Distribution of new varieties of grain crops suitable for the natural climatic conditions of Uzbekistan

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Abstract. This article examines the issues of the history of the dissemination of new varieties of grain crops in the region of Uzbekistan through the analysis of articles and literature. The article also provides a comparative analysis of the history of the cultivation of grain crops during the years of the Russian Empire, Soviet power and independence.

1 Introduction

The climate change in the world’s, ecological problems, water and food shortages continue to be a constant focus of attention of the world community. Taking into account the soil and climate conditions of the Central Asian region, innovative methods of growing new varieties and types of plants suitable for the harsh ecological environment, introduction of perspective technologies, establishment of forests against soil erosion, creation of new varieties of grain crops, drought, various selection of disease-resistant crop types and expansion of areas under these crops with resource-saving technologies remain relevant.

2 Materials and methods

Intensive scientific research is being carried out in the scientific centers of developed countries of the world to solve these problems, derived from widely use of historical experiences in this regard. Due to the resettlement policy of the government of the Russian Empire, a number of Russian villages appeared in the regions of the country, where they began to engage in farming and cattle-breeding.

Historical data confirm the introduction of varieties of new crops into the territory along with the displaced population. It is known that from time immemorial in Turkestan the cultivation of grain crops in agriculture, as well as cotton, gourds, horticultural spheres, until the establishment of colonial procedures, grain crops formed the main part of the land area. An analysis of sources that provide information about new crop varieties shows that they can be conditionally divided into two groups.

1. The introduction of new varieties of cereals and cotton, which have long been cultivated in the country.
2. Distribution of completely new crop varieties in the culture of crop farming.

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3 Results and discussion

The first group of new crop varieties can include new varieties of wheat, barley, rye, millet, corn and cotton. The cultivation of grain crops was considered a traditional important type of farm in Uzbekistan, and such varieties of wheat as “White wheat”, “Red wheat”, “Black quantity”, “Shashqirra”, “Desert wheat” became widespread. Wheat cultivated lands accounted for 3/1 of the total land area, and local residents cultivated crops from the above wheat varieties before the Russians entered the land. After the European population entered the territory, varieties of wheat “Poltava”, “Kubanka” (Kubanka), “Donbass”, “Kharkov wheat”, “Arnaoutka”, “Turkish Red wheat” were brought with them, A.Shakhnazarov writes that in Russian farms, 20-50 percent of the land was planted with the Kubanka variety of wheat, and each body received a maximum of 20 Poods of land, and in the years of low harvest, 10-15 Poods were harvested. Along with the fact that the Kubanka wheat variety quickly adapted to the climate of the country and gave a more significant harvest than the local varieties, the incidence rate was also much lower.

New varieties of wheat were planted and tested mainly on rain fed lands. Also, the renewal of varieties was observed in barley, such “Himalayas” barley. The varieties “Himalayan” barley, “ikvale”, “Golden Melon”, “naked barley” corn “Chikvintano”, “sekler”, “Minnissota-1”, “Minnissota-2”, “Kutaisi hybrid”, “motto”, “Calico”, “Rosen”, “pride of the North”, “American corn”, “Canadian corn”. The yield of the “American”, “Canadian” varieties of corn in particular was high, which was also favorable for the population and livestock consumption. Not only the displaced population, but also local farmers, planted and tested new varieties of grain crops on their farms. Of the spike crops, not all varieties of rye, millet, flax, hemp have adapted to the climatic conditions of our country.

After the formation of the Uzbekistan SSR, quite significant results were achieved in the development of grain production, the implementation of seed production and selection work. The government and heads of state were concerned that the areas where grain crops were sown, especially wheat, were reduced due to cotton monoculture.

In the field of grain farming, the efficiency was very low between 1925 and 1930, and a period was necessitating an increase in grain extraction from each hectare of land through the application of new varieties and agrotechnical measures. In particular, in 1938, an average of – 6 centners per hectar of spring grain was harvested from each hectare of autumn grain – 4.6 centners per hectar. And in 1939, there was no significant shift in this regard, the ratio was 7.8 centners per hectar and 6 centners per hectar. This figure was very low, whereas it was planned to obtain a grain yield of 26-30 centners per hectar of land. During the 1950s and 1980s of Soviet power, the main attention in collective farms and collective farms was paid to sowing cotton, planting cotton, its maintenance, harvesting of the crop, in advance, special meetings (selectors) were held in each district and regions, in which the party and the government participated and gave speeches.

