Impact of Reciprocal Position of The Conventional Roller Gin Stand Fixed Knife on Ginning Efficency and Cotton Fiber Properties

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ABSTRACT: This investigation was carried out at Plant Production Department, Faculty of Agriculture (Saba Basha), Alexandria University, Egypt, during 2014/2015 season to study the impact of reciprocal position of the conventional roller gin stand fixed knife and seed cotton grade on ginning efficiency and cotton fiber properties of two long staple cotton cultivars. Two fixed knife positions, (Reciprocal and normal position) besides, three seed cotton grades; namely; Good + ¼, Good (G), and Good – ¼, belonging to two commercial Egyptian long staple cotton varieties; namely; Giza 92 and Giza 86. The obtained results clarified that the reciprocal position of the fixed knife, surpassed the normal position and gave the highest mean values of gin stand capacity (kg/inch/hr) and lint cotton grade. Concerning H.V.I. fiber properties, insignificant impact due to the fixed knife position on the most of fiber properties was found. With respect to the effect of seed cotton grade, the highest mean values of the gin stand capacity (kg/inch/hr), ginning out-turn (%), lint grade, upper half mean length (mm), uniformity ratio, fiber strength (g/tex), fiber maturity (%) and reflectance degree (Rd %) were recorded for the highest seed cotton grade (Good + ¼). Meanwhile, the highest mean values of yellowness degree (+b), trash area (%), trash count and nep count were recorded by the lowest seed cotton grade (Good - ¼).

Key words: Reciprocal; Normal; Position; Seed cotton grade; Fiber properties

INTRODUCTION

The Egyptian cotton is unique cotton that is characterized by high quality; it gained worldwide excellent reputation, for the highest lint length, fineness and maturity among the world cottons. Nowadays, the main problem facing the cotton ginning industry in Egypt, besides decreasing the cultivated area, is the low productivity of the conventional roller gin stand that used in all Egyptian ginning mills.

Actually, three types of conventional roller gin stands are being used in Egypt: single roller (McCarthy), single roller (Turkish) and double roller (Indian). Their productivity are not reaching 1 kantar/hour of lint cotton at the favorable conditions. In spite of this decline in productivity, no attempts were made for developing this type of gin stands for a long time. The decline of productivity could be due to reduction of the ginning roller surface area proposed to seed cotton locks (0.5 * 40 = 20 in.) during half the time of ginning.

Armijo and Gillum (2005) conducted an experiment to determine the performance of experimental stationary knives when ginning upland cotton. Three knives were modified to allow an opening between the knife and the ginning roller of {2.4, 4.0 and 5.6 mm} depth, respectively. A standard stationary knife has

practically no opening. The only fiber and cottonseed properties that were affected by stationary knife design included color reflectance, color yellowness, foreign matter content in the lint, and cotton seed linters content. Foreign matter content in the lint, increased as the opening between the stationary knives and ginning roller increased. The highest ginning rate was obtained with a 2.4 mm deep opening between the stationary knife and ginning roller. Abdel-Hameed *et al.* (2012) found that the developed gin stand performance recorded a maximum of ginning efficiency, gin stand capacity, lint turn out percentage.

As well as the gin stand developed was considered the best for ginning Egyptian seed cotton samples. Patil and Padole (2003) stated that the roller gin is used on high quality, fine fibred, extra-long staple cottons because of its tendencies to maintain fiber length and low nep levels as opposed to the adverse effects on these characteristics by the saw gins. Uniform pressure between fixed knife and roller plays an important role in quality and the output of the lint. Patil *et al.* (2007) revealed that with the increase in roller and beater speed, ginning rate was increased considerably. Anthony and William (1994) recorded that the principal function of the cotton gin is to separate lint from seed, but the gin must also be equipped to remove foreign matter, moisture, and other contaminants that significantly reduce the value of the ginned lint. Gins must produce a quality of lint that brings the grower maximum value while meeting the demands of the spinner and consumer. Operating gin machinery in accordance with the recommended speeds, adjustments, maintenance, and throughput rates will produce the highest possible fiber quality.

