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GRADE COMPONENTS IN RELATION TO GROWING SEASON, COTTON VARIETIES AND LINT GRADE

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Abstract

This study was carried out on eight Egyptian cotton varieties namely , Giza 45, Giza 70, Giza 76, Giza 77 (extra long staple) Giza 75, Giza 81, Giza 80 and Dendara (long staple) Yield of 1989 , 1990 and 1991 seasons to invistigate the relation of growing season, lint grade and cotton variety with trash content, micronaire value , Rd% and +b (lint grade components). Four lint grades of each variety were used for the determination of these characteristics by using HVI 900 system. The results indicated that high grades of lint were of low trash content, +b values and of high microniare reading and Rd% . Growing season and cotton variety affected significantly these characterisitcs. The interactions between growing season, cotton variety and lint grade were studied.

INTRODUCTION

Lint grade is a visual measure of the amount of foreign matter, lint colour, ginning preparation and the status of fiber quality in the grade sample .Therefore, trash content, colour (Rd %, +b) and maturity of fibers are the basic components of lint grade. The values of these components are different from one variety to another for the same lint grade and from year to year for the same variety and lint grade.

Nickerson (1960), Sallouma (1970) Abdel-Mohsen and Al-Ashwat (1976),

Hegab *et al.* (1989), Mahgoub *et al.* (1985) and Cotton Grading Research Section (1985) found that the higher the lint grade the higher the lint grade, the higher the reflectance percent Rd% , micronaire value , but the lower the yellowness.

Amin (1968), Abdel-Mohsen and Ahmed (1973), Ahmed (1977) , Hegab (1978) and Mahgoub *et al.* (1985) found that lint grade negatively corelated with trash content in commerical varieties.

Cotton variety and environmental growth conditions (growing season) have a significant effect on micronaire value. El-Hariry (1980) found that both variety and growing season had signifcant effect on micronaire value. Cotton Grading Research Section (1985) reported that both varieties and growing season affected significantly micronaire value , trash content % and colour measurements .

Therefore, the main objective of this sutdy was to invistigate the relation of growing season, lint grade, cotton variety and their interactions with trash content %, micronaire value, reflectance percent Rd% and yellowness in Egyptian cotton.

MATERIALS AND METHODS

This study was carried out in Cotton Technology Research Laboratories, Cotton Research Institute, Agricultural Research Center, on eight Egyptian cotton varieties namely; Giza 45, Giza 70, Giza 76, Giza 77, (Extra - long staple) , Giza 75, (Delta). Giza 81, Giza 80 and Dendara (long staple) . Four lint grades ; (G/FG, G, FGF/G and FGF) were included. The lint cotton samples were obtained from cotton co-operative marketing orgainzation, in 1989, 1990 and 1991 growing seasons. Four replicates of each lint grade were used in determination of trash content %, micronaire value , Rd% (percent reflectance) and +b (yellowness) by using HVI 900 system according to ASTM 1986 . The data obtained were computed in SAS analysis of variance to get the effect of studied factors and their interactions.

RESULTS AND DISCUSSION

Results included the analysis of variance concerning the effect of growing season (Y), lint grade (G) , cotton variety (V) and their interaction on trash content%, micronaire value, percent reflectance (Rd%) and yellowness +b.

Results of the analysis of variance of the four characteristics studied are shown in Table 1. The results show that the relation between growing season (Y) , lint grade (G) , cotton variety (V) and their interactions (first and second order interaction) and each of trash content % , micronaire value , Rd% and +b were significant at 1% level except the effect of Y x V x G on micronaire value and Rd % which was insignificant.

Table 1. Analysis of variance of grade components.

Sources	df	Grade components							
		Trash content %				Micronaire value		+b	Rd%
		Ms	F	Ms	F	Ms	F	Ms	F
Year (Y)	2	1.97	3188 **	2.67	46.89 **	20.77	1647 **	25.40	7.87 **
Varieties (V)	7	2.20	3909 **	1.31	22.89 **	77.08	6115 **	779.67	241.71 **
Grade (G)	3	20.70	3909 **	5.36	94.02 **	37.64	2986 **	710.93	220.40 **
Y x V	14	0.30	545 **	0.31	5.34 **	0.49	38.5 **	15.33	4.75 **
Y x G	6	0.29	527 **	0.70	11.67 **	0.16	12.51 **	9.84	3.05 **
V x G	21	0.29	521 **	1.10	12.34	0.44	35.18 **	6.12	1.90 **
Y x V x G	42	0.07	115	0.07	1.18	0.09	7.45	5.10	1.50
Error	192	0.01		0.06		0.01		3.23	
Total	287								

** Significant at 0.01 level
* Significant at 0.05 level

A - Main factors (growing season, lint grade and variety) :

Means of area of trash content %, micronaire value, Rd % and +b for each of year, lint grade and varieties are given in Table 2. The results coud be summarized as follows :

1 - 1989 growing season showed the highest means of trash content %, and +b and the lowest means of micronaire value and Rd% whereas, 1991 resulted in the highest mean of micronaire value and Rd% and the lowest means of trash content and

Table 2. Means and LSD values of factors (year, grade and variety) related to grade components.

