Egypt. J. Plant Breed. 29(1): 17-33 (2025)

FOLLOWING THE METHOD OF MAINTENANCE AND PRODUCE OF THE BREEDER'S SEED OF SUPER GIZA 86 EGYPTIAN COTTON CULTIVAR DURING 2021-2024 SEASONS

A.H. Mabrouk and M.W. El-Shazly
Cotton Research Institute, Agricultural Research Center, Giza, Egypt

ABSTRACT

The present study was carried out at El-Gemmeiza Agricultural Research Station, El-Gharbia Governorate, Cotton Research Institute, during 2021-2024 seasons to produce the breeder's seed of Super Giza 86 Egyptian cotton cultivar. The purpose of the present study is to follow the strategy of maintaining cotton varieties and produce breeder's seed that carry the genetic traits of the standard cotton cultivar Super Giza 86. The results revealed that the process of self-pollination with continuous selection, which occurs every season, is considered necessary to maintain genetic purity and eliminate any off-type plants from the cotton cultivar Super Giza 86 breeding population as a result of highly homozygous in minor genes or recombination among themselves. Furthermore, the current method for maintaining the genetic purity of Egyptian cotton varieties, which relies on mixing the offspring of several plants rather than propagating the offspring of a single selected plant, is thought to be more effective in overcoming environmental fluctuations in yield and quality characteristics.

Key words: ***Gossypium barbadense L., Cotton, breeder's seed, Nucleolus, Super Giza 86.***

INTRODUCTION

The Egyptian cotton is regarded as a special long and extra-long staple variety of cotton characterized by exceptional quality, and it has established a global reputation for having the best lint quality among worldwide cottons. Breeding program of cotton aims to produce new cotton varieties with high yielding varieties with early maturing and good fiber quality properties that can meet the needs of local and foreign spinners. Its products are regarded as the best in the world due to its fineness, strength, and excellent fiber properties. This reputation was earned throughout time as a result of the Cotton Varietal Maintenance Department at Cotton Research Institute's to produce breeder's seed of the commercial varieties in addition the further seed production (foundation and approved seeds) that produced with collaboration with Central Administration for Seed Production and Central Administration for Seed Certification. This study aims to maintain the genetic purity and keep the unique standard qualities of Egyptian cotton varieties. Thus, continuity in global markets.

Producing pure seed and cotton cultivars via the pedigree selection method is critical to renewing and maintains the breeder's seed of commercial cotton cultivars; this method relies on massing selfed seeds from homogeneous type families based on their performance in evaluation with the most recent nuclei. Similar results were reported by El-Akkad *et al* (1982), Younis *et al* (1993), Abo-Arab *et al* (1995), Lasheen (1997), El-

Disouqui (2001), Nagib and Hemida (2001), Abd Al-Zaher (2004), Mohamed (2013), Al-Ameer (2014), Abd El-Salam (2015), Al-Hibbiny (2015), El-Dahan (2016), Hamed (2016), Mahrous (2017), Soliman (2018), Badeaa (2019), Mabrouk (2019), Al-Hibbiny (2020) and El-Lawendey and Darwesh (2024).

The purpose of the present study is to follow the strategy of maintaining cotton varieties and produce breeder's seed that carry the genetic characteristics of the standard cotton cultivar Super Giza 86.

MATERIALS AND METHODS

A. Field Experiments

The commercial Egyptian cotton cultivar Super Giza 86 belongs to (*G. barabadense* L.) and classified as a long stable with a stable length of 33.2 - 34.0 mm and represents of high yielding ability and high lint percentage. This variety was developed by the pedigree selection method from the cross between (Giza 75 x Giza 81). It was received by Cotton Varietal Maintenance Department in 1996 season.

The present study was carried out at El-Gemmeiza Experimental Station at El-Gharbia Governorate, Cotton Research Institute, Agricultural Research Center, Egypt, during four seasons from 2021 to 2024. The basic materials for this study were the individual elite plants selected based on field evaluation and laboratory determination from breeding plot of 2020 season.

After 2020 ginning season, fifty-six plants from the standerd cultivar Super Giza 86 were selected from the nursery to form the increase lines A. During 2021 growing season, selfed seeds of the progenies of the 56 selected type plants were grown in number of rows as the amount of seed allowed conveniently named increase "line A". According to the determination values of both agronomic and fiber characteristics on bulked families of increase A, 22 families were selected from (increase A) to form (increase B) in 2022. The 22 selected families as well as the three latest strains of Super Giza 86 cultivar were evaluated for yield, yield components and fiber quality properties. In 2023 season, according to the results of yield trail, the best nine families representing the type of Super Giza 86 cultivar were selected from (increase B) and their selfed seeds were carefully

massed together to form (increase C). It was planted in an area of about 34 feddans. In 2024 season, it was also propagated as new nucleolus (breeder's seed) under the name of season (Super Giza 86 nucleolus/2024).

B. The studied traits

B.1. Yield, yield components traits

- Seed cotton yield (SCY) (k/f). Yield per feddan was calculated from the mean plot size.
- Lint cotton yield (LCY) (k/f)
- Lint percentage (LP%)
- Lint index (g) (LI)
- Boll weight (g) (BW)
- Seed index (g) (SI)

B.2. Fiber quality properties

- 2.5% Span length (mm) (2.5% SL)
- Pressley index (PI)
- Strength g/tex (ST g/tex)
- Micronaire reading (MR)
- Fiber reflection as percentage (Rd %)
- Micronaire reading (MR)
- Uniformity index (UI%)
- Yarn strength (YS)
- Elongation% (E%)
- Yellowness (+b)

All fiber properties were measured in the Cotton Technology Research Division's Laboratories – Cotton Research Institute, Giza.

C. Statistical and genetic procedures

All studied characters in the yield experiment were analyzed for variation and significance was determined using the "F" test. On the other side, Mean, standard error (SE) and coefficient of variability (C.V.%) were calculated for all the studied traits for the selected families and comparison.

RESULTS AND DISCUSSION

Ideal type plants (2021 growing season)

Mean of yield, yield components and fiber quality properties for the 56-selected type plants of the cotton variety Super Giza 86 are presented in Table (1). The results indicated the smallest values of Standard error (SE) for all the studied traits, indicating that means is more accurate reflecting the actual Giza 86 population mean.

