PROSPECTIVE PECAN GROWING IN THE SOUTH OF UZBEKISTAN OPPORTUNITIES OF CULTIVATION

[1]Kuchkorov Astonakul Musurmankulovich, [2]Goibov Bakhrullo Fayzulloevich
[1]Termiz Institute of Agrotechnology and Innovative Development, head of the department, candidate of biological sciences
[2]Assistant teacher
https://doi.org/10.5281/zenodo.10897978

Abstract. *In this article, 10 types of pecan samples were tested for yield and oil yield in the study of the possibilities of cultivation in the subtropical soil-climate conditions of the southern Surkhondarya region in the researches of the practical project. In terms of yield, it was found that "Hasildar" variety had the highest result, i.e. 82.2 centners per hectare, and "Fakhr" variety had 73.8% and "Kapalak" variety had 72.7% oil yield.*
Keywords: *pecan, nut fruit, cultivar examples, practical project, subtropical soil-climate conditions, yield, oil yield, cultivation possibilities and characteristics.*

Relevance of the topic. On the topic of this article, we conducted scientific research on the origin of the pecan nut, its botanical description, the first created varieties, its distribution area, its use in the national economy, the richness of its composition of useful substances, especially its medicinal and healing properties in the preservation of human health in medicine, in the food and confectionery industry, we studied the information of literature sources about its wide use in woodworking and furniture making, its importance as a phytosanitary plant in ecology and environmental protection.

It is known that the original homeland of pecan is North America. Pecan nuts, like other nuts, grow in mountain and sub-mountain regions and in subtropical climate regions, so from the point of view of food safety, the fruit is an ecologically clean natural product with a large number of useful substances necessary for the human body.

According to the botanical definition, the pecan nut belongs to the nut family (Juglandaceae) like the ordinary pecan. Its international scientific term is Carya illinoinensis (Wangenh.) K. Koch. It is called Orth.Var.(1869). Around the world, pecan is called by different names, i.e. pecan, cariya and hickory (Shryoter, Panasyuk, 1999). Caria was first classified by K. Linnaeus as a genus of nuts. Later, in 1818, pecans were separated as a separate species of Caria. "Karya" is an ancient Greek word that means "nut", "nut", "nut grove". Pecans are often referred to as American walnuts.

The cultivated area of the pecan nut is the Mississippi Valley (southern Indiana to northern Illinois and southeastern Iowa to Alabama, Mississippi, Louisiana, and eastern Texas). Wild species are found in Mexico. Pecan grows in the southeastern part of the North American continent, it is cultivated on the Atlantic coast (from Florida to Virginia), on the Pacific coast (from California to Oregon). In the United States, the pecan tree is the most economically important tree nut. The United States accounts for 80% of the world's pecan crop.

Pecan is considered to be a very ancient tree. In North America, his "Moneymaker", "Stewart", "Frotcher", "Schley", "Mantura", "Success", "Van Demen", "Curtis", "Major", "Hinton", "Buisseron", " Varieties such as Niblek, Indiana, Wichita, Pawnee and Navajo were created. In Belarus, the "Bussengo" variety, which is extremely cold-resistant and quick to harvest,

is being cultivated. In Georgia, planting of pecan in large areas has been started in order to increase the potential of industrial production and export. The introduction of pecan to our country began in the former USSR, it was planted in the Caucasus, Batumi, Sochi and Sukhum in 1909 in order to acclimatize it, and the first industrial garden was established in the Zhytomyr region of Russia in 1918. In Central Asia, pecan cultivation began in 1926, experimental experiments were introduced in 1934, and in 1948-49, it was planted for the first time in the South Uzbekistan experimental station, which is considered the southern region of Uzbekistan. Earlier in Uzbekistan, work was carried out on "Druzhba", "Pamyat Shredera", "Urojayniy" and "Uzbekistan" pecan varieties.

It is worth noting that nuts serve as an important tool for improving the immune system of the human body and strengthening the walls of blood vessels. In particular, the nut of the pecan plant, with its medicinal and healing properties, is a natural immunizer useful in strengthening the cardiovascular walls, preventing heart-ischemic, heart attack, stroke, diabetes, cancer, and respiratory diseases, boosting the immune system, improving eyesight, and fighting cholesterol. It is widely used as an effective dietary supplement. The wood of the pecan tree is considered a valuable building material. The main body wood of the pecan tree is very durable and is a unique material used in the production of high-quality furniture. Pecan nuts are eaten raw or roasted. Ripe nuts are eaten directly, and are widely used in the food and confectionery industry to prepare a variety of sweet and savory dishes that people enjoy. In the confectionery industry, pecan nuts are used to make nut butters, pies, cakes, ice cream, jam, candies, and similar desserts. Pecan kernels produce an oil that tastes like olive oil. This oil is used in the food and canning industry.

