

STUDY OF FIBER LUMEN WIDTH, SECONDARY WALL THICKENING, AND MATURITY PERCENT OF EXTRA LONG STAPLE EGYPTIAN COTTON CULTIVARS

Badr, L. A.

Agricultural Botany Department, Fac. of Agric., Cairo Univ., Giza, Egypt.

ABSTRACT

Six commercial Egyptian cotton cultivars (Extra long staple) were used in this study; namely Giza 45, Giza 67, Giza 77, Giza 76, Giza 84, and Giza 87. Ten different growth regions were used also; namely; Kafr El-Sheikh, El-Beheira, Dommietta, Dakahlia, Al-Sharkeih, Al-Gharbia, El-Fayoum, El-Menya, Assuit and Sohag. The two successive seasons of this study were 1996 and 1997. Data of three replicates from each location of the six EIS Egyptian cotton cultivars were distributed in a randomized complete block design in both seasons. All tests were carried out at the Department of Botany, Faculty of Agriculture, Cairo Univ., Giza, Egypt.

This study clear that the secondary wall thickening ranged from 14.48 μ in Giza 45 cv. to 18.54 μ for Giza 77 cv. . Also, lumen width ranged from 3.50 μ in Giza 45 cv. to 4.07 μ for Giza 70 cv. . The degree of wall thickening percent ranged from 80.45% in Giza 45 cv. to 82.45% in Giza 76 cv. . The fiber diameter (ribbon width) ranged from 18.05 μ for Giza 45 cv. to 22.72 μ for Giza 77 cv.

Secondary wall thickening, lumen width and degree of wall thickening percent of each cultivar differed from location to location during the same season, as well as from one season to another in the same location, whereas fiber diameter (ribbon width) seemed to be little affected by environmental fluctuation.

Giza 45 cv. recorded the finest fiber diameter (ribbon width), whereas Giza 77 has the coarsest one in the ELS Egyptian cotton cultivars. This study may be help in the cultivar policy in Egypt, to determine the suitable cultivar for each area.

INTRODUCTION

Recently, the goal of producing strong, fine and mature cottons is becoming a reality. As the demand for these cottons increases, new and improved cultivars are being developed to supply this demand. Breeders can develop cottons that satisfy the needs of the textile manufacturing industry and adapted to various locations of production. Verhalen and Murray (1964) stated that fiber coarseness was influenced significantly by (cultivar x year) interaction. Turner et al. (1973) showed that the variability in fiber fineness was mainly affected by environments. In studies of the seeds of 3 cultivars of *G. hirsutum* and *G. barbadense*, Kehagia and Mihaelides (1981) found that from the chalaza to the micropyle they were increase in fiber perimeter from 63 to 75 μ and 55 to 68 μ as well as maturity (relative wall thickness) from 22 to 45% and 33 to 60% in *G. hirsutum* and *G. barbadense*; respectively. Fransen et al. (1985) stated that the results of fiber maturity which obtained by the Causticaire method for measuring the maturity are apparently strongly influenced by the treatment technique. It appears that this is difficult to define in such a way that each operator can carry out exactly the same operations. The cousticaire method is not reliable if the degree of fiber maturity is law.

These judgements are based on an inter laboratory testing of three cultivars each containing samples of different maturity. Peeters *et al.* (1986) studied the never-dried cotton fibers as a meaning full expression of maturity. Such that, a novel microscopical technique was used for direct measurement of the dimensions of never-dried fibers, fibers swollen with water, and fiber swollen in sodium hydroxide. The original state or never dried-fibers could not be deserved when using seed cotton or bale cotton. No clear relation was found between parameters of never dried fibers and those of fibers swollen with sodium hydroxide.

For evaluating four methods of cotton fiber maturity testing, i.e., microscope measurement of the cell-wall of the fibers after swelling by using sodium hydroxide; examination in polarized light, differential dyeing, and the Causticaire method, Vuljanic *et al.* (1986) found that the microscope and polarized light techniques are found to give equally objective results. The Causticaire method is shown to give no real picture of the fiber maturity.

Greef and Humman (1988) found that the year and cultivar effect on fiber maturity ratio are significant. Nawar *et al.* (1989) stated that Giza45 the Egyptian Extra long staple (ELS) which has the lowest ribbon width, is the finest cultivar in the world. Thibodeaux and Evans (1989) cleared that the direct methods of measuring maturity so far have been tedious and time consuming.

Guthrie *et al.* (1993) reported that micronaire value is the quality attribute most affected by environment. This study was carried out to determine fiber diameter, lumen width., secondary wall thickening, and maturity percent in Extra long staple cotton cultivars.

