10 genotypes revealed fiber length exceeded the check varieties Giza 90, Giza 80 and other genotypes in Trial A. The genotypes were $H^5$103/2011 cross [(G 83 x Aust.) x G85], $H^5$113/2011 cross (G 83 Rad. x Kar.) x G 90, $H^5$150/2011 (G 83 rad x Kar.) x [(G 83 x G 80) x G 89], $H^6$166/2011 cross (G 83 Rad. x G 91), $H^6$189/2011 cross {(G83 x G 80) x G 75] x G 90}, $H^6$198/2011 cross [(G 83 x G 80) x G 89] x (G 83 x Delta pine), $H^7$215/2011[(G 83 x G 80) x G 89] x Aust.], $H^9$235/2011 and H^{10}254/2011 (G 91 x Pima S62 24202) and H^{10}257/2011 [G 83 x (G 75 x 5844) x G 91]. Other genotypes were slightly longer than the check varieties (Table 4).

4- Yarn strength (Y.St).

Most strains were nearly of the same strength or slightly stronger than the check variety Giza 80, while Giza 90 check variety recorded lowest Yarn strength (Y.St) value compared with the genotypes in trial A (Table 4).

The advanced strain test (Trial B).

The advanced strains which selected from Trial A are testing in Trial B, they carried out at five locations in Middle and Upper Egypt i,e. El-Fayoum, Seds, El-Minia, Assuit and Sohaag in order to study the breeding behavior of the genotypes grown under different environments to evaluate the genotype stabilities in different locations.

A- Yield components

1- Seed cotton yield (SCY).

From (Table 5), all genotypes in Trial B exceeded the check variety Giza80 in seed cotton yield. On the other hand seven genotypes out of eighteen genotypes exceeded insignificantly Giza 90 in seed cotton yield (SCY). These genotypes were H^{5}136/2010 descending from the cross [(G 85 x G 83) x G 90], H^{6}177/2010 for the cross [(G 83 x G 80) x G 89] x Aust., H^{6}182/2010 belong to the cross C.B58 x G90, H^{8}249/2010 descending from the cross G91 x Pima S62 (24202), H^{9}262/2011 belong to cross [G 83 x (G 75 x 5844) x G 91], H^{10}274/2011 [(G 83 x G 72) x Dend.] x G85 and breeder2 for the promising cross (G90 x Aust.).

2- Lint yield (LY).

Results in Table (5) revealed that the means of lint yield (LY) values ranged from 9.4 Ken/Fed for the strain H^{6}212/2010 of the cross (G80 x Pima S6) x G91 and H^{7}229/2010 of the cross (Denda Rad. x Kar.) to 11.2 Ken/fed for the strain H^{6}177/2010 of the cross [(G 83 x G 80) x G 89] x Aus. All genotypes showed significant increase for lint yield (LY) compared with the check variety Giza 80. While the strain H^{6}177/2010 of the cross [(G 83 x G 80) x G 89] x Aus revealed significant increases lint yield (LY) compared with Giza 90 variety. On the other hand the strains H^{5}136/2010 descending from the cross [(G 85 x G 83) x G 91], H^{6}182/2010 belong to the cross C.B58 x G90, H^{8}249/2010 descending from the cross G91 x Pima S62 (24202), H^{9}263/2011 belong to cross [G 83 x (G 75 x 5844) x G91], H^{10}274/2010 of the cross [(G 83 x G 72) x Dend.] x G 85 and breeder2 for the promising cross (G 90 x Aust.) showed slightly increase lint yield but insignificant compared with the check variety Giza 90.

3- Boll weight (BW).

The data presented in Table (5) revealed that the two genotypes exceeded insignificant Giza90 and Giza80 in boll weight, H^{9}262/2011 belong to cross [G83 x (G 75 x 5844) x G 91] and H^{10}271/2011of the cross [(G 83 x G 72) x Dend.] x G 85. Other genotypes were less or equal to the check varieties Giza 90 and Giza 80 for boll weight.

