BRIEF HISTORY OF BREEDING DEVELOPMENT AND IMPORTANCE OF CULTURE VARIETIES IN AGRICULTURAL PRODUCTION

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***Annotation.** This article discusses the importance of crop varieties in agricultural production and a brief history of the development of breeding, the original concepts of breeding and seed production, as well as a brief history of the general development of fine and medium-fiber cotton varieties. And also, we touched on the importance of crop varieties and a number of other species in agricultural production that are still relevant today.*

***Key words**: agricultural crops, high-quality harvest, agricultural enterprise, farm fields, seed production, fine- and medium-fiber cotton varieties, hybridization, mutation, polyploidy, heterosis, genetic engineering, biotechnology, crop productivity, folk breeders, creation of a new variety.*

INTRODUCTION. High-yielding varieties and hybrids that meet the requirements of agriculture in certain conditions with the aim of annually obtaining high and high-quality crop yields, providing the population with abundant food products throughout the year, and industry with sufficient raw materials. The significance of their creation and widespread implementation in the fields of agricultural enterprises and farms is extremely great.

Because a variety (hybrid) is one of the main elements of crop cultivation technology. That is why the government of our republic pays special attention to the creation of new varieties of agricultural crops and the radical improvement of selection and seed production for their implementation over large areas. A striking example of this is the adoption by the Oliy Majlis of the Republic of Uzbekistan on August 29-30, 1996 of the Laws “On selection achievements” and “On selection”. The implementation of these Laws and the rapid development of agriculture in our country pose important tasks for breeding and seed science.

The main task in agriculture is to increase crop yields and grow high-quality and cheap products. Productivity can be increased mainly in two ways: firstly, by adapting the external environment of the crop to the needs of the plant through agrotechnical measures, developing a regional technology for cultivating crops for each soil and climatic conditions, and secondly, by means of selection methods can be expanded, influencing directly on the wire itself and creating varieties with valuable characteristics.

The science of breeding deals with the creation of new varieties and hybrids of agricultural crops. “Choice” is a Latin word meaning “to choose.” “Breeding” is a science that studies methods for creating new varieties and improving cultivated varieties of agricultural crops.

In the early stages of the emergence of agriculture, the only method of selection was the creation of varieties based on the selection of the best plants that existed in nature or were cultivated.

The modern concept of selection corresponds to the work of selection in ancient times. At the same time, the meaning of the word “selection” expanded, as a result of which it could not fully reflect the volume of work in the field of selection.

Modern selection includes the creation and selection of source material, the study of heredity and variability, and the selection of new forms (varieties) of plants. The more different methods (hybridization, mutation, polyploidy, heterosis, genetic engineering, biotechnology, etc.) are used in breeding, the more the creative role and possibilities of selection in creating a new variety will increase. Therefore, selection remains a real method that cannot be separated from the selection process. Because no matter how selection work is carried out, selection work will be carried out. The science of breeding is closely related to the science of “field crop seed production.” But seed production cannot be considered part of selection or its continuation. Seed production is a special branch of agricultural production, the main task of which is to fully meet the needs of agricultural enterprises and farms for quality seeds. As a science, seed production deals with the following issues: reproduction of varietal seeds, keeping them clean (ensuring the purity of the variety), preserving the genetic, economic and biological characteristics of the variety, and improving the quality of seeds by all means.

Breeding and seed production are sciences that work together. They are related to the sciences of botany, plant physiology, biochemistry, ecology, cytology, plant growing, phytopathology, entomology, land reclamation, agrochemistry, agriculture, mechanization, processing and storage of agricultural products,” uses a wide range of methods and teaching methods. and information.

Selection and seed production belong to the sciences of agronomy, but differ sharply from such sciences as agriculture, agrochemistry, land reclamation, entomology, and plant growing.

Most sciences related to agronomy study ways to increase the productivity of crops by influencing their growing conditions. For example, new methods of soil cultivation, fertilizing crops, washing salt, watering and other activities are being developed. Selection and seed production directly affect the plants themselves and their heredity, increasing the productivity of agricultural crops, changing crops in the right direction. That is why Academician Vavilov described that livestock farming is, firstly, a science, secondly, an art and, thirdly, the most important branch of agriculture.