MATERIALS AND METHODS

Six Commerical Egyptian Extra Long Staple cultivars of cotton plant, *Gossypium vitifolium* Lam. var. *barbadense* were used in this study; namely; Giza 45, Giza 76, Giza 77, Giza 70, Giza 84 and Giza 87. Lint samples of the studied cultivars were taken from the miniature experiments conducted by Regional Evaluation of Cotton Cultivars Research Department. Cotton Research Institute, Agricultural Research Center, at Giza, during the two successive seasons 1996 and 1997. The different growth regions were; Kafer El-Sheikh, El-Beheira, Dommieta, Dakahlia, Al-Sharkeih, Al-Gharbia, El-Fayoum, El-Menya, Assuit and Sohag.

The routine cultivation was carried out in this study. Ridges were 60 cms. apart, and the hills were spaced at 20 cms. The stand was thinned to two plants per hill, land preparation, fertilizer application and cultural operations followed the normal practices or cotton cultivation in the vicinity. Complete insect and pathological control was maintained whenever required.

Data of three replicates from each location of the six Egyptian cotton cultivars were distributed in a randomized complete block design in both seasons. Then combined analysis was carried out for all location and seasons according to Snedecor and Cochran (1982). The least significant difference (L.S.D) was calculated for each character.

All tests of the fiber properties were carried out at the Agricultural Botany Dept. Faculty of Agriculture, Cairo University. Giza, Egypt.

Degree of thickening and diameter were measured. 200 fibers of each sample were taken and laid parallel on microscope slides, covered with a glass cover for each slide, 2-3 drops of 18% solution of sodium hydroxide were added to fibers on each slide (Fig. a). By micrometric lens in the microscope the measures were taken at a magnification of 400 x as follows:

Fig (a): Cotton fiber after swelling with sodium hydroxide under microscope

1. Diameter (ribbon width) (μ)
2. Lumen width (μ)
3. Secondary wallthickening (μ)

Such that the degree of wall thickening percent was calculated according to the following formula:

$$\text{The degree of wall thickening \%} = \frac{\text{Secondary wall thickening } (\mu)}{\text{Diameter } (\mu)} \times 100$$

RESULTS AND DISCUSSION

1- Secondary wall thickening:

Data in Table (1) show the mean values of secondary wall thickening for the Egyptian Extra Long Staple Cultivars grown at different locations in 1996 and 1997 seasons. The result of analysis of variance indicated that the differences in secondary wall thickening due to cultivars, locations, seasons and their interactions were statistically highly significant.

As to cultivars, the results in Table (1) and Fig (1) cleared that the secondary wall thickening ranged from 14.48 μ in Giza 45 to 18.54 μ for Giza 77. It is apparent that Giza 45 and Giza 76 exhibited lower secondary wall thickening than the other cultivars. With respect to locations, Fig (2), El-Beheira location showed the highest secondary wall

Table (1) : Effect of cultivars, locations , seasons and their interaction on secondary wall thickening in ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

Seasons	Cultivars	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
	Locations							
1996	Kafr El-sheikh	15.6	17.2	16.6	18.0	16.9	16.7	16.83
	El-Beheira	14.2	17.2	17.1	19.7	17.4	17.5	17.18
	Domietta	14.4	17.3	16.8	18.3	17.9	17.9	17.10
	Dakahlia	14.1	17.3	16.7	19.0	17.5	17.6	17.03
	Al-Sharkia	13.9	17.3	17.4	18.1	18.0	17.0	16.95
	Al-Gharbia	14.3	17.3	17.1	18.6	17.7	17.4	17.07
	El-Fayoum	14.7	17.2	16.3	18.2	17.0	17.3	16.78
	El-Menya	14.4	17.2	17.6	17.9	17.2	17.2	16.92
	Assuit	14.4	17.1	17.6	18.3	17.9	17.2	17.08
Sohag	14.2	17.1	17.3	18.5	17.5	17.7	17.05	
Mean		14.42	17.22	17.05	18.46	17.50	17.35	17.00

Seasons	Cultivars	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
	Locations							
1997	Kafr El-sheikh	15.2	17.3	16.9	18.4	17.0	16.7	16.92
	El-Beheira	14.5	17.1	16.6	19.0	17.6	17.8	17.10
	Domietta	14.5	17.4	16.8	19.1	18.1	17.8	17.28
	Dakahlia	14.5	17.3	16.7	18.7	17.1	17.5	16.97
	Al-Sharkia	14.4	17.4	16.8	17.9	17.9	17.3	16.95
	Al-Gharbia	14.7	17.5	16.5	18.7	18.0	17.6	17.17
	El-Fayoum	14.4	17.4	16.6	18.2	17.6	17.3	16.92
	El-Menya	14.4	17.4	16.8	19.1	18.2	17.4	17.22
	Assuit	14.5	17.5	16.8	18.6	17.7	17.5	17.10
Sohag	14.3	17.5	16.7	18.6	17.3	17.5	16.98	
Mean		14.54	17.38	16.72	18.63	17.65	17.44	17.06
General Mean		14.48	17.30	16.88	18.54	17.57	17.39	17.03

