Production of Fine Count Yarns from Some Extra-long Egyptian Cottons on Different Spinning Systems

Eman Yehia Abd-Elkawe and Eman Rashwan El-Sayed

ABSTRACT

The current research was carried out to produce fine count yarns from extra-long Egyptian cotton varieties using compact and ring spinning systems.in addition, to compare between compact yarns and ring yarns in terms of their physical and mechanical properties. Three commercial extralong staple Egyptian cottons Giza92, Giza93 and Giza 96 were used to produce four linear densities of 80, 100, 120 and 140 at 3.6 twist multiplier. Results obtained showed that Giza 92 was surpassed significantly other extra -long staple varieties. It recorded the highest mean values of varn strength and yarn evenness While, the same variety recorded the lowest mean values of yarn hairiness and imperfections. Compact yarns were much better than yarns spun on the ring spinning in yarn strength, yarn elongation, evenness, yarn imperfections and yarn hairiness. Yarn count 80's gave higher single yarn strength (20.89cN/tex), yarn elongation (5.03%) and yarn evenness (17.49%) and lower yarn hairiness (2.04) and imperfections than yarn count 140s. Single yarn strength, yarn elongation and yarn evenness were decreased with increasing yarn count. While the number of neps, hairiness, the number of thin and thick places were increased with increasing yarn count. Concerning, the effect of interaction between cotton varieties × yarn counts × spinning systems on yarn quality properties. Yarn count 80s recorded the highest mean values of yarn strength (23.14, 21.1 and 20.2 cN/tex) and yarn evenness (17.72, 16.53 and 16.79%) for varieties Giza92, Giza93 and Giza96, respectively for compact spinning system. Yarn strength at count 80, 100, 120 and 140 correlated negatively and highly significant with micronaire value and maturity ratio.

Keywords: Fine count, Ring and compact spinning, Combed yarns, Yarn quality properties.

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I. INTRODUCTION

Cotton fiber properties and spinning variables such as yarn count and spinning system are well known to play an important role in the efficiency and performance of spinning process besides the yarn quality [1]. Fibre quality is extremely important to the producer as it will largely determine the spinning efficiency of converting the fiber into yarn and the yarn to fabric. Spinning efficiency is affected by fiber fineness, maturity, trash, uniformity, and fiber to fiber adhesion, length, and fiber strength [2]. Spinning is one of the most cost processes in textile industry though, cotton breeders, technologists and spinners are primarily interested in translating the qualities of raw cotton into the qualities of varn. Every spinning system produces varn over a certain count range, and the limit of this range varies from system to system.

Ring spinning technology is the most widely accepted yarn production method. It is capable of spinning nearly all sorts of natural and synthetic fiber types within a very wide count range. In conventional ring system not all fibers that are placed at the external edges of the triangle can be spun into the yarn structure and can leave the drafting equipment without having been spun into the yarn [3]. Although, ring

spinning machine is vastly used, it has some limitations such as unevenness and more hairiness that bounds the spinners to choose alternative spinning systems. Rotor was selected to produce more even yarn and compact spinning gives both even and less hairy yarn [4].

Compact spinning is one of the most important improvements in traditional ring spinning, which is implemented by adding fiber condensing device on a ring spinning frame to condense the fiber bundle and decrease or even eliminate spinning triangles, with the spun yarn structure and quality having a qualitative development since the fiber tension distributions in the spinning triangles are more uniform [5]. The compact spinning process produces a new yarn structure which permits the reduction of the number of fibers in the cross section, or to spin a finer yarn count. Reducing the possibilities of the number of fibers in the cross section allows for the use of lower priced tops with coarser fibers. Reference [6] concluded that the compact yarns have the following advantages when compared to the conventional ring yarns: significantly reduced hairiness, smooth Surface, high gloss, improved tenacity, elongation percentage, evenness, and imperfections. Reference [7] stated that Combing process plays important role it is improve the quality of raw material by removing short fiber, trash particles and neps present in it. Combed yarn has appearance, strength, evenness, and luster better than carded yarn.

