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Taxonomy and Phytocenology of the Species Included in the *Dianthus* L. Genus in Shahbuz District and Study of Their Bioecological Characteristics to Learn Their Effective Use Methods

Abstract

In the research study, information was given about the taxonomic composition and phytocenological properties of species belonging to the genus *Dianthus* L. distributed in the Shahbuz region, and the methods of studying the effective use of the species were mentioned. The distribution and bioecological properties of 4 species belonging to the genus (*Dianthus Calocephalus* Boiss., *Dianthus aristatus* Boiss., *Dianthus cretaceus* Adams., *Dianthus orientalis* Adams.) in the Shahbuz region were shown. Plant groups formed by the species were examined. It was determined that the species included in the genus *Dianthus* L. were grouped with annual and perennial herbaceous plants, mainly wild cereals. The species in the local flora are widely used in decorative floriculture and folk medicine.

***Keywords*:** *Dianthus L., taxonomy, distribution areas, phytocenological properties, usage directions*

Introduction

The flora of the Nakhchivan Autonomous Republic is represented by 176 families, 908 genera and 3021 species, 124 of which belong to 29 genera are representatives of the *Caryophllaceae* family. The *Dianthus* L. genus, which has a rich species diversity in the section, has about 340 species in the world. The *Dianthus* L. genus is represented by 18 species in the flora of the Nakhchivan Autonomous Republic and constitutes 14.5 % of the total species. *Dianthus* L. species are distributed in different areas from meadows to the upper mountain belt. The species included in the genus are widely used in medicine and ornamental gardening. In addition, among the species of the *Dianthus* L. genus distributed in the Nakhchivan Autonomous Republic, useful, rare, endemic and relic species included in the "Red Book" prevail. Thus, taking into account the modern status of the species *Dianthus orientalis* Adams. [NT] in nature, it was included in the Red Book of Nakhchivan MR (Talibov & Ibrahimov, 2010) as a rare plant with a limited distribution area. In the III edition of the "Red Book" of the Republic of Azerbaijan (2023), 18 species of the genus *Caryophllaceae* are included in different statuses, some of which we define as endangered species. Among these plants, there are species of particular decorative, medicinal, food and agricultural importance. However, they are rarely used (Talibov, 2017).

Research

Considering all this, the study of taxonomic, phytocenological and bioecological characteristics of *Dianthus* L. and the search for effective methods of its use are urgent.

Materials and Methods

The aim of the study is the Shahbuz district of the Nakhchivan Autonomous Republic, and the species belonging to the species *Dianthus* L. collected by us during the field research in the region were taken as material. A.A. Grossheim's works "Flora Azerbaijan" and "Flora Caucasus" (Flora of Azerbaijan, 1952; Grossheim, 1945) were used. The latest taxonomic additions and changes are based on real materials in the funds of the Institute of Biological Resources of the Ministry of Education of the Republic of Azerbaijan and the Herbarium of Nakhchivan State University and in the III volume of the book "Conspect flora Caucasica" (Abstract of the flora of the Caucasus, 2012; AGM Plants – Ornamental, 2018), and also the taxonomic spectrum of the Nakhchivan

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Autonomous Republic by T. H. Talibov and A. Sh. Ibrahimov was carried out according to the works of T. H. Talibov (Talibov, 2008; Talibov, Ibrahimov, & Ibrahimov, 2021). Systematization of geographical elements was carried out according to Portenier (Portenier, 2012).

A systematic analysis of the *Dianthus* L. genus in the local flora was developed, taking into account the APG IV system.

By specifying the names of plants distributed in the region, the works of E.M. Gurbanov "Systematics of higher plants", A. M. Asgarov's "Plant world were used" (Gurbanov, 2016; Askerov, 2009).