The theoretical basis of selection and breeding is genetics. The theoretical basis of breeding work is the laws of heredity and variability, studied in the science of genetics. Selection creates a new breed based on genetic methods. Breeding work teaches how to propagate seeds of a new variety and deliver them to production. Thus, the sciences of genetics, selection and seed production are inextricably linked.

Currently, the use of new genetic methods in breeding is bearing fruit. Great progress has been made in the creation of heterozygous hybrids of corn, sorghum and vegetable crops. The use of cytoplasmic male sterility in the production of heterozygous hybrids of corn and other crops is a new stage in seed production.

The use of cytoplasmic male sterility also contributes to the creation of heterozygous hybrids of wheat and other grain crops. Polyploid forms and varieties of dandelion, rye, marigold, soybean and other crops have been created. Mutant (altered) varieties with important economic and biological characteristics were obtained under the influence of radioactive rays and chemicals. All this shows that genetic methods will be widely used in breeding work in the future. In addition to using genetic methods to create new varieties (hybrids), study the laws of formation of new forms and their application, modern selection has its own techniques and methods of work as an independent science.

The achievements of folk breeders are of great importance in the creation and enrichment of breeding doctrine. Based on new theoretical concepts, the work to create a new breed was improved and expanded. In the modern development of selection, theory and practice are closely related to each other.

Plant breeding works on populations and varieties in accordance with its objectives and methods of work. The study and use of variability arising in a population to create a new variety is an important component of breeding work.

Using artificial selection, the breeder was able to create new varieties of crops in a relatively short period of time. According to academician N.I. Vavilova, “Selection is practical evolution, controlled and directed by man.”

The importance of crop varieties in agricultural production. Thanks to breeding work, new varieties (hybrids) of agricultural crops are created. A variety is a group of cultivated plants created by selection methods and possessing certain hereditary morphological, economic and biological characteristics and characteristics.

A generation of plants with different heredity, the characteristics and characteristics of which are not fixed (variable), is called a hybrid.

The variety is a product of human activity and is one of the means of increasing labor productivity in agricultural production and accelerating scientific and technological progress.

Increasing labor productivity in agriculture largely depends on the type of crops. First of all, the variety increases productivity.

State variety testing, many years of experience and production data show that newly created good breeding varieties give yields 10-40% higher than previously cultivated varieties. When planting new varieties, the yield of cotton and grain crops per hectare is 2-5 centners, corn 10-12 centners, potatoes 30-40 centners. This makes it possible to grow tens, hundreds, thousands and even millions of tons of additional products over large areas due to the new variety.

A brief history of the development of selection. According to academician N.I. Vavilova, “Field culture and plant growing developed simultaneously with universal human culture.”

The history of the development of selection is associated with the emergence and development of agriculture on earth and consists of four stages: ancient (simple) selection, folk selection, industrial selection and scientific selection.

Ancient (simple) selection. In the distant past, people selected and used plants that gave abundant and high-quality harvests from wild plants, but did not know how to propagate and preserve them. This process, which continued uninterrupted for many centuries, was gradually refined with the development of human intelligence and laid the foundation for the selection that was subsequently used. Simple selection arose after ancient people selected the best, most productive plants, propagated and preserved them. Archaeological excavations show that most of the cultivated plants were planted ten thousand years BC, that is, in the Stone Age. In the past, simple breeding has helped create valuable varieties of grains, vegetables, legumes, fruit plants and grapes. These achievements play a major role in the further development of plant breeding. Our generations who lived in the distant past, thanks to their tireless selection work, were able to form valuable varieties and types of agricultural crops even using simple methods.

People's selection. The further development of agricultural culture and the improvement of tools also influenced the development of selection. The accumulated experience and knowledge about agricultural crops was passed on from generation to generation, the differences between plant species became increasingly clear, and the possibilities for their practical use expanded. The choice itself became more complicated. Advances in agriculture and selection have made it possible to use the method of artificial selection even more widely.

Thus, popular selection was gradually created and developed in many countries.

The first fine-fiber cotton varieties “2” and “3”, “35-1”, “35-2”, “23” were developed, as were the late-ripening varieties “Yanovich”, “Ashmuni” and “Released from Pima” brought from Egypt. In general, local varieties are the golden fund of modern breeding.

Industrial selection. The emergence of capitalism and the development of social productive forces made plant breeding more advanced. Employees, organized in special institutions, began to engage in selection and seed production.