L.S.D. at 0.05

Cultivars = 0.106 CXL = 0.329 CXLXS = 0.492

Locations = 0.157 CXS = 0.070

Seasons = 0.050 LXS = 0.180

Fig (1): Effect of cultivars on secondary wall thickening of ELS Egyptian cotton cultivars in 1996 and 1997 seasons

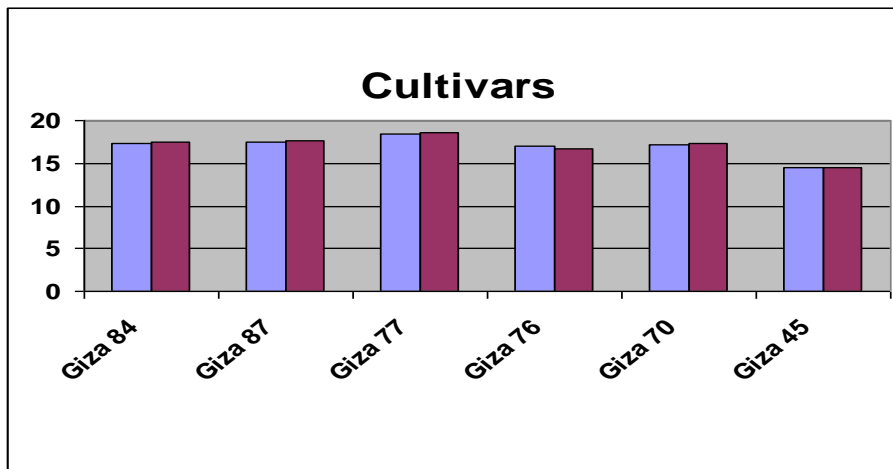
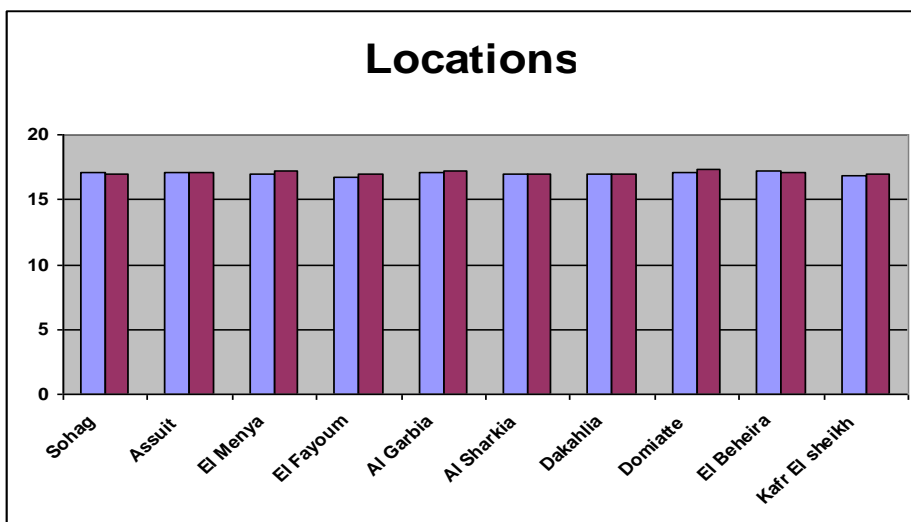


Fig (2) : Effect of locations on secondary wall thickening of ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

Mean 1996  Mean 1997 



thickening for the EIS cultivars (17.18μ), while Kafr El-Sheikh showed the lowest value in this respect (16.83μ).

As to seasons, nearly the growing season 1997 showed slightly secondary wall thickening than 1996.

As to cultivars x locations x seasons interaction, the secondary wall thickening differed from location to location during the same season and from season to season within the same location. The highest value was recorded at El-Beheira in 1996 season for Giza 77, being (19.7μ), while the lowest value was recorded at Al-Sharkeia in season 1996 for Giza 45, being (13.9μ).

2- Lumen width :

Data in Table (2) show the mean values of lumen width for the Egyptian Extra Long Staple cultivars grown at different locations in 1996 and 1997 seasons. The result of analysis of variance revealed that the differences in lumen width due to cultivars, locations, seasons and their interactions were statistically highly significant.

As to cultivars, the results in Table (2) and Fig (3) cleared that the lumen width ranged from 3.50μ in Giza 45 cv. to 4.07μ for Giza 70 cv. . It is apparent that Giza 45 cv. and Giza 76 cv. exhibited the lower lumen width than the other cultivars. With respect to locations, Fig (4), El-Sharkia location showed the highest lumen width for the EIS cvs. (4.05μ), whereas El-Meneya showed the lowest lumen width (3.67μ).

As for seasons, the growing season 1996 showed the highest lumen width, being (3.85μ).

As to cultivars x locations x seasons, the lumen width differed from location to location during the same season, as well as from season to another in the same location. The highest value recorded at El-Sherkeia in 1996 for Giza 77 cv. (being 5.0) while the lowest value was recorded at Kafer El – Sheirkh in 1995 season for Giza 45 cv., being (2.8μ).