Since pecan is a beautiful tree that grows for a long time (about 500 years), it also plays an important ecological role in urban and rural greening. In addition, pecan trees are widely planted in landscaping and as an ornamental plant. Pecan plants purify the air from various toxic gases and as a phytosanitary plant by killing disease-causing bacteria and other microbes in the environment due to the presence of essential oils and phytoncides. is of great importance.

Pecan is a promising nut-bearing perennial tree plant, which is superior to walnut in several parameters. It is high in calories, reduces cholesterol in the human body, does not cause allergies, is completely harmless to the body when consumed, and can be used up to 20-40 grams per day in the diet. An average-sized pecan contains 250 kernels in 1 kg of pecans, the pulp is sweet and makes up to 49% of the weight of the fruit, and the pulp is split into two, easily separated from the pod (Strebkova, 1958).

Nuts mainly consist of shell and kernel, shell makes up 55-60%, kernel 40-45%. The stomach contains more than 70% fat, 19% protein and 5% sugar (Toychiev, 1959).

Pecans are high in connective tissue, magnesium, and polyunsaturated fats, as well as cancer-preventing antioxidants. They reduce the risk of cardiovascular diseases and cholesterol levels. Pecans are rich in macro and micronutrients. It is recommended for anti-cholesterol diets, to increase appetite, relieve fatigue, avitaminosis, and anemia (Kuchkorov, 2018; 2019).

The information from the literature sources mentioned above shows that the pecan nut has an incomparably great importance in the national economy, and it is an important topical issue to study it scientifically and practically from the point of view of the requirements of the present time in our subtropical soil-climate conditions.

This article was based on the results of the research carried out within the framework of the practical project BV-A-QX-2018-437 for 2018-2020 - "Improving the technology of selecting

pecan varieties and growing seedlings for mountain and sub-mountain regions of Surkhandarya region".

The object of the study. The main object of the study was considered to be samples of 10 existing varieties of pecan nuts.

The subject of research. The study of valuable economic indicators of pecan variety samples served as the subject of the study.

The purpose of the study. Academician Makhmud Mirzaev scientific-research institute of horticulture, viticulture and winemaking named after Surkhandarya research-station is to carry out scientific research on 10 samples of pecan varieties from walnuts and to select promising varieties of production value and study the possibilities of growing them in regional conditions.

Method of research. Research "Method and program for studying fruit, berry fruit and nut fruit varieties" (Michurinsk, 1973) and "Methodology of calculations and phenological observations in experiments with fruit and berry - fruit plants" authored by Kh. Ch. Boriev and others (methodological manual, Tashkent, 2014)" was conducted according to

Research results. The yield, fruit weight, and oil yield, which are the main valuable indicators of pecan nuts, were planned for the study. In the 10 samples of the studied pecan, the yield varied from 55.1 centners to 82.2 centners per hectare, as shown in Table 1 below. Productivity was the highest in the "Hasildar" (control) variety (82.2 centners per hectare), while the "Gigant" and "Kapalak" varieties could not match the control option, 72.1 centners -77.8 centners per hectare. was a relatively high indicator among the studied varieties. The lowest indicator was recorded in "Small-fruited" and "Columbia" varieties (55.1 centners -59.1 centners).

Average yield of pecans, hectares/centners (hec/cent)

Table 1

№	Naming of options and varieties	Crop scheme , m	2018 year		2019 year		2020 year		Average 3 years	
			bush/ kg	hec/cent	bush/ kg	hec/cent	bush/ kg	hec/cent	bush/ kg	hec/cent
1	Yield (control)	10x10	80.0	80.0	85.0	85.0	81.6	81.6	82.2	82.2
2	Giant	10x8	58.0	72.5	58.0	72.5	57.0	71.2	57.6	72.1
3	Butterfly	10x10	77.0	77.0	80.0	80.0	76.6	76.6	77.8	77.8
4	Pride	10x10	50.0	50.0	75.0	75.0	78.0	78.0	67.6	67.6
5	Harvest	8x8	50.0	62.5	36.0	56.1	36.0	56.1	40.6	58.2
6	Colombia	10x8	55.0	68.7	45.0	56.2	42.0	52.5	47.3	59.1
7	Small fruit	8x8	38.0	59.2	35.0	54.6	33.0	51.5	35.3	55.1
8	Uzbekistan	10x10	75.0	75.0	65.0	65.0	63.0	63.0	67.6	67.6
9	Akhil	8x8	40.0	62.4	41.0	63.9	42.0	65.5	41.0	63.9
10	Denau	10x10	70.0	70.0	58.0	58.0	54.0	54.0	60.6	60.6

In addition, we also analyzed the kernel and fat yield indicators of the researched varieties. The resulting data are illustrated in Table 2 below.