In the Independent Republic of Uzbekistan, from the first years, special attention was paid to the cultivation of (grain) crops with ears, the rating of new varieties. Particular attention was paid to the consideration of climatic conditions in the development of grain growing in the regions of the Republic. In particular, in the fields of Bukhara region in 1894-1895, it was in collective farms and state farms of Romitan district, in the collective farm “Khalkabad” an experimental-tested new wheat variety “Intensive”, in other places the varieties “Sanzar-3”, “Sanzar-4” were planted and harvested as expected [1-5].

The branch of agriculture dedicated to the cultivation of grain crops is called grain growing. The main grain crops are wheat, barley, oats, corn, rice, buckwheat and peas. Grains are the main source of calories in most developing countries. In developed countries, the share of cereals in the diet is not so significant, and they, as a rule, get to the consumer's
table in a significantly processed form (for example, in the form of cereals, cookies or beer, and not the actual cereals). There is an increase in the consumption of whole grains: for example, in the USA for 10 years from 2006 to 2016, the share of whole grains in the consumption of grain crops increased from 12% to 16% [3].

Also, agricultural workers and scientists-breeders of the Samarkand region in cooperation with Irish agronomists have created a new grain variety “Ulugbek-600” from local and foreign Seed Production. This wheat variety has become widespread in peasant farms due to its fastness (the growing season is short for 5-7 days) resistance to any diseases, an abundance of grains in the cobs and high strength, quality. When creating a wheat variety, practical work was carried out in the region on the selection of intensive seeds aimed at saving water. Also, at the Andijan Scientific Research Institute of Agriculture, new wheat varieties such as “Qadr”, “Nadir”, “Uzbekistan-25” were created for peasant farms, from which the expected yield of harvest was obtained. The fields in which these varieties are planted, breeders from Andijan propose suggestions and recommendations about their agrotechnical condition.

By 2017, the cultivated areas of mash, which belongs to the group of cereals and legumes, reached 15 thousand hectares in Uzbekistan, along with traditional varieties, new varieties such as "Durdona", "Zilola", "Marjon" and "Turon" were created during the years of independence. These new varieties are distinguished by the fact that the fruit is located above the stem, the grains are hard, and they are exportable. In 2017, the council of "Alliance on mash for diversification of production, increase of farmers' income and development of export opportunities" was held in Tashkent. In this council, the Agricultural Scientific Production Center of Uzbekistan, Scientific Research Center of Plant Science, Kashkadarya Scientific Experimental Center for Cultivation of Cereals and Leguminous Crops and scientists of the International Vegetable Center participated. At the council, issues of creation and distribution of drought-resistant, disease-resistant, high-yielding varieties, which are easy to collect in the harvester without much destruction, were discussed and a number of agreements were signed. In order to increase the export of mash, work was planned on marketing, product certification, coordination of relations between producers and trade organizations. Because Uzbekistan has a leading position in the region in the creation of new varieties of mash, growing crops and consumption.

Among grain crops, dozens of Uzbek and foreign hybrid varieties of corn were created during the years of independence. Many varieties of them have been regionalized and acclimatized. Among foreign corn varieties included in the State Register of the Republic in 2010-2020 are "Borja G' 1" (selection hybrid of the Spanish state), "Vechita (BT 6470)" (Turkey), "Deliton G'1" (Netherlands), "Dneprovsky 181" (Ukraine), , "Donana" (Spain), "Moldavsky 257 SV", "Moldavsky 215 AMV" (Moldava), "Maksimka" (Hungary) are recommended for planting. Also, varieties such as "Uzbekistan 300 MV", "Uzbekistan 420 VL" from the selection hybrid varieties of the Uzbekistan Maize Research Station are new varieties [6-10].