Discussion and Results of the Study

Dianthus L. *Caryophyllaceae* Juss. It is one of the largest genera in the family; more than 300 species are distributed in Eurasia, the tropics and South Africa, and a few species in North America. The most widespread region of the species is the Mediterranean countries. In Azerbaijan, 18 species and 28 species are represented in the flora of the Nakhchivan Autonomous Republic, which constitute 14.5 % of the species belonging to the *Caryophyllaceae* family distributed in this region. Wild species belonging to the *Dianthus* L. genus can be found in forests and shrubs, meadows and rocky places from the low mountain belt to the upper mountain belt. *Dianthus barbatus*, *Dianthus chinensis*, garden or *Dianthus caryophyllus* are grown in Azerbaijan. In Dianthus species, the calyx leaves are adjacent, and 2-8 inflorescences surround the leaf under the calyx. The petiole is long, the curve is smooth, entire or toothed. There are 10 stamens and two stamens. It is widely used in decorative gardening (Novruzova, 2019).

As a result of the expeditions made to different regions of the Shahbuz region of the Nakhchivan Autonomous Republic in the 2024 research year, the taxonomy, distribution regions, phytocenological and bioecological characteristics of the species included in the *Dianthus* L. genus were examined.

As a result of the research conducted by us, the taxonomic composition of the *Dianthus* L. genus was determined and it was understood that there are 4 species spreading from the lower mountain belt to the high mountain belt in the Shahbuz region (*Dianthus Calocephalus* Boiss., *Dianthus aristatus* Boiss., *Dianthus cretaceus* Adams., *Dianthus orientalis* Adams) are found.

Dianthus Calocephalus Boiss.

It is a perennial plant with a stem 40-60 cm high, branched root, and a bare surface. The leaves are 15-20 mm wide, stemless, linear, wedge-shaped, sharp, dark-colored, serrated on the edges, and a 15-20 mm long sheath is united at the base. The flowers are collected at the end of the stem, gathered in a multi-flowered head, the heads are covered with a leathery cover. The inflorescence is blunt-tipped, elliptical, covered with whitish, elliptical scales. The calyx is 17-20 mm long, cylindrical, surrounded by red scales on the top, sharp, with toothed edges. The leaves are 5-6 mm long, bright red, oval, hairy on the top, with toothed edges. The box is cylindrical, up to 10 mm long. The seeds are 2 mm long, oval and short-clawed. The plant produces fruits and seeds in June-July, sometimes in August.

Dianthus Calocephalus Boiss. species grow mainly in mountainous areas, on grassy and grassy rock slopes. It is a small size type of geographical type.

Dianthus Calocephalus species are found in Kuku, Nursu and Yukhari winter villages of Shahbuz region.

It is more common in the plains, lowlands, lowland areas of mountainous and foothill regions and in the meadow-shrub areas of the middle mountain slopes in Nakhchivan Autonomous Republic. *Artemisia lerchiana, Stipa szovitsii, Eromopyrum triticeum, Geranium tuberosun, Atrophaxis spinosa, Rhamnus pappasi, Pyrus salicifolia, Onosma sericeae* and many other species are also common in these regions. 45-60 plants with different life forms have been recorded in the phytocenosis. It forms groups with other plants in the mountainous and foothill areas. It is also known that this species is distributed in various phytocenoses consisting mainly of maquis-meadow, desert-semi-desert vegetation types on the slopes of the low mountain belts.

Dianthus aristatus Boiss. (*D.preobrashenskii* Klok)

The species is described from Turkey.

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The root develops directly from the rhizome, several branches, 25-50 cm high, the lower part is smooth, hairy or glabrous. The leaves are 1-2 mm wide, linear, sessile, pointed, hairy on the edges, and sheaths 1-2.5 mm long develop from the base. The flowers are located singly on the branches in the upper part of the stem. The inflorescence is scaly leathery, whitish, oval or elliptical, pointed on the upper part, whitish coated on the edges and short cilia, covering 1/3 of the calyx. The calyx is 17-20 mm long, cylindrical, the sepals are triangular-lanceolate, sharply toothed, whitish, covered with a dark red coating. The leaves are 6-8 mm long, oval, dark pink on the upper part, dark spotted on the upper part, yellowish-greenish on the lower part, comb-shaped on the edges. The plant produces flowers and fruits in July-August (RHS A-Z encyclopedia of garden plants, 2008).

