



Analysis Of Cotton Selection Varieties Affecting The Quality Indicators Of The Yarn

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ABSTRACT

This article presents an analysis of scientific research carried out by scientists of the world's textile industry on the study of cotton selection varieties to improve the quality of yarn spun from cotton fiber, which is the most important raw material of the textile industry. Also, properties and characteristics of several cotton selection varieties were analyzed. The selection of cotton varieties can have a significant impact on the quality indicators of yarn. Here are some factors to consider when analyzing the effect of cotton selection on yarn quality indicators: Fiber Length and Strength: Different cotton varieties have varying fiber lengths and strengths, which can directly impact the yarn quality. Longer fibers generally produce stronger and more durable yarn, while shorter fibers may result in weaker yarn with lower tensile strength. Micronaire Value: Micronaire value is a measure of fiber fineness and maturity, which can affect the spinning performance and yarn quality. Certain cotton varieties with optimal micronaire values can produce smoother and more even yarn, while extreme values may lead to yarn imperfections.

Keywords:

cotton fiber, selection varieties, gloss-4, Bukhara, Andijan, length, ripeness, productivity.

Introduction

Large-scale scientific and research work is being carried out in world to improve the technique and technology of the initial processing of cotton, and to develop their scientific basis. In this regard, including the development of effective technologies for separating cotton from air, creating resource-efficient and effective equipment for separating cotton from air, identifying factors that have a negative effect on product quality and natural properties at each stage of production, and technical solutions to eliminate them, in the technological process of cotton cleaning development of technologies capable of managing product quality while maintaining its initial quality indicators are important issues.

In the development strategy of New Uzbekistan for 2022-2026, by ensuring stable high growth rates in economic sectors, in the next five years, the gross domestic product per capital will increase by 6 times and by 2030 it is necessary to increase the income from 4 thousand dollars and to entrance the ranks of "countries with an income above the average".

Continuing the industrial policy aimed at ensuring the stability of the national economy and increasing the share of industry in the gross domestic product, increasing the production volume of industrial products by 4 times. To double the volume of production of textile industry products, to develop industrial cooperation between large industrial sectors and regional enterprises, to widely introduce

labor productivity improvement programs in industrial sectors, to increase the turnover of the stock market from 200 million dollars to 7 billion dollars, the republic's by increasing the export potential, the republic's export volume is set to reach 30 billion US dollars in 2026[1].

In the field of plant breeding in our republic, methods such as hybridization, changing the plant species under the influence of drugs, and exposure to various types of light are used. Most of the cultivars created are not improved to the level of a mature cultivar population, the cultivar is tested and propagated without being enriched with genotypes with high potential, and the cultivars that are improved, without the potential for variation, are widely distributed in more fields. cannot live and is excluded from zoning. On the contrary, with the help of improved methods of genetics and selection, all biological and valuable features of (stable) varieties with enriched genetic composition and balanced (stable) varieties develop from generation to generation and increase productivity [2].

Cotton farming is an important production industry in our country, and the new cotton varieties being created play an important role in its development. In the development of this industry, not only economic characteristics of varieties (quick ripening, fiber output, fiber length, meeting industrial requirements), but also resistance to various diseases and pests, adaptation to extreme conditions or endurance are important. It is important to study the wild and semi-wild forms of cotton from different countries, which have preserved many useful characteristics, in order to collect such characteristics in the varieties. Samples of cotton with valuable features can be found in the collection that has been studied and preserved for many years [3].

Our republic has such a unique collection of cotton, which is an important technical crop, and such a collection ensures the preservation of cotton types and varieties, as well as their use in the field of applied sciences. This cotton collection at the Scientific Research Institute of Cotton Breeding and Breeding of Uzbekistan contains about 13,000 samples of wild, semi-

wild forms and varieties collected from more than 110 countries of the world. these samples are mainly from USA, Mexico, India, China, Australia, Turkmenistan, Tajikistan, Egypt, Brazil, Israel, Peru, Pakistan, Iran.