"NS 205" (Serbia), "LG 3475", "LG 3232" (France), "PR 38", "P 92", "PR 39 T12" (Juanita), entered into the State Register of foreign selection hybrid varieties in 2012 alone. Such as "PR 31 N 27" (Switzerland) can be listed. [10] The height, 1000 seed weight, growing season, yield, nutritional quality, grain yield percentage, disease and pest infestation of these corn varieties were studied by experts. It was recommended to plant in the fields of the republic.

We found it necessary to show the reference provided for each variety on the example of the breeding hybrid of the Netherlands "Deliton G'1". "Deliton G'1" is a breeding hybrid of the Netherlands. Since 2015, it has been included in the state register of Andijan, Jizzakh, Kashkadarya, Namangan, Samarkand, Surkhhandarya, Sirdarya, Tashkent, Fergana regions. Average plant height is 208-308 cm, weight of 1000 seeds is 280.0-369.0 grams.
The average vegetation period is 90-111 days. The hybrid variety is resistant to lodging. Suitable for mechanical mowing. The average productivity is 48.8-90.0 tons/ha. Grain yield is 80 percent. During the years of testing, there was no damage by diseases and insects.

In 2010-2017, a number of new varieties of vegetable (sweet) corn, which is a valuable food product of the peoples of the world, were created, including "Sherzod", "Zamin", "Zamon", "Mazza". Among them, "Sherzod", "Zamon" played an important role, and through experiments and tests in 2017-2019, the technology and agro-daily development of such varieties were developed. "Dilbar", "Navroz" varieties were created.

In the years of independence, scientists of the Samarkand Agricultural Institute created two new varieties of beans from legumes. These varieties are called "Ravat" and "Mashuldar", their biological maturation period is 73-79 days, and the yield is 21-25 tons/ha. Various dishes and salads are prepared from grain, and it is considered a dietary product for diabetes.

Soybean cultivation began in Uzbekistan in 1930-1934, and now about 20 varieties of soybeans are included in the State Register. Currently, soy's "Nafis", "Uzbek-2", "Uzbek-6", "Golden Taj", "Genezik-1", "Orzu", "To'maris", "MAN-60", "Sochimas", "Ustoz" , medium-sized varieties such as "Baraka", "Parvoz", "Ustoz MM60" are widely planted in cultivated fields of Uzbekistan. Cultivation of soybean varieties "Amego", "Sparta", "Selekta-201", medium-sized "Selekta-202", "Eurika-357" is widespread in Khorezm region. Soybean oil is medicinal and useful for the human body, environmentally safe, the vegetation period of this crop lasts 119-122 days, the height of the stem is from 85 cm to 115 cm, the weight of 1000 grains is around 190-225 grams, the grain contains 41-42 percent protein, 24 Contains 1-24.7 percent vegetable oil. Extensive scientific research is being carried out in the field of soybeans, and the creation of new and hybrid varieties, technical processing, shortening the vegetation period, and increasing its fertility are urgent tasks. In the cultivation of grain and leguminous crops in Uzbekistan, peas, beans, and mush have taken an important place, and significant progress has been made in the creation of new varieties of these crops. In 2010-2019, "Yulduz", "Uzbekiskiy-32", "Lazzat" varieties of peas, early-early "Ravot", mid-yielding "Mahsuldor" varieties of beans were created, and scientific research was carried out on 5 new hybrid varieties of mash with large grains and immunity to diseases.

In the years of independence, the decisions of the state and government in this regard also played an important role in the cultivation of grain crops.

If only 940,000 tons of wheat were grown in 1991, the first year of independence, 7-8 million tons of wheat were grown in 2012-2015. The Republic of Uzbekistan turned from a grain buying country into a wheat exporting country and fully ensured grain independence.

In this regard, the decision of the President of the Republic of Uzbekistan dated February 10, 2014 "On improving the activities of the Agricultural Scientific Production Center of Uzbekistan", the decision of the Cabinet of Ministers of the Republic of Uzbekistan dated November 27, 2018 "In additional measures to further encourage the cultivation of grain" The decisions and decrees aimed at [9].

