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EVALUATION OF TWO EGYPTIAN COTTON CULTIVARS IN UPPER EGYPT

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ABSTRACT

The goal of the present study was suggesting an evaluation of cotton using the least unit of the latin square design (2 x2). Two Egyptian cotton (*Gossypium barbadense*, L.) cultivars, *viz.*, G80 and G90 were used. Cultivars were evaluated at three different locations (Beni Souif, Minia and Assuit) in Upper Egypt during 2010 and 2011 seasons except for Assuit in 2010 season. The studied traits were seed and lint yield, boll components (dry weight, seed cotton, lint cotton, seeds weight and number of seeds), indices (harvest, seed, lint and lint percentage) and fiber properties (fiber length, micronaire reading and Pressely index). Five of (2 x2) latin square designs were used in individual locations. The data of five (2x2) latin square design were used together to produce cross over designs. G90 significantly surpassed G80 with respect to seed cotton yield in Beni Souif. In both locations, lint percentage of G80 was greater than the G90. In contrast, harvest index of G90 was greater than G80 since it had the lowest value of dry weight per boll than 80 in both locations. On the other hand, the difference between cultivars with respect to the number of seeds per boll was slight except at Assuit where the differences were significant. The results of fiber properties in both locations revealed that G80 had the longest fiber length compared with G90 due to genetic differences between them and it gave a high micronaire value followed by G90 due to coarseness of fibers. The results of multiple regression revealed that the effects of dry weight per boll, the number of seeds per boll and seed index on seed and lint cotton yield were strong for G80. Results of the present study is important for the regional program to evaluate cotton genotypes.

Key words: *cotton, genotypes, locations, statistical analysis.*

1. INTRODUCTION

Experimental units in a latin square design are organized into two groups referred to as rows and columns with regard to the organization of data in a two-way table. Each treatment is assigned the same number of times (usually once) within each group so that differences between groups are not due to treatment effects. At least as many replications are required as there are treatments. Latin squares are usually not practical with more than eight treatments. Only when both rows and columns vary appreciably, will the latin square design improve the detection of treatment differences over the randomized complete block (Little and Hills, 1978).

Abou-Tour *et al.* (1996) evaluated five Egyptian cotton cultivars, *viz.*, G85, G3, G80, Dendera and G75 at three locations in Upper Egypt (Fayoum, Assuit and Sohag) using a (5 x 5) latin square design in each location. Results revealed significant differences among cultivars with respect to lint cotton yield, seed index, lint percentage and fiber length in the individual locations. In contrast, non-significant variation due to cultivars was recorded for boll weight.

Awad *et al*. (2004) evaluated two cultivars G90 and G83 with respect to yield and fiber properties in Upper Egypt (Assuit and Sohag). The results showed that G90 gave 5% higher yields (seed and lint) than G83. It slightly surpassed G83 for boll weight and gave the same range of lint percentage of G83. Fiber quality for G90 was nearly the same for the long staple cotton group in Upper Egypt.

Idris *et al.* (2011) evaluated four genotypes using (4 x 4) latin square design at four locations through two seasons. A compressed latin square design was used to estimate variances of locations and genotypes. The data of each location (two seasons) were considered column and each cell of the design included eight readings. Statistical analysis of compressed was similar to analysis of simple latin square for more than one observation per experimental unit.

Idris (2012) evaluated two groups of cotton in different zones. The first group was evaluated at two locations in the Delta using a (4 x 4) latin square design. The second group was evaluated in the two locations in Upper Egypt using (4 x 4) latin square design. Analysis of multiple latin square designs was used to estimate the variance among genotypes in different zones. The data of both the Delta and Upper Egypt locations (4 x 4) were used together to produce a latin square design (8 x 8). Statistical analysis of the multiple design was similar to the analysis of the simple latin square design.

Researchers need a statistical measure to evaluate genotypes under different locations when the number of treatments is small. Thus, the final goal was to study the possibility of suggesting an evaluation of cotton using the least unit of latin square design (2 x2).

2. MATERIALS AND METHODS

Five (2 x2) latin square designs were carried out at three different locations (Beni Souif, Minia and Assuit) in Upper Egypt during 2010 and 2011 seasons except for Assuit in 2010 season. Latin square design followed was according to Cochran and Cox (1950), Federer (1955), Snedecor and Cochran (1967) and Gomez and Gomez (1984), Table (1).