Table 1. Means of yield components and fiber quality properties for the 56 selected type plants of cotton variety Super Giza 86 from the nursery in 2021 season to form increases A in 2022 season.

No.	Selected families	BW (g)	LP %	SI (g)	LI (g)	2.5% SL (mm)	MR	PI
1	1/2021-6	3.5	39.7	9.9	6.5	32.9	4.2	10.5
2	2/2021-11	3.6	39.7	10.3	6.8	34.1	4.5	10.1
3	2/2021-19	3.2	39.1	10.9	7.0	32.7	4.5	10.0
4	3/2021-29	3.4	39.8	10.9	7.2	34.4	4.6	10.3
5	5/2021-8	3.6	39.6	10.7	7.0	33.4	4.5	10.1
6	9/2021-17	3.5	39.1	11.1	7.1	33.9	4.6	10.0
7	9/2021-22	3.6	39.2	11.7	7.5	34.1	4.3	10.5
8	9/2021-28	3.3	39.5	11.0	7.2	34.1	4.8	10.1
9	11/2021-19	3.6	39.5	10.1	6.6	34.1	4.3	10.2
10	11/2021-21	3.0	40.6	10.0	6.8	32.7	4.4	10.3
11	13/2021-9	3.8	39.9	10.7	7.1	33.4	4.3	10.3
12	14/2021-18	3.4	41.3	10.9	7.7	32.4	4.6	10.0
13	15/2021-4	3.4	39.1	10.5	6.7	33.0	4.6	10.1
14	15/2021-9	3.8	39.4	10.1	6.6	32.8	4.4	9.9
15	15/2021-15	3.4	41.2	10.8	7.6	34.6	4.6	10.2
16	15/2021-21	3.3	40.5	11.2	7.6	32.9	4.5	10.7
17	18/2021-12	3.2	41.7	9.9	7.1	34.5	4.5	10.1
18	19/2021-11	3.2	39.0	10.3	6.6	32.3	4.6	10.7
19	20/2021-1	3.6	39.6	10.1	6.6	32.1	4.4	10.2
20	20/2021-8	3.4	39.3	10.0	6.5	33.3	4.5	10.2
21	20/2021-14	3.2	39.5	10.1	6.6	34.9	4.4	10.3
22	21/2021-5	3.3	39.7	10.9	7.2	33.0	4.6	10.1
23	21/2021-11	3.0	39.6	10.2	6.7	33.0	4.4	10.7
24	21/2021-13	3.0	39.8	10.1	6.7	33.1	4.5	10.1
25	26/2021-6	3.8	40.7	9.9	6.8	33.0	4.5	10.3
26	26/2021-11	3.6	39.1	10.5	6.7	34.6	4.6	10.0
27	26/2021-22	3.0	39.3	10.2	6.1	33.8	4.2	10.7
28	27/2021-5	3.6	40.0	9.9	6.6	33.1	4.5	9.9
29	27/2021-8	3.0	39.5	10.3	6.7	34.3	4.4	10.0
30	27/2021-11	3.2	39.8	10.4	6.9	31.3	4.5	10.2
31	27/2021-20	3.9	39.6	10.2	6.7	34.1	4.5	11.0

Table 1. Cont.

No.	Selected families	BW (g)	LP %	SI (g)	LI (g)	2.5% SL (mm)	MR	PI
32	27/2021-21	3.2	39.2	10.2	6.6	33.4	4.5	10.1
33	28/2021- 1	3.2	39.1	10.6	6.8	32.6	4.6	10.8
34	28/2021-23	3.0	39.6	10.3	6.8	33.6	4.3	10.6
35	28/2021- 26	3.0	39.1	10.4	6.7	32.5	4.6	10.4
36	29/2021-6	3.4	39.1	10.5	6.7	34.1	4.5	10.1
37	29/2021-13	3.2	41.1	9.9	6.9	33.0	4.5	10.6
38	29/2021-20	3.6	39.8	10.1	6.7	33.7	4.6	11.0
39	31/2021-4	3.2	40.1	10.0	6.7	32.5	4.5	10.9
40	31/2021-20	3.4	41.3	9.9	7.0	34.0	4.4	10.2
41	31/2021-23	3.2	40.7	10.1	6.9	32.6	4.6	9.9
42	37/2021-4	3.0	40.0	10.0	6.7	33.6	4.5	9.9
43	37/2021-10	3.0	39.3	10.5	6.8	34.1	4.3	10.6
44	37/2021-12	3.0	40.1	10.0	6.7	33.8	4.3	10.3
45	37/2021-14	3.1	40.3	10.0	6.8	33.5	4.3	10.1
46	37/2021-26	3.2	39.1	10.6	6.8	34.1	4.2	10.9
47	38/2021-2	3.2	39.4	10.4	6.8	33.2	4.3	10.0
48	38/2021-5	2.8	39.6	10.7	7.0	33.2	4.2	10.5
49	38/2021-22	3.7	40.3	10.1	6.8	34.0	4.3	10.1
50	43/2021-2	3.5	39.9	10.3	6.8	33.0	4.5	10.2
51	44/2021-20	3.4	39.5	10.1	6.6	33.8	4.0	10.1
52	45/2021-17	3.2	40.6	10.7	7.3	32.9	4.6	10.9
53	46/2021-12	3.4	39.3	10.5	6.8	33.6	4.4	10.1
54	47/2021-11	3.4	40.0	10.1	6.7	33.2	4.6	10.8
55	48/2021-24	3.0	41.6	9.9	7.1	32.8	4.2	10.0
56	53/2021-23	3.7	39.2	10.5	6.8	33.7	4.2	9.9
Mean of selected families		3.3	39.8	10.4	6.9	33.4	4.4	10.3
Mean of comparisons (Control)		3.2	39.5	10.1	6.6	33.2	4.5	10.4
Standard error (SE)		0.04	0.09	0.05	0.04	0.10	0.02	0.04
Coefficient of variability (CV%)		7.83	1.75	3.81	4.32	2.17	3.43	3.10

On the other side, lint percent as well as 2.5% span length are the two most important traits that explain the extent of deviation or stability of the cotton varieties generally, therefore as shown in the figures (1 and 2), it was exhibited that the mean increased, the variance decreased, and the skewness changed from negative to positive after selection in 2021 as compared with the selection in 2020 growing season for LP % with the decrease in variance for 2.5% SL, indicating the efficiency of the selection procedure.