The works of Galle, Lecouter and Shireff among Western European breeders who lived in the 18th century were of great importance in the further development of selection. In their work, these breeders showed ways to create a variety.

In 1744, the famous Vilmorin company was founded near Paris, which made a great contribution to the initial development of plant breeding. Researchers from this company were the first to use the method of evaluating selected plants over generations to create a new variety.

Determination of sex and sexual process in plants, the study of artificial pollination and mass hybridization have become important for the development of industrial breeding. Thus, breeding progressed significantly from the end of the 18th century to the first half of the 19th century and achieved undeniable success. But despite this, selection for a long time could not have a theoretical scientific basis.

Scientific selection. Charles Darwin's theory of evolution played a decisive role in the emergence and development of scientific selection. The doctrine put forward by scientists about the development of the organic world provided the first scientific basis for selection and remained its eternal basis (see: Figure-1). Ch. Darwin’s contribution to the creation of scientific selection is that in his works he summarized the practical work of botanists and breeders who lived before him to create varieties of plants and animal breeds. The scientist described the achievements of selection as an art in his work “Changes in domestic animals and cultivated plants at home.”

Picture 1. Charles Darwin (1809-1882).

Academician N.I. Vavilov explains the significance of Charles Darwin's theory in the emergence of scientific selection by the fact that "Darwin's evolutionary theory became the main basis of scientific selection." The work of a number of talented breeders, such as I.V. Michurin and L. Burbank, was also important in the theoretical and practical development of scientific selection.

I.V. Michurin began his work in the field of breeding in 1874-1875, created many new varieties of fruit trees and successfully applied a number of new and excellent breeding methods in his practical work (see Fig. 2). His famous slogan “We cannot wait for gifts from nature, it is our duty to receive them” clearly expresses the revolutionary nature of selection as a science that changes the nature of plants.

Figure 2. Ivan Vladimirovich Michurin (1855-1935).

I.V. Michurin was the first to put forward the idea that a person can consciously control the creation of varieties and types with the signs and characteristics necessary for him. In order to theoretically substantiate his opinion, he created many varieties of fruit and berry fruit plants.

I. V. Michurin’s work on the hybridization of geographically distant plant varieties, interspecific, intergenerational hybridization was extremely important for the theory and practice of breeding.

Together with I.V. Michurin, scientific research on hybridization and selection methods is carried out by the American breeder Luther Burbank. He grew a large number of seedlings from each breeding pair, carried out strict selection within them and was able to create a number of new popular varieties of various crops. Some of these varieties, such as seedless plum, giant nut, apricot-plum hybrid, thornless monkey, plum varieties whose fruits dry on the bush, etc., due to their incomparable role in increasing agricultural productivity and improving its quality. product quality, at the end of the 19th and beginning of the 20th centuries, wide networks of breeding institutions began to be created in most countries of the world. In 1886, the single selection method was first widely used at the famous Svalev breeding station, which made a great contribution to the theoretical and practical development of breeding in Sweden. This method is theoretically very extensive - it was laid down in 1903 in the teaching of V. Jogensen “On populations and pure lines”. At the Svalyovo breeding station, the famous Swedish varieties of oats and many other valuable varieties were bred using individual selection. This station is currently one of the most famous modern breeding enterprises in Europe.

In 1884, the Poltava experimental field was created, where E. A. Zaikevich began to study existing varieties of Russian wheat and types of alfalfa.

In 1886, Nemerchan and Uladovo-Lyulines, and in 1889 - the Verkhnyachya selection and experimental station, and in 1896 L. I. Sempolovsky published the first Russian-language guide to improving cultivated plants and seed propagation (“Ptstsvodstvo to breeding seeds. improving the created pacts "," he wrote.

In 1894, the Bureau of Applied Botany was created under the Ministry of Agriculture of Russia, and under the leadership of Professor R. E. Regel, the collection and study of samples of cultivated plants began. In 1924, on the basis of this bureau, the Institute of Applied Botany was created, and in 1930 it was transformed into the All-Union Research Institute of Plant Growing (BNP). Even now, this institute is a world-famous breeding center for the collection and study of varieties and varieties of cultivated plants. For many years after the creation of the BNP, this scientific institution was headed by the famous Russian scientist academician N.I. Vavilov (now this institute bears his name) (see Fig. 3). N.I. Vavilov created the doctrine of the source material of plant selection and founded the ecological-geographical principle in selection. The theoretical part of plant breeding on the resistance of cultivated plants to diseases and pests, the law of similarity of lines in genetic variability and the determination of the centers of origin of cultivated plants belongs to N.I. Vavilov. Academician N.I. Vavilov made a great contribution to the development of scientific selection, having carried out great work on the creation of breeding and experimental institutions in the territory of the former Union.