Our objectives in this investigation were to produce fine count yarns from extra-long Egyptian cotton varieties using compact and ring spinning systems. Moreover, compare between compact yarns spun and the conventional ring-spun yarns in terms of their physical and mechanical properties.

II. MATERIALS AND METHODS

This study was conducted in El Shorbagy Company for Spinning and Waving. Three commercial Egyptian cotton varieties i.e., Giza 92, G93 and Giza 96 as extra-long staple cotton varieties were used to produce several ring and compact yarns. Ring and compact yarns were produced with four linear densities 80s, 100s, 120s and 140s at 3.8 twist multiplier. The combed yarns were manufactured from the same varieties, eliminating 18% of noils during combing.

Cotton fiber and yarn testing were carried out in the laboratories of Cotton Technology Research Division, Cotton Research Institute, Agricultural Research Centre, Egypt. About 10 Kg of lint was taken in order to perform both fiber and yarn tests. Fiber properties were measured by using High Volume Instrument (HVI) according to ASTM

Yarn strength (cN/tex) and varn elongation (%) were measured by Statimat Me according to ASTM [9] with testing speed of 5000mm/min and test length of 50cm used for the testing of tensile properties. Average of 120 breaks per sample. Yarn evenness (C.V. %) and number of imperfections were measured according to ASTM [9] by the Uster Tester 3 with 400mm/min testing speed and I min testing time at -50%, +50% and +200% sensitivity levels for thin places, thick places and neps respectively. All the samples were tested under laboratory conditions of 65±2% relative humidity and 21±1 °C temperature.

The experimental design of this study was conducted as a completely randomized design with three replications and analyzed as factorial experiment according to the method described by [10]. The value of the significance level selected for all statistical tests in the study was 0.05 according to [11]. All statistical procedures were conducted using the SPSS 20 statistical software package.

Fiber properties of the studied commercial extra-long staple cottons, Giza 92, Giza 93 and Giza 96 are presented in Table I. Giza96 had the lowest fiber strength among the extra-long staple cottons. Also, Giza96 showed the highest maturity ratio and yellowness. While, Giza 92 gave higher upper half mean, uniformity ratio and fiber strength than other extra -long staple varieties.

TABLE I: FIBER QUALITY PROPERTIES MEASURED BY HVI

	Cotton varieties	S	
Fiber properties	Giza 92	Giza 93	Giza 96
Upper Half Mean "mm"	35.72	33.54	33.56
Uniformity index %	86.07	84.87	85.37
Short Fiber Index %	5.23	5.43	5.43
Strength "g/tex"	45.53	4503	43.50
Elongation %	4.23	4.67	4.50
Micronaire value	2.99	3.60	3.86
Maturity %	0.88	0.91	0.92
Reflectance (Rd %)	70.23	67.13	75.33
Yellowness (+b)	9.53	11.70	9.57

III. RESULTS

Data presented in Table II showed the main effects of cotton varieties, spinning systems and yarn counts on yarn quality properties. Spinning systems and yarn counts had significant effects on all yarn quality properties. Also, cotton varieties had significant effect on all yarn properties except yarn elongation % and number of neps (+200).

A. Mechanical Yarn Properties (Yarn Strength and Yarn Elongation)

As shown in Table II, cotton varieties had significant effect on all yarn properties except yarn elongation %. Giza 92 was surpassed significantly other extra -long staple varieties. It recorded the highest mean value of yarn strength (21.44cN/tex) followed by Giza93 (18.91cN/tex). While Giza 96 gave the lowest mean value of yarn strength (17.93cN/tex). The spinning systems had significant effects on yarn strength and yarn elongation. Generally, compact yarn strength (20.20 cN/tex) and yarn elongation (4.42%) were higher than conventional yarn strength (18.65cN/tex) and elongation (4.13%) due to all fibers contribute to yarn formation during spinning in compact system.

