

Bioecological Properties and Growing Technology of *Capsella Bursa-Pastoris* L. In Uzbekistan (IN THE CONDITIONS OF SYRDARYA REGION)

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Abstract: This article is devoted to the bioecological properties and cultivation technology of the medicinal plant - *Capsella bursa-pastoris*. In order to determine the bioecological properties of the plant, its morphological indicators were determined in laboratory and field conditions. The chemical composition was analyzed and medicinal properties were studied. Cultivation technology was improved and yield indicators were calculated.

Keywords: Medicinal plant, *Capsella bursa-pastoris*, bioecology, Latent period, Virginal period, Generative period, Senile period, cultivation technology, pharmaceutical industry.

Introduction. There are more than 182 thousand species of flowering plants growing wild in the world, of which 600-650 species are cultivated. Today, people use more than 3 thousand cultivated and wild plant species for food purposes. Also, about 12 thousand species of plants are used in medicine for various therapeutic purposes.

These data demonstrate the importance of effective use and culturalization of natural resources, which will help to increase the role of medicinal and food plants in meeting food and medical

needs [12].

Medicinal plants have been known to mankind since ancient times and have been widely used not only as food but also as a source of biologically active substances. There is historical evidence that these plants were used for medicinal purposes in the Sumerian civilization 5000 years ago. For long periods of history, medicinal plants served as the only source of medicines [10].

Today, approximately 50% of the world's pharmaceutical products are made from medicinal plants. In particular, most of the drugs for cardiovascular, liver, and gastrointestinal diseases, as well as expectorants and hemostatics, are created on the basis of these plants [11].

About 4500 higher plants are distributed in Uzbekistan, of which 1200 species have medicinal properties. 112 species of medicinal plants are officially allowed for use in medicine in the republic, 80% of which grow naturally. This fact confirms the rich and biologically diverse nature of Uzbekistan's medicinal plant reserves [9].

In the Republic of Uzbekistan, a number of measures have been identified to meet the demand of the pharmaceutical industry and the population for medicinal plant raw materials and to expand the production of modern medicines. In particular, in accordance with paragraph 3 of the minutes of the Cabinet of Ministers meeting No. 222 dated August 5, 2013, it was determined to create industrial-scale medicinal plant plantations for the organization of enterprises for the study of medicinal plants and the production of new medicines.

Also, according to paragraph 1.12 of the minutes of meeting No. 5 dated January 20, 2015, measures were developed to develop the forestry system and further expand the cultivation, preparation and processing of medicinal and food plants in 2015-2017.

These measures are aimed at developing the pharmaceutical industry by organizing the cultivation of medicinal plant raw materials on an industrial scale. They play an important role in improving the process of modern drug production and satisfying the population's need for natural medicines [1, 2].

The need for medicinal plant products in Uzbekistan is increasing every year. This situation leads to an increase in the volume of raw material reserves of medicinal plants. However, as a result of the depletion of natural resources due to increased demand, there is a risk that the process of preparing raw materials for some medicinal plants will be limited or completely stopped.

To solve this problem and rationally use medicinal plant resources, it is necessary to establish their cultivation and cultivation in industrial plantations. This approach creates broad opportunities for preserving natural resources, stabilizing the production of medicinal products, and developing the pharmaceutical industry [15].

Research object and methods.

The plant *Capsella bursa-pastoris* L., belonging to the *Brassicaceae* family, was selected as the object of research.

C. bursa-pastoris is an annual herbaceous plant belonging to the *Brassicaceae* family, reaching a height of 20-30, sometimes up to 60 cm. The stem is single, sometimes multiple, erect, branched or unbranched. The basal leaves are serrated, oblong-lanceolate, with a serrated or pinnately cut edge, sometimes with a straight edge. The leaves on the stem are smaller, straight-edged, arranged in a row without serrations. The small, whitish, four-lobed flowers are located in a panicle.



Figure 1. General view of *C. bursa-pastoris*

The fruit is an inverted triangular or inverted triangular-cordate capsule. *C. bursa-pastoris* flowers from April to autumn, and the fruit ripens from June. This plant is a very common species. It grows as a weed in meadows, roadsides, residential areas, fields, and arable land in all regions, except for the far north and desert zones [14, 15].

Anatomically, the leaves of *C. bursa-pastoris* have a cuticular epidermis, the upper layer of which contains stomata. In the middle of the leaf is the main tissue, the mesophyll, which consists of columnar cells in the upper layer of cells and spongy parenchyma tissue in the lower layer [4, 3].

