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SILENE VIRIDIFLORA L. STUDYING THE GERMINATION OF PLANT SEEDS

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Abstract: *This article examines the medicinal potential of the flora of Uzbekistan, specifically the bioecological characteristics of Silene viridiflora L. a promising species with adaptogenic and hepatoprotective properties. The study utilized seeds collected from natural populations in the Tashkent oasis (Chatkal Ridge). Using modern methodologies (Zaitsev, Serebryakov) and statistical analysis (Statistica 10.0, MS Excel), the morphometric parameters, seed microstructure, and germination dynamics under various temperature regimes were evaluated.*

The results indicate that the optimal temperature range for S. viridiflora seed germination is 19-30 °C, yielding a maximum germination rate of 88%. The paper provides a scientific justification for the strategic importance of establishing industrial plantations to supply the pharmaceutical sector with standardized raw materials and reduce production costs. These findings serve as a scientific basis for determining the optimal agrotechnical periods for the cultivation of S. viridiflora.

Keywords: *Silene viridiflora, Zorcha, adaptogen, germination dynamics, morphometry, cultivation, Chatkal Ridge, hepatoprotector, bioecology.*

Аннотация: *В данной статье исследуется терапевтический потенциал флоры Узбекистана, в частности биоэкологические особенности Silene viridiflora L. - перспективного вида, обладающего адаптогенными и гепатопротекторными свойствами. Объектом исследования послужили семена, собранные в естественных популяциях Ташкентского оазиса (Чаткальский хребет). С применением современных методик (Зайцев, Серебряков) и статистического анализа (Statistica 10.0, MS Excel) изучены морфометрические параметры, микроструктура семян и динамика их прорастания при различных температурных режимах.*

Результаты показали, что оптимальный температурный диапазон для прорастания семян S. viridiflora составляет 19 - 30 °C, при котором зафиксирована максимальная всхожесть - 88%. В статье научно обоснована стратегическая значимость введения растения в культурные плантации для обеспечения фармацевтической отрасли стандартизированным сырьем и снижения себестоимости препаратов. Полученные данные служат фундаментом для определения оптимальных агротехнических сроков культивирования S. viridiflora.

Ключевые слова: *Silene viridiflora, адаптоген, динамика всхожести, морфометрия, культивирование, Чаткальский хребет, гепатопротектор, биоэкология.*

Introduction

The flora of Uzbekistan is rich in plant species, with more than 4,380 natural plant species growing there. Today, 112 species of these resources are actively used in the pharmaceutical industry. However, the world of modern phytotherapy and biologically active additives is constantly expanding and discovering new promising species. One such unique plant is Silene viridiflora L. (or in the vernacular, uzb. Zo‘rcha). This plant is distinguished by its phytochemical potential. Modern studies show that the biologically active substances contained in (uzb. Zo‘rcha) are highly effective in increasing the body's adaptogenic (adaptive) abilities and increasing overall tone. Silene viridiflora occupies a worthy place not only in traditional medicine, but also in the direction of high-tech nutrition. Useful compounds in its composition serve as a natural source of power necessary for modern man [1].

Relevance of the topic. Relevance of the topic. The share of medicinal plants in the global pharmaceutical industry is growing rapidly. Today, about 40% of drugs, and even 80% of drugs for the treatment of certain chronic diseases, rely on plant raw materials. In particular, Silene viridiflora L. (uzb. Species such as Zo‘rcha) are of strategic importance. The reduction of natural reserves and the establishment of innovative cultural plantations of this plant are urgent issues in order to maintain ecological sustainability. This not only ensures the pharmaceutical industry with high-quality, standardized raw materials, but also reduces the cost of drugs and allows for cost-effectiveness. It is also possible to introduce new technologies that maximize the retention of biologically active substances in the plant by cultivating the plant.

Object and methodology of experience (research). Silene viridiflora L. In the family of cloves (Caryophyllaceae) as an object of study. selected. Seed samples were collected from natural populations in the Tashkent Oasis (Chatkal Mountains) for scientific research purposes for extraction and propagation. The morphological description and biometric dimensions (length, width) of the seeds were studied using modern electron microscopy and high-precision micrometers. The weight of 1000 seeds was determined using electronic scales according to the methodology of GOST 12037-81. Laboratory tests (Germination): G. in

determining the germination potential of seeds.N. Zaysev (1981) and I.G. Serebryakov's methods were used. Experiments were carried out on special thermostat (I-10 model or similar) devices, under controlled temperature modes (4-5oC, 10-12oc, 19-20 oC, 30oC), in Petri dishes on four return.

The ontogenetic development stages and adaptive features of the plant were digitized based on generally accepted methods in botanical research.

All collected empirical data were subjected to variational-statistical analysis using MS Excel and Statistica 10.0 packages. The reliability of the results obtained (P=0.005) and the error levels of the arithmetic mean values were calculated.

Results of the experiment (study) and their discussion. During the latent period of the study, the object was Silene viridiflora L. The seeds of the plant are harvested from the natural populations of the Tashkent Oasis (Chotqol mountain range). According to laboratory analysis, the average weight of 1,000 seeds of the plant was 1.2-1.5 g. The morphological description of the seeds of Silene viriflora, when studied using modern microscopy, was found to be fine-grained (fine-grained and dark brown in color). The seeds are 1.0-1.5 mm long (Table 1).