Sources		Grade componets			
		Trash Content%	Micronaire value	+b	Rd%
Year (Y)	1989	0.949	3.24	11.45	66.48
	1990	0.745	3.43	11.17	67.08
	1991	0.690	3.56	10.55	67.50
LSD 0.05		00.7	0.07	0.03	0.51
Grade (G)	G/FG	0.225	3.72	10.19	70.51
	G	0.526	3.54	10.78	68.59
	FGF/G	0.971	3.28	11.45	65.53
	FGF	1.451	3.11	11.81	63.45
LSD 0.05		0.008	0.08	0.04	0.59
Variety (V)	G.45	0.763	2.99	10.25	67.92
	G.70	0.674	3.65	10.19	70.02
	G.76	0.631	3.44	9.87	71.70
	G.77	0.572	3.48	12.65	62.91
	G.75	0.563	3.39	9.84	71.16
	G.81	0.959	3.41	9.87	70.50
	G.80	1.285	3.55	12.83	61.62
	dendara	0.011	3.38	13.96	60.34
LSD 0.05			0.11	0.05	0.84

+b, the mean values of the four characteristics obtained from 1990 were in between of those obtained from 1989 and 1991. It could be concluded that 1991 produced cleaner, more mature and of good colour quality cottons, whereas 1989 produced cottons of lower levels of their qualities.

2 - The four lint grades could be arranged in descending order according to their means of micronaire value and Rd% as follows: G/FG. G, FGF/G and FGF, whereas it was the ascending ordre for means of trash content % and +b. These results indicated that, the higher the lint grade the higher the maturity values , Rd% values (brightness), the lower the trash content and +b values (darkness). These results are in line with that of Sallouma (1970) , Abd El-Mohsen and El- Ashwat (1976) , Hegab (1978) , Hegab *et al.* (1982) and Mahgoub *et al*. (1985).

3 - Cotton varieties could be arranged in descending order:

a . according to their means of trash content as follows: Dendara, Gia 80 , Giza 45, Giza 70 and Giza 77, Giza 76, Giza 75 and Giza 81.

b . according to their micronaire value means as follows : Giza 70, Giza 80,

Giza 77, Giza76, Giza 81, Giza 75, Dendara and Giza 45.

c . according to their means of Rd % as follows : Giza 76, Giza 75, Giza 81, Giza 70, Giza 45, Giza 77, Guza 80 and Dendara.

d . according to their +b means as follows : Dendara, Giza 80, Giza 77, Giza 45, Giza 70, Giza 76 and Giza 81 , Giza 75.

These results indicated that cotton varieties were different in foreign matter content %, micronaire value, Rd% and +b.

El-Harriry (1980) and Cotton Grading Research Section (1985) obtained the same results.

B- Effect of interactions among growing season (Y) , lint grade (G) and cotton varieties (V):

Means of trash content %, micronaire value, Rd % and +b pertaining first and second order interactions are given in Tables 3, 4, 5 and 6, respectively.

Summarizing the rsults of this study it could be concluded that:

1 - The higher the lint grade the higher the micronaire value (maturity), Rd% (brightness), the lower the +b and trash content %.

2 - Trash content %, micronaire value Rd% and +b could be different from growing season to another. This could be attributed mainly to the environmental conditions during each season and the care in preparing the crop (growing treatments , harvesting and ginning process).

3 - Trash content , micronaire value, Rd% and +b could be different from one lint grade to another for the same variety within the same year, from one year to another for the same lint grade and variety.

Table 3. Relation of season, lint grade, variety and their interactions with trash content percent.