A standardized sequence that includes dryers to obtain the proper moisture level as well as machines to remove the foreign matter is recommended for processing cotton at the gin. Bourland (2010) stated that the new ginning technology that is now showing promise is the high speed roller gin. By adding a cooling system to the roller, feed rate can be increased drastically, comparable to saw ginning rates. Also, adhesion of fiber to seed of varieties is being examined with the goal of identifying ones that would gin more easily on a roller gin.

The highest mean values of gin stand capacity, ginning out-turn, lint grade, micronaire value, fiber elongation (%) and reflectance degree (Rd %) were obtained from the highest seed-cotton level, Good to Fully Good (Ibrahim 2010). Batisha (2005), concluded that all studied ginning efficiency parameters were significantly affected by seed cotton level except ginning out turn. Otherwise, the fiber staple length, degree of reflectance (Rd %), degree of yellowness (+b), proportion of maturity (PM), hair weight bundle strength and elongation (%) were significantly affected by the cotton cultivar. Beheary (1989) concluded that the gin stand capacity and ginning out turn were affected significantly by the seed cotton grade.

The highest seed cotton grade the more the ginning efficiency and vice versa. The highest seed cotton grades recorded the best grade component (color index and non-lint content), fiber length parameters, fiber fineness, highest fiber tenacity and elongation. Frig (2002), concluded a highly significant differences

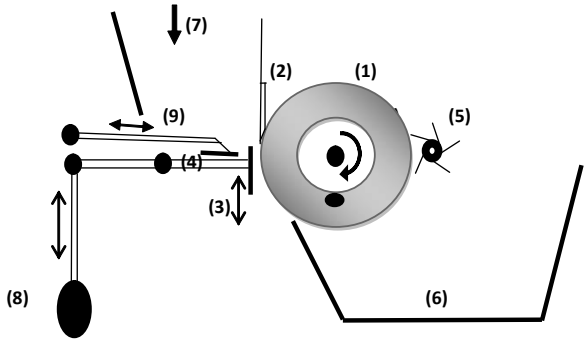
between the studied treatments in the ginning efficiency parameters, ginning time, gin stand capacity and ginning out turn. The orthogonal comparisons of the studied treatments demonstrated that seed cotton level (FGF/G) significantly surpassed, (GF) in the ginning time, gin stand capacity and the ginning out turn. This could be attributed to the higher percentage of fluffy locks and the lower trash content in the higher seed cotton level than the lower one. The seed cotton cleaning was significantly surpassed uncleaning.

Therefore, the main objective of this study was to develop the conventional roller gin stand through increasing the ginning roller surface area exposed to seed cotton, all the time by changing position of the fixed knife.

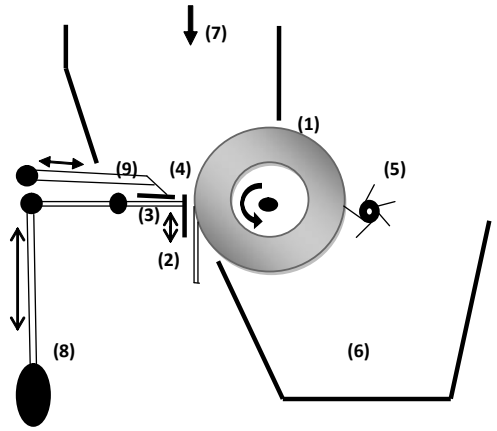
MATERIALS AND METHODS

This study was carried out at Plant Production Department, Faculty of Agriculture (Saba Basha), Alexandria University, Egypt, during 2014/2015 season. The experimental work was done at El-Arabia ginning Mill, Damanhour, Al-Beheira Governorate, using two commercial Egyptian cotton varieties (*G. barbadense* L.), namely; Giza 92 and Giza 86. Three seed cotton grades; Good + ¼, Good, Good – ¼ from each variety, were used. Six seed cotton samples (3 kilograms each) were randomly drawn from each seed cotton grade and divided into two groups (three replicates each).

