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WALNUT CROPS IN THE NORTH-EAST OF AZERBAIJAN AND THEIR IMPORTANCE IN FOOD SECURITY

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ОРЕХОПЛОДНЫЕ КУЛЬТУРЫ СЕВЕРО-ВОСТОКА АЗЕРБАЙДЖАНА И ИХ ЗНАЧЕНИЕ В ПРОДОВОЛЬСТВЕННОЙ БЕЗОПАСНОСТИ

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Abstract. The article presents the results of the study of nut crops common in the north-eastern region of Azerbaijan. As a result of scientific expeditions carried out in the north-eastern — Kuba-Khachmaz Economic Region of Azerbaijan, the areas of distribution of nut crops have been identified. It has been established that *Corylus* ranks first in this region in terms of distribution area. Kuba, Khachmaz, Kusar Districts are rich in wild forms of *Corylus*. According to the distribution area, the *Juglans regia* occupies the second place after the *Corylus*.

Аннотация. В статье приведены результаты изучения орехоплодных культур, распространенных на северо-востоке Азербайджана. В результате проведенных научных экспедиций в северо-восточном — Куба-Хачмасском экономическом районе Азербайджана выявлены ареалы распространения орехоплодных культур. Установлено, что в этом районе по ареалу распространения орешник занимает первое место. Кубинский, Хачмасский, Кусарский районы богаты дикорастущими формами орешника. По ареалу распространения второе место после орешника занимает грецкий орех.

Keywords: nut crops, *Juglans regia*, *Corylus*, *Prunus dulcis*, *Castanea*, varieties, food security.

Ключевые слова: орехоплодные культуры, грецкий орех, орешник, миндаль обыкновенный, каштан, сорта, продовольственная безопасность.

The rapid process of globalization taking place in the world in recent times has put mankind before the problems of food security. Eliminating the food security problems that currently threaten humanity reduces (minimizes) the country's dependence on foreign food. To ensure the country's food security and create food abundance, first of all, it is necessary to achieve full satisfaction of domestic food needs through domestic production and reduce dependence on food imports. Against the backdrop of global climate change in the world, the solution of these problems is gradually regulated by state programs adopted in our country. Among fruit crops in terms of national economic importance, nut crops occupy a special place. Walnut crops in Azerbaijan grow in all fruit growing zones, but mainly in the Sheki-Zakatala, Kuba-Khachmaz zones, on the Absheron Peninsula, in the Ordubad region, Nagorno-Karabakh, Ganja, Lachin, Kalbajar and other regions.

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The soil and climatic conditions of these zones are favorable for the development of walnut crops.

The fruits of nut crops are valuable food products, raw materials for the food and especially the confectionery industry, and also find the most diverse use in the national economy and are used fresh. The kernel of these crops contains oil, sugars, nitrogenous substances, vitamins, microelements, etc. The minerals that make up nuts play an important role in the metabolism of the human body. The fruits of nut crops are used both fresh and in the form of processed, canned products. Azerbaijan pays serious attention to the protection, protection and conservation of genetic diversity. Sustainable agricultural development and improved food security depend to a large extent on the conservation and use of genetic resources. The plant flora of Azerbaijan is rich in a variety of fruit plants.

Material and methods

The research materials are nut fruit crops: hazelnuts, walnuts, chestnuts, pistachios, almonds, common in the Kuba-Khachmaz region. The study was carried out in accordance with the "Program and methodology for the study of fruit, berry and nut crops" [5, 6]. The soil and climatic conditions of the Kuba-Khachmas zone are especially favorable for the development of fruit growing. The composition of this zone includes Kusar, Kuba, Khachmaz, Shabran, Siyazan regions. Kuba-Khachmaz zone is located on the southern slopes of the Greater Caucasus and in the north-eastern part of Azerbaijan. In the northwest, the region is bounded by Dagestan, in the southwest by the Main Caucasian Range, and in the east by the Caspian Sea.

The relative height of the region: from 26 m to 4466 m are divided into plains: foothills, medium mountains, high mountains. The climate in the mountainous part of the zone is cold in winter, in the foothills it is moderately warm, and in lowland-temperate-warm semi-deserts and dry steppes with dry summers. The relief of the zone is uneven. The mountain zone is significant in space and reaches alpine meadows. It includes the foothill and mountainous parts of the northeastern slopes of the Great Caucasus Range, on which the Konagkend and partially Kusar, Kuba, Shabran, Siyazan regions are located.

