

# BIOECOLOGICAL FEATURES OF THE MEDICINAL SMALL-FLOWERED MOUNTAIN BASIL (*ORIGANUM TYTTANTHUM* L.)

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## Abstract

The introduction and bioecological characteristics of the medicinal small-flowered mountain oregano, *Origanum tyttanthum* L., were studied under the climatic and soil conditions of the Samarkand oasis. These scientific investigations aimed to enrich the local flora with diverse medicinal plants and meet the increasing demand of the regional pharmaceutical industry for raw materials by introducing a promising medicinal species. Field experiments on seed propagation of *Origanum tyttanthum* L. were conducted in typical gray soil climate conditions of the Samarkand region during 2021, 2022, and 2023. Seeds were sown in two seasons—spring and autumn—across different planting schemes (45×30 cm, 60×30 cm, and 90×30 cm). Germination capacity and phenophases were carefully monitored to determine optimal planting times. Despite the importance of seed germination timing, no detailed studies or reliable data were available from either local or international sources concerning the sowing time's effect on seed germination of *Origanum tyttanthum* L. To address this gap, this research focused on evaluating how sowing periods influence seed germination under local field conditions. Findings from these studies will support successful introduction and cultivation of this medicinal plant, contributing to the biodiversity and pharmaceutical raw material base in the Samarkand oasis. This work provides a foundation for further research and sustainable use of *Origanum tyttanthum* L. in the region.

**Keywords:** *Origanum tyttanthum* L., medicinal plant, introduction, bioecology, seed germination, field conditions, Samarkand region, ecological conditions, plant propagation, sowing time, phenophase, pharmaceutical industry.

## Introduction

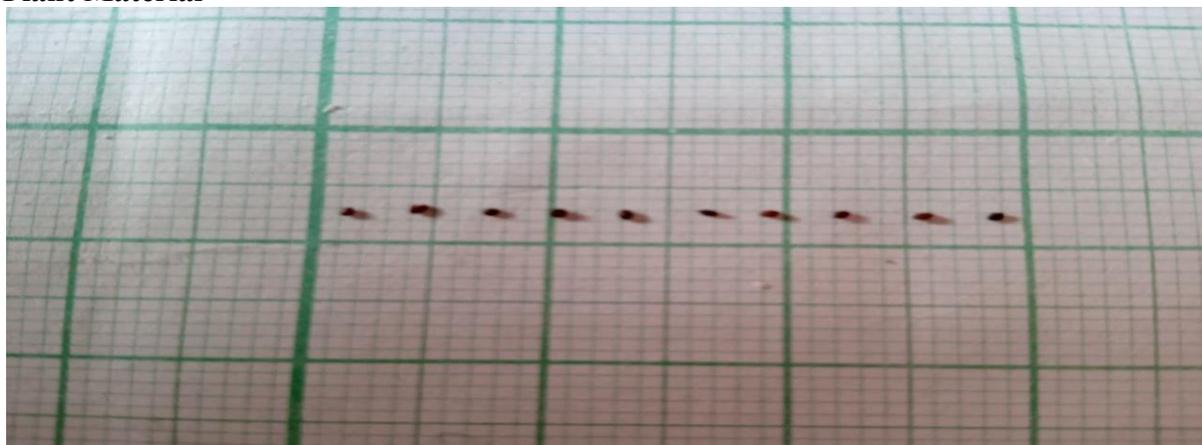
Currently, one of the most pressing issues worldwide is the conservation of biological diversity and the rational use of natural resources. Addressing this problem requires the propagation of medicinal plant species growing naturally and establishing their seed production. The primary research focus is on the introduction of plants from both natural and cultivated flora.

Integration of science and production, continuous supply of medicinal plant raw materials to the pharmaceutical industry that meet international standards, reduction of import volumes, increasing export volumes by propagating highly demanded species abroad through plantation methods, and conducting scientific research aimed at preserving wild medicinal plants and expanding their cultivation areas determine the relevance of this study.

Seed germination is a critical phase in the plant life cycle, encompassing intricate biochemical, anatomical, and physiological processes. Water uptake initiates respiration and enzyme activity, leading to the synthesis of proteins essential for seedling development. The emergence of the primary leaf, shoot, and root marks successful germination. Understanding the germination behavior of medicinal plants such as *Origanum tyttanthum* L. is vital for optimizing cultivation practices and ensuring sustainable production.

## Materials and Methods

### Plant Material



**Figure 1. Seed sizes of the Origanum (Origanum tyttanthum L.) plant**

Seeds of *Origanum tyttanthum* L., a medicinal herb with small flowers, were collected and characterized. Seeds are dark brown, elongated, about 1 mm in length and 0.4-0.5 mm in width. Thousand seed weight was approximately 0.11-0.12 g.