3- Degree of wall thickenings percent:

The degree of wall thickening percent as a measurement for fiber maturity was determined in this study. Data in Table (3) show the mean values in this respect. The result of the analysis of variance indicated that the differences in the all sources of variance were statistically highly significant. As to cultivars, Fig. (5) cleared that degree of wall thickening percent ranged from 80.45% in Giza 45 cv. to 82.45% in Giza 76 cv. It is apparent that Giza 45 cv. exhibited lower fiber maturity than the other cultivars.

With respect to locations, Fig (6), Domietta, El-Meneya, Assuit and Sohag showed the highest degree of wall thickening percent being (82.25%), where as El-Sharkeih showed the lowest value being (80.75%). As to season, the growing season 1997 showed slightly higher degree of wall thickening percent than season 1996.

As to cultivars x locations x seasons interaction, the differences in the degree of wall thickening percent between the cultivars under study differed from location to location during the same season and from season to season within the same location. The highest value was recorded at

Table (2) : Effect of cultivars, locations , seasons and their interaction on lumen width in ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

Seasons	Cultivars	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
	Locations							
1996	Kafr El-sheikh	2.8	4.2	3.5	4.5	3.9	4.3	3.87
	El-Beheira	4.0	4.2	3.7	3.3	3.8	3.9	3.82
	Domietta	3.3	4.3	3.3	4.4	3.8	3.2	3.72
	Dakahlia	3.8	4.1	3.8	3.8	3.9	3.9	3.88
	Al-Sharkia	3.8	4.1	3.3	5.0	4.0	4.3	4.08
	Al-Gharbia	3.8	4.1	3.8	4.3	3.8	4.2	4.00
	El-Fayoum	3.2	4.0	3.8	4.2	4.5	4.0	3.95
	El-Menya	3.4	4.0	3.6	3.5	4.2	3.7	3.73
	Assuit	3.6	4.0	3.3	3.9	3.6	3.9	3.72
	Sohag	3.2	4.1	3.8	4.1	3.2	3.8	3.70
Mean		3.49	4.11	3.59	4.1	3.87	3.92	3.85

Seasons	Cultivars Locations	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
1997	Kafr El-sheikh	2.9	4.1	3.5	3.9	3.8	4.2	3.73
	El-Beheira	3.8	4.1	3.6	3.4	3.7	3.7	3.72
	Domietta	3.4	4.2	3.5	3.8	3.7	3.4	3.67
	Dakahlia	3.8	4.2	3.6	4.0	3.9	3.8	3.88
	Al-Sharkia	3.8	4.1	3.6	4.5	4.0	4.1	4.02
	Al-Gharbia	3.8	4.0	3.7	4.2	3.6	4.1	3.90
	El-Fayoum	3.3	3.9	3.7	4.3	4.0	4.0	3.87
	El-Menya	3.4	3.9	3.6	3.7	3.3	3.7	3.60
	Assuit	3.7	3.9	3.4	4.2	3.2	3.7	3.68
	Sohag	3.2	3.9	3.6	4.0	3.8	3.7	3.70
Mean		3.51	4.03	3.58	4.0	3.70	3.84	3.77
General Mean		3.5	4.07	3.58	4.05	3.78	3.88	3.81

L.S.D. at 0.05

Cultivars = 0.028 CXL = 0.089 CXLXS = 0.133

Locations = 0.043 CXS = 0.020

Seasons = 0.015 LXS = 0.040

Fig (3) : Effect of cultivars on (diameter) lumen width of ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

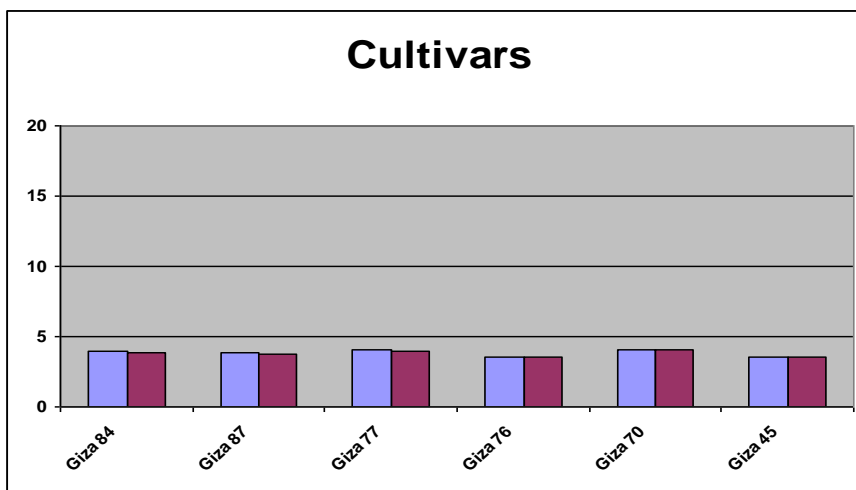


Fig (4) Effect of locations on (diameter) lumen width of ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