Two single roller gin stands (McCarthy type) were used; the first was a conventional roller gin stand with the normal (upper vertical) position of the fixed knife and ginning roller made from natural leather ribbons with a diameter of 8 inches, (Design A) and the second was the modified roller gin stand with reciprocal (lower vertical) position of the fixed knife and ginning roller made from chrome composite leather clad (CCLC) - with a diameter of 7 inches, (Design B). The first group of samples belonging to each seed cotton grade was ginned using the modified gin stand and the second was ginned using the normal one. The ginning time in minutes was recorded and ginned lint was weighed for each replicate.



Design (A): The normal position of the fixed knife of the conventional roller gin stands (Side view)



1	Ginning roller	4	Seed grid	7	Hopper
2	Fixed knife	5	Doffer	8	Eccentric
3	Moving knife	6	Lint box	9	Pusher board

Design (B): The reciprocal position of the fixed knife of the modified roller gin stand (Side view)

Studied characters:

1. Ginning efficiency parameters

These parameters were calculated, according to the following equations, proposed by Chapman and Stedronsky (1959).

1.1. Gin stand capacity (G.S.C.)

as the lint weight in kg per inch per hour, as follows:

Gin stand capacity (G.S.C.) = 60 X weight of ginned lint (kg)/ Ginning time (minute) X Length of roller (inch) = (kg/inch/hr)

1.2. Ginning out-turn, (G.O.T.)

as a percentage, as follows:

Ginning out-turn (G.O.T.) = [Lint cotton weight (kg)/Seed cotton weight (kg)] X 100 = (%)

1.3. Lint grade

was determined by three classers two from (CATGO) and the third one from Modern Nile Cotton Company. All lint grades were reviewed by the head sector of sworn experts sector at El-Arabia ginning mill at Damnhour, El- Beheira Governorate.

For statistical analysis, the lint grades were converted to code numbers, as in the following:

Table (1). Grade analysis of the Egyptian cotton by (Sallouma, 1970)

Grade	Abbreviation	Code
Fully good	FG	33
Good/fully good	G/FG	29
Good	G	25
Fully good fair/good	FGF/G	21
Fully good fair	FGF	17
Good fair/fully good fair	GF/FGF	13
Good fair	GF	9
Fully fair/good fair	FF/GF	5
Fully fair	FF	1

$^{1}/_{16}$ grade is represented by half mark.

2. Fiber properties by H.V.I. Instrument:

Fiber properties were determined by the High Volume Instrument (H.V.I.) Premier HFT 1000 system at the laboratory of the Cotton Arbitration and Testing General Organization (CATGO), Alexandria, Egypt. Samples were preconditioned for 48 hours at least under the standard conditions of 65 % ± 2 % relative humidity and 20 ± 1ºC temperature before testing.

3. Nep count:

was determined by the Nep Tester.

4. Statistical procedures:

The completely randomized design with three replications was used to outline this work. The attained data was statistically analyzed as a factorial experiment according to Steel and Torrie (1980). Ststistical analysis was done by, ANOVA, F-test, and least significant differences (L.S.D.) at 0.05 level of probability procedures available within SAS software package (version 9.13, 2007).

RESULTS AND DISCUSSION

The attained results could be presented in three main categories as follows:

1. Fixed knife position effect:

1.1 . Gin stand capacity (kg/inch/hr)

Data shown in (Table 2) revealed that there were highly significant differences among the studied two gin stands, (reciprocal and normal position of the fixed knife). The highest mean values of gin stand capacity (1.06 and 1.21 kg/inch/hr) were recorded by the modified gin stand with the reciprocal position of the fixed knife. On the other hand, the lowest mean value for the same character (0.90 and 1.01 kg/inch/hr) were obtained using the normal position of the fixed knife of the conventional roller gin stand for Giza 92 and Giza 86 cotton varieties, respectively.

Generally, it could be concluded that the gin stand capacity of the reciprocal position of the fixed knife surpassed the normal position by 17.77 % and 19.80 % for Giza 92 and Giza 86, respectively.

These results could be attributed to that the reciprocal fixed knife position increased the ginning roller surface area exposed to seed cotton provided to tangle the seed cotton with the ginning roller surface area. Thus increased the chance for seed cotton locks to attach roller surface and creating more ginning points along the length of the ginning roller, consequently increase the gin stand capacity.