Season (S)	Grade (G)	Varieties (V)								
		G. 45	G. 70	G. 76	G. 77	G. 75	G. 80	G. 81	dandara	Mean
1989	G/FG	0.28	0.24	0.22	0.34	0.22	0.28	0.32	0.28	0.28
	G	0.55	0.62	0.53	0.68	0.35	0.42	0.95	0.61	0.61
	FGF/G	1.22	1.01	0.98	1.15	0.70	0.70	2.35	1.79	1.79
	FGF	1.95	1.85	1.55	2.00	1.30	1.15	2.35	1.79	1.79
Mean		1.00	0.93	0.82	1.04	0.64	0.64	1.36		
1990	G/FG	0.20	0.14	0.16	0.24	0.13	0.24	0.25	0.21	0.21
	G	0.42	0.38	0.42	0.50	0.32	0.38	0.80	0.50	0.50
	FGF/G	0.97	0.66	0.88	0.65	0.52	0.65	1.65	0.94	0.94
	FGF	1.20	0.96	1.06	1.25	0.94	0.90	2.20	1.30	1.30
Mean		0.70	0.54	0.63	0.66	0.48	0.54	1.23		
1991	G/FG	0.16	0.13	0.11	0.24	0.20	0.20	0.27	0.19	0.19
	G	0.38	0.43	0.28	0.68	0.34	0.34	0.85	0.48	0.48
	FGF/G	0.85	0.72	0.48	1.24	0.56	0.56	1.70	0.86	0.86
	FGF	0.98	0.94	0.90	1.98	0.93	0.93	2.25	1.24	1.24
Mean		0.59	0.56	0.44	1.04	0.51	0.51	1.27		

	L.S.D. 0.05
SxG	0.22
SxV	0.24
GxV	0.24
SxGxV	0.28

Table 4. Relation of season, lint grade, variety and their interactions with micronaire value.

Season (S)	Grade (G)	Varieties (V)								
		G. 45	G. 70	G. 76	G. 77	G. 75	G. 81	G. 80	dandara	Mean
1989	G/FG	3.1	3.7	3.4	3.5	3.7	3.6	3.8	3.5	3.5
	G	2.9	3.5	3.3	3.3	3.4	3.3	3.5	3.3	3.3
	FGF/G	2.7	3.2	3.1	3.1	3.3	3.2	3.2	3.1	3.1
	FGF	2.6	3.0	3.0	2.9	3.1	3.0	3.1	3.1	2.9
Mean		2.8	3.4	3.2	3.2	3.4	3.3	3.4	3.3	
1990	G/FG	3.2	4.1	3.6	3.7	4.1	3.7	4.5	3.8	3.8
	G	3.0	3.8	3.4	3.5	3.8	3.6	4.1	3.5	3.6
	FGF/G	3.0	3.6	3.3	3.1	3.5	3.3	3.6	3.2	3.2
	FGF	2.8	3.5	3.1	3.0	3.2	3.1	3.2	3.1	3.1
Mean		3.0	3.8	3.4	3.3	3.7	3.4	3.9	3.4	
1991	G/FG	3.4	4.2	4.2	4.2	4.6	3.7	3.9	3.8	3.8
	G	3.2	4.0	4.0	4.2	3.5	3.7	3.5	3.6	3.7
	FGF/G	3.1	3.7	3.6	3.5	3.4	3.4	3.3	3.3	3.1
	FGF	3.0	3.4	3.3	3.2	3.2	3.2	3.2	3.1	3.2
Mean		3.2	3.8	3.8	3.9	3.5	3.6	3.5	3.5	

	L.S.D. 0.05
SxG	0.27
GxV	0.30
VxG	0.31
SxGxV	0.40

Table 5. Relation of season, lint grade, variety and their interactions with percent reflectance (Rd%).

Season (S)	Grade (G)	Varieties (V)								
		G. 45	G. 70	G. 76	G. 77	G. 75	G. 81	G. 80	dandara	Mean
1989	G/FG	71.0	73.4	75.0	64.7	73.8	73.8	64.2	63.3	69.9
	G	66.7	71.1	73.4	63.1	71.6	72.0	62.7	61.5	67.8
	FGF/G	65.6	67.5	69.4	62.4	68.0	67.7	61.5	58.5	65.1
	FGF	64.0	65.3	67.7	60.6	65.6	56.6	59.3	56.2	63.2
Mean		66.8	69.3	71.4	62.7	70.0	64.8	61.9	59.9	
1990	G/FG	71.6	74.8	76.8	66.9	75.0	74.8	65.2	64.0	71.4
	G	67.3	72.2	75.9	64.4	73.5	73.2	64.0	63.0	69.2
	FGF/G	66.8	68.8	70.3	63.0	69.0	68.4	59.4	58.0	65.5
	FGF	65.2	66.2	68.2	62.0	67.0	66.8	58.2	57.0	63.8
Mean		67.7	70.5	72.8	64.1	71.1	70.8	61.7	60.5	
1991	G/FG	72.2	74.1	74.0	64.2	76.0	74.5	65.3	63.8	70.5
	G	70.0	71.3	72.2	63.4	74.8	72.8	64.0	62.0	68.8
	FGF/G	68.0	68.5	69.5	60.8	70.0	69.4	63.2	59.4	66.1
	FGF	66.6	67.0	68.0	59.4	68.6	67.5	62.4	57.5	64.6
Mean		69.2	70.2	70.9	61.9	72.3	71.1	63.7	60.7	

	L.S.D. 0.05
SxG	0.72
SxV	0.93
GxV	1.04
SxGxV	1.66

Table 6. Relation of season, lint grade, variety and their interactions with yellowness.

