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3 **Ginning efficiency and fiber quality properties of cotton as affected by roller gin stand**  
4 **feeding methods and seed cotton grade**

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**ABSTRACT:**

**Aims:** Attaining the highest ginning efficiency process and fiber quality properties of Egyptian cotton cultivar 'Giza 88' during feeding methods of roller gin stand is the ultimate objective of the community of cotton field industry for local uses, but the productivity of the three feeding methods of conventional roller gin stand used in ginning process still limited

Therefore, the aim of this investigation is to overcome this obstacle.

**Study design:** This investigation was conducted in a completely randomized design with three replicates and analyzed as a factorial experiment.

**Place and Duration of Study:** Plant Production Department, the Faculty of Agriculture (Saba Basha), Alexandria University, Egypt during 2017.

**Method:** Four seed cotton grades; namely, Good to Fully Good (G/FG), Good + ¼ (G + ¼), Good (G) and Good -¼ (G - ¼) belonging to 'Giza 88' cotton cultivar were used in this work. The extra-long staple Egyptian cotton variety with the pedigree and origin of cotton Giza 88 (Giza 77 x Giza 45 B) was used. This work was carried out in 2017. About half cantar (1 cantar = 157.5 kg) of each seed cotton grade as a bulk sample was thoroughly mixed and checked and reclassified by a committee of three expert classers belong to the Cotton Arbitration for Testing General Organization (CATGO), in the gin plan.

**Results:**

The obtained results indicated that the gin stand's hand feeding method (control treatment); results insignificant increases the highest mean values of the gin stand capacity (0.97 kg lint/inch/h), Lint % (36.59%) and lint grade code (27.33) and the lowest mean value of the ginning time (1.42 h/cantar). Meanwhile, the Belt (2 row) as a mechanical feeding method; gave rise to the lowest mean value of gin stand capacity (0.89 kg lint/inch/h). The differences in fiber length parameters (Upper half mean length and short fiber index), fiber elongation %, micronaire reading, yellowness degree (+b) were not significantly affected. The highest seed cotton grade (Good / Fully Good) gave the better lint cotton grade and the best fiber properties tested by HVI instrument of 'Giza 88' cotton cultivar.

**Conclusion:**

- The hand feeding method of seed cotton to the gin stand surpassed all studied feeding methods in gin stand productivity, lint % and the most HVI fiber properties are better classer grade. Though, this method is recommended to be used specially with the high levels of the extra-long cottons.
- Cylinder feeding method ranked first in order among studied mechanical method and it could be recommended for ginning medium and low seed cotton level.
- Belt (2 rows) is the preferred feeding method regardless of gin stand productivity.

9  
10 *Keywords:* Seed cotton grade, Hand method and Cylinder, feeding method, Fiber quality.

11  
12 **1. INTRODUCTION**

13 Historically, ginning is the process in which seed cotton is subjected to separation of fibers from the  
14 seed with conserving its quality characteristics [1]. The roller gin stand was designed by Fones  
15 McCarthy in 1840. Ginning efficiency usually evaluated as gin stand capacity, ginning time and  
16 ginning out-turn. Generally, the gin stand capacity is influenced by several factors such as gin stand  
17 speed and adjustments, feeding method, cotton variety grade, besides its moisture content. Also, the  
18 feeder of gin stand regulates the flow of seed cotton provided to ginning system according to rate preset  
19 by ginner, beside fluffing and cleaning of the fed seed cotton. Historically, the first method for feeding  
20 gin stand with seed cotton by using hands was designed by Eli Whitney. In Egypt, the hand feeding  
21 remains in use beside two more mechanical feeding methods as the cylinder and belt. The rate of  
22 cleaning, fluffing and regulating the flow of seed cotton to the ginning zone greatly varied from one  
23 method to another, in addition to the lack of uniformity of seed cotton locks distribution along the  
24 ginning roller. On the other hand, some cotton dealers believe that the mechanical feeders in general  
25 have a deleterious effect on ginning efficiency and fiber quality.

