

COMPARATIVE EVALUATION OF TWO NEW AND CULTIVATED EXTRA - LONG STAPLE COTTON VARIETIES GROWN AT NORTH DELTA

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Abstract

Two new Egyptian cotton cultivars and four commercial varieties were evaluated at three locations in North Delta for two successive seasons (1995 and 1996). Randomized complete blocks designs were used in all trials. The characters studied were seed cotton yield, lint yield, boll weight, lint percentage, seed index, 2.5%, 50% span length, micronaire reading and yarn strength. Highly significant differences between varieties, environments and varieties x environment interaction were obtained for most studied traits. The two newly released varieties Giza 87 and Giza 88 succeeded to compete with extra long staple cultivars in North Delta. Giza 88 produced the highest overall yield, seed index and boll weight. Giza 88 surpassed Giza 45 and Giza 77 in 2.5% span length and exceeded Giza 45 and Giza 70 in yarn strength. Giza 87 surpassed all studied varieties for 2.5%, 50% span length, and yarn strength and surpassed all varieties except Giza 45 in micronaire reading. Giza 77 produced the lowest lint percentage compared to all varieties.

INTRODUCTION

Improving cotton quality through introducing new varieties is the most important objectives of the Cotton Research Program carried out by the Cotton Research Institute (CRI). Cotton quality is a composite characteristic, it includes the various fiber properties that affect processing and the quality of the end product. In Egypt, it has been reported by several workers that cotton cultivars show wide variation in their quality properties and cotton yield when grown at different locations in the country (Abdel-Salam et al., 1970 and Abdel Aal et al., 1977). Therefore, in the cotton breeding program of the CRI, the cultivars are tested along with the established varieties in regional yield trials in different locations (Al-Didi, 1982). Therefore, the Regional Evaluation Res. section C.R.I., carries out yearly regional variety tests in all cotton locations, with main objective of identifying the best loca-

tions for the new varieties and the best substitution variety for each of the existing commercial one in case of degeneration or deterioration.

The performance of cotton varieties under different environments was studied by several workers, i.e. Abdel-Dayim *et al.* (1982), Abdel Salam *et al.* (1985), Nasrallah (1987), Abo El-Zahab *et al.* (1992), Abdel Rahman *et al.* (1994), El-Akhdar (1995) and Abo-Tour *et al.* (1996). Sarma *et al.* (1994) reported significant genotype x environment interaction for ginning outturn and seed cotton yield.

The objective of this study was to evaluate two new extra long cotton cultivars with four commercial varieties at North Delta of Egypt.

MATERIALS AND METHODS

The materials consisted of two new cotton cultivars; Giza 87 and Giza 88, and four commercial varieties; Giza 45, Giza 70, Giza 76 and Giza 77 of Egyptian cotton were grown in the region of North Delta for the two successive years 1995 and 1996 as follows: Northern Delta (Where the extra long staple varieties are planted) at Kafr El-Sheikh, El-Beheira, Damanhour, 1995 and 1996. Belkas (1995) and Damietta (Kafr Saad, 1996).

A complete randomized block design was used at each location with four replications, the plots were 5 rows each of 4 m long and 0.6 m apart. Distance between hills was 20 cm and each hill was thinned to two plants. Sowing date was as the optimum date of each location. Normal cultural practices were followed. All tested varieties were evaluated for seed cotton yield and lint cotton yield per plot (S.C.Y., L.C.Y.), boll weight in grams (B.W.), lint percentage (L.P.), seed index (S.I.), span length in mm (2.5%, 50% S.L.), micronaire reading (Mic.) and yarn strength (Y. str.) measurements. Fiber and yarn tests were carried out at Cotton Technology Dept., Cotton Res. Inst. under controlled humidity and temperature.

The standard analysis of variance, (Snedecor and Cochran 1967) was computed for each experiments combined analyses for varieties, locations, and years. Differences means were tested by least significant differences (LSD).

RESULTS AND DISCUSSION

Average of the studied traits for combined overall the six environments are given in Table 1. Results revealed that highly significant differences were observed

among varieties, environments and varieties x environment interaction for most studied traits. Averages of the studied traits over six varieties and six environments are given in Table (2).