2.1. Statistical analysis

2.1.1 Analysis of the least unit of latin square design

For the only (2x2) latin square design, this is zero degrees of freedom associated with the residual sum of squares. Thus, the data of five (2x2) latin square design were used together to produce cross over designs (Table 2). Statistical analysis (Table 3) was straightforward as Bailey (1994), Roger (1994) and Mcpherson (2001). The cultivar means were compared by the least significant difference (L.S.D.) test as given by Steel and Torrie (1980). All comparisons were done at 0.05 level of significance.

2.1.2 Multiple regression

The analysis of multiple regression was used to estimate the effect of boll components (x) and indices **(**x) on both seed and lint cotton yield (y) in the three locations. Statistical analysis was straightforward as Little and Hills (1978), Fowler *et al.* (1998) and Sing and Narayanan (2000).

3. RESULTS AND DISCUSSION

The analysis of variance of the data from individual locations revealed the presence of significant columns, (partitioning columns to squares and columns within squares), rows and genotypes (Table 4).

Table (1) : Layout of five (2 x 2) latin square designs in individual locations.

Square (1)		Square (2)		Square (3)		Square (4)		Square (5)	
A	B	A	B	B	A	B	A	A	B
B	A	B	A	A	B	A	B	B	A

A = G80 B = G90

Table (2): Layout of cross over designs in individual locations.

A	B	A	B	B	A	B	A	A	B
B	A	B	A	A	B	A	B	B	A

A = G80 B = G90

The materials used in this study were two Egyptian cotton (*Gossypium barbadense,* L.) cultivars, *viz.,* G80 and G90. Cultivars were evaluated for seed cotton yield (S.C.Y.) and lint cotton yield (L.C.Y.) in kentar / feddan. One sample of 50 bolls was obtained from each plot to estimate boll components (dry weight g, seed cotton g, lint cotton g, seeds weight g and number of seeds), indices (harvest, seed, lint and lint percentage) and fiber properties (fiber length (mm), micronaire reading and Pressely index). The lint cotton samples were tested by the Cotton Research Laboratories, Cotton Research Institute.

Table (3): Analysis of variance of cross over designs.

Source of variation	df
Columns	r - 1
Rows	t - 1
Genotypes	t - 1
Experimental error	(t – 1) (r - 2)
Total	t r -1

3.1 Analysis of cross over design

3.1.1 Beni Souif location

In the first season, significant variation due to genotypes was observed for seed cotton yield, dry

Table (4): Mean square of yield, boll components, indices and fiber properties.

Beni Souif (2010 Season)						
		Yield		**Fiber properties**		
Source of variation	**df**	**Seed**	**Lint**	**Length**	**Micronaire**	**Pressely**
Columns	9	2.41**	3.71**	0.454	0.018	0.690
Squares (S)	4	1.62	2.30	0.528	0.029	0.718
Columns within (S)	5	3.05**	4.77**	0.393	0.009	0.669
Rows	1	1.76	1.93	6.85**	0.200	0.012
Genotypes	1	2.87*	1.10	1.11	0.512*	0.180
Experimental error	8	0.446	0.629	0.249	0.092	1.02
Total	19	**Boll Components**				
Source of variation	**df**	**Dry weight**	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
Columns	9	0.009**	0.014	0.002	0.005	0.719
Squares (S)	4	0.013**	0.028	0.004	0.011	1.11
Columns within (S)	5	0.006*	0.003	0.001	0.001	0.403
Rows	1	0.005	0.012	0.004	0.002	1.49
Genotypes	1	0.164**	0.029	0.001	0.035	2.97
Experimental error	8	0.001	0.036	0.007	0.012	1.69
Total	19	**Indices**				
Source of variation	**df**	**Harvest**	**Seed**	**Lint**	**Lint percent**	
Columns	9	0.042	0.273	0.129	0.255	
Squares (S)	4	0.054	0.347	0.206	0.166	
Columns within (S)	5	0.032	0.214	0.067	0.324	
Rows	1	0.011	0.014	0.001	0.716	
Genotypes	1	1.52**	0.001	0.627*	13.61**	
Experimental error	8	0.022	0.109	0.071	0.157	
Total	19	**2011 Season**				
		Yield		**Fiber properties**		
Source of variation	**df**	**Seed**	**Lint**	**Length**	**Micronaire**	**Pressely**
Columns	9	1.49*	2.50	0.372	0.050	0.147
Squares (S)	4	0.973	1.97	0.151	0.006	0.088
Columns within (S)	5	1.90*	2.92	0.549	0.085	0.193
Rows	1	3.26*	5.13*	0.049	0.162	0.005
Genotypes	1	4.14*	4.35	6.96**	0.098	0.041
Experimental error	8	0.371	0.830	0.165	0.068	0.212
Total	19	**Boll Components**				
Source of variation	**df**	**Dry weight**	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
Columns	9	0.007	0.051	0.011	0.016	1.91
Squares (S)	4	0.003	0.100	0.020	0.031	4.17
Columns within (S)	5	0.010	0.012	0.003	0.004	0.108
Rows	1	0.043	0.381	0.068	0.128	10.18
Genotypes	1	0.102*	0.002	0.001	0.004	1.32
Experimental error	8	0.009	0.135	0.024	0.046	4.21
Total	19	**Indices**				
Source of variation	**df**	**Harvest**	**Seed**	**Lint**	**Lint percent**	
Columns	9	0.050	0.309	0.195	0.276	
Squares (S)	4	0.034	0.490	0.212	0.213	
Columns within (S)	5	0.064	0.164	0.181	0.327	
Rows	1	0.001	0.025	0.025	0.013	
Genotypes	1	0.874**	0.234	0.707	2.97	
Experimental error	8	0.049	0.254	0.293	1.04	
Total	19					