26 In 1902 Chessman used a small drum as cleaning feeder to regulate the flow of seed cotton. In 1917  
27 Murray Company invented a draper or a spiked belt as a feeder, a drum type feeder, and saw gin stand,  
28 which was usually located between the ginning roller and the overhead cleaning feeder to provide more  
29 uniformity and slower feeding at the working zones. The feeder was used at this time with modern  
30 roller gin stands. It was a type known as cleaner extractor, it was regulate the feeding the roller gins  
31 with suitable amount of seed cotton [2].The seed cotton feeding rate to the gin stand, significantly  
32 affected the ginning efficiency (ginning capacity and ginning time), lint grade, non-lint content and lint  
33 colour ( Rd% and +b). As the feeding rate increased; the amount of seed cotton increased in ginning  
34 point, while the extractor of tight locks worked as an opener for the seed cotton before ginning in  
35 process. Ginning efficiency increased or decreased owing to the level of feeding rate and the position  
36 of the extractor [3]. Feeding rates of seed cotton to roller gin stand, significantly affected gin stand  
37 capacity, ginning time, non-lint content, but insignificantly affected lint colour ( Rd% and +b) [4]. An  
38 extractor feeder led to lint separation from seeds consistently at higher given feed rate. The obtained  
39 results showed that the performance and capacity of the cage gin can be increased by improving the  
40 separation and distribution of seed cotton on the surface of the roller [5]. Likewise, feeding the gin  
41 stand with seed cotton by hand exhibited the highest gin stand capacity (32.76, 38.8 and 38.9 kg/in/h)  
42 for the belt, cylinder and hand feeding methods, respectively [6]. A new designed extractor-feeder  
43 machine was built to replace both the inefficient belt and cylinder methods that are in use in feeding the  
44 gin stand with seed cotton .The obtained results also show that fixing the speed of the extractor feeder  
45 at 0.7 rpm, resulted in an increase in the gin stand capacity *ca.* 38.5% higher than using hand, and by  
46 about 35% and 27% for cylinder and belt methods, consecutively [7]. Furthermore, the seed cotton hand  
47 feeding method to the gin stand, surpassed all studied feeding methods in gin stand productivity,  
48 ginning out-turn, length uniformity be better classer grade [8]. Gin stand capacity (kg/inch/h) was  
49 increased by increasing the seed cotton grade, while, the ginning time varied within the same variety  
50 using different grades. This could be explained on the basis that each cotton variety has unique  
51 characteristics in terms of staple length, lock size, seed weigh and also the attachment force of the  
52 fibers to seeds [9]. Fiber length parameters considerably depending on the used grade of cotton cultivar  
53 [10].

54 The present research was conducted aiming to investigate the effect of feeding method of  
55 conventional roller gin stand and seed cotton grade on ginning efficiency, lint grades and fiber  
56 properties of the Egyptian extra-long staple cotton variety 'Giza 88'.

## 72 2. MATERIAL AND METHODS

73 This investigation was carried out in the Plant Production Department, the Faculty of  
74 Agriculture (Saba Basha), Alexandria University, Egypt to overcome the research statement. Two  
75 independent variables were under investigation as 1) three feeding methods were used in this research  
76 as follows: hand feeding (control), cylinder feeding and belt feeding (2 rows) of tooth spicks, and 2)  
77 four seed cotton grades; namely, Good to Fully Good (G/FG), Good +  $\frac{1}{4}$  (G +  $\frac{1}{4}$ ), Good (G) and Good  
78 - $\frac{1}{4}$  (G -  $\frac{1}{4}$ ) belonging to 'Giza 88' cotton cultivar during the season of 2017. It is an extra-long staple  
79 Egyptian cotton variety and its pedigree and origin of cotton Giza 88 (Giza 77 x Giza 45 B). About half  
80 cantar (1 cantar = 157.5 kg) of each seed cotton grade as a bulk sample was, thoroughly, mixed and  
81 checked or reclassified by a committee of three expert classers belong to the Cotton Arbitration for  
82 Testing General Organization (CATGO), in the gin plant. The studied samples were attained from the  
83 Arabia Ginning Company, Damanhour, of the commercial cotton received from Shubrakhit region, El-  
84 Beheira Governorate, during 2017 season. The bulk sample (27 kg) of each seed cotton grade was  
85 divided into nine sub- samples (3 kg/replicate), representing the various combinations of both variables

86 (Twelve treatments representing four seed cotton grades and three feeding methods). The studied sub-  
 87 samples were ginned using the conventional single roller gin stand [a roll covered with natural leather  
 88 (McCarthy roller gin)] with the adjustments required for the each grade in the same gin plant.