Table 1. Analysis of variance of some characters for cotton cultivars under different environments.

Trait	Environment (E)	Replication within Env	Genotypes (G)	G x E	Pooled error
Degree of freedom	5	18	5	25	90
Seed cotton yield	48.27**	0.921**	5.94**	0.406**	0.1778
Lint cotton yield	6.65**	0.12**	1.36**	0.72**	0.024
Boll weight	0.857**	0.181	0.3923**	0.0734**	0.0217
Lint percentage	10.40**	0.670	113.07**	1.500**	0.6037
Seed index	5.00**	0.2932	2.85**	0.562**	0.2273
2.5% span length (mm)	2.382**	0.0706	0.968**	0.4054**	0.0727
50% span length (mm)	1.39**	0.0517	0.1373**	0.1243**	0.0361
Micronaire reading	1.38**	0.0238	2.8925**	0.0586**	0.016
Yarn strength	293915.7**	11417.36	189687.40**	17800.80**	7629.706

* and ** Significant at 5% and 1% for pooled error, respectively.

Giza 88 produced the highest seed cotton yield being 4.24 kg/p, lint cotton yield (1.61 kg/p), boll weight (2.97g), lint percentage (38.08%). The difference was highly significant for all studied varieties except Giza 77. It surpassed Giza 45 and Giza 77 in 2.5% S.L. and surpassed Giza 45, Giza 70 in yarn strength.

Giza 87 surpassed all studied varieties for 2.5%, 50% span length and yarn strength and surpassed all varieties, except Giza 45, for micronaire reading. The effect of interaction between cotton varieties and growing environments on cotton quality traits are presented in Table (2).

Giza 45 cultivar gave the highest value for seed cotton yield, lint cotton yield, lint percentage and yarn strength at Domiatte (1996 season) than the other studied environments. While it exceeded at Kafr El-Sheikh for 2.5% and 50% span length. It gave average for boll weight, seed index and micronaire reading at El-Beheira.

Giza 70 cultivar exceeded at El-Beheira for seed cotton yield, lint cotton yield, lint percentage and micronaire reading. However, it exceeded at Domiatte for 2.5%, 50% span length and yarn strength.

Giza 76 cultivar gave high values for seed cotton yield, lint cotton yield and lint percentage at Domiat and El-Beheira, while it gave high values for boll weight, seed index and micronaire reading at El-Beheira, but it gave higher values for 2.5%, 50% span length at Kafr El-Sheikh, yarn strength at Domiat and Kafr El-Sheikh during 1996 growing season.

Giza 77 gave higher means for seed cotton yield, lint cotton yield, boll weight, lint percentage and seed index at El-Beheira, 2.5%, 50% span length and micronaire reading at El-Beheira and Kafr El-Sheikh, higher values for yarn strength at Domiat then Kafr El-Sheikh.

Giza 87 variety gave higher means for seed cotton yield, lint cotton yield, boll weight, lint percentage and seed index at El-Beheira, 2.5%, 50% span length, yarn strength and micronaire reading at Kafr El-Sheikh.

Giza 88 variety gave higher values for seed cotton yield, lint cotton yield, boll weight, lint percentage and seed index at El-Beheira while at Kafr El-Sheikh for 2.5%, 50% span length, micronaire reading and yarn strength.

Effect of the cotton variety, environment and the interaction between cotton variety x environment showed significant differences for most studied characters. These results are in harmony with those obtained by Abo-El-Zahab *et al.* (1992), Abdel-Rahman *et al.* (1994), El-Akhdar (1995) and Abo-Tour *et al.* (1996).

Table 2. Averages of the studied traits over six varieties and the combined over six environments.