As shown in Table II, all yarn properties were significantly affected by yarn counts. Yarn count 80s gave the highest mean values of single yarn strength (20.89cN/tex) and elongation ratio (5.03 %). On the other hand, the lowest mean values of strength (18.01cN/tex) and elongation (3.67 %) were recorded by yarn count 140s. It noticed that single yarn strength (cN/tex) and yarn elongation (%) were decreased significantly by increasing yarn count. Generally, it could be concluded that single yarn strength correspondingly increased by increasing numbers of fibers in yarn crosssection. Furthermore, yarn strength increased with increasing the number of longer fibers in yarn due to the greater number of points of contact and cohesion between them, and consequently increased yarn strength [12].

B. Physical Yarn**Properties** (Yarn Evenness, Imperfections and Yarn Hairiness)

Data presented in Table II showed that cotton varieties had significant effect on yarn evenness, (CV %), Neps, thin (-50%) and thick places (+50%) and yarn hairiness. Giza93 was recorded the highest mean values of thin places (209) and yarn hairiness (2.38). On the other side, the highest mean values of yarn evenness (19.05), Neps (177), thin (82) and thick places (214) and yarn hairiness (1.95) recorded by Giza 92. The experimental results of ring (conventional) and compact are given in Table II. According to statistical analysis, all yarn properties were significantly affected by spinning systems. Compact spinning system recorded the highest mean value of yarn evenness (17.97) and the lowest mean values of thin places (61), thick places (156), neps (136) and yarn hairiness (1.97).

These results are in agreement with those obtained by [13] and [14] who reported that compact spun yarns have higher strength, higher elongation ratio, higher yarn evenness, lower hairiness, and lower imperfections compared to conventional yarns. As shown in Table II, all yarn properties were significantly affected by yarn counts. Yarn count 80, s gave the highest mean value of yarn evenness (17.49) and the lowest mean values of thin places (28), thick places (158),

neps (122) and yarn hairiness (2.04). While, yarn count 140s gave the lowest mean value of evenness (21.72) and the highest mean values of thin places (328), thick places (384), neps (309) and yarn hairiness (2.42). It noticed that yarn evenness was increased with increasing yarn count. While the number of neps, yarn hairiness, the number of thin and thick places were increased with increasing varn count.

These results are in agreement with those obtained by [15], [16], [17] and [18] who found that yarn linear density had significant effect on all yarn properties. Yarn unevenness, the number of thin places, thick places, neps and yarn hairiness were increased with increasing yarn linear density. In contrary, yarn strength and yarn elongation were decreased with increasing linear density that may be due to the lower number of fibers in cross section of fine yarns.

C. The Interaction between Cotton Varieties and Spinning System $(V \times S)$

According to the data given in Table III, it could be noticed that the first order interaction between Egyptian cotton varieties and spinning systems (V × S) was significantly affect all yarn quality properties except for yarn elongation % and number of neps /400 m. Concerning the yarn strength (cN/tex), the highest mean values of single yarn strength recorded by Giza92 for each ring and compact spinning Systems 20.47 and 22.42 cN/tex, respectively. Whereas the lowest mean values recorded by Giza 96 for each ring and compact spinning systems 17.26 and 18.59 cN/tex, respectively. Giza 92 for each ring and compact spinning systems recorded the highest mean values of yarn evenness (19.88 and 18.22 %) and the lowest mean values of thin places (117 and 47 400/m), thick places (266 and 161 400/m) and hairiness (2.26 and 1.64). Generally, it could be reported that yarn unevenness and yarn hairiness of compact yarns are significantly lower when compared with yarn evenness and yarn hairiness with conventional ring yarns.