In these decisions, attention was paid to issues such as the scientific-experimental laboratory for the cultivation of grain crops, the revitalization of selection works, and the creation of "road maps" for the implementation of agrotechnical measures.

The new "Bunyodkor" variety has 1000 grains per ear, grain weight is 41-43 grams at average moisture, productivity is 76.1 centners per hectare, it is especially high in protein content, the wheat stem is not prone to lodging, the height is 90-100 cm, 208 - It ripens in 215 days (Figure 1). The "Bunyodkor" wheat variety is recommended for planting in the central regions of the Republic and the Fergana Valley in October. [8]

In 2009-2015, the best economic characteristics of the "Bunyodkor" variety of winter soft wheat are shown in the table below.
Table 1. Indicators of "Bunyodkor" wheat variety

<table>
<thead>
<tr>
<th>Years</th>
<th>Plant height</th>
<th>Resistance to yellow rust disease %</th>
<th>Productivity q/hectare</th>
<th>Protein %</th>
<th>Gluten %</th>
<th>1000 weight of grain, gramme</th>
<th>The nature of the grain gramme/liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>89.0</td>
<td>10MR</td>
<td>73.1</td>
<td>14.2</td>
<td>29.0</td>
<td>43.2</td>
<td>790.0</td>
</tr>
<tr>
<td>2010</td>
<td>93.0</td>
<td>TR</td>
<td>76.4</td>
<td>14.2</td>
<td>28.6</td>
<td>43.7</td>
<td>805.0</td>
</tr>
<tr>
<td>2011</td>
<td>92.0</td>
<td>5MR</td>
<td>76.9</td>
<td>14.2</td>
<td>28.4</td>
<td>42.8</td>
<td>808.0</td>
</tr>
<tr>
<td>2012</td>
<td>87.0</td>
<td>TR</td>
<td>72.2</td>
<td>14.2</td>
<td>38.1</td>
<td>42.9</td>
<td>875.0</td>
</tr>
<tr>
<td>2013</td>
<td>94.0</td>
<td>10MR</td>
<td>77.1</td>
<td>15.8</td>
<td>28.4</td>
<td>44.8</td>
<td>810.0</td>
</tr>
<tr>
<td>2014</td>
<td>102.0</td>
<td>TR</td>
<td>84.1</td>
<td>13.6</td>
<td>28.8</td>
<td>45.4</td>
<td>821.0</td>
</tr>
<tr>
<td>2015</td>
<td>93.0</td>
<td>R</td>
<td>73.0</td>
<td>14.2</td>
<td>28.6</td>
<td>42.5</td>
<td>805.0</td>
</tr>
<tr>
<td>Average</td>
<td>92.9</td>
<td>X</td>
<td>76.1</td>
<td>14.5</td>
<td>28.6</td>
<td>43.6</td>
<td>803.4</td>
</tr>
</tbody>
</table>

Note: There is no TR-disease, no symptoms are observed; R-chlorosis or necrosis present, no urediospores; MR-less uredispora, less chlorosis and necrosis. The Kashkadarya branch of the Kashkadarya Research Institute of Grain Breeding and Breeding selected 30 varieties of soft wheat during the next decade (2009-2019) and conducted experiments. One such variety is the "Hisorak" variety, which differs from other varieties in that it is immune to rust disease. [7]

Fig. 1. THE vegetation period of the "Bunyodkor" wheat variety.

In particular, the initial seeding of new promising winter soft and hard wheat varieties, the achievement of super-elite seed cultivation was set as a future task. Breeder scientist P.P. According to Lunyanenko, the seed of a variety grown in a high agro background can be preserved in 8-10 generations for half a century. Such aspect was observed in "Bezastan-1" wheat variety, and later it was tested in 14 soft wheat varieties and 2 winter hard wheat varieties. In 2012-2014, the wheat seed gene pool was tested on 32 wheat seeds.