3- Lint percentage (L %).

Regarding lint percentage value (Table 5), the means of this trait ranged from 38.6% for the strain H^{8}249/2010 descending from the cross G 91 x Pima S62 (24202) to 39.9% H^{5}136/2010 descending from the cross [(G 85 x G 83) x G 91]. Five genotypes i.e H^{5}136/2010, H^{5}166/2010, H^{6}177/2010, H^{10}274/2010 and breeder2 descending from the crosses [(G 85 x G 83) x G 91]. [(G 83 x G 80) x G 89] x (G 83 x Deltapine), [(G 83 x G 80) x G 89] x Aust, [(G 83 x G 72) x Dend] x G 85 and G 90 x

Aust gave significantly higher lint percentage (L %) than the check varieties Giza 90 and Giza 80, respectively.

5- Seed index (SI).

The results of seed index (SI) in all genotypes under study (Table 5) ranged from 10.0gm to 12.9gm. The highest seed index (12.9gm) was recorded for strain H^{6}212/2010 of the cross (G 80 x Pima S6) x G91 followed by the check variety Giza 90 and H^{10}271/2010 [(G 83 x G 72) x Dend.] x G91. Five genotypes recorded seed index (10.6gm) equal to Giza 80, i.e H^{5}112/2010 and 126/2010 of the cross G83Rad. x G91, H^{8}234/2010 of the cross G 91 x Pima S62 (24240), H^{10}271/2010 [(G 83 x G 72) x Dend.] x G 85, and breeder1 of the promising cross [G 83 x (G 75 x 5844) x G 80], while the other genotypes recorded lowest seed index (SI) than the check varieties Giza 90 and Giza 80.

6- Lint index (LI).

As shown in Table (5) means of lint index ranged from 6.3gm for the strain H^{5}132/2010 of the [(G 83 x G 80) x G 75)) x Kar] to 8.4gm for the strain (G 80 x Pima S6) x G91. Seven strains had significantly higher lint index (LI) than the check variety Giza 90, the strains were H^{5}112/2010 and 126/2010 belonging to the cross G83Rad. x G91, H^{5}136/2010 belong to the cross (G 85 x G 83) x G 91, H^{6}212/2010 descending from the cross (G 80 x Pima S6) x G 91, H^{8}234/2010 of the cross G 90 x Pima S62 (24240), H^{10}274/2010 of the cross [(G 83 x G 72) x Dand.) x G 85] and breeder1 of the promising cross [G 83 x (G 75 x 5844) x G80].

Fiber properties.

1- Fiber fineness and Maturity (Mic).

Fiber fineness and maturity (Mic) reading presented in Table (6) showed that the micrnaire reading (Mic) for all genotypes ranged from 4.0 to 4.3. the genotypes H^{5}136/2010 belong to the cross (G 85 x G 83) x G91 and breeder2 of the promising cross G90 x Aus had higher micrnaire reading (Mic) than the check varieties Giza 90 and Giza 80. On the other hand the remaining genotypes in Trial B recorded higher micrnaire reading (Mic) than the commercial variety Giza 90 except for the strain H^{5}156/2010 belong to the cross [(G 83 x G 80) x G 89] x (G 83 x Delta pine) which had the same micrnaire reading (Mic) as Giza 90.

2- Length uniformity ratio (LUR).

Length uniformity ratio estimates (Table 6) showed nearly the same trend as the check varieties Giza 90 and Giza 80.

3- Upper half mean length (UHM).

All genotypes of all crosses could be considered in long staple category (Table 6). All strains didn't exceed the check variety Giza 80 for Upper half mean length

(UHM) trait, while it were higher in UHM compared with the check variety Giza 90 except the breeder2 of the promising cross (G 90 x Aust) which had lowest UHM compared with Giza 90 and all strains in Trial B.

4- Yarn strength (Y.St).