Location	Year	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 88	Combined
Seed cotton yield								
Kafr El-Sheikh	1995	1.17	1.64	1.48	1.85	1.65	2.18	1.666
	1996	2.58	3.13	2.89	3.38	3.71	4.75	3.41
El-Behiera	1995	2.67	3.13	3.08	3.82	3.17	4.02	3.31
	1996	4.04	5.42	4.38	5.94	4.78	6.24	5.13
El-Dakhlia	1995	1.93	2.08	1.89	2.17	2.00	2.80	2.14
Domiatta	1996	4.28	5.19	4.94	4.84	5.09	5.42	4.97
Combined		2.78e	3.43c	3.11d	3.67b	3.40c	4.24a	3.44
New LSD at Environment	5%	0.0494	1%	0.0654				
Varieties		0.0494		0.0654				
Var. x Env.		0.30		0.390				
Lint cotton yield								
Kafr El-Sheikh	1995	0.42	0.61	0.52	0.71	0.53	0.83	0.60
	1996	0.87	1.16	1.02	1.27	1.16	1.80	1.21
El-Behiera	1995	0.85	1.13	1.07	1.46	1.00	1.51	1.17
	1996	1.42	2.06	1.61	2.34	1.61	2.41	1.91
El-Dakhlia	1995	0.66	0.78	0.68	0.81	0.68	1.08	0.78
Domiatta	1996	1.49	1.90	1.83	1.85	1.69	2.07	1.80
Combined		0.95e	1.27c	1.12d	1.40b	1.11d	1.61a	1.25
New LSD at Environment	5%	0.0181	1%	0.024				
Varieties		0.0181		0.024				
Var. x Env.		0.110		0.140				
Boll weight								
Kafr El-Sheikh	1995	2.25	2.90	2.33	2.73	2.55	2.83	2.60
	1996	2.90	2.93	3.10	2.85	2.83	3.10	2.95
El-Behiera	1995	2.93	3.05	3.25	3.25	2.93	3.23	3.10
	1996	2.53	2.93	2.90	3.00	2.75	2.93	2.84
El-Dakhlia	1995	2.68	2.63	2.88	2.55	2.47	2.82	2.67
Domiatta	1996	2.60	2.75	2.75	2.85	2.50	2.93	2.73
Combined		2.65d	2.86b	2.87b	2.87b	2.67c	2.97a	2.81
New LSD at Environment	5%	0.0173	1%	0.0228				
Varieties		0.0173		0.0228				
Var. x Env.		0.1035		0.137				
Lint percentage								
Kafr El-Sheikh	1995	35.90	37.00	35.22	38.30	32.08	37.97	36.08
	1996	33.78	36.98	35.33	37.35	31.23	37.85	35.42
El-Behiera	1995	23.63	36.00	34.68	38.10	31.68	37.47	35.09
	1996	35.08	37.97	36.83	39.35	33.65	38.63	36.92
El-Dakhlia	1995	34.35	37.25	35.83	37.45	33.95	38.40	36.20
Domiatta	1996	34.88	37.08	36.93	37.83	33.18	38.15	36.34
Combined		34.43d	37.05b	35.80c	38.06a	32.63e	38.08a	36.01
New LSD at Environment	5%	0.0911	1%	0.1205				
Varieties		0.0911		0.1205				
Var. x Env.		0.5464		0.7227				

Table 2. Cont .