Finally, conclude that the new idea to develop the roller gin stand using the reciprocal position of the fixed knife, lead to increasing the gin stand capacity in the Egyptian cotton varieties.

1.2. Ginning out-turn (%)

With regard to data in (Table 2), it could be noticed that the ginning out-turn was significantly influenced by the fixed knife position for Giza 92 variety only. The highest mean value of the ginning out turn (37.08 %) was gained using the normal position of fixed knife. On the other hand, the lowest mean value for the same character (35.64 %) was recorded using the reciprocal position of the fixed knife for that variety.

The previous results could be explained on the bases that the ginning out-turn is controlled by the genetically structure of variety and less affected by the environmental conditions.

Table (2) Mean values of gin stand capacity, ginning out turn, lint grade and reflectance degree as affected by the fixed knife position (P), seed cotton grade (G) and their interaction (P * G), for Giza 92 and Giza 86 cotton varieties.

Factors	Gin stand capacity (kg/inch/hr)		Ginning out turn (%)		Lint grade		Reflectance degree (Rd. %)	
	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86
Fixed knife position (P)								
Reciprocal	1.06	1.21	35.64	34.90	27.44	26.50	74.63	70.42
Normal	0.90	1.01	37.08	34.93	26.67	25.33	76.30	69.73
F test	**	**	**	N.S.	**	**	**	N.S.
Seed cotton grade (G)								
Good + ¼	0.82c	1.28a	37.25a	37.32a	28.16a	27.83a	77.42a	75.33a
Good	0.91b	1.05b	35.72b	34.13b	27.33b	25.92b	75.02b	69.26b
Good - ¼	1.22a	1.00c	36.12b	33.28c	25.67c	24.08c	73.97c	65.63c
L.S.D. (0.05)	**0.04**	**0.04**	**0.71**	**0.26**	**0.49**	**0.67**	**0.91**	**1.21**
Interaction								
P * G	N.S.	N.S.	N.S.	**	*	*	*	*

Mean values designated by the same letter are not significantly different according to L.S.D. at 0.05 values.
* And ** Significant at 0.05 and 0.01 levels of probability, respectively.
N.S.:Not significant.

1.3. Lint grade

Looking at the data shown in (Table 2), it could be noticed that the lint grade for both Giza 92 and Giza 86 cotton varieties was significantly affected by the studied fixed knife position and seed cotton grade.The highest mean values of the lint grade code (27.44 and 26.50) were recorded using the reciprocal position of the fixed knife for the two studied cotton varieties Giza 92 and Giza 86, respectively. On the contrary, the lowest mean values (26.67 and 25.33) of the lint grade code was attained using the normal position of the fixed knife for both cotton varieties Giza 92 and Giza 86, respectively.

1.4. The reflectance degree (Rd %)

The reflectance degree (Rd %) for Giza 92 was significantly affected by the fixed knife position and insignificantly influenced by the same factor in case of Giza 86 cotton variety as illustrated in (Table 2). The normal position possessed the highest mean value of this trait.

1.5. H.V.I. Fiber properties

With regard to (Table 3 a), it could be noticed that there were insignificant differences due to the fixed knife position concerning the fiber properties i.e., upper half mean length (mm), uniformity ratio (%), short fiber index (w) and fiber strength (g/tex). Meanwhile, the fiber elongation (%) of Giza 86, only, was significantly

increased using the normal position of the fixed knife. Concerning data in (Table 3 b), it is obvious that the effect of fixed knife position was insignificant on all H.V.I. fiber properties except, trash area (%) of Giza 86. The highest mean value of the trash area, (1.32 %) were recorded using the normal fixed knife position.

2. Seed cotton grade effect:

2.1 Gin stand capacity (kg/inch/hr)

As for the effect of seed cotton grade, it was obvious that the highest gin stand capacity (1.28 kg/inch/hr) was gained from the highest seed cotton grade (Good + ¼) while, the lowest mean value for the same property (1.00 kg/inch/hr) was gained using the lowest seed cotton grade (Good - ¼) for Giza 86. The opposite trend was observed for Giza 92 cotton variety as shown in Table (2).