D. The Interaction between Cotton Varieties and Yarn Count (VXC)

Data presented in Table IV showed the first interaction between extra-long cotton varieties and yarn counts $(V \times C)$ for yarn quality properties. The highest mean value of yarn strength 22.44 cN/tex was recorded by Giza 92 using yarn count 80s. On the other hand, Giza96 using yarn count 140s recorded the lowest mean value of yarn strength 16.57 cN/tex. While Giza93 using yarn count 80s recorded the highest mean value for yarn evenness (16.93%) and the lowest mean value of thick places (141). These results were in agreement with the findings of [19], [20], [21], [22] and [23] who reported that the interaction between cotton varieties and yarn counts had significant effect on lea count strength product, yarn hairiness, C.V. %, neps/100m, thin places/100 m and thick places/100 m).

E. The Interaction between Yarn Counts and Spinning Systems $(C \times S)$

As shown in Table V, the interaction between yarn counts and spinning systems $(C \times S)$ was significantly affect all yarn quality properties except for yarn elongation % and number of neps /400 m. Yarn count 80s recorded the highest mean values of yarn strength (20.30 and 21.48 cN/tex), yarn elongation (5.05 and 5.02%) and yarn evenness (17.96 and

17.01%) for each ring and compact spinning systems, respectively. While the same count recorded the lowest mean values of thin places (14/400 m) and yarn hairiness (1.77) for compact spinning system. Yarn count 140s recorded the lowest mean values of yarn strength (17.30 cN/tex), yarn elongation (3.45%) and varn evenness (23.94%) for ring spinning system. On the other side, the same count recorded the highest mean values of thin places (514 /400 m), thick places (570/400 m) and yarn hairiness (32.63) for ring spinning system. [1] reported that fiber properties and spinning variables such as yarn count and spinning system are well known to play an important role in the efficiency and performance of spinning process besides the yarn quality. The Interaction among Cotton Varieties, Spinning Systems and Yarn Counts $(V \times S \times C)$.

Regarding data in Table VI and Fig. 1, 2 and 3 showed that the second order interaction among cotton varieties, spinning systems and yarn counts ($V \times C \times S$) was significantly affect all yarn quality properties except for yarn elongation % and number of neps /400 m. Yarn count 80s recorded the highest mean values of yarn strength (23.14, 21.1 and 20.2 cN/tex) and yarn evenness (17.72, 16.53 and 16.79%) for varieties Giza92, Giza93 and Giza96, respectively for compact spinning system. While, the same count recorded the lowest mean values of thin places (18, 15 and 8), thick places (157, 104 and 152) and yarn hairiness (1.51,1.79 and 2.01) for varieties Giza92, Giza93 and Giza96, respectively for compact spinning system. On the other hand, yarn count 140s recorded the lowest mean values of yarn strength (19.37, 16.55 and 15.97 cN/tex) and yarn evenness (21.47, 25.92 and 24.44%) for varieties Giza92, Giza93 and Giza96, respectively for ring spinning system. In contrary, the same count recorded the highest mean values of thin places (249,772 and 519), thick places (407,734 and 568) and yarn hairiness (2.41, 2.82 and 2.66).

Generally, compact spinning system gave better yarn quality properties compare to ring spinning system for all yarn counts. Compact spinning system is more appropriate for long staple varieties, coarse and medium counts than for the extra-long staple varieties and finer counts [24].

F. Relationship between Yarn Properties and Fiber **Properties**

The correlation between fiber and yarn properties under different yarn counts shown in Table VII. The results indicated that yarn strength at count 80s, 100s, 120s and 140s correlated negatively and highly significant with micronaire value and maturity ratio. However, it had positive highly significant correlation with upper half mean length at all yarn counts. Also, yarn strength at 80s, 100s and 140s yarn count correlated positively and highly significant with fiber strength. Yarn unevenness (CV%) showed Negative significant correlations with upper half mean length and fiber strength at all yarn counts. It noticed that yarn unevenness decreased with increasing maturity ratio (%) and fiber strength (g/tex). Yarn hairiness at 80s, 100s, 120s and 140s yarn counts correlated positively and highly significant with micronaire value and maturity ratio. While, it had negative significant correlation with upper half mean length at all yarn counts.