Table (4): Cont. I

Minia (2010 Season)						
		Yield		**Fiber properties**		
Source of variation	**df**	**Seed**	**Lint**	**Length**	**Micronaire**	**Pressely**
Columns	9	4.09	6.55	1.14	0.065	0.115
Squares (S)	4	7.70	11.41	0.709	0.063	0.023
Columns within (S)	5	1.21	2.66	1.48	0.065	0.187
Rows	1	21.22*	28.97	1.51	0.085	0.001
Genotypes	1	2.24	0.391	0.479	0.005	0.005
Experimental error	8	3.10	5.88	0.492	0.064	0.254
Total	19	**Boll Components**				
Source of variation	**df**	**Dry weight**	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
Columns	9	0.016	0.033	0.005	0.014	0.837
Squares (S)	4	0.019	0.007	0.002	0.004	0.248
Columns within (S)	5	0.014	0.055	0.008	0.022	1.31
Rows	1	0.004	0.828**	0.107**	0.346**	21.47**
Genotypes	1	0.351**	0.025	0.022	0.001	0.033
Experimental error	8	0.023	0.036	0.006	0.013	1.80
Total	19	**Indices**				
Source of variation	**df**	**Harvest**	**Seed**	**Lint**	**Lint percent**	
Columns	9	0.096	0.216	0.056	0.843	
Squares (S)	4	0.099	0.366	0.101	1.38*	
Columns within (S)	5	0.094	0.097	0.020	0.412	
Rows	1	0.950*	1.02	0.046	3.17*	
Genotypes	1	1.31*	0.046	0.865	8.62**	
Experimental error	8	0.119	0.465	0.158	0.350	
Total	19	**2011 Season**				
		Yield		**Fiber properties**		
Source of variation	**df**	**Seed**	**Lint**	**Length**	**Micronaire**	**Pressely**
Columns	9	1.42	2.19	0.616	0.031	0.111
Squares (S)	4	1.21	1.76	0.470	0.048	0.062
Columns within (S)	5	1.60	2.53	0.732	0.017	0.150
Rows	1	0.013	1.01	1.25	0.005	0.013
Genotypes	1	19.96**	16.76*	4.42*	0.041	0.013
Experimental error	8	1.04	1.72	0.678	0.097	0.100
Total	19	**Boll Components**				
Source of variation	**df**	**Dry weight**	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
Columns	9	0.009	0.085	0.016	0.027	3.13
Squares (S)	4	0.008	0.150	0.029	0.047	5.53
Columns within (S)	5	0.009	0.034	0.007	0.011	1.22
Rows	1	0.035	0.090	0.029	0.018	8.42
Genotypes	1	0.386**	0.034	0.027	0.001	0.651
Experimental error	8	0.009	0.113	0.019	0.040	4.18
Total	19	**Indices**				
Source of variation	**df**	**Harvest**	**Seed**	**Lint**	**Lint percent**	
Columns	9	0.070	0.045	0.062	0.712	
Squares (S)	4	0.080	0.066	0.084	0.662	
Columns within (S)	5	0.062	0.028	0.044	0.752	
Rows	1	0.021	0.749	0.002	4.03**	
Genotypes	1	1.97**	0.271	0.384	13.41**	
Experimental error	8	0.025	0.475	0.179	0.302	
Total	19					