Increase A (2022 growing season)

Means of yield, yield components and fiber quality properties for the 56 selected type plants (increase A) with the three latest strains of the cotton variety Super Giza 86 are presented in Table (2). Results noticed that, the means of (increase A) slightly exceeded the means of comparisons for some fiber quality traits. On the other side, coefficient of variability CV % decreased for all the studied traits after selection, except for 2.5 % SL (mm), indicating gene fixation beside improvement. Similar results were obtained by El-Dahan (2016), Hamed (2016), Mahrous (2017), Soliman (2018), Mabrouk (2019), Al-Hibbiny (2020) and El-Lawendey and Darwesh (2024). Twenty-two families were selected according to the cotton variety Super Giza 86 standard characteristics to form increase B families; these families were compared in yield trail in 2023 season.

Increase B (2023 growing season)

Twenty-two selected families (increase B) compared with the three latest strains of Super Giza 86 (controls) are presented in Table (3). The results demonstrated non-significant differences among the families as compared with control for all the studied traits, except for lint percentage (LP %), lint index (LI) , uniformity index (UI) and strength g/tex (ST g/tex). These results are in agreement with those obtained by Abo-Arab *et al* (1995), Lasheen (1997), El-Disouqui (2001), Nagib and Hemida (2001), Abd Al-Zaher (2004) and El-Lawendey and Darwesh (2024). As a result of selection, Figure (3) showed an increase in the mean, and a decrease in variance for LP%.

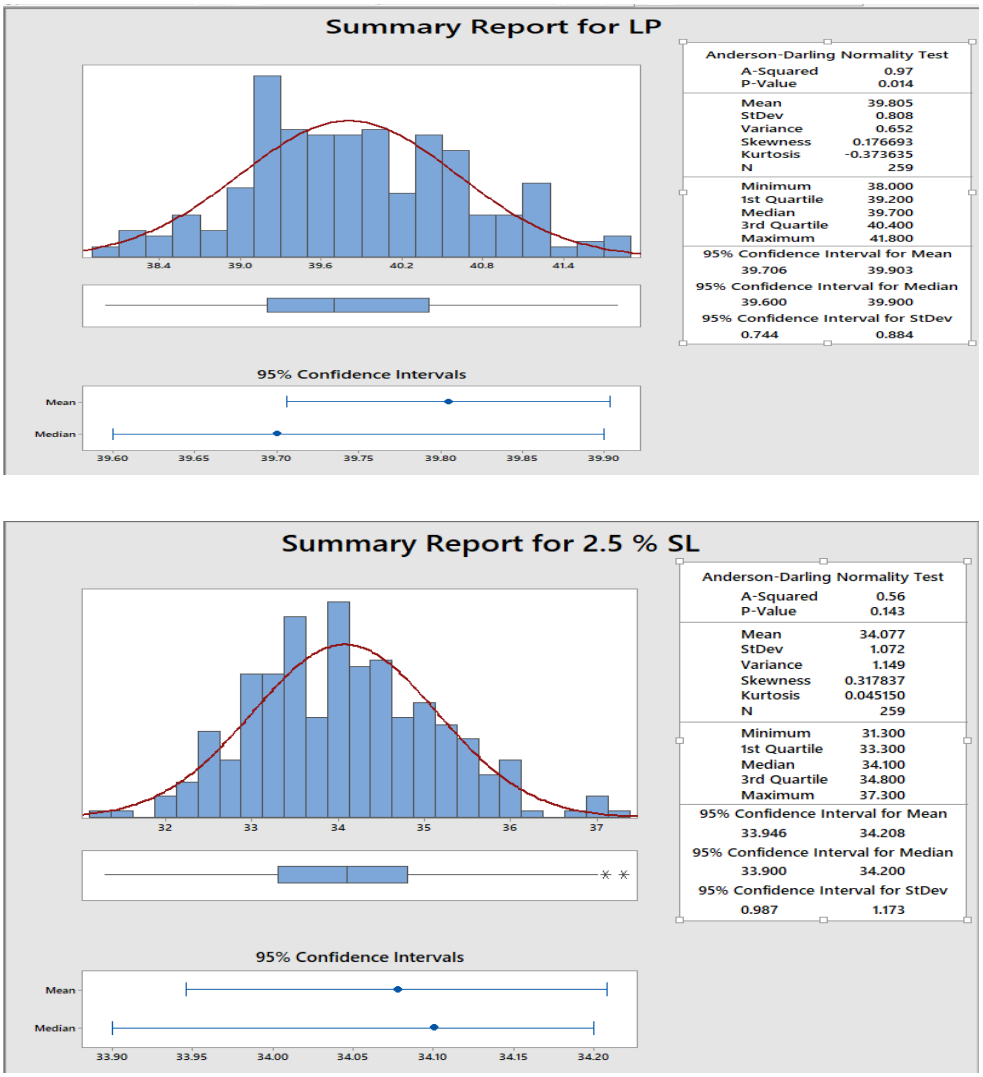

Fig.1. Frequency distribution curves for lint percentage% and 2.5% Span length before selection in 2020 growing season.