Walnuts (*Juglans regia* L.), hazelnuts (*Corylus avellana* (L.) H. Karst.), chestnuts (*Castanea sativa* Mill.), almonds (*Amygdalus communis* L.) and pistachios (*Pistacia vera* L.) are ancient fruit crops grown in Azerbaijan [7, 8]. As you know, the Sheki-Zagatala region is the center of nut crops in Azerbaijan, but in recent years, these plants, especially hazelnuts, have been grown on large areas in Khachmaz, Kuba, Kusar and Khudat regions. Almond orchards have been planted in Siyazan.

In the districts of the Kuba-Khachmaz region, in the foothills, around the Caspian Sea, in the river valleys, many local varieties, forms and wild relatives of fruit crops, nut-bearing are common. The walnut belongs to the genus *Juglans* (walnut) in the Juglandaceae family. In the temperate and subtropical countries of both hemispheres, there are 40 species of plants of this genus. The walnut has been cultivated since ancient times and plays an important role in human nutrition.

Common walnuts grown in Azerbaijan and growing in forests belong to the species *Juglans regia* L. Common walnuts grow in temperate and temperate climates, do not tolerate cold and do not like hot places. In places where the summer is very hot, the leaves burn, and the tree weakens. An ordinary wild nut in the regions of the Greater and Lesser Caucasus, Lankaran, Sheki-Zakatala, Guba-Khachmaz regions, in the middle of a mountain range.

Walnut trees are photophilous, demanding on soil and moisture, do not like acidic and saline soils, resistant to frost. This is the second cultivated walnut plant in the country after hazelnut. Walnut has been cultivated since ancient times and plays an important role in human nutrition. The plant flora of Azerbaijan is rich in a variety of fruit plants [1, 3]. Among these fruit plants, the

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walnut has been cultivated since ancient times, which plays an important role in human nutrition. Walnut trees are photophilous, demanding on soil and moisture, do not like acidic and saline soils, resistant to frost. This is the second cultivated walnut crop in the country after hazelnuts.

Its fruits and kernels are eaten fresh and used in various sectors of the economy, the food industry, including the confectionery. Walnut kernels are superior to other fruit plants in terms of high-density nutrients required for human life.

All varieties and forms of walnut available in the republic are divided into two groups according to the ease of separating the kernels: with a thin, easy-to-separate shell) and varieties and forms with a massive, difficult-to-separate shell. Paper walnuts differ from each other in the size and shape of the fruit, the fat content of the kernels, the yield of trees and the ripening time. It is desirable to increase the best forms of walnut and as a variety in this group.

Nutrients contained in walnuts, essential for human life, is different from other legumes. It contains 77% fat, 24% protein, 25% water carbon, 1.5-2% mineral salts, mainly phosphorus, calcium and iron. The lamb kernel also contains vitamins A, B, C, E, and P, which are essential vitamins. Green walnuts are very rich in vitamin C and iodine. On this basis, it is 6 times more than currants, 9 times more than wild rose and 40 times more than tangerines.

The leaves and green bark of the boiled walnut are used for measles, gastrointestinal and eye diseases, and colds. There are many types of walnuts. The common walnut, grown in Azerbaijan and growing in forests, belongs to the genus *Juglans regia* L.

The trees belonging to this species are tall, round umbrella trees. In favorable soil and climatic conditions, the height of the tree is more than 30 m, the thickness of the trunk is more than 15-20 m. Very long-lived — 400 years, even longer. The lamb has strong roots that run horizontally along very deep stem roots. The body is high, dense, straight, sprawling. Bark white, ash brown, very thick. There are many valuable varieties of walnuts in Azerbaijan. The original varieties of walnut grown in Azerbaijan are of high quality. Their shells are very thin, the kernels are oily and tasty. All varieties and forms of walnut available in the country are divided into two parts. Paper (thin-shelled) and hemp (hard-shelled) kernels are difficult to separate. Paper walnuts differ from each other in the size and shape of the fruit, the fat content of the kernels, the productivity of the trees and their ripening at different times. Within this group, it is advisable to increase the best nut forms as a variety. In addition to paper walnuts, in different regions of the republic there are walnuts called hemp, the kernels of which are difficult to remove, the yield of kernels is low.