### Laboratory Germination Tests

The seed viability of the medicinal small-flowered mountain basil (*Origanum tyttanthum* L.) was determined in the laboratory of Samarkand Veterinary Medicine, Animal Husbandry, and Biotechnology University. In our scientific research, seed viability was tested on seeds stored for 4 months. To stimulate seed germination, a special stratification process was carried out, where seeds were kept for 40-45 days in a substrate of sand spread 4-5 cm thick with 25-30% moisture. This treatment increased seed viability by 40-50%. The moist sand on the seed coat enhances the seeds' moisture permeability. The study of seed viability was conducted during the spring (March-April) and autumn (September) seasons.

Seeds were incubated in thermostats at +10°C, +15°C, +20°C, +25°C, +30°C, and +35°C. Each treatment consisted of 100 seeds, monitored for germination over 30 days. Germination percentage and speed were recorded.

### Field Experiments

Field trials were conducted in Samarkand under typical arid climate conditions from 2021 to 2023. Seeds were sown in spring (March) and autumn (October) at various spacing arrangements. Germination rates were assessed at intervals post-sowing.

## Results

### Laboratory Germination

#### Seed Germination Percentage (%) of Medicinal Small-Flowered Mountain Basil (*Origanum tyttanthum* L.) under Laboratory Conditions (n=100) in 2020

Seed Count (pcs)	Variants (Temperature)	Number of seedlings emerged on observation days (pcs)							Total seed germination percentage (%)	V %
		3 days	5 days	10 days	15 days	20 days	25 days	30 days		
100	10°C	-	4,1	12,2	17,5	-	-	-	17,3 ± 1,21 %	13,8

100	15°C	1,1	8,3	16,4	22,7	28,6	-	-	28,6 ± 2,97 %	14,8
100	20°C	5,4	11,7	22,4	37,5	58,2	71,3	-	71,4 ± 1,68 %	3,4
100	25°C	6,5	18,4	39,6	62,9	78,9	93,7	-	93,8 ± 1,2 %	2,01
100	30°C	32,7	47,7	59,1	65,5	-	-	-	65,5 ± 3,39 %	7,2
100	35°C	30,2	45,3	-	-	-	-	-	45,44 ± 3,6%	11,9

**\*V- Variation.**

- Germination percentage increased with temperature, peaking at +25°C with 93.8% germination.
- At +10°C, germination was low (17.3%), with fungal infections observed.
- At +30°C and +35°C, germination decreased to 65.5% and 45.4%, respectively, indicating thermal stress limits.
- Germination completed within 24-25 days under optimal conditions



**Figure 2. Laboratory germination of *Origanum tyttanthum* L. seeds**

Laboratory analyses of our research determined that the optimal temperature for the germination of *Origanum tyttanthum* L. seeds is 35°C. At this temperature, after sowing, 1 seed germinated on the 4th day, 53 seeds on the 14th day, 15 seeds on the 16th day, 5 seeds on the 19th day, and 8 seeds on the 20th day. In total, 82 seeds germinated, representing 82% of the sown seeds. At 40°C, 5 seeds germinated on the 6th day and 20 seeds on the 14th day, but the seeds quickly turned black and dried out within 4-5 days. No further germination was observed after these days at this temperature.

Thus, it was established that high temperature has a certain physiological impact on seed germination. It is also important to note that at 40°C, the seeds showed signs of mold. At the temperatures mentioned above, the seeds fully germinated within twenty days after sowing.

**References**

1. Интродукция и селекция ароматических и лекарственных растений. Методологические и методические аспекты / В. П. Исиков, В. Д. Работягов, Л. А. Хлыпенко и др. - Ялта, Никитский ботанический сад, 2009. - 110 с.
2. Исиков, В. П. Грибы на ароматических и лекарственных растениях, культивируемых в Крыму / В. П. Исиков, Н. С. Овчаренко // Труды Никитского Ботсада. - 2011. - Т. 133. - С 62-90.



106. Либусь, О. К. Эфиромасличные и пряно-ароматические растения / О. К. Либусь, В. Д. Работягов, С. П. Кутько, Л. А. Хлыпенко. - Херсон: Айлант, 2004. -270 с.
3. Либусь, О. К. Эфирные масла Ароматерапия / О. К. Либусь, В. Д. Работягов, Н. Н. Бакова, Л. А. Хлыпенко. - Донецк, ЗАО «Кедр», 2001. - 33 с.
- Olim K. Khojimatov, Dilovar T.Khamraeva, Alisher N. Khujanov and Rainer W. Bussmann. An overview of Ethnomedicinal plants of Uzbekistan. *Ethnobotany Research & Applications*. 2020. Pp. 1-19
- 4.Исмоилова С. “Фармацевтика саноати учун ноёб доривор ўсим-ликларни етиштириш”, "Science and Education" Scientific Journal Volume 1 Issue 3 June 2020 111 [www.openscience.uz](http://www.openscience.uz)