Syrdarya region is a region within the Republic of Uzbekistan. It was established on February 16, 1963. It borders the Republic of Kazakhstan to the north, Tashkent region to the east, the Republic of Tajikistan to the south, and Jizzakh region to the west.

The relief is mainly a rolling plain, sloping from south to northwest. Part of the Mirzachul steppe is included in the region. The altitude is 230 m in the north, 400-450 m in the central part, and 600-650 m in the south and southwest. In the east is the wide Syrdarya valley.

The weather is extremely changeable and dry. The average annual temperature is 14° C. Often hot winds dry out the soil and adversely affect plant development. The growing season is 218 days. Annual precipitation is 180-220 mm, mainly in winter. The soils are mainly light-colored, weakly loamy gray soils, with low and moderate salinity, and are loamy and sandy loam soils according to their mechanical structure. Salt loam and salt toxic soils are found on the plains [13].

The results obtained and their discussion.

C. bursa-pastoris is found on almost all continents, including Europe, Asia, North and South America, Australia, and Africa. In Uzbekistan, it is mainly found in the Syrdarya, Tashkent, Jizzakh, and Samarkand regions [7, 5].

According to powo.science.kew.org, *C. bursa-pastoris* is native to Eurasia and Africa. It has been introduced to southern Africa, North America, South America, and parts of Australia.

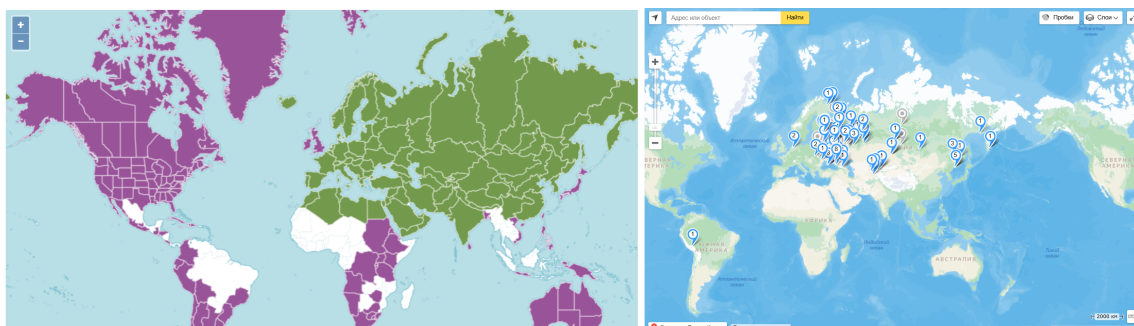


Figure 2. Global distribution maps of *C. bursa-pastoris*

C. bursa-pastoris is adapted to a variety of climatic conditions and is mainly found in cultivated fields, roadsides, wastelands and gardens. It is frost-resistant and grows well, especially on moist and fertile soils. The growing season is short and can produce several generations in one season [7].

In the Syrdarya region, this plant is mainly found in irrigated fields, roadsides, edges of cultivated areas, and gardens. Climatic conditions are favorable for the growing season of jag-jag, and there is a possibility of its industrial cultivation in this area [15].

C. bursa-pastoris is a fast-growing, cold-resistant, and adaptable plant. It can grow in a variety of soil and climate conditions, but thrives in fertile, well-drained soils [6].

Seeds of *C. bursa-pastoris* germinate at +2...+4°C. The optimum temperature for the growth and development of the plant is +15...+25°C. The plant has a low moisture requirement, that is, it requires moderate moisture, and is therefore also drought-resistant.