Treatments	Yarn properties									
Varieties	Strength (cN/tex)	Elongation %	CV %	Thin -50%	Thick +50%	Neps 200%	Hairiness			
Giza92	21.44	4.33	19.05	82	214	177	1.95			
Giza93	18.91	4.2	19.7	209	294	227	2.38			
Giza96	17.93	4.29	19.76	172	282	228	2.34			
LSD	0.591	Ns	0.546	47.3	33.94	Ns	0.122			
Spinning	Strength (cN/tex)	Elongation %	CV %	Thin -50%	Thick +50%	Neps 200%	Hairiness			
Ring	18.65	4.13	21.04	248	370	285	2.48			
Compact	20.20	4.42	17.97	61	156	136	1.97			
LSD	**	**	**	**	**	**	**			
Count	Strength (cN/tex)	Elongation %	CV %	Thin -50%	Thick +50%	Neps 200%	Hairiness			
80	20.89	5.03	17.49	28	158	122	2.04			
100	19.77	4.44	18.91	89	216	199	2.16			
120	19.03	3.95	19.92	172	296	214	2.28			
140	18.01	3.67	21.72	328	384	309	2.42			
LSD	0.683	0.386	0.631	54.61	39.19	86.68	0.141			

 $TABLE~III:~THE~INTERACTION~BETWEEN~EXTRA-LONG~COTTON~VARIETIES~AND~SPINNING~SYSTEMS~(V\times S)~FOR~YARN~QUALITY~PROPERTIES~AND~SPINNING~SYSTEMS~(V\times S)~FOR~YARN~QUALITY~PROPERTIES~AND~SPINNING~SYSTEM~SYSTEM~SYSTEM~SYSTEM~SYSTEM~SYSTEM~SYSTEM~SYSTEM~$

Varieties Spinning	Strength	Elongation	CV	Thin	Thick	Neps	Hairiness		
varieties Spinning		(cN/tex)	%	%	-50%	+ 50	+200	Hanniess	
Giza92	Ring	20.47	4.30	19.88	117	266	251	2.26	
Giza92	compact	22.42	4.36	18.22	47	161	103	1.64	
Giza93	Ring	18.22	4.03	21.72	358	456	302	2.73	
Giza93	compact	19.59	4.38	17.69	61	132	152	2.02	
Giza96	Ring	17.26	4.06	21.52	269	389	302	2.45	
Giza90	compact	18.59	4.53	18.01	74	175	154	2.23	
	LSD	0.84	Ns	0.77	66.89	48	Ns	0.17	

TABLE IV: THE INTERACTION BETWEEN COTTON VARIETIES AND YARN COUNTS (V \times C) FOR YARN QUALITY PROPERTIES

Varieties	Count	Strength (cN/tex)	Elongation %	CV %	Thin -50%	Thick + 50	Neps +200	Hairiness
	80	22.44	5.36	18.04	38	170	96	1.77
Giza92	100	21.94	4.26	18.75	36	179	140	1.92
Giza92	120	21.17	4.08	18.99	73	206	185	1.98
	140	20.22	3.61	20.43	180	300	288	2.13
	80	20.59	5.02	16.93	24	141	84	2.19
C:02	100	19.37	4.60	18.98	125	247	191	2.33
Giza93	120	18.42	3.66	20.29	233	336	277	2.45
	140	17.24	3.53	22.60	455	451	356	2.54
	80	19.64	4.72	17.49	22	163	185	2.15
Giza96	100	18.01	4.46	18.99	106	221	265	2.22
	120	17.49	4.13	20.47	210	344	179	2.40
	140	16.57	3.86	22.11	348	400	281	2.60
LSD		1.183	Ns	1.092	94.59	67.88	Ns	Ns