These results could be explained for Giza 86 on the basis that higher seed-cotton grade contained higher percentage of healthy fluffy locks and a low percentage of dust, trash and infected locks and vice versa (Ibrahim, 2010).

2.2. Ginning out turn (%)

Furthermore, data presented in the same table revealed that the ginning out-turn was significantly affected by seed-cotton grade. It could be concluded that the ginning out-turn, correspondingly, decreased as the seed-cotton grade decreased. It is obvious that the best ginning out-turn (37.25 and 37.32 %) were attained from the highest seed-cotton grade (Good + ¼) of Giza 92 and Giza 86, respectively. These results may be due to the highest seed cotton grades containing the highest of the fluffy mature untwisted locks, compared with the compact locks and high trash content in the lowest seed cotton grades.Generally, it could be concluded that the highest seed cotton grades give directly the highest percentage of the ginning out turn, and vice-versa.

Table (3a). Mean values of H.V.I. fiber properties as affected by the fixed knife position, seed cotton grade and their interaction (P * G), for Giza 92 and Giza86 cotton varieties.

Factors	Upper half mean length (mm)		Uniformity Ratio (%)		Short fiber Index (w)		Fiber strength (g/tex)		Fiber elongation (%)	
	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86
Fixed knife position (P)										
Reciprocal	32.56	31.57	86.65	86.34	6.40	6.45	43.93	38.40	5.40	6.64
Normal	32.52	31.59	87.52	85.64	6.34	6.70	43.78	38.47	5.60	7.20
F_{test}	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	*****
Seed cotton grade (G)										
Good + ¼	32.15a	32.28a	86.98a	89.23a	6.50a	5.71b	44.60a	42.33a	5.43a	6.10b
Good	32.91	31.37b	87.62a	84.30b	6.22a	7.16a	43.48a	36.18b	5.70a	7.16a
Good - ¼	32.55a	31.10b	86.67a	84.45b	6.40a	6.85a	43.48a	36.80b	5.35a	7.50a
$L.S.D._{(0.05)}$	**N.S.**	**0.75**	**N.S.**	**2.01**	**N.S.**	**0.58**	**N.S.**	**1.14**	**N.S.**	**0.65**
Interaction										
P * G	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	******	**N.S.**	**N.S.**

Table (3b). Mean values of H.V.I. fiber properties as affected by the fixed knife position (P), seed cotton grade (G) and their interaction (P*G), for Giza 92 and Giza86 cotton varieties.

Factors	Micronaire value		Fiber maturity (%)		Yellowness degree (+b)		Trash area (%)		Trash count (%)		Nep count	
	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86	Giza 92	Giza 86
Fixed knife position (P)												
Reciprocal	3.52	4.53	0.85	0.86	8.63	10.06	0.77	0.86	69.00	59.55	99.55	77.22
Normal	3.48	4.65	0.85	0.86	8.42	10.05	0.54	1.32	56.22	76.55	99.44	74.22
F test	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	*****	**N.S.**	**N.S.**	**N.S.**	**N.S.**
Seed cotton grade (G)												
Good + ¼	3.27b	4.90a	0.85a	0.88a	8.53a	9.11b	0.50a	0.35b	45.17b	29.50b	109.33a	70.16b
Good	3.70a	4.58b	0.85a	0.86b	8.27a	10.35a	0.66a	1.40a	78.00a	76.83a	96.500a	72.66b
Good - ¼	3.53a	4.28c	0.85a	0.85c	8.78a	10.71a	0.80a	1.52a	64.67ab	97.83a	93.670a	84.33a
L.S.D. (0.05)	**0.17**	**0.16**	**N.S.**	**0.008**	**N.S.**	**0.38**	**N.S.**	**0.49**	**23.007**	**21.12**	**N.S.**	**7.98**
Interaction												
P * G	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**	**N.S.**

Mean values designated by the same letter are not significantly different according to L.S.D. at 0.05 values.
***and **: Significant at 0.05 and 0.01 levels of probability.**
N.S.: Not significant.