Table (4): Cont. II

Assuit (2011 Season)						
		Yield		Fiber properties		
Source of variation	**df**	**Seed**	**Lint**	**Length**	**Micronaire**	**Pressely**
Columns	9	3.61	6.34	1.85	0.132	0.122
Squares (S)	4	2.11	3.99	2.72	0.167	0.165
Columns within (S)	5	4.82	8.23	1.15	0.103	0.088
Rows	1	0.152	0.253	1.74	0.001	0.018
Genotypes	1	4.53	3.86	0.002	0.112	0.512
Experimental error	8	3.36	5.44	0.929	0.114	0.482
Total	19	**Boll Components**				
Source of variation	**df**	**Dry weight**	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
Columns	9	0.009	0.053	0.008	0.021	2.12*
Squares (S)	4	0.003	0.040	0.007	0.015	2.16*
Columns within (S)	5	0.013	0.063	0.009	0.025*	2.09*
Rows	1	0.003	0.265**	0.043**	0.094**	0.990
Genotypes	1	0.013	0.269**	0.021*	0.143**	5.46**
Experimental error	8	0.023	0.020	0.004	0.007	0.450
Total	19	**Indices**				
Source of variation	**df**	**Harvest**	**Seed**	**Lint**	**Lint percent**	
Columns	9	0.081	0.591	0.201*	0.324	
Squares (S)	4	0.067	0.182	0.158	0.293	
Columns within (S)	5	0.093	0.918	0.237*	0.349	
Rows	1	0.432	1.61*	0.471*	0.062	
Genotypes	1	0.730*	0.615	0.051	9.22**	
Experimental error	8	0.123	0.269	0.052	0.215	
Total	19					

* , ** Significant at 0.05 and 0.01 levels, respectively.

weight per boll, harvest index, lint index, lint percentage and micronaire reading, (Table 4). G90 significantly surpassed G80 with respect to seed cotton yield and harvest index due to the lowest dry weight per boll. In contrast, G80 significantly exceeded G90 in dry weight per boll, lint index, lint percentage and micronaire reading (Table 5).

In the second season, significant variation due to genotypes was recorded for seed cotton yield, dry weight per boll, harvest index and fiber length (Table 4). G90 significantly exceeded G80 with respect to seed cotton yield and harvest index. G80 significantly surpassed G90 for dry weight per boll and fiber length (Table 5).

Results also showed that G90 was the best cultivar with respect to yield since it gave the highest seed cotton yield and harvest index in both seasons. G80 had the highest value for fiber length compared with G90 in 2011 season.Non–significant differences between the two cultivars were observed for boll components except for dry weight per boll in both seasons, indicating that the boll components were similar in the two cultivars except for dry weight per boll (Table 5).

3.1.2 Minia location

In the first season, significant variation due to cultivars was observed for dry weight per boll, harvest index, lint index and lint percentage (Table 4). G80 significantly exceeded G90 with respect to dry weight per boll, lint index and lint percentage. G90 significantly surpassed G80 with respect to harvest index since it had the lowest value of dry weight per boll than G80 (Table 5).

In the second season, significant variation due to genotypes was detected for seed cotton yield, dry weight per boll, harvest index, lint percentage and fiber length (Table 4). G90 significantly surpassed G80 with respect to seed and lint yield and harvest index. In contrast, G80 significantly exceeded G90 in fiber length, dry weight per boll and lint percentage (Table 5).

On the other hand, G80 had the highest values of dry weight per boll and lint percentage, significantly surpassed G90 in the two seasons (Table 5).

3.1.3 Assuit location

Non-significant variation due to cultivars was observed for seed and lint yield and fiber properties.In contrast, significant variation between cultivars was recorded for boll components and indices except for dry weight per boll,seed and lint index (Table 4).G90 significantly surpassed G80 with respect to seed cotton per boll, lint cotton per boll, seed weight, number of seeds per boll and harvest index, G80 significantly exceeded G90 for lint percentage,(Table 5).