Mean 1996 Mean 1997

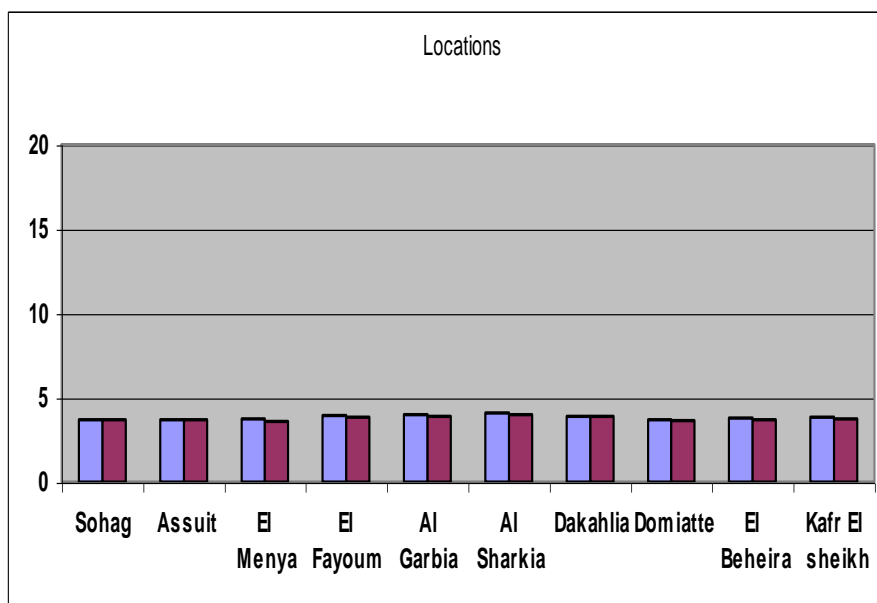


Table (3) : Effect of cultivars , locations , seasons and their interaction on degree of wall thickening percent in ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

Seasons	Cultivars Locations	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
1996	Kafr El-sheikh	85	80	83	80	81	84	82.17
	El-Beheira	78	80	82	86	82	82	81.67
	Domietta	81	80	84	81	82	85	82.17
	Dakahlia	79	81	81	83	82	82	81.33
	Al-Sharkia	79	81	84	78	82	80	80.67
	Al-Gharbia	79	81	82	81	82	81	81.00
	El-Fayoum	82	81	81	81	79	81	80.83
	El-Menya	81	81	83	84	80	82	81.83
	Assuit	80	81	84	82	83	82	82.00
	Sohag	82	81	82	82	85	82	82.33
Mean		80.6	80.7	82.6	81.8	81.8	82.1	81.60

Seasons	Cultivars Locations	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
1997	Kafr El-sheikh	84	81	83	83	82	80	82.17
	El-Beheira	79	81	82	82	83	83	81.67
	Domietta	80	81	83	83	83	84	82.33
	Dakahlia	78	81	82	82	81	82	81.00
	Al-Sharkia	79	81	82	80	82	81	80.83
	Al-Gharbia	79	81	82	82	83	81	81.33
	El-Fayoum	81	82	82	81	81	81	81.33
	El-Menya	81	82	82	84	85	82	82.67
	Assuit	80	82	83	82	85	83	82.50
	Sohag	82	82	82	82	82	83	82.17
Mean		80.3	81.4	82.3	82.1	82.7	82.0	81.80
General Mean		80.45	81.05	82.45	81.95	82.25	82.05	