89 Studied characteristics

90 1. Ginning efficiency parameters:

91 These parameters were calculated according to the following equations, proposed by [11]:

92 1.1. Gin stand capacity (GSC) expressed as the lint weight (kg) per inch per hour, as follows:

$$\text{Gin stand capacity (GSC)} = \frac{60 \times \text{weight of ginned lint (kg)}}{\text{Time (min)} \times \text{Length of roller (inch)}}; = (\text{kg lint /inch/h})$$

93 (Length of roller = 40 inch of the McCarthy roller gin stand)

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95 1.2. Ginning time (GT) was determined according the following equation:

$$\text{Ginning time (GT)} = \frac{\text{Ginning time (minute)} \times 157.5}{\text{Seed cotton weight (kg)} \times 60}; = (\text{h/cantar})$$

96 (1 metric seed-cotton cantar = 157.5 kilograms)

97 1.3. Lint (%): was expressed as a percentage, and determined according the following equation:

$$\text{Lint \%} = \frac{\text{Lint cotton weight (kg)}}{\text{Seed cotton weight (kg)}} * 100; = \%$$

98 1.4. Seed index: The average weight of 100 seeds (g) was determined for each replicate.

99 1.5. Lint grade: The ginned lint of each sample was determined by a three export classers, at (CATGO),  
 100 Alexandria. For statistical analysis, the grades were converted to code numbers [12] as shown in the  
 101 following Table (1).

102 Table (1): Lint cotton grades, their abbreviation and their codes.

Grade	Abbreviation	Code
Extra	Extra	41
Fully good/Extra	FG/Extra	37
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

103 Each 1/8 grade is represented by one mark.

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107 **32. Determination of fiber properties using HVI instrument:**

108 **Description of cotton fiber quality characteristics (USTER® HVI SPECTRUM)**

109 **High Volume Instrument (HVI)**

110 In relation to cotton fiber selection, the HVI system is the primary source of fiber information.

111 This is because of the rapid testing and data access associated with the system. The introduction of the

112 High Volume Instrument (HVI) has revolutionized the process of fiber selection and bale management.

113 The HVI system provides many measures of fiber characteristics including: Micronaire (Mic), fiber

114 length (FL), length uniformity (LU), fiber strength (FS), fiber elongation (FE), trash area (TA), short

115 fiber index (SFI), color reflectance (Rd), and color yellowness (+b). The HVI system was introduced to

116 provide a rapid and accurate testing of cotton fibers in a way that largely resembles the traditional

117 subjective evaluation of cotton by the classer. In the U.S. market, all upland cotton is classed using the

118 HVI system. The rate of HVI testing is generally determined on the basis of throughput in cycle time

119 for one sample to be measured once on all stations. In modern HVI systems, this amounts to

120 approximately 80 tests per hour or approximately 640 tests per eight-hour shift. This feature is

121 important considering the millions of cotton bales that are classed by the system during the harvest

122 season. The flood of data generated by the HVI system can be managed and manipulated by

123 microcomputers and powerful software programs.

124 **Length:** Upper Half Mean Length, Uniformity Index, Short Fiber Index Measured optically in a

125 tapered fiber beard which is automatically prepared, carded, and brushed.

126 **Upper half mean length**  
127 UHML is the mean length by the number of fibers in the largest half by weight of fibers in a  
128 cotton sample, usually measured from the fibrogram. Upper half mean length is normally equivalent to  
129 the staple length. Fiber length which is equivalent to the classer's staple.

130 **Uniformity index:** The ratio between mean length (ML) & Upper half quartile length is called  
131 uniformity index, express as a percentage. Quality characteristic which is proportional to the  
132 variation of the fiber length  $UI = \frac{ML}{UHML} \times 100$

133 **Short fiber index**  
134 Short fiber content is the percentage by number or weight of fibers less than a specified  
135 length, 0.5 inches (12.7mm) for cotton. Measurement of short fibers <0.5 in/12.7 mm.

136 **Fiber Strength**  
137 Fiber strength is measured by breaking the fibers held between clamp jaws. It's reported as  
138 grams per tex, which is the force in grams required to break a bundle of fibers one tex unit in size. A  
139 tex unit is equal to the weight in grams of 1000 meters of fiber. Fiber strength, measured at the fiber  
140 bundle

141 **Strength and elongation**  
142 Breaking tenacity measured on fiber bundle. Strength is measured physically by clamping a  
143 fiber bundle between 2 pairs of clamps at known distance. The second pair of clamps pulls away from  
144 the first pair at a constant speed until the fiber bundle breaks. The distance it travels, extending the fiber  
145 bundle before breakage, is reported as elongation

146 **Maturity index**  
147 Calculated index of the maturity. Maturity Ratio Calculated using a sophisticated algorithm  
148 based on several HVI™ measurements. Ratio of mature to immature fibers.