2.3. Lint grade

Looking data presented in (Table 2), it could be noticed that the lint grade was significantly decreased as the seed cotton grade decreased.

Generally, it could be mentioned that the lint grade increased significantly by increasing the seed cotton grade in a direct positive trend. It is obvious that the highest mean values of lint grade code (28.16 and 27.83) were obtained from the highest seed cotton grade (Good + ¼), of Giza 92 and Giza 86 varieties, respectively. Otherwise, the lowest seed cotton grade (Good - ¼) recorded the lowest mean values of the lint grade code (25.67 and 24.08) for Giza 92 and Giza 86 varieties, respectively.

2.4. The reflectance degree (Rd %)

The seed cotton grade significantly affected the reflectance degree (Rd %) for both studied cotton varieties (Table 2). The reflectance degree correspondingly increased as the seed cotton grade increased.

2.5. H.V.I. Fiber properties

Regarding the seed cotton grade effect, data presented in (Table 3 a) clarified that this factor had significant effect on all studied H.V.I. fiber properties of the cotton variety Giza 86 only. The highest mean values of fiber length (32.28 mm), uniformity ratio (89.23 %) and fiber strength (42.33 g/tex) were obtained from the highest seed cotton grade (Good + ¼). Moreover, lower seed cotton grades (Good and Good - ¼) gave the highest mean value of short fiber index (w) and fiber elongation (%). This could be explained on the basis that whenever the seed cotton grade decreased, the weak fibers increased.

Data presented in (Table 3 b) cleared that seed cotton grade had significant effect on all H.V.I. fiber traits of the two cotton varieties, except fiber maturity (%), yellowness degree (+b), trash area (%) and nep count of Giza 92. The highest seed cotton grade (Good +1/4) recorded the highest mean values of micronaire reading and fiber maturity (%), while the seed cotton grade (Good +1/4) recorded the lowest mean values of yellowness degree (+b), trash area, trash count (%) and nep count. On the contrary, the lowest seed cotton grade (Good -1/4) possessed the highest mean values of yellowness degree (+b), trash area, trash count and nep count, as well as the lowest mean values of micronaire reading and fiber maturity (%) in Giza 86 variety. Concerning cotton variety Giza 92 worthy to mention that the highest mean values of micronaire value and trash count was gained from the seed cotton grades (Good and Good – 1/4), on the other hand, the highest seed cotton grade (Good +1/4) recorded the lowest mean values for the same fiber properties.

3. The interaction between fixed knife position and seed cotton grade (P * G):

The interaction between fixed knife position and seed cotton grade (P * G) was insignificant for gin stand capacity (Table 2). Meanwhile, this interaction was significant for ginning out-turn (%) of the cotton Giza 86 variety as well as lint grade and reflectance degree (Rd %) for both studied cotton varieties as shown in (Table 2). The interaction between fixed knife position and seed cotton grade (P * G) was insignificant for all H.V.I. fiber properties of the two cotton varieties Giza 92 and Giza 86 except the fiber strength of Giza 86 as presented in (Table 3 a).

Mean values of the ginning out-turn (%), lint grade, fiber bundle strength (g/tex) and reflectance degree (Rd. %) traits as influenced by this interaction are shown in (Table 4).

The highest mean values of the lint grade code and fiber bundle strength (g/tex) were recorded by the highest seed-cotton grade (Good + ¼) which was ginned using the reciprocal position of the fixed knife for the two varieties and Giza 86 with normal fixed knife position.

Meanwhile, the highest mean values of the ginning out turn and reflectance degree (Rd. %) were gained using the highest seed-cotton grade (Good + ¼) which was ginned using the normal position of the fixed knife. On the other hand, the lowest mean value of the same traits was attained using the lowest seed cotton grade (Good - ¼) ginned using the normal position of the fixed knife.

However, the lowest mean value of the lint grade code was attained using the lowest seed-cotton grade (Good - ¼) ginned using the normal position of the fixed knife. These results could be explained on the basis that, as the seed cotton grade increased, the size of seed cotton locks and fiber maturity increased and gave the best fiber properties and vice versa.