TABLE V: THE INTERACTION BETWEEN YARN COUNTS AND SPINNING SYSTEMS (C \times S) FOR YARN QUALITY PROPERTIES

Count	Spinning	Strength (cN/tex)	Elongation %	CV %	Thin -50%	Thick + 50	Neps +200	Hairiness
	Ring	20.30	5.05	17.96	42	178	165	2.30
80	compact	21.48	5.02	17.01	14	138	78	1.77
100	Ring	18.84	4.23	20.31	133	297	282	2.46
100 compact	20.07	4.65	17.50	45	135	115	1.86	
120	Ring	18.17	3.78	21.95	302	437	282	2.53
120	compact	19.89	4.13	17.88	42	154	146	2.02
140	Ring	17.30	3.45	23.94	514	570	411	2.63
140	compact	18.73	3.88	19.49	142	198	206	2.21
LSD		0.97	Ns	0.89	77.23	55.43	Ns	0.20

 $TABLE\ VI:\ The\ Interaction\ Between\ Extra-Long\ Cotton\ Varieties,\ Spinning\ Systems\ and\ Yarn\ Counts\ (V\times S\times C)\ for\ Yarn\ Quality$

PROPERTIES									
Varieties	Spinning	Count	Strength	Elongation	CV	Thin	Thick	Neps	Hairiness
varieties	Spinning	Count	(cN/tex)	%	%	-50%	+ 50	+200	Transmess
Giza92	Ring		21.74	5.35	18.36	58	183	124	2.03
Gizaaz	compact		23.14	5.38	17.72	18	157	68	1.51
Giza93	Ring	80	20.08	5.09	17.33	32	177	92	2.6
Gizass	compact	80	21.1	4.95	16.53	15	104	75	1.79
Giza96	Ring		19.08	4.7	18.19	37	174	278	2.29
Gizaeo	compact		20.2	4.73	16.79	8	152	92	2.01
Giza92	Ring		20.85	4.14	19.66	42	203	214	2.26
Giza)2	compact		23.02	4.39	17.84	30	155	66	1.58
Giza93	Ring	100	18.54	4.54	20.68	196	375	244	2.73
Gizass	compact	100	20.19	4.67	17.28	54	119	139	1.93
Giza96	Ring		17.11	4.02	20.59	162	312	389	2.39
Gizazo	compact		18.9	4.9	17.39	50	131	141	2.05
Giza92	Ring		19.93	4.23	20.05	117	273	270	2.34
Giza)2	compact		22.42	3.94	17.93	29	140	100	1.62
Giza93	Ring	120	17.7	3.31	22.93	431	536	368	2.79
Gizass	compact	120	19.15	4.01	17.65	36	136	186	2.1
Giza96	Ring		16.88	3.81	22.88	359	503	206	2.45
Gizazo	compact		18.11	4.44	18.06	61	186	152	2.35
Giza92	Ring		19.37	3.49	21.47	249	407	397	2.41
Giza)2	compact		21.08	3.72	19.4	110	193	180	1.85
Giza93	Ring	140	16.55	3.16	25.92	772	734	504	2.82
Gizazz	compact	140	17.93	3.9	19.28	138	168	208	2.26
Giza96	Ring		15.97	3.7	24.44	519	568	333	2.66
	compact		17.17	4.02	19.78	176	232	229	2.54
LSD			1.673	Ns	1.549	133.77	96	Ns	0.345

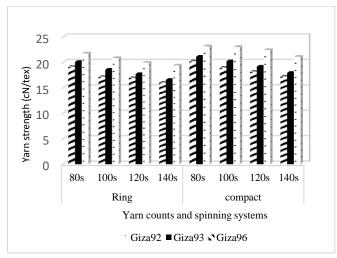


Fig. 1. Single yarn strength as affected by the interaction between cotton varieties, spinning systems and yarn counts.