As an explanation of such results , cultivar

Table (5): Means of yield, boll components, indices and fiber properties.

Beni Souif (2010 Season)					
Genotypes	**Yield**		**Fiber properties**		
	Seed	**Lint**	**Length**	**Micronaire**	**Pressely**
G80	8.92	11.51	32.43	4.31 *	9.89
G90	9.68 *	11.98	32.90	3.99	9.70
L.S.D.	0.69	--	--	0.31	--
Genotypes	**Boll Components**				
	Dry weight	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
G80	1.06 *	2.37	0.97	1.40	15.49
G90	0.88	2.45	0.96	1.49	16.26
L.S.D.	0.03	--	--	--	--
Genotypes	**Indices**				
	Harvest	**Seed**	**Lint**	**Lint percent**	
G80	2.24	9.16	6.29 *	40.97 *	
G90	2.79 *	9.15	5.93	39.33	
L.S.D.	0.15	--	0.27	0.41	
	2011 Season				
Genotypes	**Yield**		**Fiber properties**		
	Seed	**Lint**	**Length**	**Micronaire**	**Pressely**
G80	10.07	13.14	31.28 *	4.72	10.07
G90	10.98 *	14.07	30.10	4.58	10.16
L.S.D.	0.63	--	0.42	--	--
Genotypes	**Boll Components**				
	Dry weight	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
G80	1.03 *	2.51	1.04	1.47	14.18
G90	0.89	2.53	1.03	1.50	14.69
L.S.D.	0.10	--	--	--	--
Genotypes	**Indices**				
	Harvest	**Seed**	**Lint**	**Lint percent**	
G80	2.44	10.40	7.37	41.46	
G90	2.86 *	10.18	6.99	40.69	
L.S.D.	0.23	--	--	--	
Minia (2010 Season)					
Genotypes	**Yield**		**Fiber properties**		
	Seed	**Lint**	**Length**	**Micronaire**	**Pressely**
G80	10.24	13.44	33.15	4.25	10.07
G90	10.91	13.87	32.84	4.22	10.10
L.S.D.	--	--	--	--	--
Genotypes	**Boll Components**				
	Dry weight	**Seed cotton**	**Lint cotton**	**Seeds weight**	**No. seeds**
G80	1.26 *	2.66	1.11	1.55	17.07
G90	0.99	2.59	1.04	1.55	17.15
L.S.D.	0.16	--	--	--	--
Genotypes	**Indices**				
	Harvest	**Seed**	**Lint**	**Lint percent**	
G80	2.13	9.09	6.51*	41.73 *	
G90	2.64 *	9.00	6.09	40.42	
L.S.D.	0.36	--	0.41	0.61	

Table (5): Cont. I

Genotypes	2011 Season				
	yield		Fiber properties		
	Seed	Lint	Length	Micronaire	Pressely
G80	12.07	15.41	31.22 *	4.39	9.99
G90	14.07 *	17.24 *	30.28	4.48	9.94
L.S.D.	1.05	1.35	0.85	--	--
Genotypes	Boll Components				
	Dry weight	Seed cotton	Lint cotton	Seeds weight	No. seeds
G80	1.12 *	2.51	1.02	1.49	15.87
G90	0.85	2.42	0.94	1.48	15.43
L.S.D.	0.10	--	--	--	--
Genotypes	Indices				
	Harvest	Seed	Lint	Lint percent	
G80	2.23	9.38	6.39	40.51 *	
G90	2.86 *	9.62	6.11	38.88	
L.S.D.	0.16	--	--	0.57	
Assuit (2011 Season)					
Genotypes	yield		Fiber properties		
	Seed	Lint	Length	Micronaire	Pressely
G80	7.56	9.85	31.12	4.22	9.51
G90	8.51	10.73	31.11	4.07	9.19
L.S.D.	--	--	--	--	--
Genotypes	Boll Components				
	Dry weight	Seed cotton	Lint cotton	Seeds weight	No. seeds
G80	0.94	2.12	0.87	1.24	15.41
G90	0.89	2.35 *	0.94 *	1.41 *	16.45 *
L.S.D.	--	0.15	0.06	0.08	0.69
Genotypes	Indices				
	Harvest	Seed	Lint	Lint percent	
G80	2.29	8.07	5.60	41.39 *	
G90	2.67 *	8.55	5.70	40.03	
L.S.D.	0.36	--	--	0.48	

--: Not significant at .05 level. * : Cultivar significantly surpassed.

differences in cotton yield are primarily due to differences in reproductive sink. Reproductive sink development depends on the occurrence of the first flower, the time interval between successive flowers and the rate of boll growth (Hearn, 1969). On the other hand, Culp and Harrell (1975) reported that maintaining a high lint percentage was necessary to ensure high lint cotton yield.