The collection of specimens is updated every 8-10 years. Most of these samples are important for practical breeding and genetic research due to some of their characteristics. Some of them were widely distributed varieties at the time, and some of them were removed from production due to the increase in industrial requirements and resistance to diseases and for other reasons. Some wild and semi-wild specimens growing in nature have completely disappeared or are on the verge of disappearing as a result of human interference, in the process of land development [4].

In our republic, varieties of cotton that give white fiber are grown on a large scale. Such varieties meet the requirements of the cotton growing industry with most of their characteristics and today occupy an important place in the economy of our republic.

At the same time, there are also samples of colored fibers (brown, green, brown) collected from different countries and varieties of cotton, and there are a number of such samples. In addition, most of the samples with colored fiber have not been studied for the purpose of introduction into wide production due to their somewhat lateness and low fiber quality. Since the fibers of such varieties have a natural color, it is not necessary to dye them in order to make such colored fabrics. Fabric made of natural colored fiber is harmless to human health and does not cause various allergic conditions.

It can be said that the color of the fiber in some green fiber samples is different in different parts of the plant due to the sensitivity of the color-determining pigment to sunlight. This shows the low efficiency of using such colored fiber [5].

Based on the experiments, it can be concluded that there is a correlation between the hardness of the fiber and the fibril crystallites that make up the second layers of the fiber. It was found that this relationship can even be used as a genetic marker in hybrid samples. In particular,

it was found that hybrids obtained with the participation of *G. tomentosum* species have superior fiber maturity, the amount and size of crystallites compared to the varieties of *G. hirsutum* L. species. Based on these results, it can be concluded that the use of the hydrolysis method provides an opportunity to create a quick method that determines the ripeness of cotton fiber before the end of the cotton vegetation period and for the first time [6].

In order to form valuable complex traits of cotton varieties, traditional breeding methods such as simple, saturated, backcross and others are widely used by breeders. However, when using these methods, the possibilities of obtaining high-level gene recombination are limited, and the efficiency of character improvement in the created hybrids is low. Because traditional methods of selection can create varieties whose productivity is only 10-15% better than standard varieties.

Local Porloq, Ferghana-3, Namangan-77, S-5619, Omad, Ferghana-5, Mehr, Tashkent-6, SoyuzNIXI-11, S-9070, Andijan- 27, Andijon-31, Zafar-4, Zafar-3 and S-6530 varieties, D-8, DS-3, KS-11 ridges and foreign Paymaster-266 (USA) variety, K-010305 and K-010306 (Australia) samples were used.

Crossbreeding with the mentioned varieties was carried out in three stages. In the first stage, simple hybrids, in the second stage, double hybrids, and in the third stage, the seeds of complex hybrids were obtained [7].

In terms of fiber yield and length, the simple hybridization method was slightly superior to the complex hybridization.

Scientists at the Scientific Research Institute of Cotton Breeding and Seed Production of Uzbekistan have created a new cotton variety, Aqqorgon-2. This cotton variety is medium-growing, with an average yield of 36.0 to 45.0 tons per hectare in different climatic and soil conditions.

The created new cotton variety Aqqorgon-2 was planted and tested at the "Arif" farm. The Akkorgon-2 cotton variety was recognized as a promising variety. It is planned to plant this variety in the fields of our country on an area of 65 thousand.

One of the new promising varieties, S-6770, is being cultivated in collective farms related to seed production in the Okkorgan district of Fergana, Namangan and Tashkent regions. However, due to good performance in the State variety testing stations, it was determined that the ripening in 109 days fully meets the current demand, and it was recommended for planting [10].

The "Omad" variety was created by the scientists of the Scientific Research Institute of Cotton Breeding and Seed Production of Uzbekistan. The zoning plan for planting this variety was established only in Samarkand, Andijan, and Fergana regions [8].