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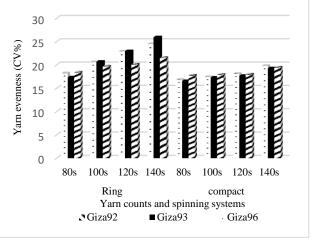


Fig. 2. Yarn evenness (CV %) as affected by the interaction between cotton varieties, spinning systems and yarn counts.

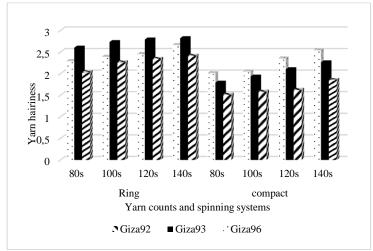


Fig. 3. Yarn hairiness as affected by the interaction between cotton varieties, spinning systems and yarn counts.

TABLE VII: CORRELATION COEFFICIENT BETWEEN YARN PROPERTIES AND FIBER PROPERTIES AT 80s, 100s, 120s And 140s YARN COUNTS USING RING AND COMPACT SPININING SYSTEMS

*7		g · ·	Fiber properties						
Yarn properties	Count	Spinning system	Micronaire	Maturity %	UHM (mm)	Fiber strength (g/tex)			
	00	Ring	-0.713*	-0.662*	0.609*	0.666*			
	80	Compact	-0.876**	-0.875**	0.899**	0.599			
	100	Ring	-0.918**	-0.934**	0.848**	0.628			
Strength	100	Compact	-0.850**	-0.839**	0.824**	0.700*			
(cN/tex)	120	Ring	-0.918**	-0.934**	0.848**	0.628			
	120	Compact	-0.661	-0.726*	0.544	0.325			
	1.40	Ring	-0.850**	-0.839**	0.824**	0.700*			
	140	Compact	-0.942**	-0.917**	0.897**	0.659			
	90	Ring	0.463	0.29	-0.329	-0.787**			
	80	Compact	0.639	0.626	-0.59	-0.41			
	100	Ring	0.354	0.227	-0.238	-0.682*			
CV%		Compact	0.776*	0.808**	-0.673*	-0.386			
CV%	120	Ring	0.354	0.227	-0.238	-0.682*			
		Compact	0.617	0.623	-0.511	-0.312			
	140	Ring	0.776*	0.808**	-0.673*	-0.386			
		Compact	0.204	0.212	-0.388	0.039			
	80	Ring	0.546	0.613*	-0.649*	-0.155			
	80	Com	0.58	0.631	-0.505	-0.265			
	100	Ring	0.319	0.4	-0.436	-0.141			
II-:-:	100	Com	0.772*	0.790*	-0.737*	-0.583			
Hairiness	120	Ring	0.319	0.4	-0.436	-0.141			
	120	Com	0.772*	0.751*	-0.723*	-0.654			
	1.40	Ring	0.772*	0.790*	-0.737*	-0.583			
	140	Com	0.830**	0.786*	-0.743*	-0.601			

IV. CONCLUSIONS

The main objective of this study to produce four fine yarn counts 80,100,120 and 140 at the same twist multiplier 3.6 from three extra-long staple cotton varieties namely Giza92, Giza93 and Giza 96 using ring and compact spinning systems. Also, it made comparison between ring and compact yarns in yarn quality properties. Fiber properties were estimated by HVI, mechanical yarn properties (yarn strength and yarn elongation) were measured by Statimat Me and physical yarn properties (yarn evenness, yarn hairiness, thin places, thick places, and number of neps) were measured by Uster tester 3. The experimental design was randomized complete design, with three replications. From the results of this study, it was clear that Giza92 was much better than all extra-long staple cotton varieties under study in mechanical and physical yarn quality properties. The yarn count 140 recorded the lower yarn strength, yarn elongation and the higher yarn unevenness, yarn hairiness and number of thin, thick and neps places/400m as compare with yarn count 80. Ring yarns recorded the highest yarn hairiness and yarn imperfections and the lowest yarn strength and yarn elongation than compact yarns.

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