Picture 1. Pecan ripeness posture and kernel posture

In order to determine the oil content of pecan nuts, the core was separated from the fruit shell and a separate measurement was carried out. In terms of yield, the "Hosildor" variety (control) averaged 51.5 %, while the " Kapalak " variety exceeded the control option, making 54.7 % and showing the highest indicator.

The lowest seed yield was in the "Holis" variety, which was 44.1 %. In other varieties, the yield of kernels was from 46.5 % to 51.0 %.

After extracting the kernels, the amount of oil in them was determined, the kernels were dried in their position in sunlight, and the amount of oil was determined in the laboratory of the Denov oil-oil extraction plant. The oil content of the varieties was different, and the indicators were very close to each other, ranging from 70.4 % to 73.8 %.

In the control variant, i.e. "Hosildor" variety, it was 71.8 %. It was found that the highest rate was 73.8 % in the "Faxr" variety and 72.7 % in the "Kapalak" variety, and it was relatively superior to other varieties. The lowest rate was 70.4 % in the "Holis" variety (Table 2).

As we know, pecan oil has been used in folk medicine since ancient times to treat colds and skin diseases.

According to M.Rovsky (1954), pecan nuts are not affected by pests and diseases. In our research, the tested varieties of pecans have also been shown to be resistant to pests and diseases.

The main reason for this is the hardness of the fruit peel, the presence of essential oils, phytoncide and antioxidant substances in its composition, and the height of 30-35 meters, which causes inconvenience to the increase in the load of harmful organisms and phytopathogens that cause especially dangerous diseases.

Today, 100 pecan saplings are planted and cared for around the intensive grape orchard in the "Loyliq" area of the Uzun district "Serharakat" LLC.

A pecan garden was established on an area of 0.5 ha in the area of the farm located in the territory of "Saroy" district, Bandihon district. A pecan garden was established on an area of 10 hectares in the farm "Anorhol momo and Sardor" located in the mountain and foothills of Oltinsoy district. Innovative development was established in cooperation with the Ministry.

Fat content of pecans, %

Table 2

№	Naming of options and varieties	By years	Fruit weight	Kernel rind		Kernel germination		The amount of oil output	
			gram	gram	%	gram	%	gram	%
1	Hosildor (control)	2018	10.8	4.6	42.5	6.2	57.5	4.6	74.19
		2019	6.8	3.7	54.4	3.1	45.6	2.1	67.7
		2020	6.8	3.4	50.0	3.4	50.0	2.3	73.5
	On the average in the 3rd years		8.1	3.9	48.5	4.2	51.5	3.0	71.8
2	Giant	2018	12.2	6.2	51.8	6.0	48.2	4.4	73.33
		2019	13.3	7.6	57.2	5.7	42.8	4.1	71.9
		2020	13.1	6.3	48.2	6.8	51.8	4.9	72.05
	On the average in the 3rd years		12.8	6.7	52.4	6.1	47.6	4.4	72.4
3	Kapalak	2018	6.1	2.3	37.7	3.8	63.3	4.2	72.41
		2019	6.75	3.45	51.1	3.3	48.9	2.4	72.7
		2020	4.5	2.1	46.7	2.4	53.3	1.75	72.9
	On the average in the 3rd years		5.8	2.6	45.1	3.2	54.7	3.4	72.7
4	Faxr	2018	13.2	7.5	57.2	5.7	42.8	4.1	71.93
		2019	9.4	4.9	52.1	4.5	47.9	3.4	75.5
		2020	9.4	4.8	51.1	4.6	49.9	3.4	73.9
	On the average in the 3rd years		10.6	5.7	53.5	4.9	46.5	3.6	73.8
5	Holis	2018	11.5	6.0	52.3	5.5	47.7	4.0	72.73
		2019	7.7	4.4	57.4	3.3	42.6	2.2	66.6
		2020	6.8	3.6	53.0	3.2	47.0	2.3	71.9
	On the average in the 3rd years		8.6	4.6	54.2	4.0	44.1	2.8	70.4
6	Colombia	2018	8.3	3.7	47.0	4.6	53.0	3.4	73.91
		2019	11.9	5.9	49.6	6.0	50.4	4.3	71.6
		2020	10.3	5.3	51.3	5.0	48.7	3.6	72.0
	On the average in the 3rd years		10.1	4.9	49.3	5.2	50.7	3.7	72.5
7	Small fruit	2018	10.1	5.0	49.5	5.1	50.5	3.7	72.55
		2019	6.5	3.3	50.8	3.2	49.2	2.2	68.7
		2020	4.0	2.1	51.7	1.9	48.3	1.4	71.8
	On the average in the 3rd years		6.8	3.4	50.7	3.4	49.3	2.4	71.0
8	Uzbekistan	2018	9.8	5.0	44.9	4.8	48.97	3.5	72.91