Season (S)	Grade (G)	Varieties (V)								
		G. 45	G. 70	G. 76	G. 77	G. 75	G. 81	G. 80	dandara	Mean
	G/FG	9.3	9.5	9.2	12.4	9.4	9.5	12.6	12.8	10.6
1989	G	10.8	10.6	9.7	12.8	9.7	10.0	13.0	13.3	11.2
	FGF/G	11.4	11.2	10.7	13.2	10.5	10.7	13.4	13.6	11.8
	FGF	11.6	11.5	11.0	13.4	11.2	11.0	13.7	13.8	12.2
Mean		10.8	10.7	10.2	13.0	10.2	10.3	13.2	13.4	
	G/FG	9.0	9.2	8.8	12.2	9.2	9.1	12.5	12.5	10.3
1990	G	10.7	10.4	9.3	12.6	9.5	9.5	12.8	12.8	10.9
	FGF/G	11.2	11.0	10.5	12.9	9.9	10.3	13.4	13.2	11.6
	FGF	11.5	11.3	10.8	13.1	10.6	10.6	13.6	13.6	11.9
Mean		10.6	10.5	9.9	12.7	9.8	9.9	10.1	13.0	
	G/FG	8.5	8.2	8.8	11.6	8.5	8.5	11.5	11.7	9.7
1991	G	9.0	8.6	9.2	12.0	9.1	9.0	12.0	12.3	10.2
	FGF/G	9.7	10.2	10.0	12.6	10.0	10.0	12.5	12.7	10.2
	FGF	10.3	10.6	10.4	13.0	10.5	10.3	13.0	13.2	10.7
Mean		9.4	9.4	9.6	12.3	9.5	9.5	12.3	12.5	

	L.S.D. 0.05
SxG	0.22
SxV	0.24
GxV	0.24
SxGxV	0.28

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العلاقة بين موسم النمو وصنف القطن ورتبة القطن الشعر ومكونات الرتبة فى القطن المصري

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معهد بحوث القطن - مركز البحوث الزراعية

أجريت هذه الدراسة علي ثمانية أصناف من القطن المصري هي جيزة ٤٥، جيزة ٧٠، جيزة ٧٦، جيزة ٧٧، جيزة ٧٥، جيزة ٨١، جيزة ٨٠، ودندرة في مواسم ١٩٨٩، ١٩٩٠و ١٩٩١ لدراسة تأثير موسم النمو وصنف القطن ورتبته علي كل من نسبة المواد الغريبة ، قراءة الميكرونير ، درجة الإنعكاس ٪، ودرجة الإصفرار (مكونات رتبة القطن الشعر) وذلك باستخدام أربعة رتب للقطن الشعر هي : (جـ ، فج، جـ ، فجف/ جـ . نجف) ، كما تم استخدام جهاز HVI لتقدير الصفات المذكورة.

وأوضحت نتائج تحليل التباين ما يلي

١ - كان لموسم النمو تأثيرا معنويا علي مكونات الرتبة وقد تميزت جميع الرتب في موسم ١٩٨٩ بمحتوي أعلي من المواد الغريبة وارتفاع في قيمة درجة الإصفرار ، بينما إنخفضت كل من قراءة الميكرونير ودرجة الإنعكاس بالمقارنة بموسم ١٩٩١، بينما تميز موسم ١٩٩٠ بقيم متوسطة لهذه الصفات بالمقارنة بالموسمين الاخرين .

٢ - كان تأثير الاصناف علي مكونات الرتبة عالي المعنوية وأظهر الصنف دندرة أعلي قيمة لمحتوي المواد الغريبة بينما كان الصنف جيزة ٧٠ أعلاها في متوسط قراءة المكيرونير والصنف جيزة ٧٦ أعلاها في متوسط درجة الانعكاس والصنف دندرة أعلاها في متوسط درجة الإصفرار.

٣ - كان تأثير التفاعل بين الصنف والرتبة علي مكونات الرتبة معنويا.