149 **Micronaire value**  
150 Indicates fiber fineness. Micronaire reading Measured by relating airflow resistance to the  
151 specific surface of fibers. Quality characteristic which is proportional to the fiber fineness. The  
152 Micronaire value is taken as an indication of fineness (linear density) and maturity (degree of cell-wall  
153 development). For a given cotton type, a relatively low Micronaire reading is a predictor for problems  
154 in processing, generation of Neps, and inefficient dyeing.

155 **Fiber brightness or reflectance degree (Rd %)**  
156 A measure of the reflected light from the sample and ranges in cotton from (40-90%). The  
157 higher the degree of (Rd) the whiter color. Whiteness/grayness of the cotton sample. Rd (Whiteness)  
158 Measured optically by different color filters. The higher this value, the better the cotton is rated.

159 **Chroma or degree of yellowness (+b)**  
160 A scale that reflects the degree of yellowing in the sample and ranges in cotton from (4 - 18)  
161 and the higher the degree of + b the more the sample is yellowing. Yellowness of the cotton sample. +b  
162 (Yellowness) Measured optically by different color filters. Assessment of color, degree of yellowness  
163 **Trash:** Trash content of a measured sample. Particle count, % surface area covered by trash, trash code  
164 measured optically by utilizing a digital camera.

165 **Trash count:** Number of trash particles per defined area.

166 **Trash area:** Percentage of trash per defined area.

167 **Spinning consistency index (SCI):** Calculated index of the spinnability of measured sample.  
168 Calculation for predicting the spinnability of the fibers.

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170 4. Statistical procedures

171 This investigation was conducted in a completely randomized design with three replicates and  
172 analyzed as a factorial experiment according to the procedure of [13]. The mean values were computed  
173 using the CoStat 6.311 (1998-2005) [14] as a statistical program, to test significant differences among  
174 treatments using the least significant difference (L.S.D.) at 0.05 level of probability.

## 175 **RESULTS AND DISCUSSION**

### 176 1. Ginning efficiency parameters:

177 Results presented in Table (2) show the mean values of the ginning efficiency parameters, i.e.  
178 gin stand capacity, ginning time, Lint (%), seed index and lint grade code for the cotton cultivar 'Giza  
179 88' during the studied season (2017).

180 The attained results indicated that feeding methods treatments affected significantly the gin  
181 stand capacity, ginning time, Lint (%) and lint grade code. Whereas, the differences in seed index were  
182 insignificant due to the feeding methods, effect.

183 It is obvious that the hand method (control treatment) possessed the highest mean values of the  
184 gin stand capacity (GSC), lint %, seed index and lint grade code and the lowest mean value of the  
185 ginning time (GT). Meanwhile, the Belt (2 row) mechanical feeding method; gave the lowest mean

186 values gin stand capacity (GSC), Lint %, seed index and lint grade code, and the highest mean value  
 187 of ginning time. It could be proposed that the gin stand capacity increases and the ginning time  
 188 decreases proportionally as the increase in delivery of cotton locks to the ginning zone in case of the  
 189 hand feeding method. These results are in accordance with those obtained by [6, 8] they noticed that  
 190 the feeding rates of seed cotton to roller gin stand significantly affected ginning efficiency (ginning  
 191 stand capacity and ginning time).

192 Table (2). Mean values of the ginning efficiency parameters of Giza 88 cotton variety as affected by the  
 193 feeding method, seed cotton grade and their interaction during season of 2017.

Characters Treatments	Gin stand capacity (kg lint/inch/h)	Ginning time (h/cantar)	Lint (%)	Seed index (g)	Lint grade code
<u>Feeding method (A)</u>					
Hand	0.97 a	1.42 b	36.59 a	9.19 a	27.33 a
Cylinder	0.94 b	1.49 ab	36.36 a	8.90 a	26.83 b
Belt (2 row)	0.89 c	1.55 a	35.89 b	8.89 a	26.66 b
L.S.D. <sub>0.05</sub>	0.027	0.076	0.411	0.372	0.397
<u>Seed cotton grade (B)</u>					
Good / Fully Good	1.03 a	1.38 c	37.33 a	10.48 a	29.00 a
Good + ¼	0.97 b	1.46 bc	37.08 a	9.99 b	28.33 b
Good	0.89 c	1.52 ab	35.98 b	8.98 c	26.33 c
Good - ¼	0.84 d	1.57 a	34.73 c	6.52 d	24.11 d
L.S.D. <sub>0.05</sub>	0.032	0.088	0.474	0.430	0.458
<u>Interaction</u>					
A × B	Ns	ns	**	*	ns

194 Means designated by the same letter within each column are not significantly different.

195 \* Significant at 0.05 level of probability. \*\*: Significant at 0.01 level of probability.

