



## FIBER QUALITY INDEXES OF NEWLY DEVELOPED COTTON LINES

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<https://doi.org/10.5281/zenodo.8026860>

**Annotation.** On the base of fiber index analysis it was identified that the fiber qualities of simple hybrid lines T-150, T-195 together with complicated hybrid lines T-212, T-215 of F<sub>5</sub> generation and simple hybrid lines T-3, T-31 together with complicated lines T-46, T-50 of F<sub>8</sub> generation in comparison to other simple, complicate hybrids and standard variety meet the world standard requirements.

**Key words:** fiber productivity, wilt, bacterial blight diseases of cotton, fiber quality, simple and complicate hybrids, fiber length, cotton line, micronier.

**Аннотация.** На основании анализа качества волокон установлено, что качества волокна простых гибридных линий Л-150, Л-195 совместно со сложными гибридными линиями Л-212, Л-215 поколения F<sub>5</sub> и простыми гибридными линиями Л-3, Л-31 вместе со сложными линиями Л-46, Л-50 поколения F<sub>8</sub> по сравнению с другими простыми, сложными гибридами и стандартным сортом соответствуют требованиям мировых стандартов.

**Ключевые слова:** продуктивность волокна, болезни, бактериальный ожог хлопчатника, качество волокна, простые и сложные гибриды, длина волокна, линия хлопчатника, микронейри.

**Introduction.** Several resolutions were adopted in the latest decades by the government of our country to development cotton growing and to get high crop. This puts the task on the creating of early, productive, resistant to pests and diseases, fiber quality meeting the world requirements and with fiber output not less 40% before plant breeding scientists. Our state has sharply negative difference on the fiber productivity than foreign cotton varieties in spite of leading rank on the raw cotton production and export in the world. Lowered productivity results in getting several 100 thousand ton less of fiber annually by our farmers and classters. Unfortunately, this problem is stayed unsolved. For this point of view, the creation of varieties with high fiber productivity is the actual task.

Based on the analysis of fiber quality indicators of simple and complex hybrids F<sub>5</sub> according to F.Toreev et al. [3], lines L-150 and L-195 from simple hybrids F<sub>5</sub> and L-212 and L-215 lines from complex hybrids, analysis of fiber quality indicators and complex hybrids F<sub>8</sub> Based on simple hybrids F<sub>8</sub>, lines L-3 and L-31 and complex hybrids, lines L-46 and L-50, in comparison with other simple and complex hybrids and model types, the fiber quality is determined to meet the requirements of world standards.

Plant breeding scientist R.G.Kim [4] suggests that plant breeding success on the resistance of cotton to wilt disease causing by Verticillium fungi depends on the study of isolates' (strains) reproduction rate in the different geographic districts, the resistance degree

of varieties, initial parental forms and hybrids. Resistance of varieties to wilt and analysis of different isolates

It is known that the varieties currently are being developed should be high fiber output and meet the requirements of textile industry which means the high fiber quality. The quality indexes of fiber are characterized: length, fineness (metric number), maturity, prolongation, elasticity, clearness and color.

Increasing of the fiber quality is being always the major goal. At this some of problems exist in the creating the varieties with bumper fiber and high quality. Firstly, there are negative relations between fiber output and its quality. According to the data of W.R.Meredith [1,5], there are strongly relations between fiber productivity and fiber quality. Australian scientist J.D.Clement noted that there are negative correlations between some of traits of productivity and fiber quality and more notable the negative rate relations of fiber length, maturity and fiber productivity. Positive relation of fiber maturity with productivity was determined. And there was determined that no relation between micronair, fiber fineness and productivity. Genes controlling the fiber quality traits present their additive efficiency in the generation of  $F_5$  –  $F_6$  [6]. Leaf residues is the one of quality lowering factor, because the contamination will be high at the machine harvesting of leaf dense plants. The considerably decreasing of leaf hairiness has lowered contamination of the fiber.

**Methods:** Fiber quality was analyzed at the laboratory of HVI-900. Statistical analyze method (Dospekhov., 1985) was used to mathematic treatment of numerical index results.

**Results:** Quality trait of fiber has a significant importance in the cotton growing. The quality indexes of fiber was defined in the modern measuring instrument of HVI at the certification center "Sifat".

Micronier (mic), SCI, LEND (inch), UI (%) and Str(g\tex) indexes of simple and complicate hybrids  $F_5$  and  $F_8$  and samples taken from standard variety S-6524 with resistant to bacterial blight and wilt diseases, positive indexes of phenotypic traits were analyzed.

It was observed that simple hybrids of  $F_5$  (L-155  $F_5$  (C-6524xS-2609) and (L-188  $F_5$  (S-2609xTuran) have from 4,4 to 4,8 indexes; complicate hybrids (L-212  $F_5$  [(S-6524xBukhara-8) x (S-6524x S-2609)] have from 4,4 to 4,7 (L-218  $F_5$  [(Bukhara-8 x Shodiana)x (Bukhara-8x Andijan-35)]. The hybrids having mic indexes higher than 4,7 subjected to discount (table 6).