Research shows that the earlier the seed is planted on a well-drained, well-drained soil, the sooner and more evenly the sprouts will sprout. For example, the An-Uzbekistan-4 variety can be cited as an example.

Any cooperative farms in the territory of our republic choose their planting scheme depending on the climate and land conditions.

The height of the Sharaf-75 variety is 110-120 cm, 0-2 side branches, the stem is strong, so it does not lie down, the crop branches are short 2-3 cm. The crop belongs to the first type according to the location of the branches. The first harvest branch appears in the 6-7th joint. The leaves are medium-sized, light green, the flowers are medium-sized, pale yellow, the pollen is pale yellow, the pods are round, slightly pointed, the surface is smooth, green, medium-sized, the pods open quickly, the cotton does not shed from the groin, the seed is hairy, and it is among the early varieties.

Also, a number of scientists conducted research in the direction of studying the processes of separation in generations and the formation of characters by conducting interspecific hybridization between *G. barbadense* L. and *G. hirsutum* L. Species [9].

It has been difficult to attract wild diploid species of cotton to hybridization and carry out backcross breeding in them. It was observed that they do not interbreed in $G'1$ *G. hirsutum* L. x *G. sturtii*, $G'1$ *G. hirsutum* L. x *G. raimondii* beccross amphidiploids. The expected result

was obtained when phytohormones were used to overcome this obstacle.

In addition, scientists have discussed the importance of interspecies hybridization in cotton selection in their research.

In addition, a number of scientists studied the inheritance of oil content in interspecific hybrids obtained with the participation of *G. tomentosum* species and *G. hirsutum* L., a polyploid species. They said that the amount of fat in hybrids depends on which sample is used as a mother. In particular, it was noted that the average fat content of hybrids with S-6530 variety as mother was 24.3 [10].

It is very important to create varieties with high fiber quality in cotton selection. Obtaining such results in hybrids obtained by interspecies hybridization requires a lot of work. Therefore, they cross-bred *G. Tricuspidatum*, *H. G. Hirsutum*, *S. P. Yucatanense* interspecies hybrids with 149-F, S-4519, L-06, L-623 varieties for 3 years, with high yield, high fiber yield and length, and low whiteness disease. they managed to get resistant ridges. Today, the enterprises of the society are actively working to expand the type of exported finished products. In particular, the export of enterprises of the network included olachipor, densely prepared and bamboo yarn, new models of ready-made knitted and crocheted goods, bedroom and kitchen linens, labels, poplin, satin and fluff fabrics, children's shirts and other new types of products. Taking into account the market requirements, the type of sewing and knitting products has been updated.

A number of scientists have observed heterosis in fiber yield during the study of the inheritance of traits in hybrids obtained with the participation of *G. tomentosum*. In addition, when *G. tomentosum* participates as a mother in the hybrid, it is recognized that the tolerance of plants to sucking insects is high [11].

For example, it was recognized that if a wild species participated as a mother, the hybrid index was low and it deviated towards the fast form, on the contrary, if a fast variety participated as a mother, this indicator was high in the hybrids.

Scientists say that the hybrids obtained as a result of complex interspecies crossings are resistant to white spot disease compared to the hybrids obtained by crossing the subspecies *G. hirsutum* L. ssp *mexicanum*.

Analyzing the above performed and carried out work, it can be concluded that carrying out cross-breeding of cotton fibers of different selection varieties, i.e. re-breeding hybrid plants obtained by crossing wild and semi-wild species with cultivated varieties, is a high result. it was proved that it can be given. Because wild species have undergone the process of natural selection for several million years, only species resistant to external extreme conditions have reached us. In the cotton fields of our country, medium and long fiber types of cotton are grown. Most of the seed cotton harvesting from the fields is carried out with the help of cotton picking machines. As a result, the amount of contamination of seed cotton increases. It will be necessary to clean the cotton itself in cleaning equipment. Along with this, drying works are carried out at the expense of picking seed cotton with high humidity.

