Tolerance of cotton to certain biotic factors and fiber quality parameters of the ridges created by simple and complex hybridization

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Abstract. Among the strains derived from simple hybrids studied in the experiments, T-3 T-9, T-18 and strains T-43, T-53, T-57 and 60 from strains derived from complex hybrids were resistant to gommosis and wilt diseases. As a result of several years of research, it was found that the ridges obtained from complex hybrids were less affected by gommosis and wilt diseases than the ridges obtained as a result of simple hybridization. It was found that wilt disease was 3-4 times more resistant in the ridges created as a result of simple and complex hybridization compared to the model seed. Lines T-155, T-158, T-163, T-167, T-188 and T-208 from simple hybrids of cotton and lines T-212, T-215, T-220 and T-222 from complex hybrids are other It was determined that the quality of the fiber meets the requirements of the world standards in relation to the ridges and pattern type. In the studied samples, the families of ridges that do not have positive quality indicators such as fiber micronaire, yarn elasticity coefficient, fiber length, relative tensile strength and fiber uniformity are discarded, and experiments are carried out in the following years in order to incorporate new ridges that meet the requirements of the world standard with other economically valuable characteristics detached to continue.
Keywords. Cotton, fiber quality, variety, cotton diseases, fiber yield, simple and complex hybrids, ridge, micronaire, fiber length.

1 Introduction

In recent years, several decisions have been taken by the government in our country in order to develop cotton cultivation and obtain high yields [1]. This gives breeders the task of creating varieties that are quick-ripening, productive, resistant to insects and diseases, and whose fiber quality meets world standards and whose fiber yield is higher than 40%. Uzbekistan takes the leading positions in cotton production and export in the world, but it is significantly different from foreign varieties in terms of fiber productivity [2, 3]. As a result, that is, due to low productivity, our farmers and clusters receive 100 thousand tons

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less fiber every year. Unfortunately, this problem has not been solved yet. Therefore, creating varieties with high fiber yield is a very urgent issue today [4, 5].

Today, the fiber output of the varieties created in Uzbekistan should not be less than 40 percent, and at the same time, the fiber quality should correspond to type IV. It will be possible to solve the problem of diversification of agricultural crops by introducing varieties with high fiber yield while maintaining the current volume of fiber production [6].

Breeding scientist R.G.Kim [3] the success of selection work on the resistance of cotton to wilt disease depends on the in-depth study of the dynamics of new reproduction of isolates (strains) of *Verticillium* fungus in different soil geographical regions, the level of resistance of cultivated varieties, the initial parental forms and hybridization [7, 8]. Studies on cultivar resistance to wilt and different isolates of Verticillium fungi show that they have different genotypic levels of resistance to the studied isolates of the fungus. They note that Omad variety shows high phenotypic wilt resistance throughout the entire growing season when infecting primary plants with 28 isolates.

In the data of F. Toreev et al. [8] based on the analysis of fiber quality indicators of F5 simple and complex hybrids, T-150 and T-195 lines from F 5 simple hybrids and T-212 and T-215 lines from complex hybrids, fibers of F8 simple and complex hybrids based on the analysis of quality indicators, it was determined that the T-3 and T-31 lines from F_8 simple hybrids and the T-46 and T-50 lines from complex hybrids meet the requirements of world standards of fiber quality compared to other simple and complex hybrids and model types.

K. Khudarganov; M.Rakhmonkulov; In the scientific works of M.Umedova and others [6, 7, 9], valuable economic traits of cotton, disease and pest tolerance, fiber quality indicators were highlighted, and it was stated that valuable economic traits were superior to the model variety in new lines of cotton.

It is known that the currently created varieties must meet the requirements of the textile industry, i.e. have high fiber quality, along with high fiber yield. Fiber quality of cotton varieties is characterized by length, hardness, thinness (metric number), length, stretchability, elasticity, luster and color.