L. S. D at 0.05

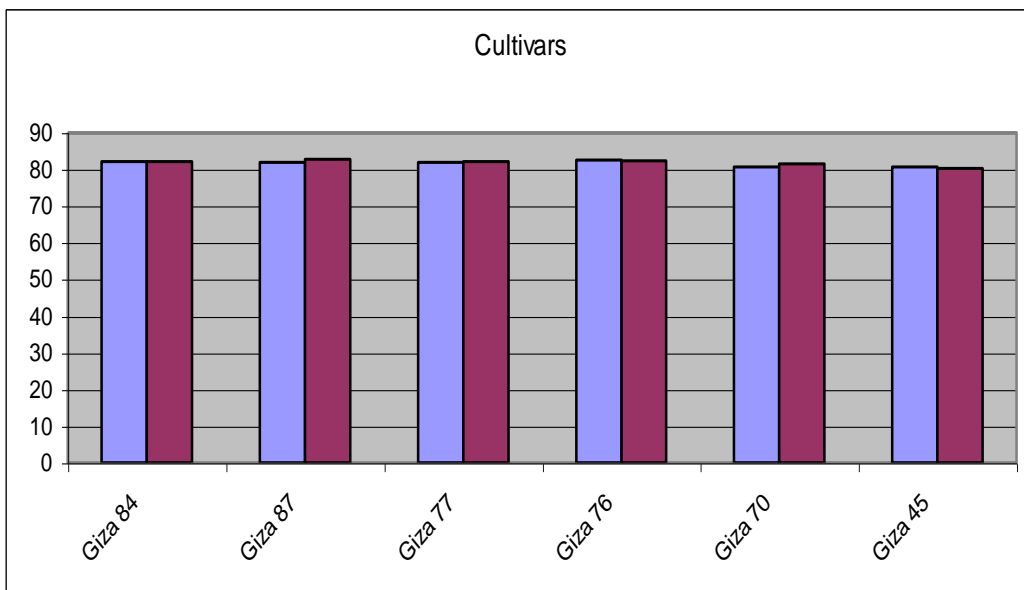
Cultivars (C) 0.139 CXL. 0.449

Locations (L) 0.200 CXS. 0.199

Seasons (S) 0.020 LXS. 2.288

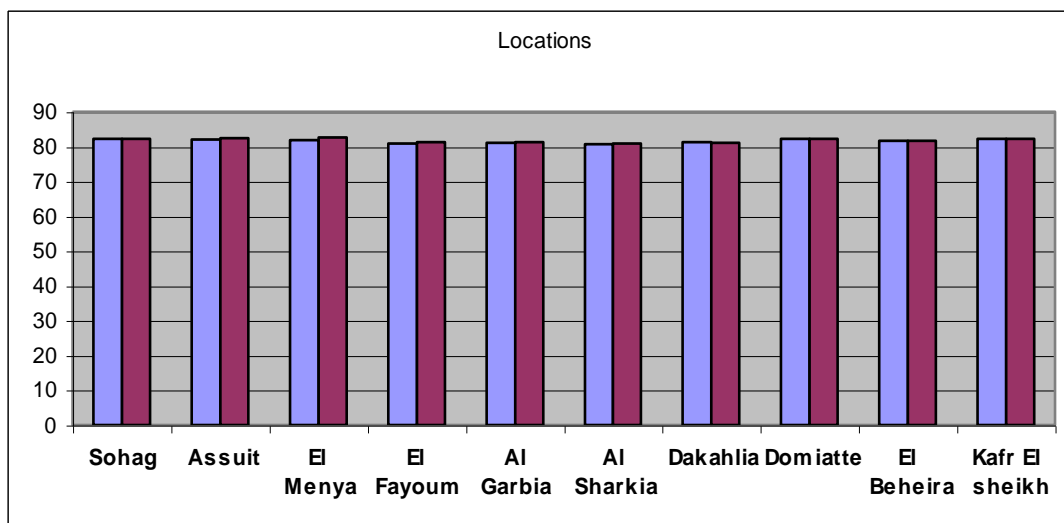
CXLXS. 0.639

**Fig (5) : Effect of cultivars on degree of wall thickening percent of ELS
Egyptian cotton cultivars in 1996 and 1997 seasons.**



**Fig (6) : Effect of locations on degree of wall thickening percent of ELS
Egyptian cotton cultivars in 1996 and 1997 seasons.**

Mean 1996 Mean 1997



El-Beheira in 1996 for Giza 77 cv. This study advises that Giza 45 should be cultivate in Kafer El-Sheikh (being 85% and 84% in 1996 and 1997, seasons respectively), whereas Giza 84 cv. should be cultivate in Domiatta location (being 85% and 84% in 1996 and 1997 seasons; respectively) whereas the lowest value was recorded at El-Beheira in season 1996 and Dakahlia in season 1997, for Giza 45 (being 78%) as well as at Al-Sharkeia in season 1996 for Giza 77, (being 78%).

4- Fiber diameter (ribbon width):

The fiber diameter (ribbon width) as a measurement of fiber fineness was determined by measure for each cultivar. Data in Table (4), show the mean values of fiber diameter for the cultivars in this study. The results of analysis of variance indicated that the differences in fiber diameter were statistically significant among cultivars in this study. The results of analysis of variance indicated that the differences in fiber diameter were statistically significant among cultivars, locations. Cultivar x location, and cultivar x location x seasons. In contrast, differences due to seasons, cultivars x season and location x season were not significant. The recorded means of the fiber diameter for the ELS cultivars Fig (7) ranged from 18.05 μ for Giza 45 cv. to 22.72 μ for Giza 77. It is apparent that Giza 45 cv. is the finest one in this group . On the other hand Giza 77 proved to be the coarsest cultivar in this study. As to location, Fig (8) the fiber diameter seemed to be little affected by environmental fluctuation, such that it was ranged from 20.68 μ in Kafr El-Sheikh to 21.07 μ in El-Gharbia. As to location x cultivar x season interaction, Giza 45 recorded the finest ribbon width at Sohag 17.4 and 17.5 μ in season 1996 and 1997, respectively. Whereas Giza 77 recorded the coarsest fiber diameter, being 23.0 and 23.3 μ in 1996 and 1997 seasons; respectively.