Table (6) showed that the genotypes of the crosses G83Rad x G91, [(G 83 x G 80) x Giza 75] x Kar, [(G 83 x G 80) x G 75] x G 90, [(G 83 x G 80) x G 89] x (G 83 x Delta pine), (Dand Red. x Kar), G 90 x Pima S62 (24240), [G 83 x (G 75 x 5844) x G 91]. [G83 x (G 72 x Dand.) x G 91] and [(G 83 x G 72) x Dand.) x G85], have higher fiber yarn strength than the commercial variety Giza 90, on the other hand all crosses in Trial B didn't exceed Giza 90 in Yarn strength (Y.St) trait.

Heritability estimates in broad sense ($h._{b.s}$ %) and Genetic coefficient of variability (G.C.V %).

Table (7) showed heritability estimates in broad sense ($h._{b.s}$ %) and Genetic coefficient of variability (G.C.V) for yield components traits in Trials A and B. High heritability estimates in broad sense ($h._{b.s}$ %) were computed for all yield traits in Trial A, indicated that the environment slightly influence in these traits. Broad sense heritability estimates ($h._{b.s}$ %) for yield traits in Trial B were low for seed cotton yield (SCY), lint yield (LY) and boll weight (BW), indicated that the environmental factors had ore effect on these traits. On the other hand, lint percentage (L %), seed index (SI) and lint index (LI) recorded high heritability estimates in broad sense ($h._{b.s}$ %) (more than 50%), indicating that environment had considerable effect on these traits. The genetic coefficient of variability (G.C.V %) 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 G.C.V % values ranged from 2.54% for lint index (LI) to 61.65% for lint yield (LY) in Trial A and ranged from 3.98% for lint percentage (L %) to 50.0% for lint yield (LY) in Trial B Table 7. These values indicated that the environmental effects on all studied traits were considerable.

Table 3. Means performance of yield components for the strains and cultivated varieties grown in Trial (A) at Seds in 2012 season.