Improving the quality of fiber has always been the main task. At the same time, there are some problems in creating varieties with sertola and high quality. First, there are negative correlations between fiber yield and quality Allambergenov et al.; According to W.R. Meredith [1, 4] there are strong negative correlations between fiber yield and fiber quality. According to Australian scientist JDClement, negative correlations were found between yield and some fiber quality traits, particularly fiber length and maturity and fiber yield were negatively correlated. Fiber maturity was found to be positively associated with yield. It was found that micronour and fiber softness were not related to yield. Genes controlling fiber quality traits show their additive effect in the F_5 -F_6 generation [10-12]. Another factor that reduces fiber quality is leaf residue, as contamination is high in deciduous plants during machine harvesting. Dramatically reducing leaf hairs reduces fiber contamination.

2 Materials and methods

The laboratory analysis of fiber quality in the HVI-900 laboratory provides numerical indicators as results. These indicators represent various aspects of fiber characteristics such as length, strength, micronaire, and other relevant properties.

To make sense of the data and draw meaningful conclusions, the numerical results are subjected to mathematical processing using statistical analysis methods. Statistical analysis involves a range of techniques to interpret and understand the data, including measures of central tendency (mean, median, mode), measures of dispersion (standard deviation, variance), and correlation analysis.

By employing statistical analysis, researchers can identify patterns, trends, and relationships within the fiber quality data. This information is vital for making informed decisions related to fiber processing, production optimization, and quality control in the textile industry.

The results of the statistical analysis can also serve as a basis for comparison with industry standards and benchmarks, allowing for the evaluation of the fiber's suitability for specific applications or markets.

The combination of laboratory analysis and statistical processing ensures a comprehensive understanding of fiber quality and assists in enhancing the efficiency and competitiveness of fiber-related industries.

3 Results and discussion

New varieties of cotton being developed should be quick-ripening, productive, high in fiber yield and quality, as well as resistant to various diseases, including wilt and gommosis. In cotton fields affected by wilt and gommosis diseases, along with yield reduction, the fiber quality also decreases sharply. In the researches, resistance to these diseases in the environment artificially infested with gommose bacteria and naturally infested with wilt fungus was studied in new lines created by simple and dark hybridization.

In this case, the number of plants in the ridges obtained from simple hybrids was from 72 to 114, and in the ridges obtained from complex hybrids from 110 to 184. It was found that 10.8% of T-18 ridges and 20.8% of T-7 ridges were infected in the ridges obtained from common hybrids with the spring form of Gommoz disease, and in the autumn form, 7.1% of T-18 ridges and 16.7% of T-7 ridges were infected. . In the ridges obtained from complex hybrids of cotton , with the spring form of gommoz from 8.7 percent (T-53), to 15.4 percent (T-46), and with the autumn form from 4.8 percent (T-53), to 10.9 percent (T - 46) was observed to be infected. The C-6524 variety, taken as a model, was damaged by 20.2 % spring form of gommosis , and 14.8 % by autumn form (Figure 1) .

When the general and severe damage by wilt disease was studied, the total damage by wilt in the rows obtained from the hybrids was from 3.6 percent (T-18), to 16.0 percent (T-30), and the severe damage by this disease was from 0.9 percent. (T-18), up to 9.3 percent (T-30) were found to be infected. As a result of multi-year selection, the total damage in the lines obtained on the basis of complex hybridization is from 3.3 percent (T-53), to 10.0 percent (T-46) damage, and the severe damage in these lines is from 0 percent (T-53), 5.4 percent (T-46) was observed to be infected. C-6524, which was taken as a model, had 43.2 percent wilt damage, and 18.9 percent in severe cases. T-3, T-9, T-18 and T-43, T-53, T-57 and 60 from complex hybrids were resistant to gommosis and wilt diseases.

As a result of several years of research, it was found that the ridges obtained from complex hybrids were less affected by gommosis and wilt diseases than the ridges obtained as a result of simple hybridization. It was found that wilt disease was 3-4 times more resistant in the ridges created as a result of simple and complex hybridization compared to the model seed. On the basis of experiments, families of ridges resistant to gommosis and wilt diseases, quick-ripening, productive, with large bags, fiber output higher than 39 percent and large seeds were isolated for the purpose of breeding and creation of initial materials.