G80 had the longest fiber length compared with G90 due to genetic differences between them. G80 gave higher micronaire value followed by G90 due to coarseness of fibers.

The results showed that both genetics and locations affected boll components.

In both locations, the difference between cultivars with respect to the number of seeds per boll was slight but at Assuit these differences were significant.

Harrell and Culp (1976) reported that more numbers of seeds per boll were desirable because of the greater amount of surface area for lint production within the boll. Scholl and Miller (1976) found that selection for both greater seed per boll and larger seed would produce a reduction in lint yield.

Harvest index is a compound character since it depends on two primary factors, weight of seed cotton per boll and weight of dry weight per boll. It is expected to vary considerably according to fluctuations of the two factors.

In both locations, harvest index of G90 was greater than G80 due to second factor (dry weight per boll) since it had the lowest value. This may explain the transcend of G80 over G90 and significant differences for dry weight per boll

Table (6): Mean square of multiple regression of yield (y), boll components (x) and indices(x).

	Seed cotton yield (y)							
Boll components (x)	**Beni Souif**			**Minia**		**Assuit**		
Source of variation	**df**	**G80**	**G90**	**G80**	**G90**	**df**	**G80**	**G90**
Regression	5	2.17	2.09	5.12	7.38	5	7.36	0.741
Dry weight (x_1)	1	1.08	1.93	22.38**	9.83	1	0.090	0.998
Seed cotton (x_2)	1	2.94	2.01	1.35	4.85	1	10.84	2.04
Lint cotton (x_3)	1	0.186	2.03	1.44	13.91	1	0.644	0.009
Seeds weight (x_4)	1	0.125	0.502	0.412	3.26	1	25.00	0.081
No. Seeds (x_5)	1	6.51*	3.97	0.010	5.05	1	0.218	0.578
Residual	14	0.859	2.03	2.11	5.63	4	4.17	0.593
Total	19					9		
Indices (x)	**Beni Souif**			**Minia**		**Assuit**		
Source of variation	**df**	**G80**	**G90**	**G80**	**G90**	**df**	**G80**	**G90**
Regression	4	2.16	1.90	5.40	9.66	4	1.69	0.626
Harvest (x_6)	1	2.14	3.27	12.71*	13.91	1	3.52	0.433
Seed (x_7)	1	5.33*	4.05	0.131	19.38	1	0.009	0.004
Lint (x_8)	1	0.494	0.103	8.18	0.602	1	3.07	2.05
Lint percent. (x_9)	1	0.691	0.170	0.575	4.76	1	0.167	0.017
Residual	15	0.947	2.08	2.23	5.14	5	9.34	0.714
Total	19					9		
	Lint cotton yield (y)							
Boll components (x)	**Beni Souif**			**Minia**		**Assuit**		
Source of variation	**df**	**G80**	**G90**	**G80**	**G90**	**df**	**G80**	**G90**
Regression	5	4.09	4.60	6.01	7.59	5	12.42	1.24
Dry weight (x_1)	1	2.14	1.91	27.38*	6.69	1	0.180	2.47
Seed cotton (x_2)	1	5.44	4.83	2.20	7.11	1	18.32	2.60
Lint cotton (x_3)	1	1.67	9.34	0.146	10.06	1	0.623	0.125
Seeds weight (x_4)	1	0.322	0.819	0.415	5.80	1	42.56	0.090
No. Seeds (x_5)	1	10.85*	6.12	0.001	8.30	1	0.397	0.935
Residual	14	1.43	3.31	3.63	8.93	4	7.10	1.04
Total	19					9		
Indices (x)	**Beni Souif**			**Minia**		**Assuit**		
Source of variation	**df**	**G80**	**G90**	**G80**	**G90**	**df**	**G80**	**G90**
Regression	4	4.23	4.76	5.87	10.14	4	3.00	1.18
Harvest (x_6)	1	3.85	6.34	16.78	13.90	1	6.14	0.244
Seed (x_7)	1	10.84*	11.93	0.003	18.26	1	0.03	0.024
Lint (x_8)	1	1.92	0.371	5.57	0.101	1	5.22	4.41
Lint percent. (x_9)	1	0.303	0.391	1.11	8.28	1	0.62	0.020
Residual	15	1.57	3.35	3.83	8.16	5	15.70	1.14
Total	19					9		