N.O	Strain	Parent	Origin	SCY Can/fed	LCY Can/fed	BW	L%	SI	LI
1	H^5 103/2011	H^4 67/2010	(G83 X Aust.) X G85	5.62	6.66	154	37.6	10.6	6.3
2	$H^5$107/2011	H^4 68/2010	" "	5.43	6.41	154	37.5	10.2	6.1
3	H^5 109/2011	H^4 71/2010	(G83 Rad. X Kar.) X G90	7.07	8.27	143	37.1	9.9	6.2
4	H^5 113/2011	H^4 73/2010	" "	6.49	7.69	149	37.6	11.4	6.8
5	H^5 118/2011	H^4 82/2010	(G83 Rad. X Aust.) X G91	8.19	9.81	144	38.0	11.0	6.9
6	H^5 122/2011	H^4 84/2010	" "	7.18	8.66	148	38.3	10.9	6.8
7	H^5 124/2011	" "	" "	8.43	10.11	158	38.1	9.2	6.3
8	H^5 128/2011	H^4 94/2010	(G80 X Aust.) X G83	7.79	9.28	150	37.8	10.1	6.5
9	H^5 129/2011	" "	" "	7.98	9.45	154	37.6	10.1	6.5
10	H^5 130/2011	H^4 95/2010	" "	7.09	8.56	159	38.3	10.7	7.2
11	H^5 138/2011	H^4 104/2010	(G83 Rad X Kar.) X [(G83XG80) XG89]	7.07	8.62	156	38.7	9.7	6.0
12	H^5 141/2011	" "	" "	6.49	7.79	161	38.1	10.0	6.4
13	H^5 150/2011	$H^4$110/2010	" "	8.02	9.68	158	38.3	9.7	6.0
14	H^5 151/2011	" "	" "	7.54	8.96	155	37.7	10.0	6.4
15	H^6 160/2011	$H^5$122/2010	G83 Rad X G91	7.25	8.50	158	37.2	10.6	6.4
16	$H^6$166/2011	H^5 126/2010	" "	7.19	8.43	152	37.3	10.3	6.4
17	H^6 176/2011	H^5 132/2010	[(G83XG80) XG75] X Kar.	7.03	8.48	158	38.3	9.9	6.1
18	H^6 183/2011	H^5 136/2010	(G85XG83) X G91	5.95	7.36	160	39.2	10.4	6.6
19	H^6 184/2011	" "	" "	6.93	8.27	159	37.9	11.1	7.7
20	H^6 188/2011	$H^5$152/2010	[(G83XG80) XG75] X G90	7.44	8.78	158	37.4	8.5	5.3
21	H^6 189/2011	" "	" "	7.64	8.96	152	37.2	9.5	5.7
22	H^6 197/2011	$H^5$156/2010	[(G83XG80) XG89] X (G83X Deltapin)	7.53	8.98	151	37.9	9.7	6.4
23	H^6 198/2011	" "	" "	8.69	10.37	142	37.9	10.3	6.0
24	H^6 213/2011	$H^5$166/2010	" "	6.69	8.03	162	38.1	9.89	6.4
25	H^7 215/2011	$H^6$177/2010	[(G83XG80) XG89] X Aust.	9.37	11.34	144	38.4	9.9	6.3
26	$H^7$219/2011	$H^6$182/2010	C.B 58 X G90	7.63	9.02	145	37.5	9.6	6.5
27	H^7 222/2011	" "	" "	8.02	9.26	147	36.7	10.6	6.0
28	H^7 227/2011	$H^6$212/2010	(G80 X Pima S6) X G91	7.41	8.73	152	37.4	9.8	6.3
29	H^7 228/2011	" "	" "	7.37	8.72	144	37.6	9.3	5.9
30	H^8 238/2011	$H^7$229/2010	Dand Rad. X KAR.	7.91	9.50	140	38.1	9.5	6.0
31	$H^9$244/2011	$H^8$234/2010	G90 X Pima S62 (24240)	8.14	9.79	155	38.2	10.6	6.0
32	$H^9$253/2011	$H^8$249/2010	G91 X Pima S62 (24202)	8.28	9.94	157	38.1	11.2	6.7
33	$H^9$254/2011	" "	" "	8.14	9.73	158	37.9	10.3	6.1
34	H^{10}257/2011	$H^9$262/2010	[G83X (G75 X 5844)] X G91	7.09	8.57	161	38.3	10.1	6.5
35	H^{10}268/2011	H^9 271/2010	[(G.83 xG.72) X Dand] X G91	8.40	9.86	160	37.3	10.4	6.0
36	H^{11}281/2011	H^{10} 274/2010	[(G.83 xG.72) X Dand] X G85	7.76	9.28	158	38.0	10.8	6.0
37	Breeder1		[G83X (G75 X 5844) X G80]	9.90	11.88	161	38.1	10.2	6.3
38	Breeder2		(G90 X Aust.)	7.73	9.48	143	38.9	9.0	6.0
39	Giza 90		(G.83 X Dand)	5.92	6.82	155	36.6	10.7	6.4
40	GIza 80		(G.66 X G.73)	4.70	5.52	154	37.3	10.5	6.7
	Mean			7.41	8.84	153	38.4	10.2	6.4
	LSD5%			1.94	2.42	8.0	0.527	0.216	0.169
	LSD.1%			N.S	N.S	9.0	0.692	0.284	0.222

Table 4 . Means performance for fiber properties of the strains and cultivated varieties grown in Trial (A) at Seds in 2012 season.