Figure 3. Nikolai Ivanovich Vavilov (1877-1943).

Although the first breeding institutions in Russia were created at the end of the 19th century, real breeding work began in the 20th century. In 1903, under the leadership of Professor D.L. Rudzinsky, the first breeding station was created at the Moscow Agricultural Institute (now the Agricultural Academy named after K.A. Temiryazev), and the first varieties of grain crops and flax in Russia were created here. In the 1903-1904 academic year, students of the Moscow Agricultural Institute were given a lecture on selection and seed production for the first time. This lecture was given by breeder D. L. Rudzinsky. From this period, breeding and seed science began to be taught in agricultural universities of the former Union.

In 1909, the Kharkov Agricultural Experimental Station was created (now the Ukrainian Research Institute of Plant Growing, Breeding and Genetics named after Yu. Yuryev). After this, in 1910-1914, Saratov, Bezenchug, Krasnokutsk, Odessa, Mironovsk, and Ivanovo experimental stations were created in Russia.

The first agricultural experimental stations were created in Central Asia in 1900. Turkestan, Andijan, Mirzachol, Ashgabat are experimental stations, and they mainly worked on sowing cotton. In 1910, at the Turkestan experimental station (now

R.R. Schroeder Scientific and Production Association of Horticulture, Viticulture and Winemaking) Academician R.R. Schroeder planted local varieties of cereals and for the first time began to study them from a breeding point of view.

It was a very difficult task to create a new breed that fully meets the requirements of today. That is why great changes are taking place in the structural and organizational structure of breeding work, because the main task of breeding is to create new varieties with the most important economic and biological properties that ensure increased productivity of agricultural crops. To do this, it is necessary to unite, specialize and collaborate between individual scientists and specialists in this field. It is necessary to carry out an accelerated breeding program, reduce the time required to create new varieties as much as possible, and carry out work on a large scale with the widespread use of new genetic methods and modern technical means.

In order to radically improve the breeding and breeding of agricultural crops, the Agricultural Research and Production Center of Uzbekistan (UZSPTC) was created in our republic.

The center includes institutions of various industries - grain, cotton growing, cotton selection and seed production activities of Uzbekistan, plant breeding, vegetable and potato growing, horticulture, viticulture and viticulture, plant protection and other scientific and inspection institutes, their local branches, base addresses, and agricultural higher education institutions, professional colleges.

They carry out selection and sowing work on the most important agricultural crops, comprehensively evaluate new varieties, develop and improve new methods of selection and seed production, coordinate the work carried out in other research and selection and experimental institutions, provide them with scientific support - conduct it methodically.

Each breeding institution includes large breeding departments and several laboratories working on specific crops or several crops. Modern laboratory buildings and breeding complexes are being built in breeding institutions. They are equipped with the latest equipment. All conditions are created for carrying out breeding and selection work in accordance with the requirements of the time. The creation of breeding and selection institutions and the unification of the scientific forces of specialists in various fields (breeders, geneticists, biochemists, cytologists, physiologists, plant pathologists, entomologists, technologists, etc.) will help to comprehensively solve the most important and complex issues of breeding makes this possible.

From the first years of independence, the Republic of Uzbekistan paid special attention to the organization and development of selection and seed production in our country, and in 1996, the Oliy Majlis adopted the Laws "On selection achievements" and "On selection" laws.

The Law "On Selection Achievements" contains the basic concepts of selection work, the authorship of selection achievements and the basis for the protection of their property, criteria for the protection of varieties, the procedure for obtaining patents and certificates for them, and patent rights. issues of owners and other rights to use selection achievements, and in the Law "On Seed Production" - the basic concepts and conditions of seed production, the main tasks of seed production, the procedure for determining the quality of seeds, their certification and sale, the scientific support for organizing seed production, the role of government bodies in certification and seed quality control.