On the fiber length: from inch of 1,11 defined in the sample hybrids of  $F_5$  (T-201  $F_5$  (C-2609 x Андижон-35)) to 1,22 (T-150  $F_5$  (S-6524 x Bukhara-8)) and in the complicated hybrids from 1,14 (T-222  $F_5$  [(C-2609 x Андижон-35) x (Л-842 x Барҳаёт)]) to 1,19 inches (T-218  $F_5$  [(Бухоро-8 x Шодиёна) x (Бухоро-8 x Андижон-35)]) but in the standard variety it was equal to 1,08 inch.

It was identified that fiber length of simple hybrids was slightly longer than complicated hybrids (table 1).

Table 1. **Fiber quality indexes of simple and complicate hybrids in the  $F_5$ .**

№	$F_5$ simple and complicate hybrids	Mic	SCI	Lend (inch)	UI (%)	Str (g/tex)
1	L-150 $F_5$ (S-6524 x Bukhara-8)	4,5	163	1,22	85,2	35,7

2	L-155 F <sub>5</sub> (S-6524 x S-2609)	4,4	157	1,18	85,8	34,5
3	L-158 F <sub>5</sub> (S-6524 x Shodiana)	4,8	144	1,12	84,8	31,8
4	L-163 F <sub>5</sub> (Bukhara-8 x S-2609)	4,6	148	1,15	84,9	34,8
5	L-167 F <sub>5</sub> (Bukhara-8 x Shodiana)	4,7	155	1,19	84,7	33,4
6	L-178 F <sub>5</sub> (Bukhara-8 x Andijan-35)	4,5	145	1,14	85,0	32,8
7	L-188 F <sub>5</sub> (S-2609 x Turan)	4,8	158	1,19	85,4	34,8
8	L-195 F <sub>5</sub> (S-2609 x Barkhayat)	4,5	156	1,20	85,6	33,8
9	L-201 F <sub>5</sub> (C-2609 x Andijan-35)	4,7	146	1,11	84,3	32,9
10	L-208 F <sub>5</sub> (L-842 x Barkhayat)	4,6	161	1,14	84,7	32,4
11	L-212 F <sub>5</sub> [(S-6524 x Bukhara-8) x (S-6524 x C-2609)]	4,4	164	1,15	86,4	35,0
12	L-215 F <sub>5</sub> [(S-6524 x Shadiana) x (Bukhara-8 x S-2609)]	4,5	162	1,18	85,5	34,6
13	L-218 F <sub>5</sub> [(Bukhara-8 x Shadiana) x (Bukhara-8 x Andijan-35)]	4,7	160	1,19	86,1	33,9
14	L-220 F <sub>5</sub> [(S-2609 x Turan) x (S-2609 x Barkhayat)]	4,6	146	1,15	84,5	30,5
15	L-222 F <sub>5</sub> [(S-2609 x Andijan-35) x (L-842 x Barkhayat)]	4,6	151	1,14	84,4	32,0
St	S-6524	4,9	141	1,08	83,2	34,4

Analysis of fiber uniformity show that uniformity of simple hybrids L-201 F<sub>5</sub> (S-2609 x Andijan-35) is varies from 84,3 to 85,8 (L-155 F<sub>5</sub> (S-6524 x C-2609)) and in the complicated hybrids it varied between 84,4 (L-222 F<sub>5</sub> [(S-2609 x Andijan-35) x (L-842 x Barkhayat)]) and 86,4 (L-212 F<sub>5</sub> [(S-6524 x Bukhara-8) x (S-6524 x S-2609)]).

Related rupture strength in the simple hybrids ranged from 31,8 (L-158 F<sub>5</sub> (S-6524 x Shodiana)) tex\g up to 35,7 in the fiber of (L-150 F<sub>5</sub> (S-6524 x Bukhara-8)) tex\g. and in the fibers of complicated hybrids it was equal to 30,5 (L-222 F<sub>5</sub> [(S-2609 x Andijan-35) x (L-842 x Barkhayot)]) tex\g. Fiber uniformity and related fiber rupture indexes in the fiber of variety S-6524, taken as the standard were correspondingly 83,2% and 34,4 tex\g.



On the base of fiber analysis it was found that the fiber quality in the simple hybrids L-150 and L-195 as well as complicated hybrids L-212 and L-215 meet the world standards requirements than other simple and complicate hybrids and standard variety. Hybrid combinations without positive traits on the fiber quality indexes were subjected to the discount and the combinations meeting the requirements have been specially isolated as the new cotton lines to the next experiments in the coming years.