N.O	Strain	Parent	Origin	Mic	LUR	UHM	Y.St
1	H^5 103/2011	H^4 67/2010	(G83 X Aust.) X G85	4	85.9	31.5	2255
2	$H^5$107/2011	H^4 68/2010	" "	4	86.0	30.4	2190
3	H^5 109/2011	H^4 71/2010	(G83 Rad. X Kar.) X G90	3.9	84.5	30	2240
4	H^5 113/2011	H^4 73/2010	" "	3.9	84.0	31.3	2175
5	H^5 118/2011	H^4 82/2010	(G83 Rad. X Aust.) X G91	4.2	83.5	30.8	2110
6	H^5 122/2011	H^4 84/2010	" "	4	88.0	29.5	2150
7	H^5 124/2011	" "	" "	4.1	83.0	29.7	2175
8	H^5 128/2011	H 4 94/2010	(G80 X Aust.) X G83	4	85.7	30.8	2330
9	H^5 129/2011	" "	" "	4.1	80.0	29.6	2000
10	H^5 130/2011	H^4 95/2010	" "	4.2	85.3	30.5	2160
11	H^5 138/2011	H^4 104/2010	(G83 Rad X Kar.) X [(G83XG80)XG89]	4.1	83.0	29.8	2015
12	H^5 141/2011	" "	" "	4.2	84.5	29.3	2130
13	H^5 150/2011	$H^4$110/2010	" "	3.9	85.8	31	2100
14	H^5 151/2011	" "	" "	4	82.7	29.6	2105
15	H^6 160/2011	$H^5$122/2010	G83 Rad X G91	3.8	84.2	31.1	2175
16	$H^6$166/2011	H^5 126/2010	" "	3.9	86.1	30.7	2130
17	H^6 176/2011	H^5 132/2010	[(G83XG80)XG75] X Kar.	4.1	84.6	29.7	2150
18	H^6 183/2011	H^5 136/2010	(G85XG83) X G91	4.1	83.6	30.2	2015
19	H^6 184/2011	" "	" "	4.3	84.2	29.6	2090
20	H^6 188/2011	$H^5$152/2010	[(G83XG80)XG75] X G90	3.8	84.4	30.1	2200
21	H^6 189/2011	" "	" "	3.8	84.1	31.4	2115
22	H^6 197/2011	$H^5$156/2010	[(G83XG80)XG89] X (G83X Deltapin)	3.8	84.4	29.8	2010
23	H^6 198/2011	" "	" "	4	83.3	31.3	2350
24	H^6 213/2011	$H^5$166/2010	" "	4	84.8	29.8	2085
25	H^7 215/2011	$H^6$177/2010	[(G83XG80)XG89] X Aust.	3.8	85.7	31.2	2410
26	$H^7$219/2011	$H^6$182/2010	C.B 58 X G90	3.8	85.8	29.9	2110
27	H^7 222/2011	" "	" "	4	85.3	30.2	2010
28	H^7 227/2011	$H^6$212/2010	(G80 X Pima S6) X G91	3.7	85.4	29.5	2160
29	H^7 228/2011	" "	" "	3.7	82.3	29.6	2105
30	H^8 238/2011	$H^7$229/2010	Dand Rad. X KAR.	4	83.6	30.4	2255
31	$H^9$244/2011	$H^8$234/2010	G90 X Pima S62 (24240)	4	82.5	29.3	2135
32	$H^9$253/2011	$H^8$249/2010	G91 X Pima S62 (24202)	4.1	85.0	32.1	2445
33	$H^9$254/2011	" "	" "	4.3	85.0	31.2	2125
34	H^{10}257/2011	$H^9$262/2010	[G83X (G75 X 5844)] X G91	4.4	85.3	31.5	2375
35	H^{10}268/2011	H^9 271/2010	[(G.83 xG.72) X Dand] X G91	4.3	83.8	29.3	2130
36	H^{11}281/2011	H^{10} 274/2010	[(G.83 xG.72) X Dand] X G85	4.2	83.3	30.4	2070
37	Breeder1		[G83X (G75 X 5844) X G80]	4.4	85.4	29.5	2010
38	Breeder2		(G90 X Aust.)	4.8	84.8	30.3	2100
39	Giza 90		(G.83 x Dand)	4.0	84.2	29.2	1990
40	GIza 80		(G.66 x G.73)	4.2	85.3	30.2	2200
	Mean						

Table 5. Combined analysis for yield component of selected strains and cultivated varieties in Trial B at six different locations in Upper Egypt in 2012 season.