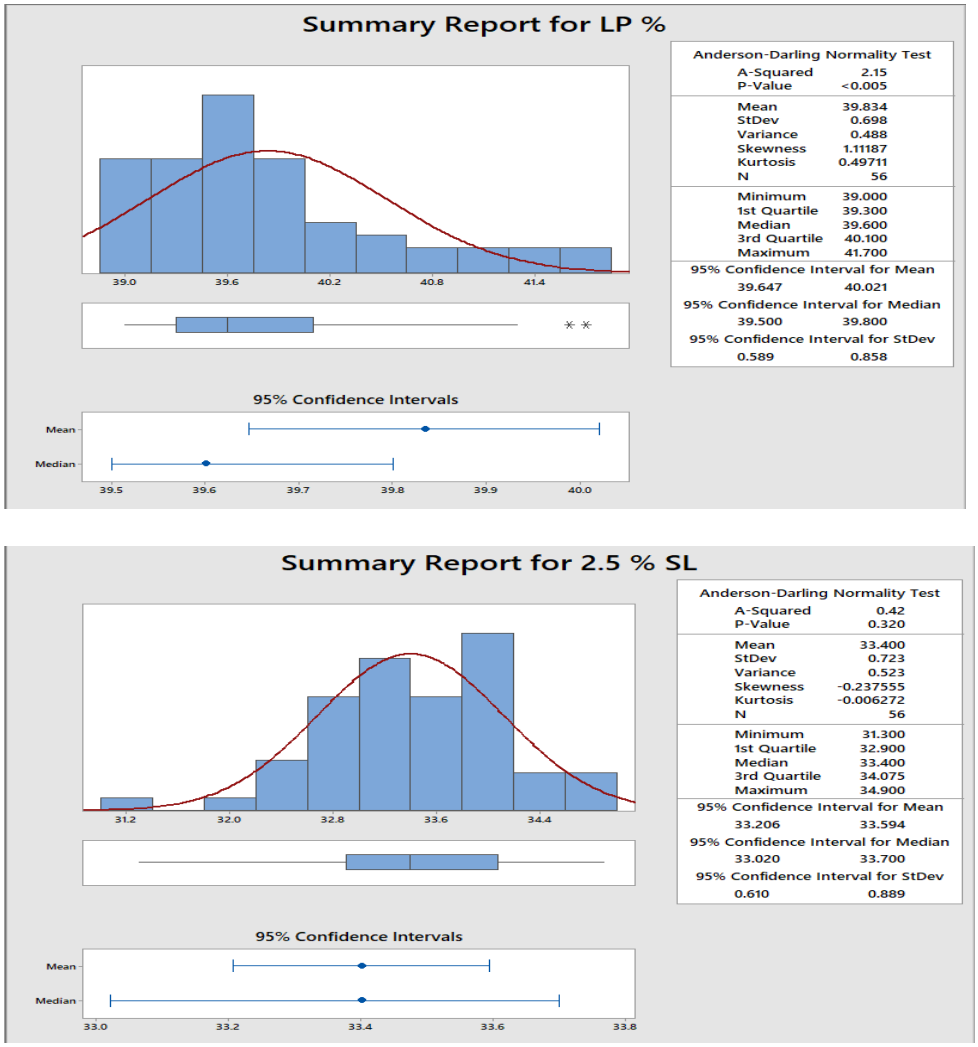

Fig. 2. Frequency distribution curves for lint percentage% and 2.5% Span length after selection in 2021 growing season.

Table 2. Mean of yield components and fiber quality properties for the 56 selected progenies (increases A) in 2022 growing season.

No.	Selected families No.	BW (g)	LP %	SI (g)	LI (g)	2.5% SL (mm)	UI %	ST (g/tex)	YS	MR	Rd %	+ b
1	1/2021-6	3.4	39.7	10.7	7.0	31.3	86.4	42.7	2040	4.6	77.6	8.4
2	2/2021-11	3.5	39.5	10.7	7.0	33.0	88.9	39.6	2040	4.5	79.4	8.0
3	2/2021-19	3.2	39.9	10.1	6.7	32.0	87.0	44.4	2220	4.6	79.3	8.7
4	3/2021-29	3.4	40.5	10.8	7.3	33.0	86.2	44.3	2440	4.5	77.6	8.9
5	5/2021-8	3.8	40.6	11.3	7.7	33.5	88.9	43.5	2340	4.6	78.2	8.9
6	9/2021-17	3.3	40.5	10.6	7.2	33.3	86.5	42.6	2340	4.6	76.8	7.1
7	9/2021-22	3.4	39.6	10.9	7.1	32.3	87.8	41.5	2120	4.6	78.0	8.4
8	9/2021-28	3.4	40.8	10.2	7.0	33.2	88.4	46.1	2540	4.6	78.7	8.1
9	11/2021-19	3.4	39.4	10.7	7.0	33.2	87.6	42.7	2160	4.5	79.3	8.3
10	11/2021-21	3.4	40.6	10.9	7.4	33.2	86.4	39.8	2220	4.6	78.1	8.1
11	13/2021-9	3.7	40.9	10.8	7.4	32.1	86.6	41.8	2100	4.4	77.0	8.7
12	14/2021-18	3.6	39.2	11.3	7.3	33.0	86.3	42.0	2160	4.5	76.0	8.6
13	15/2021-4	3.8	41.2	10.7	7.5	33.0	88.3	43.1	2220	4.6	79.1	8.8
14	15/2021-9	3.7	40.9	11.2	7.7	33.3	87.3	42.0	2240	4.6	79.7	8.5
15	15/2021-15	3.8	41.3	11.0	7.7	32.0	88.4	46.9	2400	4.5	79.4	8.2
16	15/2021-21	3.6	41.1	10.7	7.4	31.7	88.1	46.1	2300	4.6	79.0	8.7
17	18/2021-12	3.8	39.9	11.2	7.4	32.8	88.1	44.2	2440	4.2	75.9	8.9
18	19/2021-11	3.6	40.3	11.2	7.6	32.3	85.7	42.3	2220	4.6	77.9	8.2
19	20/2021-1	3.6	39.8	11.2	7.4	32.6	86.5	41.2	2140	4.6	78.6	8.9
20	20/2021-8	3.2	40.6	10.2	6.9	33.2	87.3	45.7	2540	4.7	78.4	8.7
21	20/2021-14	3.7	41.0	10.2	7.1	32.8	86.3	43.4	2340	4.6	79.4	9.1
22	21/2021-5	3.5	40.7	10.3	7.1	32.2	85.6	41.5	2120	4.5	79.0	8.3
23	21/2021-11	3.6	39.8	10.5	6.9	31.6	86.8	40.3	2120	4.6	77.6	8.3
24	21/2021-13	3.7	39.2	11.2	7.2	36.2	87.5	42.8	2240	4.7	77.9	8.0
25	26/2021-6	3.7	39.9	11.3	7.5	33.1	85.3	42.2	2380	4.5	78.7	8.3
26	26/2021-11	3.3	39.4	10.8	7.0	32.8	85.5	41.0	2460	4.4	76.9	8.1
27	26/2021-22	3.4	39.7	10.3	6.8	32.8	88.4	39.7	2120	4.5	74.7	8.1
28	27/2021-5	3.7	40.6	11.0	7.5	32.4	86.5	43.1	2340	4.6	79.3	8.7
29	27/2021-8	3.5	39.6	11.2	7.3	32.9	87.4	40.5	2140	4.6	79.2	7.8
30	27/2021-11	3.7	39.8	11.0	7.3	32.0	88.9	43.2	2280	4.6	79.3	8.3
31	27/2021-20	3.5	40.7	10.3	7.0	33.4	85.2	41.8	2120	4.5	78.0	8.2

Table 2. Cont.