In conclusion, secondary wall thickening, lumen width and degree of wall thickening percent of Extra Long Staple cotton proved to significantly affected by cultivars and locations, these properties differ from location to location during the same season and from season to another in the same, location these results are confirmed with those obtained by Greef and Humman (1988) , who found that the year and cultivar effect on the fiber maturity ratio are significant. On the other hard Guthrie *et al.* (1993) reported that micronaire value is the quality attribute most affected by environment.

Also, this study clear that Giza 45 cv. has the lowest fiber diameter, is the finest cultivar in Egypt compared with the other cultivars. Nawar *et al.* (1989) stated that Giza 45, the Egyptian Extra long staple cotton cultivar is the finest cv. in the world.

This study may be help in the cultivar policy in Egypt to determine, what is the best area for cultivation of the cultivar, i.e. Giza 45 cv. should be cultivate in Kafer El-Sheikh where as, Giza 84 cv. in Domiatta location. Turner *et al.* (1973) showed that variability affected by environment.

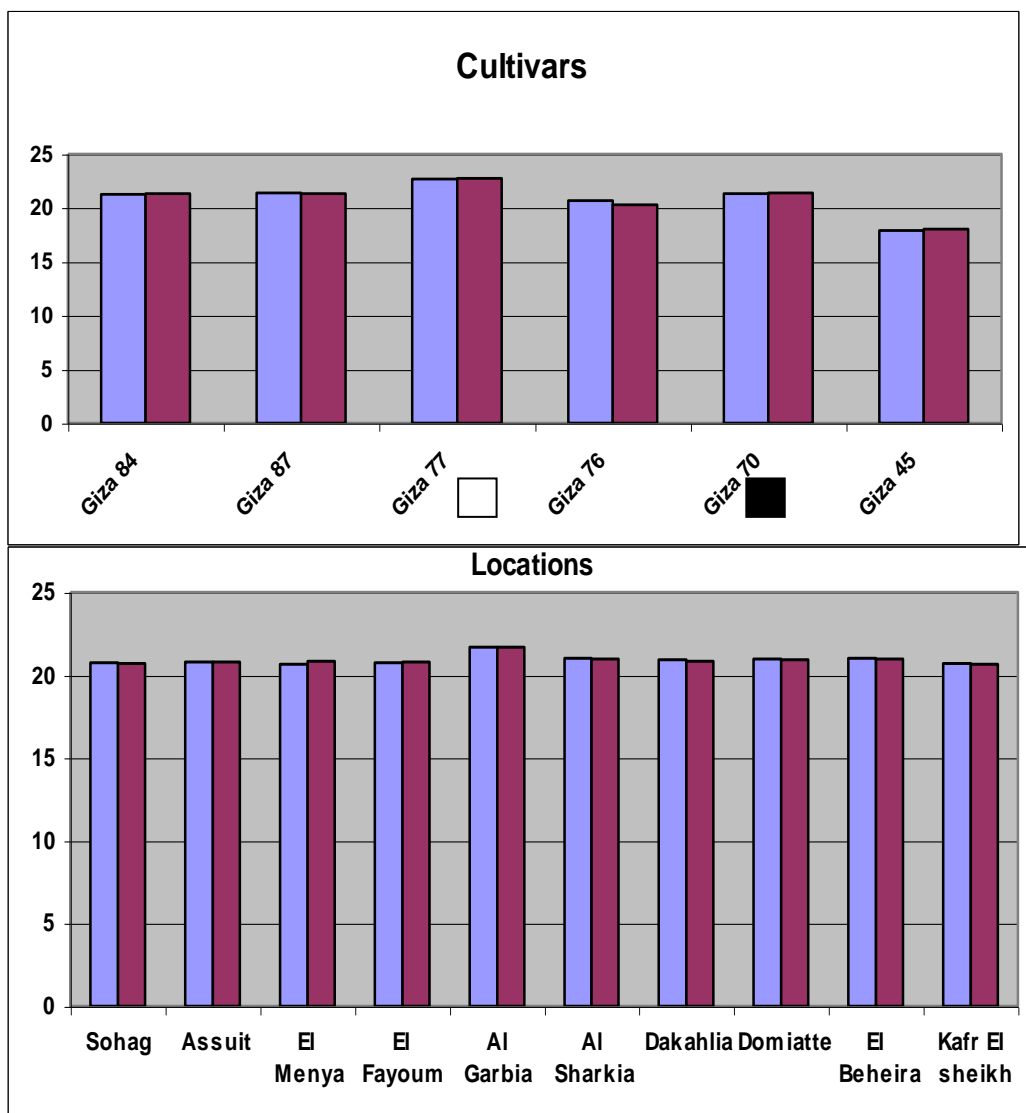
Table (4) : Effect of cultivars, locations , seasons and their interaction on fiber diameter of ELS Egyptian cotton cultivars in 1996 and 1997 seasons.