196 NS. : Not significant.

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198 In terms of the main effect of seed cotton grade, results outlined in the same Table, reveal that  
 199 all studied ginning efficiency parameters were significantly affected by seed cotton grade. It is obvious  
 200 that the highest seed cotton grade (Good to Fully Good (G/FG)); brought about the lowest mean values  
 201 of the ginning time and the highest mean values for the rest of the studied ginning efficiency  
 202 parameters. This result might be because the highest seed cotton grade usually contains the highest  
 203 proportion of the big fluffy cotton locks, and the lowest proportion of foreign matters or trash content  
 204 and tight locks. In this connection, [8, 15] reported that the highest seed cotton grade, gave rise to the  
 205 highest ginning out-turn (%) and gin stand capacity and the lowest value of the ginning time.

206 Results tabulated in Table (2) declare that the interaction between the two studied factors, i.e.  
 207 feeding methods and seed cotton grades (A×B) was significant for lint % and seed index of the cotton  
 208 cultivar 'Giza 88'. Mean values of the same traits are presented in Table (3). It is obvious that the hand  
 209 feeding method of the highest seed cotton grade (G/FG) records the highest mean value of lint %.  
 210 Otherwise, the lowest mean value of the same trait was recorded from the Belt (2 row) mechanical  
 211 feeding method with seed cotton grade (G - ¼).

212 Regarding the seed index, the highest mean value was reached by the cylinder feeding method  
 213 with the highest seed cotton grade (G /FG) and the Belt (2 row) mechanical feeding method with the  
 214 same seed cotton grade (G /FG). On the other hand, the lowest mean value of the same trait was  
 215 obtained using the cylinder feeding method with the lowest seed cotton grade (G - ¼) and the Belt (2  
 216 row) mechanical feeding method with the same seed cotton grade (G - ¼).

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218 Table (3). The interaction between feeding method and seed cotton grade (A × B) for the  
 219 lint (%) and seed index (g) of 'Giza 88' during season of 2017.

Variables		Lint (%)	Seed index (g)
Feeding method (A)	Seed cotton grade (B)		
Hand	G / FG	37.36	10.29
	Good + ¼	37.15	9.99
	Good	36.01	9.00
	Good - ¼	35.86	7.50
Cylinder	G / FG	37.33	10.58
	Good + ¼	37.16	9.99

	Good	36	8.99
	Good - ¼	34.98	6.04
	G / FG	37.32	10.58
Belt (2row)	Good + ¼	36.93	9.99
	Good	35.95	8.96
	Good - ¼	33.36	6.04
L.S.D. <sub>(0.05)</sub>		0.822	0.744

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### 3. Fiber properties tested by H.V.I. instrument:

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In general the results outlined in Table (4) indicated that the effect of the feeding method treatments had a highly significant on spinning consistency index (SCI), maturity index, length uniformity index (UI), the fiber bundle strength, fiber reflectance degree (Rd %) and the differences in trash count, and trash area. Whereas, the differences in micronaire value, fiber length parameters, upper half mean length (UHML), and short fiber index (SFI), fiber elongation %, micronaire reading and yellowness degree (+b) were not significantly affected, due to the feeding method effect.

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Hand feeding method exhibited the highest mean values for the spinning consistency index (SCI), maturity index, length uniformity index (UI), the fiber bundle strength, fiber reflectance degree (Rd %) and the lowest mean values of trash count and trash area, as shown in Table (4), while the lowest mean values of the same traits and the highest mean value of trash count were possessed by using the Belt (2 rows) mechanical feeding method. Meanwhile, the lowest mean value of the trash area was recorded by cylinder feeding method to the gin stand. These results could be attributed to the little chance for the tight locks to be hanged and ginned, besides the lower rate of flow of seed cotton to the ginning zone in case of the Belt (2 rows) mechanical feeding method.