Intensive scientific research is carried out in the scientific centers of the developed countries of the world on the solution of these problems and extensive use of historical experience in this area. Factors such as favorable climatic conditions of Central Asia, the presence of fertile soil, the cultivation of new varieties of ornamental and forested trees, their distribution and zoning open a wide way. In this respect, “Green spaces” are more important than ever for humanity and nature. [5]
A large-scale serious scientific research is being carried out in the scientific centers of developed countries of the world on the wide use of historical experience in solving the global problem of food. Factors such as the favorable climate of Uzbekistan and the fact that it has fertile soil open a wide way to grow, distribute and zoning new varieties of crops.

In the Republic of Uzbekistan there are 170 varieties of potatoes, 175 varieties of grapes, and a wide range of opportunities for the exhibition of fruits and vegetables. The demographic processes taking place in the world at the present time, lead to a sharp increase in the population, or rather to a shortage of opportunities to grow food, fruit and vegetable products due to environmental problems and other natural factors. According to the recommendations of international dietologists, 50 percent of human food intake is made up of fruits and vegetables [6-8] The issues of speeding up the reforms in the agricultural sector, the creation of new varieties of fruits and vegetables were not as topical as they are now when eating.

Valuable information on the penetration of new crop varieties into the territory of Uzbekistan and adaptation to climatic conditions is first provided in primary sources. In particular, in this article, he has been working as the head of the agricultural Experimental Station of Turkistan since 1902. Personal materials of the botanist R.R. Shreder are preserved in R-2284-fund in the National Archive of Uzbekistan [10].

In this fund, valuable information on the establishment of forestry in the country is stored. Also on the pages of the “Collection of Turkistan” there is a rich information about the arrival of new cultivated varieties, in particular new varieties of ornamental trees, along with the Rusophone inhabitants, who were transferred to the country in the first decades of the 20th century.

The sources also mentioned the preparation of farm items from new landscape trees, which were transferred to Turkistan, they were used in woodworking from the old, withered ones, including in the preparation of barrels from dub, railway sleepers, in the making of houses from listvennis, in the manufacture of paving stones from cedar, wooden shelves, in the manufacture of paving stones from Russian walnut [5]

Since ancient times in our region there were dozens of species of shrub trees, saxaul and yulgun, siyon, davak, ravochs in the regions of eastern China, Oriental poplar, willow, goojum, mountain and foothills, which did not yield, were used as firewood and construction material preserving from frost and wood, or provide shade-coolness. These trees served many purposes, such as the construction of houses and residences in the field of woodworking by the master craftsman, as wood for heating the body in the winter months and due to natural conditions.

Khorezm received the name of the “land of goojums”, in front of each apartment and around the pools were grown beech trees. When the fruits of walnut and mulberry trees were consumed, they were also used for the purpose of making household appliances from their bodies and heating the apartments in winter. Pistachio, walnut and almond trees grow in wild in the mountainous areas, the population is overgrown with the aim of consuming and selling their fruits.

In the steppe regions of the region and along the Arians-canals (ditches), along the coast of Amudarya and Sirdarya, large areas were occupied by saxaul, reed and yulgun plants. Many information in the sources about the fact that during the colonization of the Russian Empire, shrub trees such as saksovul, yulgun were lost by the Turkmen and Kyrgyz to the bare chop, the need to keep it.

In one of the sources of that period it is mentioned that “on the banks of the Toshkent and Central Asian Railways annually cut 1 million poods of saksovul and lost. Turkistan made a decision to ban the heating of houses with the Governor General saksovul, passing on the heating of houses with coal, the goal is to preserve the flourishing saksovul. To this end, the governor-general of Turkistan sent General Dragin to the region of Sirdarya.
4 Conclusion

So, in the 2nd half of the 19th-early 20th centuries, rapid changes took place in the fauna of the Turkestan region, hundreds of crop varieties entered the region. Of the new crop varieties, cereals, technical crops, crops and ornamental trees belonging to the horticultural and vegetable economy are from this sentence. Some types of crops were adapted to the climatic conditions of the region and a high level of yield was obtained from them. Some crop varieties became popular among the population in a short time in a wide variety, a number of which could not adapt to the nature and climate of the region. The preservation of new crop varieties in the region has had its significant impact on the material and spiritual life of the population.

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