Fine-staple cotton, long-staple cotton - fibers from which fibers 37-42 mm long and longer are obtained. Fine-staple cotton mainly includes varieties of Gossypium barbadense L. Fine-staple cotton is second only to medium-staple cotton in terms of cotton fiber production worldwide. Fine-staple cotton is grown over large areas in many countries, including Uzbekistan, Tajikistan, Turkmenistan, Egypt, Sudan, Peru, Northern Brazil, Nigeria and the United States.

In the Republic of Uzbekistan, fine-fiber cotton varieties are mainly yang. Grown in the regions (Surkhandarya, Kashkadarya, Bukhara, Andijan, Namangan regions). The main varieties of fine-fiber cotton grown in the country (2002):

Termiz 24, Termiz 31, 6249-B, 9883-I, 9871-I, S-6037, 6465-B and other fine-fiber cotton varieties quickly ripen and undergo phases of phenological development . This requires an effective sum of temperatures of more than 2100-2220°. Varieties of fine-staple cotton are extremely diverse in morphological and economic characteristics. Their growing season extends from 110-120 days to 180-200 days or even more. Among the varieties there are forms that grow from the branchless type (“zero type”) to broadly branched. The stem is strong, grows erect, 60-130 cm high, bare, green, turning reddish-brown in autumn. The leaves are large, thick, dark green with long triangular segments. The flowers are large, the petals are lemon-colored, and there is a bright dark red spot at the base. The pods are smaller, most of them are oblong-ovate-conical, obtuse or sharp, with 3-5 lobes. One bag yields 3-4.2, sometimes 4.5-5 g of cotton. The seeds are large, hairless, sparsely hairy or hairy, the hairs are light green or gray. Weight of 1000 seeds is 110-140 g. The fiber is shiny, pale yellow or white. 28-36% fiber comes out. High-quality, elegant fabrics and technical products are made from fibers (types I, II, III).

Agricultural technology for growing various varieties of fine-fiber cotton depends on the characteristics of the variety and the soil and climatic conditions of the cultivated zones. In Central Asia, work on the selection of fine-staple cotton began in the mid-1920s. Bayramaly (Turkmenistan) since 1926, Vakhsh Valley (Tajikistan) since 1930, then the Research Center for Cotton Breeding and Seed Production of Uzbekistan, the Fergana Breeding Station, etc. At pilot plants, work is underway to grow fine-fiber cotton varieties from Egyptian cotton. In 1930, seeds of Ashmuni, Zagora, Sahel and other varieties were brought from Egypt and planted in the Vakhsh valley of Tajikistan, but they turned out to be very poor (see figure -4).

Figure -4. Varietal characteristics of agricultural technology of different varieties of fine-fiber cotton.

This year, for the first time in Uzbekistan, fine-fiber cotton was planted (0.2 thousand hectares, yield 9.7 c/ha, gross harvest 0.2 thousand tons). The first fine-fiber cotton variety in Central Asia, 2IZ, was released in 1935 at the Yolatan breeding station. By the early 1990s, more than 50 high-value varieties of fine-staple cotton had been developed and zoned. These varieties are well adapted to the harsh continental, hot climate and other agro-ecological conditions of Central Asia: they are characterized by rapid ripening, heat resistance and strength of the root network (see Fig. 5).

Figure -5. For the first time in Uzbekistan, the «Ingichka» cotton variety is available.

Fine-staple cotton is very expensive. For example, the price of 1 ton of regular cotton is 10 million soums, and the price of fine-fiber cotton is 15 million soums. Fine-staple cotton is a heat-loving plant. It is resistant to environmental weather conditions, genetic diseases and insects. Currently, several new varieties have been created at our institute. In particular, in our region, a new cotton variety SP 1607 is being sown on 6800 hectares. In addition, the Termiz 2 variety is planted on 4600 hectares, the Surkhan 14 variety on 3500 hectares, and the new varieties Termiz 28, ST 1651 are planned to be grown on large areas of land. New varieties of cotton created this year are planned to be grown on 18 thousand hectares.

Summary. So, in our article, entitled “A brief history of the development of selection and the importance of crop varieties in agricultural production, the initial concepts of selection and seed production, at the same time, a brief history of the general development of small and medium-sized varieties of agricultural crops” - fiber varieties of cotton and their modern significance We also touched upon the issues of ownership and significance of crop varieties in agricultural production and some other species.

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