

# Practical results of introducing the vegetable crop of catnip

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**Abstract.** The goal of the research is to evaluate the collection of samples of the catnip plant in Uzbekistan according to morphological and economic valuable characteristics, and on this basis to distinguish promising varieties and plant them in different periods, to determine the optimal planting periods for growing high-quality seeds, to conduct a biochemical analysis of the grown crops, and to determine the yield in green mass and dried. Methods of conducting experiments in vegetable, potato and potato crops in conducting research used style and methodological instructions. Research was carried out on the Barkhat variety, which was selected as a result of a comprehensive study of Catnip's Basilio, Centaur, Barkhat and Goluboy Iney varieties. Experiments were carried out in the spring and autumn terms. Seedlings were grown in unheated greenhouses. Seedlings are planted in the open field in a 70x25 sm planting scheme. It was found that the weight of one plant in the autumn period was 82%, the number of branches was 46-70%, and the leaf mass was 83% more than in the spring period. When studying the biochemical composition, it was found that it contains 21.8% dry matter, 3.6% sugar, 6.8% protein, and 13.8 mg% vitamin. Essential oils from the plant were analyzed by the method of chromato-mass spectrometry, in which 54 different biologically active substances were identified. The seed productivity of the Catnip plant was 56 g/plant in spring and 87 g/plant in autumn. The conducted scientific research has shown that the successful cultivation of catnip in the south of Uzbekistan and, on this basis, provides an opportunity to provide the population with a rare vegetable crop with another valuable content throughout the year.

## 1 Introduction

Recently, the demand for not only traditional, but also rare, non-traditional vegetables has increased significantly. This requires the creation or introduction of new varieties that meet

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the needs of consumers. New varieties or introduced crops should have high productivity and be resistant to the negative effects of external environmental stressors [1,2].

The role of introduction in expanding the range of vegetable crops in our country is incomparable. Among them, the demand for rare vegetables with aromatic and essential oil, which gives a special taste and flavor to food products and beverages, is increasing day by day [3-17].

Scientific and research works related to the study of aromatic and essential oil crops, their composition and significance in the literature have a history of more than two centuries [18]. Catnip is one of the crops that are widely distributed on earth and have valuable content.

*L.Nepeta cataria* is a perennial plant belonging to the Lamiaceae family. Widespread in Northern and Western Europe, the Mediterranean Sea and Western Siberia, the Balkans, the Caucasus and the Himalayas, the Pacific coast of Asia, and North America. Catnip grows in meadows, river and sea shores, forests, thickets, riverbanks, groves, mountain slopes. As a wild type, var., which has a strong lemon scent. *citriodora* Dum. There is a type [12].

Catnip is a perennial herb with a strong lemon scent and is widely used as a spice and honeydew plant. The leaves of the catnip plant are elegantly hairy, soft, and contain phytoncides, oils, tannins, saponins, and glycosides. They can be added to salads, kales, vegetable soups in the barra (green) state and also used in making tea. Dried catnip greens retain their spicy flavor well, which makes it possible to use the product even in winter [11].

In Indian medicine, fragrant medicines are prepared from the leaves and flowers of the catnip plant, used in gastrointestinal diseases, as well as antipyretic and stimulant. Essential oil is used in perfumery, medicine and food [15].

Teas made from catnip have an antipyretic and soothing effect. Catnip tincture reduces fever, reduces skin rashes caused by measles and chicken pox [10].

Italian scientists Nostro A., Cannatelli A.M., Crisafi G. according to the data, the diethyl ether extract of catnip has an effect against fungi and gram-positive bacteria and other microbes [14].

Catnip has anti-spasmodic, anti-depressant, antimicrobial effects, and the golden color is used in the fight against staphylococcus, *Escherichia coli*, and fungi [4]. Catnip has an active effect against viruses [7]. It is used in chronic viral hepatitis [8].

In ancient times, among the fragrant plants in the gardens of China, sedum was also grown. The Chinese believed that various fragrant plants attract positive energy to a person [12].

Due to the strong sedative effect of catnip, it is recommended to take it at night. It is also used as a cough suppressant in the treatment of chronic bronchitis when mixed with other herbs.

*Nepeta L.* species are a valuable part of traditional medicine and especially in the Himalayan region of India (Uttarakhand, Himachal Pradesh, Jammu and Kashmir, Leh-Ladakh), Pakistan (Khyber Pakhtunkhwa and Pakistani Kashmir), Nepal (Baglung District), as well as China, is widely used in folk medicine in mountainous regions of Turkey and Iran. Catnip is widely used as a remedy for chicken pox, tuberculosis, malaria, pneumonia, influenza, measles, indigestion, eye diseases, respiratory diseases, asthma, colds, coughs and various other diseases [19].