No.	Selected families No.	BW (g)	LP %	SI (g)	LI (g)	2.5% SL (mm)	UI %	ST (g/tex)	YS	MR	Rd %	+ b
32	27/2021-21	3.5	41.4	10.5	7.4	31.0	87.4	41.5	2140	4.7	79.0	8.0
33	28/2021-1	3.5	39.4	10.7	7.0	31.8	86.4	40.9	2240	4.7	76.7	7.8
34	28/2021-23	3.6	40.8	10.6	7.3	33.0	87.4	40.2	2240	4.5	78.2	8.2
35	28 / 2021 - 26	3.5	40.0	10.6	7.1	33.0	87.9	41.9	2200	4.5	76.8	8.4
36	29 / 2021 - 6	3.3	40.3	10.5	7.0	30.8	85.2	43.9	2280	4.5	78.0	8.2
37	29 / 2021 - 13	3.3	39.9	10.4	6.9	32.5	89.4	42.7	2120	4.4	77.0	8.7
38	29 / 2021 - 20	3.7	40.5	11.1	7.5	31.4	86.9	40.1	2180	4.4	78.1	8.7
39	31 / 2021 - 4	3.8	40.2	11.1	7.5	33.3	88.5	42.9	2220	4.2	76.8	8.5
40	31 / 2021 - 20	3.4	39.9	10.0	6.6	32.2	88.1	42.0	2220	4.2	77.1	8.5
41	31 / 2021 - 23	3.4	40.6	10.3	7.0	33.5	86.5	44.0	2460	4.4	79.2	8.1
42	37 / 2021 - 4	2.9	39.2	9.3	6.0	32.7	87.0	43.2	2220	4.2	78.3	8.2
43	37 / 2021 - 10	3.5	40.4	10.2	6.9	34.8	88.5	43.1	2400	4.2	78.9	8.1
44	37 / 2021 - 12	3.5	40.5	10.0	6.8	33.5	87.5	40.9	2280	4.2	77.7	8.0
45	37 / 2021 - 14	3.5	39.0	10.7	6.8	32.9	87.8	40.3	2280	4.4	78.3	8.6
46	37 / 2021 - 26	3.7	40.2	10.5	7.1	32.5	85.8	38.8	2100	4.4	78.6	8.1
47	38 / 2021 - 2	3.5	40.8	10.0	6.9	31.4	87.4	43.1	2280	4.4	78.0	8.7
48	38 / 2021 - 5	3.5	39.8	10.2	6.7	33.3	88.7	41.7	2280	4.2	79.4	8.5
49	38 / 2021 - 22	3.6	39.1	10.5	6.8	33.8	86.1	48.3	2700	4.6	72.3	8.6
50	43 / 2021 - 2	3.5	41.1	10.0	7.0	33.4	87.2	40.5	2280	4.6	77.8	8.5
51	44 / 2021 - 20	3.2	38.8	10.3	6.5	32.8	86.5	46.2	2640	4.6	78.7	7.8
52	45 / 2021 - 17	3.4	40.7	10.3	7.0	33.7	85.6	39.4	2240	4.6	78.5	7.9
53	46 / 2021 - 12	3.3	39.0	10.5	6.7	32.9	86.8	41.8	2260	4.6	79.0	8.3
54	47 / 2021 - 11	3.3	39.3	10.6	6.8	34.5	87.8	43.6	2400	4.6	79.2	8.1
55	48 / 2021 - 24	3.5	40.2	10.2	6.9	33.7	87.0	40.8	2280	4.6	80.8	8.7
56	53 / 2021 - 23	3.4	40.5	10.3	7.0	33.3	87.8	43.0	2360	4.6	80.0	8.8
Mean of selected families		3.5	40.1	10.6	7.1	32.8	87.2	42.4	2271	4.5	78.2	8.4
Mean of comparisons (Control)		3.6	41.0	10.8	7.5	32.9	86.4	42.1	2310	4.5	77.0	7.7
Standard error (SE)		0.03	0.09	0.06	0.04	0.12	0.14	0.27	18.88	0.02	0.18	0.05
Coefficient of variability (C.V.%)		5.25	1.66	4.03	4.65	2.80	1.22	4.68	6.22	3.16	1.76	4.38

Table 3. Means of yield, yield components and fiber quality properties for the 22 selected families (increases B) in 2023 growing season furnishing increase C in 2024 season.