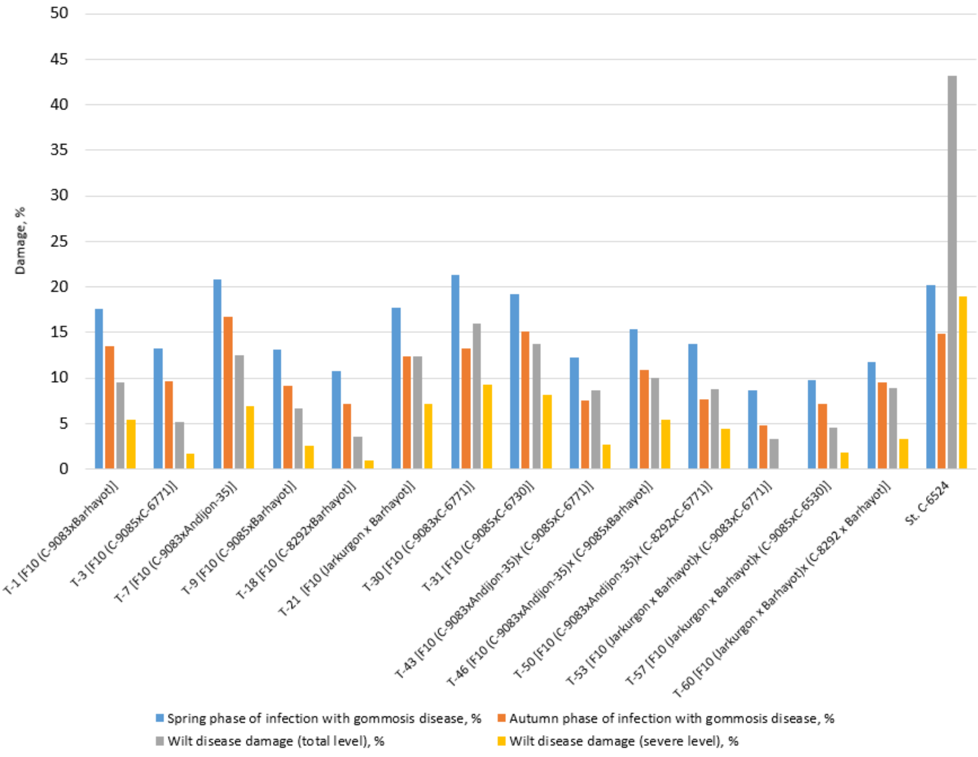

Figure 1. Tolerance of cotton ridges created by simple and complex hybridization to some biotic factors.

It is known that in all the countries that grow cotton in the world, the quality mark of the fiber is the most important in newly created varieties. In addition to the high economic characteristics of cotton, it is necessary that the fiber quality indicators meet the requirements of the world standard. In the research, the ridges created by simple and complex hybridization of medium fiber cotton with positive indicators in terms of morphoeconomic characteristics, resistant to some biotic factors, and in the samples obtained from the model C-6524 variety, fiber micronaire Mic, yarn elasticity coefficient SCI, fiber length Lend (inches) , relative tensile strength Str (g/tex) and fiber uniformity UI (%) were analyzed. Fiber quality indicators were determined in the "Sifat" certification center on a modern measuring instrument HVI.

The ridges obtained from F 6 simple hybrids ranged from 4.2 to T-188 ridges, to 5.1 to T-150 ridges, and from F 6 complex hybrids to 4.3 to T-220 ridges, to 5.2 to T-222 ridges, when these ridges were studied in terms of yarn elasticity coefficient, it was found that it was from 119 in the T-167 ridge, to 164 in the T-155 ridge, and in the ridges obtained from complex hybrids, it was from 123 in the T-220 ridge, to 162 in the T-222 ridge. The C-6524 variety, which was taken as a sample, had a microneural index of 5.0 and a yarn twist coefficient of 154. From these hybrids, the micronaire index was higher than 4.7, and the families of rows whose threadability did not meet the requirements of world fiber quality were excluded (Table 1).