Cotton fiber mainly consists of cuticle, cellulose, tubular layers, and cuticle, in turn, consists of cellulose combined with oil, wax and other substances. This layer protects against external influences. The second layer is the cellulose layer. Ripe cotton fiber contains 95-98% cellulose.

For example, cellulose contains 44.44% carbon, 6.17% hydrogen and 43.39% oxygen. In addition, cotton fiber also contains hemicellulose. As cotton fiber ripens, hemicellulose content decreases.

The greater the amount of cellulose in the cotton fiber, the longer the fiber matures and its diameter does not change. The diameter of the inner cavity is reduced.

Cotton fiber has a crystal-amorphous submicroscopic structure. As shown in several studies, the cellulose macromolecule lies simultaneously in several crystalline and amorphous areas.

During the ripening period of cotton fiber, the degree of crystallinity increases rapidly and during 35-40 days it increases to a small extent, i.e. up to 80%, and then it does not change.

The porosity of cotton fiber is considered an important structural component and determines the hardness and sorption properties of the fiber. The small porosity in the fiber is $0.8 \cdot 10^{14} \text{ cm}^{-3}$, which occupies 0.01% of the fiber volume, and the large porosity is $4.7 \cdot 10^{14} \text{ cm}^{-3}$, which occupies 0.3% of the fiber volume.

When observing the structure of cotton fiber using an electron microscope, it was observed that the arrangement of fibrils in the primary and secondary layers is different. The primary wall layer of the fiber is equal to $0.5 \text{ }\mu\text{m}$, and the fibrils are located at an angle of 400 to the axis of the fiber. The second layer is the cellulose layer, which is equal to $5\text{-}10 \text{ }\mu\text{m}$, and it consists of fibrillar bundles, located at an angle of 20-350 to the fiber axis [12].

The main purpose of using the drying process in cotton ginning enterprises is drying to the specified standard humidity, cleaning from impurities. Currently, 2SB-10, SBO drying drums are working in cotton ginning enterprises.

If we keep the seeds picked in high humidity in cotton gins for a long time, the color of the fiber will turn yellow, the quality indicators will decrease, and even in some cases it will cause symptoms of fire. For this reason, seeded cotton of the lower grade, whose moisture content is higher than the standard parameters, is primarily involved in processing. Underground roads are opened from the lower parts of the harvested cotton.

In the storage of seeded cotton received at cotton gins, harvesting is carried out taking into account the height, type, grade and moisture content of the cotton. If the moisture content of seed cotton is higher than the standard parameters, it is placed near the drying-cleaning section and is dried at high speed and sent to the cotton gin for processing.

In addition, if the received raw material in the cotton ginning enterprises, the layers of garm are not sufficiently sealed, if the corners are placed incorrectly, if the quantity of seed cotton, which has been gamed in a few days, exceeds the permitted standard, then the strength of the garm is not sufficient. won't be.

After ginning in cotton gins or processing facilities, seeded cotton slowly sinks over time, and after 10-15 days, there is a possibility that the height will decrease to 1-1.5 m.

In cotton ginning factories, cotton is stored in two different ways, i.e. in open and closed areas. Tarpaulin fabrics are used to cover seeded cotton stored in open areas in cotton gins. Seed cotton stored in storage must be covered with new or first-class tarpaulins [13].

When the humidity of the received cotton is normal, 8-10 days, and after 3-5 days for the cotton with excess moisture, one underground passage is opened. The temperature of the stored pile of cotton in all classes is controlled, I and II grades with an average moisture content of no more than 9-10%, 1st and 2nd grades, and III, IV, V grades with an average moisture content of 11-13%. Because the longer the cotton is stored in the storage, there is a possibility that its moisture will increase.