No.	Selected families	SCY (k/f)	LCY (k/f)	BW (g)	LP %	SI (g)	LI (g)	2.5 % SL (mm)	UI %	ST (g/tex)	YS	MR	E %	Rd %	+ b
1	2/2021-19	11.5	14.2	3.2	39.6	10.7	7.0	34.8	88.9	43.3	2300	4.5	7.0	74.4	8.1
2	5/2021-8	10.7	13.0	3.1	39.2	10.5	6.7	33.4	87.9	43.7	2380	4.4	7.0	79.4	8.0
3	9/2021-17	10.0	13.5	3.1	39.4	10.5	6.8	34.7	88.2	43.2	2460	4.5	7.2	79.4	9.1
4	9/2021-28	10.3	12.8	3.1	39.6	10.4	6.8	34.5	87.9	42.6	2460	4.5	7.2	79.4	8.2
5	11/2021-19	10.2	12.5	3.1	39.4	10.6	6.9	33.8	89.3	46.5	2540	4.4	7.1	78.3	8.8
6	15/2021-4	9.9	12.4	3.2	40.1	10.5	7.0	34.9	89.2	45.7	2460	4.4	7.2	78.8	9.2
7	15/2021-9	10.6	13.1	3.0	39.8	10.5	6.9	34.4	88.1	46.3	2580	4.4	7.2	70.8	7.7
8	15/2021-15	10.0	12.4	3.1	39.6	10.4	6.8	32.6	88.4	46.3	2460	4.0	7.1	79.6	9.2
9	20/2021-8	10.9	13.6	3.0	39.9	10.3	6.8	33.3	87.3	43.0	2400	4.3	7.1	79.0	8.2
10	20/2021-14	11.0	13.4	3.1	39.0	10.4	6.7	33.4	89.5	43.5	2320	4.4	7.1	78.7	8.3
11	26/2021-6	11.1	13.8	3.1	39.9	10.3	6.8	33.8	88.2	43.3	2320	4.4	7.1	77.5	8.9
12	27/2021-5	10.8	13.4	3.1	39.8	10.2	6.7	33.9	89.0	39.5	2000	4.5	7.0	79.4	9.1
13	28/2021-26	11.5	14.0	3.2	39.0	10.2	6.5	32.2	88.4	44.0	2460	4.4	7.0	77.6	8.3
14	30/2021-4	9.6	11.9	3.2	39.8	10.5	6.9	34.9	89.0	43.9	2460	4.4	7.0	80.6	8.8
15	31/2021-4	9.9	12.2	3.1	39.8	10.4	6.9	34.0	87.9	43.7	2420	4.4	7.2	78.7	8.5
16	37/2021-4	9.5	11.8	3.2	39.6	10.8	7.1	34.5	85.9	41.2	2140	4.0	7.2	79.7	8.7
17	37/2021-10	9.0	11.1	3.3	39.5	10.7	7.0	34.0	89.3	46.6	2500	4.5	7.0	79.6	8.3
18	38/2021-5	10.3	12.8	3.0	39.8	10.3	6.8	34.3	87.6	44.0	2320	4.9	7.0	77.9	8.6
19	38/2021-22	10.4	12.8	3.1	39.7	10.5	6.9	33.3	87.2	40.7	2100	4.9	7.2	77.4	9.0
20	44/2021-20	10.7	13.3	3.2	39.7	10.8	7.1	33.6	87.5	44.0	2120	4.9	7.2	78.9	9.0
21	47/2021-11	9.9	12.1	3.2	39.2	10.5	6.8	34.2	89.3	44.2	2420	4.6	7.1	78.4	8.7
22	53/2021-23	10.3	12.6	3.1	39.5	10.2	6.6	33.5	85.6	41.7	2100	4.5	7.1	70.5	8.8
Mean of selected families		10.4	12.9	3.1	39.6	10.5	6.9	33.9	88.2	43.7	2350	4.5	7.1	77.9	8.6
Mean of comparisons (Control)		11.3	13.9	3.2	39.5	10.5	6.8	34.5	87.7	43.1	2413	4.5	7.3	79.4	8.8
Standard Error		0.14	0.17	0.02	0.06	0.04	0.03	0.15	0.22	0.40	34.41	0.05	0.02	0.57	0.09
Coefficient of variability (CV%)		6.09	6.00	2.48	0.74	1.70	2.18	2.11	1.19	4.28	6.87	5.06	1.19	3.41	4.94

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

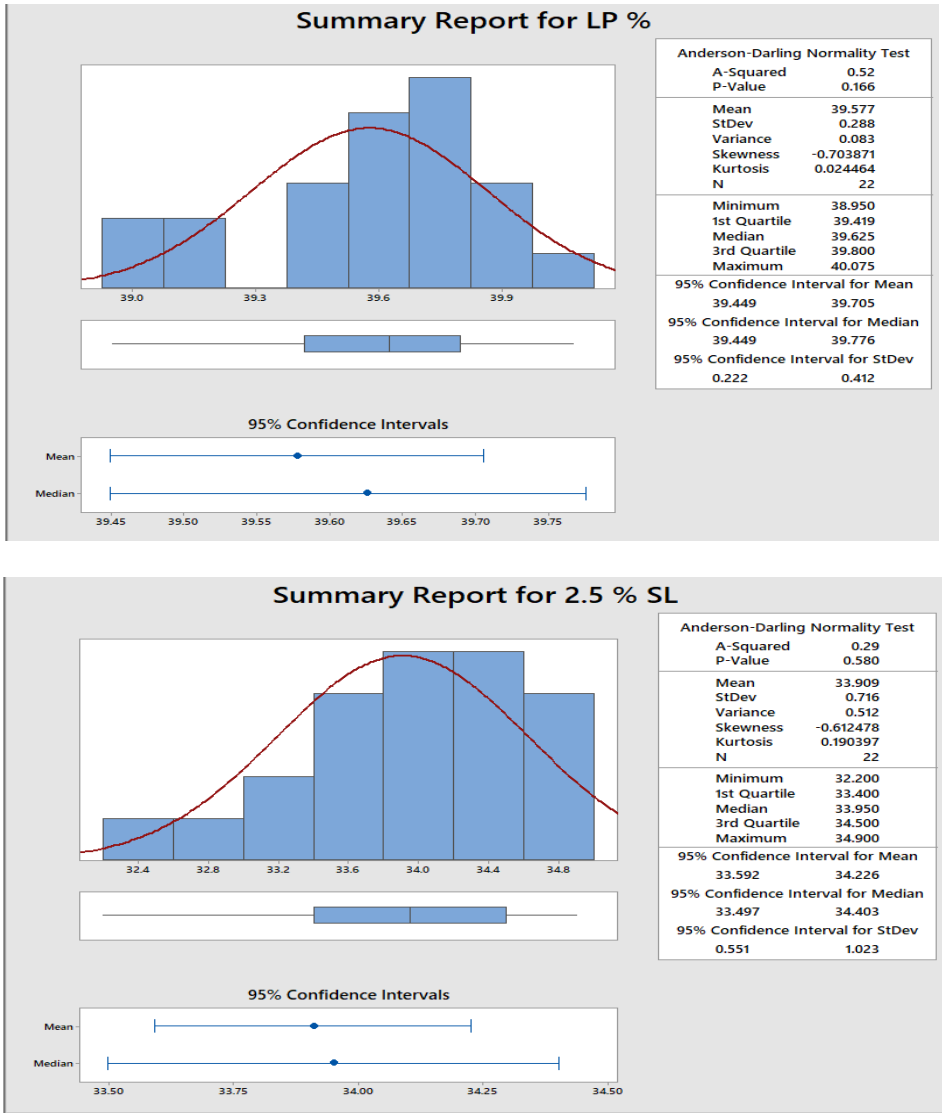

Fig. 3. Frequency distribution curves for lint percentage% and 2.5% Span length after selection in 2023 growing season.

Also, increase in the mean, a decrease in variance, and an increase in the negative skewness as a result of the increase in the minimum value for 2.5% SL (32.2 mm) this season as well as the decrease in the number of families below mean.