NO	Strain	Parent	Origin	SCY Kan\Fed	LCY Kan\Fed	BW	L%	SI	LI
1	$H^5$112/2010	H^4 52/2009	G83 Rad. X G91	8.1	10.0	146	39.2	10.6	6.9
2	$H^5$126/2010	H^4 56/2009	"" ""	8.4	10.3	147	38.9	10.6	6.9
3	$H^5$132/2010	H^4 68/2009	[(G83XG80)XG75] X Kar.	8.3	10.0	151	38.4	10.2	6.3
4	$H^5$136/2010	H^4 72/2009	(G85XG83)XG91	8.6	10.8	146	39.9	10.4	7.0
5	$H^5$152/2010	H^4 89/2009	[(G83XG80)XG75] X G90	8.1	9.8	146	38.6	10.5	6.7
6	$H^5$156/2010	H^4 93/2009	[(G83XG80)XG89]X(G83X Delta Pine)	8.5	10.6	145	39.2	10.2	6.7
7	$H^5$166/2010	H^4 101/2009	"" ""	7.9	9.8	146	39.3	10.5	6.8
8	$H^6$177/2010	H^5 112/2009	[(G83XG80)XG89] X Aust.	8.6	11.2	144	39.5	10.2	6.7
9	$H^6$182/2010	H^5 118/2009	C.B 58 X G90	8.7	10.6	146	38.6	10.3	6.6
10	$H^6$212/2010	H^5 150/2009	(G80 X Pima S6)X G91	7.6	9.4	147	38.9	12.9	8.4
11	$H^7$229/2010	H^6 186/2009	Dand Radi. X Kar.	7.7	9.4	150	39.2	10.1	6.6
12	$H^8$234/2010	H^7 190/2009	G90 X Pima S62 (24240)	8.1	9.9	148	38.7	10.6	7.1
13	$H^8$249/2010	H^7 216/2009	G91 X Pima S62 (24202)	8.8	10.6	149	38.3	10.3	6.7
14	$H^9$262/2010	H^8 240/2009	[G83X(G75X5844)]X G91	8.8	10.8	152	38.9	10.4	6.8
15	H^{10}271/2010	H^9 255/2009	[(G83xG72)xDand]X G91	8.1	9.8	152	38.2	10.7	6.7
16	H^{10}274/2010	H^9 264/2009	[(G.83 xG.72) x Dand]X G85	8.6	10.7	149	39.3	10.6	6.9
17	Breeder1		[G83X (G75 X 5844) X G80]	8.5	10.4	147	38.8	10.6	6.9
18	Breeder2		(G90 X AUS.)	8.7	10.8	147	39.4	10.0	6.6
19	Giza 90		(G.83 x Dand)	8.5	10.2	149	38.0	10.8	6.7
20	GIza 80		(G.66 x G.73)	6.8	8.3	151	38.8	10.6	70
	Mean								
	LSD 5%			0.85	1.11	4.57	0.527	0.216	0.169
	LSD 1%			1.12	1.45	6.01	0.692	0.284	0.222

Table 6. Combined analysis for yield component of selected strains and cultivated varieties In Trial B at six different locations in Upper Egypt in 2012 season.