Seasons	Cultivars	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
	Locations							
1996	Kafr El-sheikh	18.4	21.4	20.1	22.5	20.8	21.0	20.70
	El-Beheira	18.2	21.4	20.8	23.0	21.2	21.4	21.00
	Domietta	17.7	21.6	20.1	22.7	21.7	21.1	20.97
	Dakahlia	17.9	21.4	20.5	22.8	21.4	21.5	20.92
	Al-Sharkia	17.7	21.4	20.7	23.1	22.0	21.3	21.03
	Al-Gharbia	18.1	21.4	20.9	22.9	21.5	21.6	21.7
	El-Fayoum	17.9	21.2	20.1	22.4	21.5	21.3	20.73
	El-Menya	17.8	21.2	21.2	21.4	21.4	20.9	20.65
	Assuit	18.0	21.1	20.9	22.2	21.5	21.1	20.80
	Sohag	17.4	21.2	21.1	22.6	20.7	21.5	20.75
Mean		17.91	21.33	20.64	22.66	21.37	21.27	20.86

Seasons	Cultivars	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 84	Mean
	Locations							
1997	Kafr El-sheikh	18.1	21.4	20.4	22.3	20.8	20.9	20.65
	El-Beheira	18.3	21.2	20.2	23.3	21.3	21.5	20.97
	Domietta	07.9	21.6	20.3	22.9	21.8	21.2	20.93
	Dakahlia	18.3	21.5	20.3	22.7	21.0	21.3	20.85
	Al-Sharkia	18.2	21.5	20.4	22.4	21.9	21.4	20.97
	Al-Gharbia	18.5	21.5	20.2	22.9	21.6	21.7	21.7
	El-Fayoum	17.7	21.3	20.3	22.5	21.6	21.4	20.80
	El-Menya	17.8	21.3	20.4	22.8	21.5	21.1	20.82
	Assuit	18.2	21.4	20.2	22.8	20.9	21.2	20.78
	Sohag	17.5	21.4	20.3	22.6	21.1	21.2	20.68
Mean		18.05	21.4	20.30	22.72	21.35	21.29	20.85
General Mean		17.98	21.37	20.47	22.69	21.36	21.28	20.86

L. S. D at 0.05
 Cultivars = 0.130 CXL. 0.402 CXLXS = 0.601
 Locations = 0.192 CXS. N.S
 Seasons = N.S LXS. N.S

**Fig (7) : Effect of cultivars on fiber diameter (ribbon width) of ELS
Egyptian cotton cultivars in 1996 and 1997 seasons.**



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دراسة لقطر الشعرة، وعرض الفتاة، وسمك الجدار الثانوى ونسبة النضج المئوية لأصناف القطن فائقة الطول المصرية.

لطفي على بدر

قسم النبات الزراعي-كلية الزراعة – جامعة القاهرة

اختير لهذه الدراسة ستة من أصناف القطن فائقة الطول المصرية وهي جيزة 45، جيزة 76، جيزة 77، جيزة 70، جيزة 84، جيزة 87 زرعت في عشرة مناطق مختلفة في مصر وهي كفر الشيخ، البحيرة، دمياط، الدقهلية، الشرقية، الغربية، الفيوم، المنيا، أسيوط، سوهاج في كلا الموسمين 1996، 1997. وقد تم أخذ البيانات لثلاث مكررات من كل صنف وكل منطقة وكل عام في تصميم القطاعات الكاملة العشوائية، وقد أجريت جميع القياسات بقسم النبات الزراعي – كلية الزراعة – جامعة القاهرة – بالجيزة.

وتوضح هذه الدراسة أن سمك الجدار الثانوى يتراوح ما بين 14.48 ميكرون للصنف جيزة 45 إلى 18.54 ميكرون للصنف جيزة 77. كما أن عرض الفتاة قد يتراوح ما بين 3.50 μ للصنف جيزة 45 إلى 4.07 ميكرون للصنف جيزة 70. بينما تراوحت نسبة النضج المئوية ما بين 80.45% للصنف جيزة 45 إلى 82.45% للصنف جيزة 76. وبقياس قطر الشعرة (عرض الشريط)، وهو يعبر عن النعومة فقد تراوح ما بين 18.05 ميكرون للصنف جيزة 45 إلى 22.72 μ للصنف جيزة 77. وتوضح هذه الدراسة أن كل من سمك الجدار الثانوى، وعرض الفتاة ونسبة النضج المئوية قد اختلفت من منطقة إلى منطقة ومن صنف إلى صنف ومن عام إلى عام. بينما كان تأثير البيئة على قطر الشعرة (عرض الشريط) أقل. وكان الصنف جيزة 45 له أقل قطر (عرض الشريط) وهو الأنعم. بينما كان الصنف جيزة 77 الأخشن في مجموعة أصناف القطن فائق الطول المصرية. وتوضح أهمية هذه الدراسة بإنها يمكن أن تساعد في السياسة الصنافية لاختيار المنطقة المناسبة للصنف المناسب كل عام.