In cotton ginning enterprises, cotton received from farmers is mainly stored in two ways, i.e., open (in the form of sacks, this placement is 70-75%) and closed (in warehouses, in places where the upper part is closed). For example, seeded cotton with average humidity is placed in the form of a garm with dimensions of 25×14 , $22 \times 11 \text{ m}$, and a height of $10 \times 12 \text{ m}$. carried out through drying-cleaning workshops [14].

During the drying process of seeded cotton in cotton ginning plants, the evaporation of moisture contained in fiber and seed is uneven. One of the main tasks of the drying process is to create a flatness between the components. In most cases, the core has physico-chemically bound moisture, its movement inside the material is manifested first as a liquid, then as a vapor. As a result, scientific and research work was carried out on Tashkent-1 grade III cotton laboratory gin. Separated seeds were dried in the drying process, seeds with different moisture levels were cut, and changes in the structure of the core and bark were determined. Since the structure of raw material components has different morphological indicators, it is known that the distribution of moisture in them is also different. The moisture content of the

sawdust is greater than the moisture content of the fiber. Therefore, in the process of drying cotton, the separation of moisture between the components is different, which leads to a violation of the quality indicators of the fiber [15].

It is clear from a number of research studies that the crystallinity of the fiber is disturbed as a result of the temperature increase during the drying process. The method of drying cotton in an air fountain was chosen in the research work. When cotton is dried in this method, the drying process is accelerated due to the high speed gradient, and the cotton is cleaned of various impurities during intensive movement in the air fountain. The fiber is not mechanically damaged due to the fact that no mechanical stress is applied to the fiber during the cleaning process. When cotton is dried in this way, the light reflectivity of the fiber increases, and yellowing is not observed in the cotton fiber dried in drum dryers. According to the preliminary results, 20% of energy is absorbed when drying cotton in an air fountain. The degree of whiteness of the fiber is 12% higher compared to the fiber dried in a drum dryer.

At present, a new edge drum has been installed to clean the mesh surface of SBO, SBT drying drums in the cotton ginning enterprises of our republic. This edged drum is 3 meters long and rotates to clean the mesh surface. The material of the brush is made of metal, it can be used at any time, preventing it from being eaten, that is, it is used when dirt accumulates on the mesh, and it is stopped after cleaning. The result showed that the cleaning efficiency is 30-35%, the dirtiness of the fiber of the finished product is reduced by 0.4-0.5%, and the quality indicators are improved.

During the drying period of seeded cotton in cotton ginning enterprises, the amount of fiber defects and waste is reduced. This makes seed cotton better cleaned in the technological process. For example, Namangan-77 grade I and III cotton fibers were obtained during research. Test work was carried out at the cotton ginning enterprise in Bayaut district. For this, seed cotton was dried at 150°C temperature to different moisture content, and converted into

fiber in laboratory conditions, and the content of defects and waste was determined.

Conclusion and discussion

Based on the results of this article, the following conclusions and suggestions can be made:

A bank of scientific-research works conducted by scientists on the creation of promising breeding varieties, morphological properties, structure and properties of cotton fiber has been collected.

Quality indicators of fiber and seed were determined based on the State Standard.

Based on the current conditions, research work was carried out in order to obtain quality raw materials in cotton ginning enterprises.

When we analyzed the cleaning efficiency of different promising cultivars from small and large impurities, the amount of total impurities was from 31.7% to 38.4%, the amount of large impurities was from 25.0% to 70.9%, and the amount of small impurities was from 50.0% to 88. Up to 0.1% was found to be purified compared to the sample at the initial concentration.

As a result of initial processing of Kopaysin and Guliston selection varieties in cotton ginning plants, mechanical damage of fibers was observed more than other selection varieties.

If we compare the results of the research in terms of the total surface area in the comprehensive assessment, the total surface area of Kopaysin selection grade cotton fiber is 954.6 mm², the total surface area of Sultan selection grade cotton fiber is 1026.2 mm², the total surface area of Guliston selection grade cotton fiber is 1386.7 mm², and it was found that the total surface of Marvarid selection cotton fiber was 1263.6 mm².

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