Procedure of selection for (increase B) revealed that nine families were selected according to the standard cotton variety Super Giza 86 to form (increase C) as presented in Table (4). Coefficient of variability (CV%) showed a decrease for all the studied traits, indicating the homogeneity among all selected families and with control in yield, yield components and fiber quality properties.

The nine selected pure seeds families were massed together to form (increase C). This present method of maintaining the purity of Egyptian cotton varieties is based on combining progenies from multiple plants rather than increasing the offspring of a single plant. Increase C was planted in an area of about 34 feddans.

Breeder's seed are planting within the geographical zone assigned to the variety. The whole area is subjected to a careful roguing so that off-type plants in so far they can be detected by visual examination are uprooted and removed. In the concentric ring system, the purity increases from outside to inside, and the inner ring, which is the nucleus, is the purest. Although, following of this system, deterioration or genetic change may occur in cotton varieties in general cultivation through mechanical mixtures, natural crosses, mutations and natural selection. These results are similar to those obtained by El-Akkad *et al* (1982), El-Kilany and Youssef (1985), Al-Ameer (2014) and El-Shazly *et al* (2024). For these reasons, continues selfing and selection procedures carried out every season are considered crucial in maintaining the program to maintain genetic purity and eliminate any off-type plants from Super Giza 86 breeding population. Similar results are in agreement with those obtained by El-Dahan (2016), Hamed (2016), Mahrous (2017), Soliman (2018), Mabrouk (2019), Al-Hibbiny (2020) and El-Lawendey and Darwesh (2024).

Generally, the relatively low values of standard error (SE) and coefficient of variability (CV%) show strong homogeneity among the selected type plants. These findings suggested that the selected traits exhibit

the conventional characteristics of the Super Giza 86 cotton variety and its behavior across generations.

Table 4. Means of yield, yield components and fiber quality properties for the 9 selected families from increases B in 2023 growing season to form increase C in 2024 season.

No.	Selected families	LCY (k/f)	SCY (k/f)	BW (g)	LP %	SI (g)	LI (g)	2.5% SL (mm)	UI %	ST (g/tex)	YS	MR	Rd %	+ b
1	5/2021-8	10.7	13.0	3.1	39.2	10.5	6.7	33.4	87.9	43.7	2380	4.4	79.4	8.0
2	11/2021-19	10.2	12.5	3.1	39.4	10.6	6.8	33.8	89.3	46.5	2540	4.4	78.3	8.8
3	15/2021-9	10.6	13.1	3.0	39.8	10.5	6.9	34.4	88.1	46.3	2580	4.4	70.8	7.7
4	20/2021-8	10.9	13.6	3.0	39.9	10.3	6.8	33.3	87.3	43.5	2400	4.3	79.0	8.2
5	20/2021-14	11.0	13.4	3.1	39.0	10.4	6.8	33.4	89.5	43.5	2320	4.4	78.7	8.3
6	26/2021-6	11.1	13.8	3.1	39.9	10.3	6.7	33.8	88.2	43.3	2320	4.4	77.5	8.5
7	31/2021-4	9.9	12.2	3.1	39.8	10.4	6.9	34.0	87.9	43.7	2420	4.4	78.7	8.5
8	37/2021-10	9.0	11.1	3.3	39.5	10.7	7.0	34.0	89.3	46.6	2500	4.5	79.6	8.3
9	47/2021-11	9.9	12.1	3.2	39.2	10.5	6.8	33.5	89.3	44.2	2420	4.6	78.4	8.7
Mean of selected progenies		9.4	12.8	3.1	39.5	10.5	6.8	33.7	88.5	44.6	2431	4.4	77.8	8.3
Mean of comparisons		10.3	13.9	3.2	39.5	10.5	6.8	34.5	87.7	43.1	2413	4.5	79.7	8.8
Standard Error		0.23	0.29	0.03	0.11	0.04	0.03	0.12	0.27	0.48	30.57	0.03	0.90	0.11
Coefficient of variability (C.V.		6.58	6.76	2.98	0.87	1.26	1.42	1.08	0.92	3.21	3.77	1.88	3.48	4.11

REFERENCES

Abd Al-Zaher, G. H. (2004). Maintenance and producing the nucleolus (breeder's seed) of Giza 83 Egyptian cotton variety, during 2000-2004 seasons. Egypt. J. Plant Breeding 8: 77-86.

Abd El-Salam, M. E. (2015). Plan for breeding, maintenance and producing the nucleolus (breeder's seed) of Giza 45 Egyptian cotton variety, during 2011 – 2014 growing seasons. J. Plant Production, Mansoura Univ. 6 (6): 879 – 887.

Abo-Arab, A. R., A. E. Ayoub and A. F. Lasheen (1995). Maintenance and producing the nucleolus (breeder's seed) of Giza 76 Egyptian cotton variety, during 1990-1992 seasons. Zagazig J. Agric. Res. 22 (2): 399-408.

Al-Ameer, M. A. (2014). Plan for breeding, maintenance and producing the nucleolus (breeder's seed) of Giza 87 Egyptian cotton variety. Egypt. J. Agric. Res., 92 (4): 1341-1355.

Al-Hibbiny, Y. I. M. (2015). Producing new nucleolus (breeder's seed) of Giza 90 Egyptian cotton cultivar, during 2011-2014 seasons. J. Agric. Res., Kafr El-Sheikh Univ. 41 (1): 181 – 191.

Al-Hibbiny, Y. I. M. (2020). Maintenance and producing of the nucleolus (breeder's seed) of Giza 86 Egyptian cotton cultivar, during 2017-2020. Egypt. J. Plant Breed. 24(2): 435– 450.

Badeaa, A. Mahmoud (2019). Maintenance and producing of the nucleolus (breeder's seed) of Giza 45 Egyptian cotton cultivar. Egypt. J. Plant Breed. 23(8):1615– 1629.

El-Akkad, M. H. , A. F. H. El-Okkia, H. R. El-Hanafi and M. A. Abdel-Dayem (1982). Plan for maintenance and producing the nucleolus (breeder's seed) of Giza 69 Egyptian cotton variety, during 1975-1979 seasons. Agric. Res. Rev., 60 (9): 111 – 131.

El-Dahan, M. A. A. (2016). Maintenance and producing of the nucleolus (breeder's seed) of Giza 92 Egyptian cotton cultivar (*Gossypium barbadense* L). Agric. Res. Kafr El-Sheikh Univ., 42(4): 648- 656.