		2019	10.0	5.75	57.2	4.3	42.8	3.1	72.0
		2020	7.6	4.0	52.4	3.6	47.6	2.6	72.2
	On the average in the 3rd years		9.1	4.9	51.5	4.2	46.5	3.0	72.3
9	Axil	2018	8.5	4.3	45.8	4.2	49.41	3.1	73.81
		2019	12.5	5.9	47.2	6.6	52.8	4.7	71.2
		2020	8.4	4.3	51.2	4.1	48.8	2.9	71.9
	On the average in the 3rd years		9.8	4.8	48.0	5.0	50.3	3.5	72.3
10	Denov	2018	6.2	3.1	50.0	3.1	50.0	2.2	70.97
		2019	6.7	3.0	44.8	3.7	55.2	2.6	70.2
		2020	8.5	4.3	50.6	4.2	49.4	3.0	71.4
	On the average in the 3rd years		7.1	3.5	49.0	3.6	51.0	2.6	70.8

In conclusion, all the conditions and opportunities for the successful cultivation of pecans in the southern Surkhandarya region of Uzbekistan are sufficient. Currently, in the subtropical climate of the region, i.e., in the districts of Denov, Altinsoy, Sariosiyo, Uzun and Boysun, the establishment of high-quality pecan groves and in the future, it will be of great scientific and practical value in the production of ecologically clean pecan products for export. Cultivation of seedlings of industrial varieties of pecan guarantees its future prospects and economic efficiency.

REFERENCES

1. Boriev Kh.Ch. and others. Methodology of calculations and phenological observations in conducting experiments with fruit and berry plants (methodology manual. - Tashkent. - "TashSAU" publishing house. - 2014. - 32 pages.
2. Rovsky M. Walnuts and pecans. - Tashkent. - "Mehnat". -1954. - 63 pages.
3. Strebkova A.I. Harvest form of pecan // Scientific and production magazine “Garden and Vegetable Garden”. -Moscow. -VO “Agropromizdat”. -1958. - P.-65-68.
4. Toychiev M.T. Walnut tree in Central Asia. -Tashkent.- "Mehnat". - 1959. - 5-12; Pages 296-297.
5. Kuchkorov A.M. Medicinal and healing properties of the pecan plant // Materials of the scientific-practical conference of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan on the topic "Supporting active entrepreneurship and innovative technologies in the production of agricultural products". - Termiz. - TashSAU Termiz branch. - "Surkhannashr". - May 18-19, 2018. - pages 136-139.
6. Kuchkorov A.M., Allanazarov O.Ya. A pecan-prospect nut crop. Khorezm Ma'mun Academy newsletter. - Khiva. - 2018. - No. 2. - Pages 103-104.
7. Kuchkorov A.M., Mirzaev A.E. Growth, development and yield of pecans // The importance of innovative agro-technologies in the prospective development of horticulture, viticulture and winemaking" is a collection of articles of the republic-wide scientific and scientific-technical conference. - Tashkent. - "Science and education polygraph" LLC printing house. - September 26, 2019. - pages 142-145.
8. Program and methodology for the study of fruit, berry and nut crops. - Michurinsk - 1973.

9. Shroeter A.I., Panasyuk V.A. Dictionary of plant names = Dictionary of Plant Names / Int. union biol. Sciences, National Faculty of Biologists of Russia, Vseros. Institute of Lec. and aromatic plants Ros. agricultural academies; Ed. prof. V. A. Bykova. - Koenigstein: Koeltz Scientific Books, 1999. - P. 156. - 1033 p. — ISBN 3-87429-398-X.