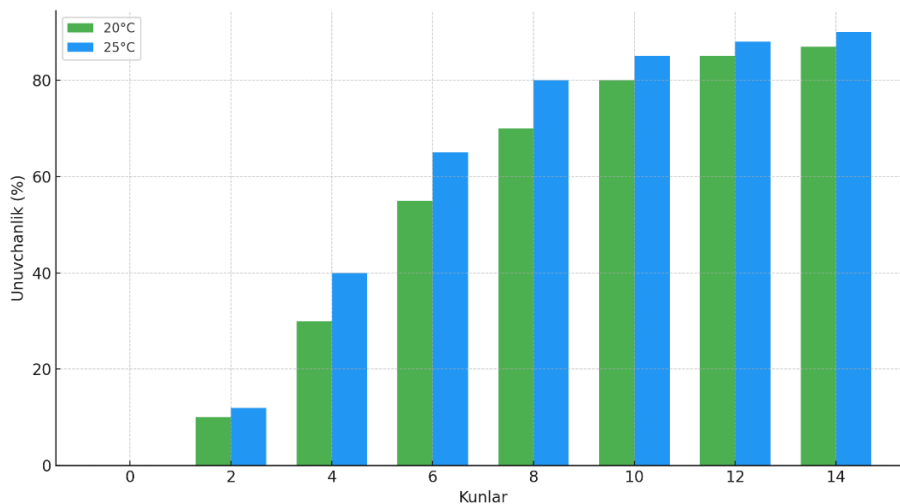


Figure 3. Seed germination of *C. bursa-pastoris*

To plant the plant - it is planted in fertile loamy and sandy soils. It has a high demand for light. It loves the sun, but can also grow in semi-shaded areas.



Figure 4. Virginal period of *C. bursa-pastoris*

C. bursa-pastoris mainly germinates in early spring and late autumn. Its flowering period is from March to June, and its fruiting period is from May to August. The growing season lasts about 80–120 days. If soil and climatic conditions are favorable, the plant can produce two crops per year.

Table 1. Bioecological characteristics of *C. bursa-pastoris*

Period	Description	Duration (days)
Latent period	The period of seed germination and emergence.	3-5 days
Virginal period	The period of vegetative growth - the formation of leaves and roots.	10-20 days
Generative period	The period of flowering and fruiting.	20-30 days
Senile period	The full ripening of seeds. The aging and death of the plant.	15-20 days

C. bursa-pastoris reproduces mainly by seeds in nature. The seeds are dispersed by wind, rain, and animals. In agriculture, they are propagated through artificial planting methods.

In medicine, the above-ground part of the plant is prepared and used before it flowers. During the flowering and fruiting period, the plant is pulled up by the roots, cut off the roots, and dried in a cool place.

The above-ground part of *C. bursa-pastoris* contains hyssopine glycoside, burso acid, 0.12% vitamins C and K, flavonoids, organic (malic, citric, etc.) acids, choline, acetylcholine, inositol, saponins, astringents, and other active ingredients. Medicinal preparations (tincture, liquid extract) are used to stop bleeding.

C. bursa-pastoris is a medicinal plant that has been used in folk medicine for a long time. Its tincture is mainly used as a hemostatic agent and in the treatment of liver diseases [15].

C. bursa-pastoris is an ephemeral-ruderal plant, and its cultivation and reproduction are convenient in the conditions of Uzbekistan. The seeds of the plant are sown in November and December on fertile soils and in areas with limited irrigation opportunities. During the growing season, the plant is irrigated 2-3 times and the yield is 7-12 centners per hectare. The plant is harvested in May-June.

Due to its resistance to diseases and pests, *C. bursa-pastoris* is recommended to be planted in areas where potatoes, tomatoes, and cucumbers are planted. It also grows well in the inter-row spaces between trees and shrubs. When preparing raw materials, the above-ground part of the plant is harvested when it is in flower, and dried in dry weather in shelters or in the open air. The moisture content of the dried raw materials should not exceed 13%.

In medicine, tinctures and extracts of the plant are used as a hemostatic and uterine muscle tonic. In addition, it is also effective in the treatment of tuberculosis. The plant contains rhamnoglycoside gossopin, bursic acid, tannins, malic and grape acids, choline, ascorbic acid, and 28% oil in its seeds. Its reserves in nature are sufficient, and it is found as a perennial weed in irrigated lands [8].

Conclusion.

C. bursa-pastoris is a widespread, cold- and drought-resistant ephemeral-ruderal plant. This plant grows well on fertile soils and requires little care. In Uzbekistan, *C. bursa-pastoris* seeds are sown in November and December and watered 2-3 times during the growing season. The yield is 7-12 quintals per hectare.

In medicine, *C. bursa-pastoris* is widely used as a hemostatic and uterine muscle tonic, and is also used to treat liver diseases. It contains the rhamnoglycoside gossopin, burso acid, vitamins C and K, flavonoids, organic acids, and oils. The medicinal properties of this plant have long

been known in folk medicine. Although it is found as a weed in irrigated lands, it is of great importance as a medicinal and agriculturally useful crop.

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