



## BIO-ECOLOGICAL FEATURES OF HYPERIKUM PERFOLATUM L. IN THE CONDITIONS OF KARAKALPAKSTAN

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**ABSTRACT:** - The article presents the bio-ecological features of growth in culture according to Hypericum perforatum L. in the conditions of Karakalpakstan.

**KEYWORDS:** Bio-ecological features, introduction, experience, ontogeny, flower, fruit, seeds, alkaloids.

### INTRODUCTION

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One of the most widely used medicinal plants, both in ethnoscience and scientific medicine for various diseases, is perforate St John's-wort (*Hypericum perforatum* L.) and is included in the pharmacopoeias of many countries. In recent years, interest in the anthraquinone pigments of perforate St. John's wort hypericin has increased, because hypericin-containing preparations have antimicrobial, antiviral, and anticarcinogenic activity [3].

Based on the primary introduction in botanical gardens and collection nurseries of research institutes, perforate St. John's wort was recommended for industrial cultivation in many countries.

The plant belongs to the perforate St. John's wort family. Perforate St. John's wort is a perennial, the height of which varies between 25-100 cm. The stem of the plant is dihedral, branches in the upper part. Perforate St. John's wort is covered with opposite oval or ovoid leaves; their length is 1.5-3 cm. The flowers of the plant are five-membered, collected in corymbs; their color varies from yellow to orange. The flowering period is June-August.

Flowers 2.5 cm in diameter, regular shape, collected at the top of the stem in a wide-paniculate complex cymose inflorescence, five-parted calyx with green lanceolate sepals, with dotted black glands along the edges; corolla 5-petal golden yellow with numerous glandular dots along the edges; the stamens are collected in 3 bundles, each of which consists of numerous fused golden yellow stamen filaments. Anthers with a dark speck at the top. The ovary is oblong-conical, three-locular with parietal placentation of ovules. The fruit is a three-celled capsule with numerous oblong dark brown seeds (1–3, 9).

In the conditions of Karakalpakstan, the study of *Hypericum perforatum* L. has not been

carried out so far. At the same time, it is quite obvious that the biological and ecological substantiation of the medicinal value of perforate St. John's wort, introduced on the territory of Karakalpakstan, the possibility of their rational use as medicinal plant materials are very relevant.

Given the value and medicinal properties of plants, we have observed the cultivation of perforate St. John's wort in the conditions of Karakalpakstan, in 2021-2022.

The purpose and objectives of the research: to study the bio-ecological features of *Hypericum perforatum* L. introduced in the soil and climatic conditions of the Republic of Karakalpakstan; assessment of growth dynamics and morphological parameters of ground organs of perforate St. John's wort; analysis of ontogenetic stages and rhythms of periods of growth and development of plants; determination of bio-ecological characteristics of plants in the generative period, depending on the place of growth;

A promising medicinal plant perforate St. John's wort (*Hypericum perforatum* L.) was chosen as the object of the study.

Research methods. Biological, ecological, botanical and statistical methods were used. Records, observations, were carried out according to the method of Beideman I. N., Dospekhov B. A. [1,2].

In 2021-2022, at the experimental sites of the Aral Sea Innovation Center under the President of Uzbekistan, and on the experimental site of the Karakalpak State University, the introduction of *Hypericum perforatum* L. plants selected as an object of study was experimented in 2022.

Choice of growing place: Open ground was chosen for sowing. Before sowing, the plot was fertilized. The seed method of sowing was used in different planting patterns. We studied

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plants grown from reproduction seeds of the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan. Sowing took place in the third decade of April. Small black seeds were used for sowing. When sowing, the seeds were sown 1.5-2 cm deep. Seedlings appeared 7-10 days after watering, at a temperature of +24°C. After germination, after 4 days cotyledon leaves appeared. Preservation of cotyledon leaves lasted up to 7 days.

Observations on the growth and development of perforate St. John's wort in crops were carried out in the conditions of Karakalpakstan. Plants during the initial ontogenetic phases have very slow growth and development rates, as a result of which they are heavily overgrown with fast-growing weeds and cannot compete for living conditions. Therefore, it is proposed to create perforate St. John's wort agrocenoses by sowing its seeds under the cover of fast-growing annual agricultural and medicinal crops with a short growing season.

The maximum number of vegetative shoots in plants was observed at a planting density of 40x40 cm. The most intensive formation of generative shoots occurred in plants in experimental variants with a planting density of 30x30 and 40x40 cm. was 49 cm. We recommend planting plants at a distance of 40 cm from each other to obtain the maximum yield of medicinal raw materials from perforate St. John's wort.

It is shown that in the first year of life the plants reach an insignificant height, about 45 cm, and, as a rule, do not enter the generative period. However, some samples showed massive (although not very abundant) flowering already in the first year of life.

When studying the morphological features, the following indicators were taken into account: the height of the shoot, the presence

of branches, the size, shape and number of leaves on the shoots of the first and other orders, the length of the shoots of the first and second orders, the number of fruits per shoot. The most active shoot growth was observed during the budding period. There were 220 fruits on one shoot. The raw weight of one plant at the end of the growing season was 15, dry - 5 g. It was noted that in the conditions of Karakalpakstan perforate St. John's wort blooms in the first year of life, but its productivity is negligible.

7–10 days after the formation of the first buds, flowering begins, which occurs in three stages: flowering of the main apical inflorescence, additional lateral axes of the generative shoot, and plagiotropic shoots. The opening of flowers on the axes of all orders occurs in the acropetal direction (central - middle - upper), first on the upper tiers, then on the lower ones, descending along the tiers of the inflorescence in the basipetal direction. The flowering of the population increases within two to four days, when only 10–15% of the inflorescences bloom. Starting from the fourth-fifth day, 100% of the inflorescences of the population bloom, and over the last three days, the number of flowering inflorescences has been reduced from 60 to 5%. The flowering of the main inflorescences in cool weather lasts almost a month, in very hot weather it accelerates to 10–12 days. After the end of flowering of the main apical inflorescence, in its continuation, after a few days, the opening of flowers begins on additional flower-bearing axes of the generative shoot, which are formed in the axils of the leaves below and later than the main inflorescence. They are smaller and bloom for a shorter time.

Fruit ripening occurs 25–30 days after flowering, i.e. in late July-early August in orthotropic shoots. In one inflorescence of perforate St. John's wort, from 16 to 73 fruits

are formed, which is 90% of the total number of flowers.

The vegetation period lasted until the end of October, a full cycle of development took place, gave viable seeds. The results of two years of observations showed that perforate St. John's wort adapts well to our conditions.

## **CONCLUSION**

1. *Hypericum perforatum* L., adapted to the conditions of Karakalpakstan, is characterized by a shortened growth period and high growth rates. In such conditions, this is explained by the fact that the main limiting factor of the bud growth period is high temperature and low humidity.
2. Under the conditions of Karakalpakstan, from the emergence of shoots to the first year of vegetation, *Hypericum perforatum* L. fruits require 120-135 days to ripen. The phases of phenological development depend on climatic conditions
3. The primary study of the species in cultivation in the conditions of the Republic of Karakalpakstan revealed the prospects of its cultivation and the need for further studies of the biology of the species in order to introduce it into culture.

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