Aromatic and essential oil crops are important in the prevention of cancer and radiation diseases. According to the National Nutrition Institute of Hyderabad (India), they help prevent cancer, have a negative effect on pathogenic fungi, bacteria, and lower cholesterol [19].

Varieties of rare vegetable crops with this valuable content are not included in the State Register of agricultural crops recommended for planting in the territory of the Republic of Uzbekistan. Studies on the study of Catnip variety samples at the ITI Surkhondaryo scientific-experimental station of vegetables, field crops and potatoes M.Kh.Aramov, G.Ergashev, Conducted by A.Saitmurodov. Later, research in this direction was not carried out, and currently there is no information on the varieties of this valuable vegetable crop and the technology of their cultivation in the scientific literature published in our country [1].

Introduction of catnip plant for the conditions of Uzbekistan, introduction of its new varieties, study of cultivation technology in spring and autumn seasons, recommendations for practice and organization of seed production of this crop are considered important tasks in vegetable growing.

In the article, the introduction of the Barkhat variety, which was selected as effective among the varieties of the catnip crop, and the results of the research conducted in the direction of evaluating its important economic characteristics are highlighted.

## **2 The location of the research and its conditions**

In 2020-2023, the Research Institute of Vegetable, Melon crops and Potato was conducted at the Surkhondaryo scientific-experimental station. The experimental station is located in "Namuna" neighborhood, Termiz district, Surkhondaryo region. According to the climatic conditions, this region is arid subtropical. The winter is warm and does not have permanent snow cover. Summer is long, very hot and dry. July is the hottest month and the maximum temperature reaches 48-49°C. The greatest effect of wind is observed in spring (15 m/s and more) - on average 21 days. The average annual precipitation in the southern plains is only 128-170 mm. The main share of precipitation falls on the winter-spring period. Soils are of desert type, mainly old irrigated gray soils, heavy loam soil according to mechanical composition. The amount of humus in the soil is very low, not more than 2-2.5%. It is necessary to apply mineral fertilizers to these soils every year, primarily nitrogen and phosphorus fertilizers [3].

## **3 Research methods**

Barkhat variety of catnip was taken as a research object. Researches were carried out based on the following methodological instructions: Methods of conducting experiments on vegetable, potato and potato crops (Tashkent, 2023), Metodicheskie ukazaniya po ekologicheskomu ispataniyu ovoshchnyx kultur v otkrytom grunte (M., VNISSOK, 1987. Chast 1), Metodicheskie ukazaniya po seleksii zelenykh, pryano-vkusovykh i mnogoletnih ovoshchnyx kultur (M., VIR-VNISSOK, 1987), Rukovodstvo po aprobatsii ovoshchnyx kultur i kormovykh korneplodov (M., "Kolos", 1982), Metodika Gosudarstvennogo sortoisplitaniya selskohozyaystvennykh kultur (M., 2019. Chast 1 ), Metodika polevogo opyta (Dospikhov B.A., 1985) and others [5;13;14;17;18].

During the growth period of plants, phenological observations were made, morphological characteristics were described, the duration of growth phases was determined, and economic important signs were studied. The productivity of blue mass and dried, seed productivity was determined.

## 4 Research results

The research was conducted in the spring and autumn seasons. In the spring, the seeds were sown in the third ten days of January, and in the autumn in the second ten days of October. The duration of the development periods of the catnip plant is presented in Table 1.

**Table 1.** Duration of development periods of the Catnip plant, 2022-2023

№	Crop type, variety name	Planting period	The duration of the development period, days			
			planting-sprouting		germination-technical ripening	
			10%	75%	10%	75%
1	Catnip Barxat variety	I (autumn)	7	10	182	187
		II (spring)	7	9	72	81

According to the results of the phenological observation carried out in the catnip plant, the initial germination in the autumn period is 6 days, the complete germination in 11 days, and in the spring term, the initial germination was observed in 7 days, and the final germination in 10 days. The period from the germination of the plant to its technical maturity was 187 days in the autumn period, and 81 days in the spring period.

Catnip harvest was harvested 3 times in autumn and spring. Catnip crop was harvested for production for the first time on April 28, the second time on May 25, and the third time on June 21. Plants were evaluated for morphobiological characters in the initial flowering phase.