* , ** Significant at 0.05 and 0.01 levels, respectively.

compared with the first factor (seed cotton per boll).

Lint percentage is a compound character since it depends on two primary factors, weight of lint and weight of seed. It is expected to vary considerably according to fluctuations of the two factors. In both locations lint percentage of G80 was greater than G90. This may explain the transcend of G80 over G90 with lint index.

3.2 Multiple regression

The analysis of multiple regression revealed the effect of boll components (x) and indices (x) on both seed and lint cotton yield (y) in the three locations (Table 6).

In the first analysis, when considered the effect of boll components on seed cotton yield exhibited effects of both number of seeds per boll and dry weight per boll were significant with respect to G80 in Beni Souif and Minia, respectively.

In the second analysis, when considered the effect of indices on seed cotton yield revealed that the effects of seed index and harvest index were significant with respect to G80 in Beni Souif and Minia, respectively.

On the other hand, when considered the effect of boll components on lint cotton yield, exhibited effects of both number of seeds per boll and dry weight per boll were significant with respect to G80 in Beni Souif and Minia, respectively. Also, the effect of indices on lint cotton yield revealed that the effect of seed index was significant with respect to G80 in Beni Souif.

As an explanation of such results, the effects of dry weight per boll, number of seeds per boll and seed index were strong on seed and lint cotton yield for G80.

In this respect, Idris (2008) in his evaluation of some Egyptian cotton genotypes in the Delta, found that the effect of boll weight and then the additional effect of seed index on seed cotton yield exhibited that the effect of boll weight was significant with respect to G86. On the other hand, when considered the effect of boll weight and then the additional effect of lint percentage on lint cotton yield exhibited that effect of lint percentage was significant with respect to G89 x G86 in the Delta.

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تقييم صنفين من القطن المصري في الوجه القبلي

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ملخص

تم تقييم محصول ى القطن الزهر والشعر و مكونات اللوزة (الوزن الجاف ، وزن القطن الزهر ، عدد البذور) ، المعاملات (معامل الحصاد للوزة ، معامل البذرة ، معامل الشعر ، معدل الحليج) ، الصفات التكنولوجية (الطول ، الميكرونير ، بريسلى) لصنفين من القطن المصري هما جيزة 80 ، جيزة 90 فى ثلاث مواقع بالوجه القبلي (بنى سويف ، المنيا ، أسيوط) فى موسمي 2010 ، 2011 ما عدا موقع أسيوط موسم 2010 بهدف تقييم القطن باستخدام أصغر وحدة من المربع اللاتيني. تم تقييم الصنفين فى خمس مربعات لاتيني (2 x 2) في كل موقع وتم تجميع الخمس مربعات معا لتكوين تصميم cross over designs.

أظهرت النتائج تفوق جيزة 90 معنويا بالنسبة لمحصول القطن الزهر في بنى سويف كما تفوق جيزة 80 فى معدل الحليج وجيزة 90 في معامل الحصاد في جميع المواقع ويرجع ذلك إلى صغر الوزن الجاف للوزة و من ناحية أخرى لوحظ أن الاختلافات بين الصنفين محدودة بالنسبة إلى عدد البذور باللوزة باستثناء موقع أسيوط.

وأشارت نتائج الصفات التكنولوجية إلى أن قيم طول الليفة وقراءة الميكرونير كانت أعلى للصنف جيزة 80. وأظهرت نتائج تحليل الانحدار المتعدد أن تأثير كل من الوزن الجاف للوزة ، عدد البذور باللوزة ومعامل البذرة كان قو يا بالنسبة للمحصول الزهر والشعر. تعتبر هذه الدراسة مهمة لبرامج التقييم من حيث هدفها وطريقة التحليل الإحصائي المستخدمة.

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