NO	Strain	Parent	Origin	Mic	HW	2.5% SL	Y.St
1	$H^5$112/2010	H^4 52/2009	G83 Rad. X G91	4.1	84.6	31.5	2265
2	$H^5$126/2010	H^4 56/2009	"" ""	4.2	84.5	31.2	2275
3	$H^5$132/2010	H^4 68/2009	[(G83XG80)XG75] X Kar.	4.2	85.9	31.3	2205
4	$H^5$136/2010	H^4 72/2009	(G85XG83)XG91	4.3	84.2	29.8	2155
5	$H^5$152/2010	H^4 89/2009	[(G83XG80)XG75] X G90	4.1	85.2	30.6	2220
6	$H^5$156/2010	H^4 93/2009	[(G83XG80)XG89] X (G83X Delta Pine)	4.0	85.1	30.4	2200
7	$H^5$166/2010	H^4 101/2009	"" ""	4.2	85.1	30.4	2260
8	$H^6$177/2010	H^5 112/2009	[(G83XG80)XG89] X Aust.	4.1	85.1	30.1	2155
9	$H^6$182/2010	H^5 118/2009	C.B 58 X G90	4.1	83.9	30.2	2140
10	$H^6$212/2010	H^5 150/2009	(G80 X Pima S6)X G91	4.2	83.0	29.8	2140
11	$H^7$229/2010	H^6 186/2009	Dand Rad. X KAR.	4.2	85.1	30.3	2255
12	$H^8$234/2010	H^7 190/2009	G90 X Pima S62 (24240)	4.2	84.2	30.2	2235
13	$H^8$249/2010	H^7 216/2009	G91 X Pima S62 (24202)	4.2	84.4	30.2	2190
14	$H^9$262/2010	H^8 240/2009	[G83X (G75 X 5844)]X G91	4.2	85.6	30.8	2245
15	H^{10}271/2010	H^9 255/2009	[(G.83 xG.72) x Dand]X G91	4.1	85.9	30.7	2278
16	H^{10}274/2010	H^9 264/2009	[(G.83 xG.72) x Dand]X G85	4.1	85.2	30.0	2255
17	Breeder1		[G83X (G75 X 5844) X G80]	4.1	84.1	30.0	2175
18	Breeder2		(G90 X Aust.)	4.3	85.2	29.5	2125
19	Giza 90		(G.83 x Dand)	4.0	84.8	29.8	2195
20	Giza 80		(G.66 x G.73)	4.2	86.9	31.6	2335
	Total						
	Mean						

Table 7. Heritability Stamatas in broad sense ($h._{b.s\%}$) and genetic coefficient of variability (G.C.V%) for yield traits in Trials A and B.

Traits	Trial A		Trial B	
	$h_{.b.s}$%	G.C.V%	$h._{b.s}$%	G.C.V%
SCY	63.705	15.867	23.33	11.66
LY	64.913	61.646	26.18	50.041
BW	72.626	36.939	14.00	18.072
L%	62.460	4.025	52.006	3.98
SI	82.675	38.053	64.290	21.408
LY	77.930	2.543	62.111	14.433

CONCLUSION

Results in Trials A and B indicated that the genotypes of the cross [(G83xG80) x G89] x Aust. exceeded all genotypes belonging to the different crosses and the check varieties for seed and lint cotton yield and they had a suitable fiber quality for long staple cotton which grown in Upper Egypt. Therefore, it could be considered as a promising material and to be followed in the breeding program.

Genotypes mean squares in Trial A were highly significant for all yield components traits. While in Trial B Combined mean squares results of the genotypes (G) were highly significant and significant for all yield traits except for lint index (LI). Environments (E) mean squares were highly significant for all studied yield traits. Genotypes-environment interaction (G x E) mean squares were highly significant for all yield traits except for lint percentage (L%) which showed significant combined mean squares, indicating change in performance of genotypes from one location to another. In other words, the rank of a genotype differed from one location to another

The G.C.V % values ranged from 2.54% for lint index (LI) to 61.65% for lint yield (LY) in Trial A and ranged from 3.98% for lint percentage (L %) to 50.0% for lint yield (LY) in Trial B. These values indicated that the environmental effects on all studied traits were considerable.

The promising strains that were selected from Trial A will be grown in Trial B in the next season with the check varieties Giza 90 and Giza 80. It should be noted that Trial A represents the descendant from the progenies of strains grown in Trial B in the same season, besides the strains that reached the fifth generation.

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تقييم بعض الأقطان طويلة التيلة

المنزرعة فى بيئات مختلفة

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معهد بحوث القطن – مركز البحوث الزراعية

يهدف هذا البحث الى تقييم بعض سلالات هجن القطن طويل التيلة للوجه القبلى مفارنة بالصنفين التجارين المنزرعين جيزة 90 و جيزة 80 وذلك من خلال تجربة أختبار النسل بتجربة المحصول الاولية (أ) المقامة بمحطة البحوث الزراعية بسدس ونجارب المحصول المتقدمة (ب) المقامة بمحافظات الوجه القبلى: الفيوم – بنى سويف (سدس) – المنيا – أسيوط – سوهاج فى موسم 2012.