**Table 2.** Morpho-biological description of the catnip plant, 2022-2023.

The name of the season	Plant height, cm	Procedure 1 number of branches, piece	2nd order is the number of branches, piece	Branches weight, g.
Autumn	25,2	31,0	156,0	49,0
Spring	24,0	22,0	72,0	9,0

**Table 3.** Morpho-biological description of the leaves of the catnip plant, 2022-2023.

The name of the season	Leaf band length, cm	Leaf plate-length of sinew, cm	Leaf width, cm	Leaf mass, g.	Weight of one plant, g
autumn	2,4	5,3	4,1	104,0	146,8
spring	2,3	4,8	3,8	86,4	121,0

As can be seen from the data presented in Table 2, the catnip plant planted in the autumn period is superior to the plants of the spring period in terms of its main indicators. The height of the plant before harvesting was 1.2 cm higher in autumn plants than in spring plants. The difference between the plants of the two periods was particularly strong in such characters as the weight of one plant, the number and weight of branches, and the mass of leaves. The weight of one plant was 146.8 g in the autumn period and was 21.1% higher than in the spring period. The mass of leaves obtained from one plant was 104 g in the plants of the autumn period, which was 20.0% more than in the spring period. The weight of shoots was 49.0 g in autumn period plants and 544.0% more than spring period plants.

The average number of branches of the 1st order in the spring period was 22 units, and in the autumn period it was 31 units. It was observed that there were 72 branches of the 2nd order in the spring period and 156 in the autumn period.

The conducted studies showed that the productivity of catnip is significantly higher in the autumn period. The effect of planting dates on the length and width of the leaf band and plate was almost not observed.

Biochemical analysis of catnip was carried out in the Chemical Technology Laboratory of the Center for Testing Agricultural Crops (Table 4).

**Table 4.** Biochemical analysis of catnip plant, 2022-2023

№	Name of the crop	Varietal name	Dry matter, %	Sugar content, %	Protein, %	Vitamin C, mg %	Nitrate, mg %
1	Catnip	Barkhat	21,8	3,6	6,8	13,8	54

According to the results of the analysis, catnip contained 21.8% dry matter, 3.8% sugar, 6.8% protein, 13.8 mg% vitamin C, and 54 mg% nitrates. The presence of essential oils in the Catnip crop is one of the indicators of its value. In order to obtain essential oil from Catnip, 800 g of the above-ground part, 400 g of the leaves, and 800 g of the culm were taken. Essential oils were extracted using the hydrodistillation method in a Nuluwa still. Essential oils were in the form of a yellowish liquid with a characteristic smell. 0.24% essential oil was extracted from the above-ground part (leaves, branches, inflorescences), 0.31% only from the leaves, and 0.37% from the inflorescences. Analysis of the chemical composition of the obtained essential oils was carried out by the method of chromatography-mass spectrometry at the Institute of Organic Chemistry of the Federal Republic of Uzbekistan. According to the analysis results, 54 substances were identified from the composition of essential oils extracted from the catnip plant. According to its biological properties, the essential oil obtained from catnip contains biologically active substances such as geraniol, dipentene, carvalol, limonene, nerol, terpene, citral, citronellol, which are extremely necessary for the human body.

In the "Product Storage and Processing" laboratory of the Termiz Institute of Agro-Technology and Innovative Development, the samples taken for the product were dried in a drying cabinet at a temperature of 30°C and packed. In this case, 4 samples of 100 g were taken from the fresh, blue mass of the crop grown in autumn and spring. As a result of research, 23-25 g of dry product was obtained from 100 g of blue mass.

The shelf life of this raw material is 2 years. Dried raw material has a gray-green color.

The elements of catnip's seed production technology were studied. The duration of development periods of catnip seed plants is presented in table 5.

**Table 5.** Duration of development periods of catnip seed plants, 2022-2024

№	Crop and variety name	Planting season	Duration of development periods, days					
			planting-sprouting		germination-flowering		germination-ripening of seeds	
			10%	75%	10%	75%	10%	75%
1	Catnip Barxat variety	I (autumn)	7	10	209	214	290	297
		II (spring)	7	9	108	112	188	193

After sowing the catnip seeds grown for seed, initial germination was observed in 6 days, full germination in 11 days in the autumn season, initial germination in 7 days, full germination in 10 days in the spring period. The duration of the period from germination to flowering was 209 days in the autumn term, 290 days from germination to the beginning of

seed ripening, and the duration of these periods was 108 and 188 days in the spring term, respectively.

The stem of catnip grown for seed is erect, 4-sided and branched, 100 cm high. The fruit is an elliptical, smooth nut. The seeds are very small, egg-shaped, shiny, dark-brown in color, the surface is smooth, there are 2 white spots. The weight of 1000 seeds is 0.53-0.54 g. <https://semenagavrish.ru/servis/skolko-semyan-v-1-gramme/>? On the website 6812010747, the weight of 1000 seeds of catnip is stated as 0.5-1.0 g.

The seed yield of the catnip plant was 56 g in spring and 87 g in autumn. The seed yield of autumn plants was 55.4% higher than that of spring plants. When studying the characteristics of seeds, their germination rate was 84%. According to the standard GOST 32592-2013 adopted in the Russian Federation, the fertility rate for catnip elite and 1st reproduction seeds is assumed to be 50%. This shows that the fecundity of catnip seeds grown in the southern conditions of Uzbekistan has a high rate.

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