Location	Year	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 88	Combined
Seed index								
Kafr El-Sheikh	1995	10.20	10.70	9.38	9.88	10.23	11.08	10.24
	1996	10.80	10.22	10.18	10.85	9.50	11.30	10.47
El-Behiera	1995	11.85	11.10	11.13	10.75	11.10	11.60	11.25
	1996	10.35	10.83	10.08	10.60	9.80	10.88	10.42
El-Dakhlia	1995	10.45	10.22	10.00	9.888	9.95	10.08	10.10
	1996	9.88	9.85	10.02	10.35	9.10	10.60	9.97
Combined		10.59b	10.49c	10.13e	10.38d	9.95f	10.92a	10.41
New LSD at Environment	5%		1%					
Varieties	0.056		0.074					
Var. x Env.	0.34		0.445					
2.5% Span length								
Kafr El-Sheikh	1995	34.95	35.35	35.10	34.40	35.15	35.50	35.08
	1996	35.40	34.60	35.35	34.65	35.60	35.00	35.10
El-Behiera	1995	34.50	35.05	35.15	34.70	35.25	34.90	34.92
	1996	34.50	34.25	33.85	34.40	34.50	34.45	34.32
El-Dakhlia	1995	34.60	35.50	35.05	34.45	35.25	34.85	34.95
	1996	34.22	34.65	35.20	34.30	34.50	34.35	34.54
Combined		34.70e	34.90c	34.95b	34.48f	35.04a	34.84d	34.82
New LSD at Environment	5%		1%					
Varieties	0.032		0.042					
Var. x Env.	0.19		0.25					
50% Span length								
Kafr El-Sheikh	1995	17.70	17.55	17.65	17.40	17.70	17.80	17.63
	1996	17.80	17.40	17.65	17.25	17.95	17.35	17.57
El-Behiera	1995	17.70	17.70	17.80	17.40	17.80	17.60	17.67
	1996	17.20	17.15	16.80	17.25	16.95	17.15	17.08
El-Dakhlia	1995	17.50	17.80	17.60	17.45	17.70	17.55	17.60
	1996	17.00	17.35	17.45	17.20	17.20	17.30	17.25
Combined		17.48b	17.49b	17.49b	17.32d	17.55a	17.46c	17.47
New LSD at Environment	5%		1%					
Varieties	0.0223		0.03					
Var. x Env.	0.134		0.177					
Micronaire reading								
Kafr El-Sheikh	1995	3.10	3.95	3.25	3.80	3.40	3.95	3.57
	1996	2.95	3.30	3.10	3.55	3.00	3.70	3.27
El-Behiera	1995	3.35	4.10	3.95	4.20	3.35	4.30	3.87
	1996	3.05	3.70	3.35	3.65	2.95	3.95	3.44
El-Dakhlia	1995	2.95	3.50	3.05	3.60	2.95	3.50	3.26
	1996	2.90	3.45	3.25	3.50	2.90	3.85	3.31
Combined		3.05a	3.67d	3.33c	3.72e	3.09b	3.87f	3.45
New LSD at Environment	5%		1%					
Varieties	0.0148		0.0196					
Var. x Env.	0.089		0.118					

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Table 2. Cont.

Locallon	Year	Giza 45	Giza 70	Giza 76	Giza 77	Giza 87	Giza 88	Combined
Kafr El-Sheikh	1995	2695	2690	2655	2840	2760	2725	2725
	1996	2955	2950	3070	2980	3230	3000	3030
El-Behiera	1995	2785	2615	2840	2965	2910	2835	2825
	1996	2760	2790	2915	2975	3175	2935	2920
El-Dakhila	1995	2810	2805	2930	2940	2970	2915	2900
	1996	2935	2880	3070	2995	3170	2905	2990
Domiatia		2825e	2790f	2910c	2950h	3035a	2895d	2900
New LSD at	5%	1%						
Environment	10.24	13.54						
Varieties	10.24	13.54						
Var. x Env.	61.43	81.25						

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تقييم صنفين جديدين من القطن المصري فائق الطول مقارنة بالأصناف المنزوعة في شمال الدلتا

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تم تقييم صنفَي القطن الجديدين (جيزة ٨٧، جيزة ٨٨) مع الأصناف المنزوعة جيزة ٤٥ وجيزة ٧٠ وجيزة ٧٦ وجيزة ٧٧ في شمال الدلتا بمناطق كفر الشيخ، دمنهور (بحيرة)، بلقاس (نقهيبة) خلال الموسم الزراعي ١٩٩٥ وكفر الشيخ، دمنهور (بحيرة)، كفر سعد (دمياط) خلال الموسم الزراعي ١٩٩٦ من خلال تجارب قسم بحوث التقييم الأقليمي بهذه المناطق، وقد أختبرت صفات متوسط محصول القطن الزهر والشعر، متوسط وزن اللوزة، معامل البذرة، معدل الحليج، طول التيلة عند نسبة توزيع (٢,٥٪، ٥,٠٪)، قراءة الميكرونيير ومتانة الشلّة. وتضمنت الدراسة تأثير التركيب الوراثي (صنف القطن) وبيئة الزراعة والتفاعل بينهما علي تلك الصفات وأوضحت نتائج تحليل التباين المركب مايلي:

كان تأثير كل من الأصناف وبيئة الزراعة والتفاعل بينهما عالي علي جميع الصفات التي درست بالنسبة لتأثير التركيب الوراثي: تفوق الصنف جيزة ٨٨ علي جميع الأصناف تحت الدراسة في صفات محصول القطن الزهر والشعر ووزن اللوزة ومعامل البذرة كما أشترك معه الصنف جيزة ٧٧ في التفوق علي باقي الأصناف في صفة معدل الحليج. أما الصنف جيزة ٤٥ فقد أعطي أقل متوسطات لصفات محصول القطن الزهر والشعر ووزن اللوزة، والصنف جيزة ٨٧ أعطي أقل متوسطات لصفات معدل الحليج ومعامل البذرة ولم يكن هناك فرق معنوي بين جيزة ٧٠ و جيزة ٧٦ وجيزة ٧٧ في متوسطات وزن اللوزة.

تفوق الصنف جيزة ٨٧ علي جميع الأصناف تحت الدراسة في صفات طول التيلة عند نسبة توزيع (٢,٥٪ و ٥,٠٪) وكذلك متانة الشلّة أما في صفة قراءة الميكرونيير أشترك معه الصنف جيزة ٤٥ في أقل متوسطات لهذه الصفة. الصنف جيزة ٨٨ تفوق علي جيزة ٤٥ وجيزة ٧٧ في صفة طول التيلة عند نسبة توزيع (٢,٥٪ و علي جيزة ٧٧ في صفة طول التيلة عند نسبة توزيع ٥,٠٪ وأعطي الصنف جيزة ٤٥ أقل قيمة لقراءة الميكرونيير عن الصنف جيزة ٨٨ كما تفوق جيزة ٨٨ علي جيزة ٤٥ وجيزة ٧٠ في صفة متانة الشلّة.

الصنف جيزة ٤٥ أعطي أعلا القيم لمتوسطات صفات محصول القطن الزهر والشعر ومعدل الحليج وأعلا متانة في منطقة دمياط بينما كانت أكبر قيم لمتوسطات طول التيلة عند نسبة توزيع (٢,٥ و ٥,٠٪) بكفر الشيخ وأعلا ميكرونيير بالجيزة بينما كانت أكبر قيم لمتوسطات صفتي وزن اللوزة ووزن ١٠٠ بذرة لهذا الصنف في البحيرة.

الصنف جيزة ٧٠ أعطي أعلا قيم لتوسطات صفات محصول القطن الزهر والشعر ومعدل الحليج ووزن اللوزة ومعامل البذرة وأعلا قراءة ميكرونيير للصنف وأعلا قيم ٢,٥ و ٥٠% وأعلا متانة للشلة بدمياط وأعلا ميكرونيير بالبحيرة.

الصنف جيزة ٧٦ أعطي أعلا محصول زهر وشعر بدمياط ثم البحيرة كما أعطي أكبر قيم لتوسطات وزن اللوزة ومعامل البذرة وأكبر قراءة ميكرونيير و ٢,٥% بكفر الشيخ و ٥٠% وأكبر قراءة ميكرونيير بالبحيرة وأعلا قيم لمتانة الشلة بدمياط وكفر الشيخ في الموسم الثاني فقط.

أعطي الصنف جيزة ٧٧ أعلا قيم لتوسطات صفات محصول القطن الزهر والشعر ووزن اللوزة ومعدل الحليج ومعامل البذرة بالبحيرة وأعلا قيم ٢,٥% و ٥٠% وميكرونيير بالبحيرة وكفر الشيخ وأعلا متانة شلة بدمياط وكفر الشيخ لموسم ١٩٩٦.

الصنف جيزة ٨٧ أعطي أعلا قيم لتوسطات محصول القطن الزهر ومكوناته ومحصول القطن الشعر بالبحيرة وأعلا قيم لتوسطات ٢,٥%، ٥٠% وأعلا متانة شلة وميكرونيير كفر الشيخ.

أعطي الصنف جيزة ٨٨ أعلا قيم لتوسطات القطن الزهر والشعر ووزن اللوزة بالبحيرة ومعدل الحليج بالبحيرة في الموسم الثاني ومعامل البذرة بالبحيرة في الموسم الأول. وأعلا قيم لتوسطات طول التيلة عند نسبة توزيع ٢,٥% و ٥٠% وأعلا ميكرونيير ومتانة شلة بكفر الشيخ.