As part of the study, the morphometric parameters of Silene viridiflora L. (uzb. Zo‘rcha) seeds were analyzed using modern methods. The results obtained show the plant's reproductive potential and its ability to form seeds.

Table 1

Morphological and biometric description of Silene viridiflora L. Seeds

Plant name	**Seed color**	**Length (mm)**	**Width (mm)**	**1000 seeds weight (g)**
S. viridiflora L.	Dark brown / black	1.2 - 1.5	1,0- 1,2	0,45 - 0,60

The seeds of the plant have a characteristic kidney-shaped (reniform) shape, and the micro-relief of their surface is characterized by a small warty (verrucous) structure. These indicators determine the resistance of seeds to external environmental factors and their technological characteristics during the cultivation process.

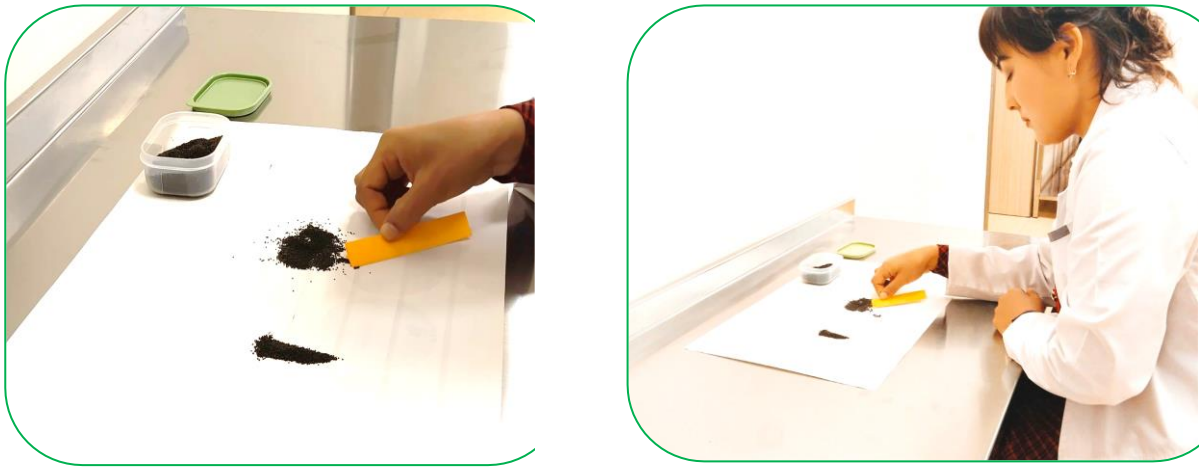

Figure 1. *Laboratory study of the seeds of the plant Silene viridiflora L.*

The germination potential of Silene viridiflora L. seeds under laboratory conditions was studied at different temperature regimes. The results of the study showed that the plant's thermo-adaptive properties and the determination of optimal planting dates are important.

The table below shows the temperature-dependent germination dynamics of S. viridiflora seeds.

Table 2

Silene viridiflora L. germination rates of viridiflora seeds in laboratory conditions

Temperature (t^0C)	**Days**									**Total uniqueness (%)**
	3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	
4-5 °C	-	-	-	-	5	4	13	11	6	39%
10-12 °C	-	11	18	30	23	-	-	-	-	82%
19-20 °C	23	30	22	13	-	-	-	-	-	88%
30 °C	20	32	25	11	-	-	-	-	-	88%

Analyses show that the optimum temperature range for Silene viridiflora seeds is between 19-30oC, with maximum germination (88%) recorded under these conditions. At low temperatures (4-5oC), the germination process slowed down significantly, and the latent period of the plant lengthened. This information serves as a scientific basis for planning agrotechnical measures in the cultivation of Silene viridiflora.

Conclusion. In this research work, the germination of laboratory seeds and their biomorphological indicators were determined. In this case, Silene viridiflora L. (uzb.

Excellent) the following scientific conclusions can be reached on the bioecological capabilities of the plant and the prospects for culturing.

Morphometric analysis of Silene viridiflora seeds (weight 0.45-0.60 gr, size 1.2-1.5 mm) and their kidney-shaped, verruclous (bulging) structure indicate the plant's high adaptive resistance to unfavorable factors of the external environment. These indicators can serve as a reliable basis for establishing sustainable seed production.

Laboratory experiments have proven that the germination of plant seeds directly depends on the temperature regime. The optimal temperature for seed germination was in the range of 19-30oC, at which the maximum germination rate (88%) was recorded. A decrease in temperature (4-12oC) significantly slows down the vegetation process, which is an important criterion in determining planting dates.

The adaptogenic and hepatoprotective properties of Silene viridiflora confirm that it is a strategic raw material for modern nutraceuticals and official medicine. The establishment of cultivated plantations through seed propagation will reduce the cost of drugs and provide the pharmaceutical industry with a natural, environmentally friendly product.

The statistical analysis of the collected biometric and phenological data (based on MS Excel) provides a scientific basis for the development of an agrotechnical system for the cultivation of this plant in Uzbekistan. This, in turn, is important for the rational use of the flora of the republic and the conservation of biodiversity.

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