Table (4).The interaction between fixed knife position and seed cotton grade (P*G) for ginning out turn, lint grade, fiber strength and reflectance degree of Giza 92 and Giza 86 cotton varieties.

Factors		Ginning out turn (%)	Lint grade		Fiber strength (g/tex)	Reflectance degree (Rd. %)	
Fixed knife position (P)	Seed cotton grade (G)	Giza 86	Giza 92	Giza 86	Giza 86	Giza 92	Giza 86
Reciprocal position	Good + ¼	37.03b	28.67a	28.00a	42.56a	77.20a	74.63a
	Good	34.20c	27.33b	26.50b	34.73c	73.63bc	70.13b
	Good - ¼	33.48d	26.33c	25.16c	37.90b	73.06c	66.50d
Normal position	Good + ¼	37.61a	27.67b	27.66a	42.10a	77.63a	76.03a
	Good	34.08c	27.33b	25.33c	37.63b	76.40a	68.40c
	Good - ¼	33.09e	25.00d	23.00d	35.70c	74.86b	64.76e
L.S.D. (0.05)		0.37	0.69	0.96	1.62	1.29	1.71

Mean values designated by the same letter are not significantly different according to L.S.D. at 0.05 values.

CONCLUSION

Worthy to mention that the reciprocal position of the fixed knife, surpassed the normal position and gave the highest mean values of gin stand capacity (kg/inch/hr) and lint cotton grade. Also, the highest mean values of the gin stand capacity (kg/inch/hr), ginning out-turn (%), lint grade, upper half mean length (mm), uniformity ratio, fiber strength (g/tex), fiber maturity (%) and reflectance degree (Rd %) were recorded for the highest seed cotton grade, (Good + ¼).

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الملخص العربى

تأثير الوضع العكسى للسكينة الثابتة للحلاجة الإسطوانية التقليدية على كفاءة الحليج و خواص ألياف القطن

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أُجرى هذا البحث بقسم الإنتاج النباتي– كلية الزراعة (سابا باشا) – جامعة الأسكندرية لدراسة تأثير كلا من الوضع العكسى للسكينة الثابتة للحلاجة الإسطوانية التقليدية ورتبة القطن الزهر على كفاءة الحليج و خواص ألياف القطن. أُستخدِم وضعان للسكينة الثابتة هما: (الوضع المعكوس، والوضع العادى). وإستخِدم ثلاث رتب من القطن الزهر هما:

(جود +1/4، جود ، جود – 1/4) لصنفان من القطن هما: جيزة 92 و جيزة 86 (أصناف طويلة التيلة) موسم 2015/2014.

أوضحت النتائج المتحصل عليها أن الوضع الجديد للسكينة الثابتة (المعكوس The reciprocal position of fixed knife) تفوق على الوضع الطبيعي (العادي The normal position of fixed knife)، حيث أعطى الوضع المعكوس أعلى إنتاجية للحلاجة (كجم/بوصة/ساعة) وأعلى رتبة من القطن الشعر الناتج. بينما كان تأثير وضع السكينة الثابتة غير معنوياً فى أغلب صفات الجودة للألياف.

وفيما يتعلق بتأثير رتبة القطن الزهر يمكن القول بأن أعلى القيم لصفات، إنتاجية الحلاجة (كجم/بوصة/ساعة)، معدل الحليج (%)، رتبة قطن شعر، طول وإنتظامية ومتانة ونضج الألياف، ودرجة نصاعة اللون سُجِلت لأعلى رتبة قطن زهر (جود+1/4)، بينما سَجَلت رتبة القطن الزهر المنخفضة (جود–1/4) أعلى القيم لصفات الألياف غير المرغوبة (درجة الإصفرار، ومساحة وعدد الشوائب وعدد العقد).

وكان تأثير التفاعل Interaction بين عاملى الدراسة معنوياً فقط فى صفتين هما (معدل الحليج ومتانة الألياف (جم/تكس) لصنف جيزة 86، وكان معنوياً فى كلا من رتبة القطن الشعر، درجة نصاعة اللون (Rd %) فى كلا الصنفين.