El-Disouqui, A. E. (2001). Maintenance system of Giza 70 Egyptian cotton cultivar. J. Agric. Sci. Mansoura Univ., 26 (4): 1853-1862.

El-Kilany, M. A. and S. M. Youssef (1985). Comparative study on six nuclei seeds of Dendera cotton cultivar and the corresponding farmer 's seed in general use. Agric. Res. Rev., 63(6): 53-59.

El-Lawendey, M. M. and A. E. Darwesh (2024). Application of the cotton varieties maintaining program in Egypt to produce the nucleolus (breeder's seed) of super giza 94 cultivar, during 2019-2023 Seasons. J. of Plant Production, Mansoura Univ., 15 (5): 235 – 241.

El-Shazly, M. W., Y. El-Mansy, A. H. Mabrouk and M. H. Abdel-Fattah (2024). Assessment of Spontaneous Variabilities and the Relation with Inferior of Yield and Quality Characteristics in Egyptian Cotton. Alexandria Journal of Agric. Sci., 69(2): 188-203.

Hamed, H. E. Heba (2016). Maintenance and producing the nucleolus (breeder's seed) of Giza 90 Egyptian cotton cultivar, during 2013-2016 seasons. Egypt. J. of Appl. Sci., 31(10): 226-239.

Lasheen, A. F. (1997). Maintenance and producing the nucleolus (breeder's seed) of Giza 75 Egyptian cotton variety. Menofiya J. Agric. Res., 22 (5): 1279-1290.

Mabrouk, A. H. (2019). Maintenance and producing of the nucleolus (breeder's seed) of Giza 86 Egyptian cotton cultivar, during 2016-2019. Egypt. J. Plant Breed. 23 (6):1125– 1136.

Mahrous, H. (2017). Maintenance and producing the nucleolus (breeder's seed) of Giza 90 Egyptian cotton cultivar, during 2014-2017 seasons. Egypt. J. Plant Breed., 21:567-576.

Mohamed, A. A. (2013). Maintenance and producing the nucleolus (breeder's seed) of Giza 90 Egyptian cotton variety, during 2009-2012 seasons. J. Agric. Res., Kafr El-Sheikh Univ., 39 :(1): 79-91.

Nagib, M. A. A. and G. M. Hemida (2001). Some aspects on cotton variety renewal and maintenance scheme of Giza 80. Minia J. Agric. Res., Develop. 21 (1): 67-75.

Soliman, A. M. (2018). Maintenance and producing of the nucleolus (breeder's seed) of Giza 90 Egyptian cotton cultivar (*Gossypium barbadense* L). J. Plant Production, Mansoura Univ., 9 (6): 567 – 571.

Younis, F. G., E. M. Ghoneim and M. O. Ismail (1993). Producing the nucleolus (breeder's seed) of Dendera Egyptian cotton variety, during 1988-1991 seasons. Egypt. Jape. Sci., 8 (2): 238-248.

إتباع طريقة المحافظة وإنتاج بذرة المربي لصنف القطن المصري سوبر جيزة ٨٦ خلال مواسم ٢٠٢١-٢٠٢٤

عادل حسين مبروك و مهاب وجدى الشاذلى

معهد بحوث القطن – مركز البحوث الزراعية – مصر

يهدف هذا البحث الي إتباع طريقة المحافظة على أصناف القطن في مصر لإنتاج بذرة المربي والتى تحمل الخصائص الوراثية القياسية لصنف القطن سوبر جيزة ٨٦ وهو مستنبط من التهجين بين الصنفين جيزة ٧٥ X جيزة ٨١. أجريت هذه الدراسة بمحطة البحوث الزراعية بالجميزة – محافظة الغربية ، معهد بحوث القطن خلال الفترة من ٢٠٢١ الي ٢٠٢٤ حيث:- تم إنتخاب ستة وخمسين نباتاً تمثل طراز الصنف سوبر جيزة ٨٦ من حقل التربية موسم ٢٠٢١ لتكون عائلات الأكثارات الأولية (أ). تم زراعة البذرة الذاتي لهذه النباتات المنتخبة في عدد من الخطوط بقدر ما سمحت به كمية البذرة مكونة إكثارات (أ) ذاتي موسم ٢٠٢٢. تم انتخاب إثنان وعشرون عائلة وفقا لصفات مكونات المحصول وخصائص جودة التيلة لعائلات اكثارات (أ) ذاتي لتكوين إكثارات (ب) حيث تم زراعة البذرة الذاتي لكل عائلة من العائلات الإثنان والعشرون في عدد من الخطوط بقدر ما تسمح به كمية البذرة مكونة إكثارات (ب) موسم ٢٠٢٣ ، وفى نفس الوقت تم زراعة البذرة الطبيعي لهذه العائلات مع أحدث ثلاثة سلالات للصنف سوبر جيزة ٨٦ (كمقارنة) في تجربة بنظام القطاعات الكاملة العشوائية في أربع مكررات. تم انتخاب أفضل تسع عائلات من إكثارات (ب) طبقا لنتائج تجربة إختبار المحصول تمثل صنف القطن سوبر جيزة ٨٦ وتم مزج بذور هذه العائلات مع بعضها لتكون إكثارات (ج) حيث تم زراعتها في مساحة ٣٤ فدان في موسم ٢٠٢٤. خلال موسم ٢٠٢٥ من المتوقع زراعة ناتج إكثار (ج) في مساحة حوالى ٧٠٠ فدان (بذرة المربي). أشارت النتائج أن إجراء التلقيح الذاتي مع الإنتخاب المستمر في كل موسم تعتبر ضرورية للحفاظ علي النقاوة الوراثية والتخلص من أي طرز مغايرة off-types قد تظهر ببرنامج المحافظة علي صنف القطن سوبر جيزة ٨٦ نتيجة تأصيل الجينات الثانوية (Minor genes) أو إعادة الإتحاد فيما بينها ، كما أن إعتماد هذه الطريقة على مزج نسل عدة نباتات بدلاً من إكثار نسل نبات واحد منتخب تعتبر أكثر كفاءة وفعالية للتغلب علي التقلبات البيئية وتأثيرها على الصفات المحصولية وخصائص جودة الألياف.

المجلة المصرية لتربية النبات ٢٩(١): ١٧-٣٣ (٢٠٢٥)