The fiber index on the micronair was 4,4 in the simple hybrids of  $F_8$  (S-9085 x S-6771) which has grown up to 4,8 in the combination  $F_8$  (S-9083 x C-6771) and in the complicated hybrids: from 4,4 -  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x Barkhayot)] to 4,7 in the  $F_8$  [(Jarkurgan x Barkhayot) x (S-9083 x S-6771)] and by the studies of the spinning ratios of yarn it was identified that the numbers of simple hybrids ranged from 144 in the  $F_8$  (S-9083 x Andijan-35) to 163 in the  $F_8$  (S-9083 x Barkhayot). In the complicated hybrids of  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x S-6771)] - 141 and 164 in the  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x Barkhayot)]. Micronair index of standard variety S-6524 was equal to 4,9 and spinning ratio of yarn - 141. Hybrid combinations with micronair more than 4,7 and the combinations do not meet the world requirements on the number of spinning ratio of yarn were discounted.

On the fiber length, the simple hybrids have from 1,12 inch -  $F_8$  (S-9083 x Andijan-35) to 1,22 in the  $F_8$  (S-9083 x Barkhayot). This index in the complicated hybrids: from 1,11 -  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x S-6771)] up to 1,19 in the  $F_8$  [(Jarkurgan x Barkhayot) x (S-9083 x S-6771)]. This index in the standard variety was equal to 1,08. So, the index of length in the simple hybrids is slightly higher than index of complicated hybrids.

The analysis on the fiber uniformity have defined that fiber uniformity of simple hybrids were in percentages: from 84,7 in the hybrids of  $F_8$  (S-8292 x Barkhayot) to 85,6 in the  $F_8$  (S-9085 x S-6730). In the complicated hybrids from 84,3 in the  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x S-6771)] to 86,4 in the  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x Barkhayot)]. Relative rupture strength in the simple hybrids of  $F_8$  (S-9083 x Andijan-35) tex/g, was 31,8 and to 35,7 tex/g. in the  $F_8$  (S-9083 x Barkhayot). This index in the complicated hybrids of  $F_8$  [(Jarkurgan x Barkhayot) x (S-8292 x barkhayot)] was equal to 32,0 tex/g. and 35,0 in the hybrids of  $F_8$  [(S-9083 x Andijan-35) x (S-9085 x Barkhayot)]. The indexes of the standard variety S-6524 on these two accounts were correspondingly: 83,2% and 34,4 tex/g. (table 2).

Table 2. **Fiber quality indexes of  $F_8$  simple and complicated hybrids.**

Nº	Simple and complicated hybrids in the $F_8$	Mic	SCI	Len (inch)	UI (%)	Str (g/tex)
1	L-1 $F_8$ (S-9083xBarkhayot)	4,5	163	1,22	85,2	35,7
2	T-3 $F_8$ (S-9085xS-6771)	4,4	157	1,18	85,8	34,5
3	L-7 $F_8$ (S-9083xAndijan-35)	4,8	144	1,12	84,8	31,8
4	L-9 $F_8$ (S-9085xBarkhayot)	4,6	148	1,15	84,9	34,8
5	L-18	4,7	155	1,19	84,7	33,4



	F <sub>8</sub> (S-8292 x Barkhayot)					
6	L-21 F <sub>8</sub> (Jarkurgan x Barkhayot)	4,5	144	1,14	85,0	32,8
7	L-30 F <sub>8</sub> (S-9083 x S-6771)	4,8	158	1,19	85,4	34,8
8	L-31 F <sub>8</sub> (S-9085 x S-6730)	4,5	156	1,19	85,6	33,8
9	L-43 F <sub>8</sub> [(S-9083 x Andijan-35) x (S-9085 x S-6771)]	4,7	141	1,11	84,3	32,9
10	L-46 F <sub>8</sub> [(S-9083 x Andijan-35) x (S-9085 x Barkhayot)]	4,4	164	1,15	86,4	35,0
11	L-50 F <sub>8</sub> [(S-9083 x Andijan-35) x (S-8292 x S-6771)]	4,4	162	1,18	85,5	34,6
12	L-53 F <sub>8</sub> [(Jarkurgan x Barkhayot) x (S-9083 x S-6771)]	4,7	160	1,19	86,1	33,9
13	L-57 F <sub>8</sub> [(Jarkurgan x Barkhayot) x (S-9085 x S-6530)]	4,6	140	1,15	84,5	30,5
14	L-60 F <sub>8</sub> [(Jarkurgan x Barkhayot) x (S-8292 x Barkhayot)]	4,6	151	1,14	84,4	32,0
	St S-6524	4,9	141	1,08	83,2	34,4

It was determined in the experiments that L-3 and L-31 out of simple hybrids and L-46 and L-50 out of complicated hybrids on the base of analysis of fiber qualities have met the world fiber quality standard requirements than standard variety and other simple and complicated hybrids. All combinations do not have positive traits on the fiber quality subjected to the discarding and representatives out of the combinations which meet the requirements were isolated as the new lines for further year experimental studies.

**Conclusion:** It was determined that the L-150, L-195 and L-212, L-215 out of simple and complicated hybrids of F<sub>5</sub> and L-3, L-31 and L-46, L-50 out of simple and complicated hybrids of F<sub>8</sub> have met the world requirements on the fiber quality indexes in comparison with standard variety. The lines of combinations which had not positive traits were subjected to the discount and the other ones which have met the world's requirements were stored for the experiments in the coming years.

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