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These results are in agreement with the findings of [7, 8]. They reported that the fiber length parameters as upper half mean length (UHML) and short fiber index (SFI), were insignificantly affected by the seed cotton feeding method to the gin stand. In the same time the attained results disagree with those of [3], who indicated that the length parameters were significantly affected by the different levels of feeding rates.

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All studied fiber properties tested by HVI instrument were significantly affected by the seed cotton grade, as presented in Table (4).

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The highest mean values of spinning consistency index (SCI), maturity index, length uniformity index (UI), upper half mean length (UHML), the fiber bundle strength, fiber elongation %, fiber reflectance degree (Rd %) and the lowest mean values of four characters short fiber index (SFI), trash count, trash area and yellowness degree (+b) were reached by the highest seed cotton grade Good / Fully Good (G/FG). On the other exhume, the highest mean value of the micronaire reading was recorded by the seed cotton grade Good + ¼ (G + ¼). Fiber properties tested by HVI instrument of 'Giza 88' cotton cultivar, except short fiber index (SFI), trash count, trash area and yellowness degree (+b) correspondingly decreased as the seed cotton grade decreased. These results were in harmony with those obtained by [8, 15]. They claimed that the HVI fiber properties are in relation with the grade and the high content of mature locks and fibers and low content of trash (non-lint content) and short fibers of the highest seed cotton levels gave the better lint cotton grades.

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Likewise, results of Table (4) refer that the interaction (A × B) of both variables under the study i.e. feeding method (A) and seed cotton grade (B) affected insignificantly all studied H.V.I. fiber properties.

257 Table (4). Mean values of the H.V.I fiber properties of 'Giza 88' as affected by feeding methods and  
 258 seed cotton levels during season of 2017.

Characters Treatments	SCI	UHML (mm)	Unifo- rmy index (%)	Short fiber index (%)	Fiber strength (g/tex)	Fiber elon- gation (%)	Mat- urity index (%)	Micro- naire reading	Rd (%)	+ b	Trash count	Trash Area (%)
Hand	218.50 a	35.04 a	88.42 a	5.54 a	46.07 a	3.72 a	0.87 a	4.00 a	70.14 a	11.61 a	35.08 b	0.49 b
Cylinder	204.75 b	35.27 a	86.09 b	5.58 a	40.27 b	3.64 a	0.85 b	3.97 a	67.98 b	11.51 a	87.08 a	1.04 a
Belt (2 row)	202.25 b	35.01 a	86.31 b	5.55 a	38.94 b	3.58 a	0.84 b	3.94 a	67.31 c	11.47 a	87.41 a	1.00 a
L.S.D. <sub>0.05</sub>	9.844	ns	1.073	ns	2.292	ns	0.008	ns	0.626	ns	8.857	0.164
Good / Fully Good	219.88 a	35.58 a	88.65 a	5.38 c	45.66 a	3.82 a	0.87 a	4.25 a	70.08 a	11.33 b	39.22 d	0.43 c
Good + ¼	212.77 ab	35.48 a	88.10 a	5.40 c	41.03 b	3.74 a	0.87 a	4.30 a	69.02 b	11.47 ab	58.88 c	0.78 b
Good	204.44 bc	35.10 b	86.78 b	5.58 b	40.08 b	3.63 a	0.84 b	3.88 b	68.47 b	11.63 ab	72.66 b	1.03 a
Good - ¼	196.88 c	34.26 c	85.31 c	5.85 a	40.26 c	3.40 b	0.83 b	3.44 c	66.33 c	11.70 a	108.66 a	1.13 a
L.S.D. <sub>0.05</sub>	11.367	0.369	1.239	0.103	2.646	0.179	0.009	0.113	0.723	0.256	10.227	0.189
A × B	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

259 Means designated by the same letter within each column are not significantly different

260 Ns: Not significant. UHML: Upper Half Mean Length.

261 SCI: Spinning consistency index

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263 **Conclusion**

264 - The hand feeding method of seed cotton to the gin stand surpassed all studied feeding methods in gin  
 265 stand productivity, lint % and the most HVI fiber properties is the best classer grade. Though, this  
 266 method is recommended to be used specially with the high levels of the extra-long cottons.

267 - Cylinder feeding method ranked first in order among studied mechanical method and it could be  
 268 recommended for ginning medium and low seed cotton level.

269 - Belt (2 rows) is the preferred feeding method regardless of gin stand productivity.

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