ويمكن تلخيص أهم النتائج فيما يلى :

1- سجلت سلالات الهجن [(جـــ83 مشع × أسترالى) × جـــ91] و [(جـــ80 × أسترالى) × جـــ83] و [(جـــ83 مشع × كاراشنكى) × (جــ 80 × جــ80)] و [[(جــ83 × جــ80) × جــ89)] × (جـــ83 × دلتاباين)] و [[(جـــ83 × جـــ80) × جـــ89)] × أسترالى] و (دندرة مشع × كاراشنكى) و (جـــ90 × بيما س 62 (24240)) و (جـــ91 بيما س 62(24202) و [(جـــ83 × (جـــ72 × دندرة)) × جــ 91] و [(جــ 83 × (جــ 72 × دندرة)) × جــ 85] و مربى 2 للهجين [(جــ 83 (جـــ75 × 5844)) × جــ80] فروق معنويه فى محصول القطن الزهر و الشعر مقارنة ب صنفى المقارنة جيزة90 و جيزة80 فى تجربة المحصول الاولية (أ).

٢ -سجلت سلالات الهجن التالية [(جـــ85 × جــ 83) × جــ 90] و [[(جــ 83 × جــ 80) × جـــ89)] × أسترالى] و(C.B58 × جـــ90) و (جــ 91 × بيما س 62(24202) و [(جــ 83 (جـــ75 × 5844)) × جــ 91] و [(جــ 83 × (جــ 72 × دندرة)) × جــ 85] و مربى 2 لهجين المبشر جـــ90 × أسترالى زيادة فى محصول القطن الزهر والشعر مقارنة بصنفى المقارنة جيزة 90 و جيزة80 فى تجربة المحصول (ب) .

٣ -أثبتت نتائج التحليل التجميعى لتجارب (ب) أن هاك تباين معنوى بين جميع التراكيب الوراثية للصفات المحصولية المدروسة عدا صفة معامل الشعر كذلك سجل التفاعل بين البيئة والتراكيب الوراثية تباين عالى المعنوية لكل الصفات المحصولية المدروسة عدا صفة تصافى الحليج حيث كان التفاعل معنوى بين البيئة والتراكيب الوراثية.

٤ -سجلت درجة التوريث فى المعنى الواسع قيم عالية للصفات المحصولية المدروسة فى تجربة (أ). بينما سجلت درجة التوريث فى المعنى الواسع للصفات المحصولية المدروسة فى تجربة (ب) قيم

منخفضة لصفة محصول القطن الزهر والشعر ووزن اللوزة اما صفات تصافى الحليج ومعامل البذرة ومعامل الشعر فقد سجلت درجة توريث عالية فى المعنى الواسع.

٥ يتراوح معامل الاختلاف الوراثى للصفات المحصولية المدروسة فى تجربة (أ) من 2.54% لصفة معامل البذرة الى 61.65% لمحصول القطن الشعر بينما يتراوح من 3.98% الى 50.% لصفتى تصافى الحليج ومحصول القطن الشعر فى تجربة (ب) على التوالى.

التوصيات المستقبلية

أظهرت نتائج تجربة المحصول الاوليه أ وتجارب المحصول المتقدمه ب أن الهجين [(جـــ 83 × جـــ80) × جـــ 89] × أسترالى تفوق على جميع التراكيب الوراثية وعلى الاصناف التجارية المنزرعة فى التجربتين وذلك لصفتى محصول القطن الزهر والشعر بالاضافة الى صفات التيله الملائمه لطبقة الاقطان الطويلة التيله وبالتالى فقد خلصت الى أن الاستمرار فى تربية هذا الهجين يمكن أن يحقق استنباط صنف مستقبلى طويل التيلة وملائم للصناعة المحلية.