From the quality indicators of the fiber, the length of the fiber was calculated from the hereditary characters and analyzed by comparison with the template variety in the lines created by simple and complex hybridization. Fiber length markers ranged from 1.07 inches in ridges derived from simple hybrids T-208 ridge [F $_6$ (L-842 x Barhayot)] to 1.20 inches in T-167 [F $_6$ (Bukhara-8 x Shodiyona)], derived from complex hybrids and in ridges from 1.05 inches T-220 ridge [F $_6$ (C-2609 x Turon) x (C-2609 x Barkhayot)], to 1.18 inches T-222 ridge [F $_6$ (C-2609 x andijon-35) x (L-842 x Barkhayot)], and in the specimen C-6524 it was 1.13 inches. According to this character, the ridges obtained from complex hybrids were slightly higher than the ridges obtained from simple hybrids and the model variety.

Table 1. Quality indicators of newly created ridges of cotton.

#	F_6 simple and complex hybrids	SCI	Mic	Land (inch)	Str (g/tex)	UI (%)
1	T-150 F_6 (C-6524xBukhara-8)	132	4.9	1.11	31.0	83.1
2	T-155 F_6 (C-6524xC-2609)	151	4.6	1.12	34.7	83.6
3	T-158 F_6 (C-6524xShodiyona)	151	4.8	1.12	35.5	83.6
4	T-163 F_6 (Bukhara-8x C-2609)	155	4.7	1.11	36.9	83.5
5	T-167 F_6 (Bukhara-8xShodiyona)	167	4.5	1.16	36.8	85.1
6	T-178 F_6 (Bukhara-8xAndijan-35)	152	4.7	1.12	37.0	82.5
7	T-188 F_6 (C-2609xTuron)	157	4.6	1.14	35.5	84.3
8	T-195 F_6 (C-2609xBarhayat)	154	4.2	1.13	37.9	81.4
9	T-201 F_6 (C-2609xAndijan-35)	135	4.8	1.12	31.9	82.5
10	T-208 F_6 (L-842xBarhayat)	147	4.4	1.14	34.4	83.5
11	T-212 F_6 [(C-6524xBukhara-8) x (C-6524x C-2609)]	155	4.4	1.11	34.6	83.3
12	T-215 F_6 [(C-6524xShodiyona)x (Bukhara-8xC-2609)]	148	4.5	1.14	33.9	83.7
13	T-218 F_6 [(Bukhara-8 x Shodiyona)x (Bukhara-8x Andijan-35)]	145	4.5	1.14	32.6	82.7
14	T-220 F_6 [(C-2609xTuron)x (C-2609xBarhayat)]	151	4.9	1.19	33.1	83.6
15	T-222 F_6 [(C-2609xAndijan-35)x (L-842xBarhayat)]	142	4.9	1.19	34.9	84.2
	St. C-6524	137	4.8	1.10	31.3	81.5

When determined by fiber uniformity and specific relative tensile strength characteristics, fiber uniformity in the ridges created by simple hybridization is from 81.4 percent for T-195 ridge, to 85.1 percent for T-167 ridge, relative relative tensile strength is 31.0 g/text for T-150 ridge Up to 37.9 g/text was observed on the T-195 ridge.

In the strands obtained from complex hybrids, the fiber homogeneity was from 82.7% in T-218 strand to 84.2% in T-222 strand, and the relative tensile strength was from 32.6

g/text to T-218 strand to 34.9 g/text to T- It was found to be on the 222 ridge. C-6524, taken as a sample, had a fiber uniformity of 81.5 percent and a specific tensile strength of 31.3 g/text.

4 Conclusions

Based on the analysis of the fiber quality indicators of the strands created as a result of simple and complex hybridization in the researches, T-155, T-158, T-163, T-167, T-188 and T-208 strands obtained from simple hybrids and T-212, T from complex hybrids. -215, T-220 and T-222 ridges were found to meet the requirements of world standards of fiber quality compared to other ridges and model types. It was observed that in these ranges there are families that meet the requirements of type IV in terms of fiber quality. The ridges that did not have positive signs in terms of fiber quality indicators were discarded, and new ridges that met the requirements of the world standard and were resistant to certain biotic factors and ridges were separated in the following years to create new varieties and initial sources by compacting most of the valuable farm characteristics.

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