Results and discussion

During the survey on the territory of the Kuba-Khachmaz zone (household plots, forests, farms, etc.), a wide variety of nut crops was revealed. Walnut is of great importance in human nutrition, as it has been grown in it since ancient times. The walnut belongs to the genus Juglans (walnut) from the walnut family. In the warm temperate, subtropical countries of both hemispheres, there are 40 species of bitches belonging to this genus.

In Azerbaijan, the common walnut *Juglans regia* L. is cultivated and grows in forests. They belong to the type. The common nut grows in temperate and temperate climates, does not like warm places, as it does not tolerate cold. In places where the summer is very hot, the leaves burn, and the tree weakens. Common walnut in the wild is distributed in the regions of the Greater and Lesser Caucasus, Lankaran, Sheki-Zakatala, Kuba-Khachmaz, in the middle mountain belt. Walnut trees are photophilous, demanding on soil and moisture, do not like acidic and salty soils, frost resistant. In our republic, the walnut is the most cultivated plant after the walnut.

Walnut in indoor fruit plants is very popular. Walnuts are used in medicine as a medicinal

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plant. Paints from the leaves, sprouts, bark and roots of the walnut are very persistent. Walnut leaf juice is used against pests. It is used in the treatment of skin diseases, eczema. Its fruits and kernels are eaten fresh and used in various sectors of the economy, the food industry, including the confectionery. Walnut kernels are superior to other fruit plants in terms of high-density nutrients required for human life.

In the northern region of Azerbaijan, wild forms of hazelnuts and folk selection varieties are widespread. Wild hazelnut bushes are widespread in the regions of Guba, Kusar, Khachmaz and Khizi. Wild hazelnuts grow well both in the lower part of the regions and in mountainous places. This area has a rich gene pool of hazelnuts (*Corylus avellana*), walnuts (*Juglans regia*). For example, very valuable local fruits, obtained by our people over the course of thousands of years, were obtained as a result of folk selection of wild varieties of fruits common in the forests of these territories. During the expedition, various wild-growing fruit plants were found in the region, mainly hazelnut, walnut, hazelnut, etc. The hazelnut, which is widespread in Azerbaijan, can be divided into 3 groups: 1. Ancestors (local varieties), 2. Introduced, 3. Breeding varieties. Favorable soil and climatic conditions of Azerbaijan gave impetus to the cultivation and development of all fruit crops in the country, including hazelnuts. Hazelnut (*Corylus avellana*), a mass of water accumulated in thick layers of humus formed at the foot of the mountains, plays an important role in the formation of optimal humidity in the area of ordinary forests by wind. On the outskirts, there is a sharp decrease in the species composition of the forest: up to 1200 m, 700 hazelnuts (*Corylus avellana*), walnuts (*Juglans regia*) and chestnuts (*Castanea sativa*) are distributed.

Research results

It should be noted that wild berries, especially hazelnuts and walnuts, play an important role in the employment and material well-being of people living in the foothills. Hazelnut is a valuable raw material for the food industry, as well as wood and bark ash are used in the furniture industry and in the production of gunpowder [1]. The content of fat (40-75%), protein (17-25%), water carbohydrates, vitamins A and B in hazelnuts is equal and even higher than in bread, dairy and meat products. It is colorless, fragrant and tasty in taste and quality, close to hazelnut, almond and olive oil. It is used in painting, perfumery, pharmaceuticals, soap making, paint and varnish production [2, 4].

Hazelnut kernels are used medicinally as a pain reliever for urinary stones. Hazelnuts in the treatment of chicken sickness, as well as in exhaustion or general weakness. Given these positive features of the hazelnut plant, it is important to spread it to wider areas in Azerbaijan. Hazelnut belongs to the genus Corylus (hazelnut) of the Betulaceae family. Naturally, 3 types of hazelnuts are common in Azerbaijan: common hazelnut, bear hazelnut, deer hazelnut. There are very few species of bear hazelnut and deer hazelnut, and they are gradually dying out. The most common and economically important of these species is the common hazelnut (*Corylus avellana*), which grows naturally in the forests of most regions of Azerbaijan, especially in the foothills of the Zagatala-Sheki and Kuba-Khachmaz valleys.

Conclusion

As a result of scientific expeditions carried out in the north-eastern — Kuba-Khachmaz region of Azerbaijan, the areas of distribution of walnut crops have been identified. It has been established that hazelnut ranks first in this region in terms of distribution area. Kuba, Khachmaz, Kusar regions are rich in wild forms of hazelnuts. According to the distribution area, the walnut occupies the second place after the hazelnut.

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