Dianthus aristatus Boiss. The species grows on dry stony slopes from the middle mountain belt to the upper mountain belt, sometimes in bushes. It is included in the geographical type of Atropatan (Novruzova, 2020).

Dianthus aristatus Boiss. species is found around the villages of Kolani, Batabat and Aghbulag in the Shahbuz region. *Dianthus aristatus* Boiss. species *Papaver ocellatum, P. bracteatum, Corydalis persica,Glaucium corniculatum, G. elegans*, *Lonicera iberica, Caccinia macranthera, Rosa canina, Amygdalus fenzliana, Juniperus polycarpos, J. excels, Astracantha microcephala forms* formations with types.

Dianthus cretaceus Adams

The species is described from the Caucasus.

It is a perennial plant with a stem 17-45 cm high, green in color, numerous and simple branches, flat or jointed, hairy or glabrous at the bottom. Leaves 2-5 mm long, 1-2 mm wide, sessile, fused from base to sheath, narrow, pointed, hairy at the edges. Flowers are located singly on the upper parts of the branches. Inflorescence 2-part scale-like, leathery, whitish, inverted oval-oblong or elliptical, green part with double small scales. Calyx 20-30 mm long, cylindrical, narrowed at the top, green or whitish, covered with blackish-dark red scales from the part close to the inflorescence. Calyx oblong lancet-shaped, sharp, toothed at the edges, up to 1/3 of the calyx. The leaves are 6-8 mm long, oval, white, sometimes pink at the bottom, with toothed or entire edges. The calyx is the same size as the calyx or relatively short. The plant produces flowers and fruits in June-August (Novruzova, 2019; 2020).

Dianthus cretaceus Adams. The species grows in subalpine and alpine regions, meadows, stony, gravelly, grassy slopes. It belongs to the Caucasus Irradiated geographical type.

The chalk carnation species are found in the vicinity of Ucgardash Mountain, Gomur, Kecili villages of Shahbuz district. In formations formed by the *Hordeum violaceum* Boiss. et Huet., *Hordeum bulbosum* L., *Dactylis glomerata* L., *Bromus variegata* (Bieb.) Holub, *Lotus corniculatus* L., *Trifolium trichocephalum* Bieb., *Trifolium pratense* L., *Amoria hybrida* (L.) C. Persl, *Agrostis capillaris* L., *Vicia variabilis* Freyn et Sint., *Astragalus cornutus* Pall., *Helichrysum plicatum* DC., *Cephalaria procera* Fisch. et Ave, *Scorzenera latifolia* (Fisch. et C. A. Mey.) DC., *Thalictrum minus* L. are typical species.

Dianthus orientalis Adams

The species was described from Georgia.

The plant is 9-30 cm tall, woody from the base and densely branched. The branches are numerous, straight, thin, ending with flowers in the upper part. The leaves are short linear – awl-shaped, 1 mm wide, fused at the base with a sheath. Inflorescence scales 6-10, egg-shaped, whitish, 2.5-3 times shorter than the calyx, membranous edges, sharp or pointed. Calyx 22-27 mm long, cylindrical, with long lanceolate sharp teeth, glabrous, usually reddish. The leaves are red. The box has a cylindrical shape and is equal to a bowl. The plant produces flowers and fruits in June-August. Ornamental plant. It is a mesoxerophyte included in the geographic type Atropatan.

Dianthus orientalis Adams. type is widespread in rock crevices, stony and dry rocky slopes in subalpine zones (Talibov & Ibrahimov, 2010; Talibov, 2017).

Dianthus orientalis species are distributed in Kecheldağ, Salvartı Dağ, Biçenak and Kızıl Kışlaq villages of Shahbuz district. Plant gourds *Astragalus aureus*), *Acantholimon* (*Acantholimon hohenackeri*), *Achillea* (*Achillea vermicularis*), *Festuca* (*Festuca sulcata*), *Euphorbia* (*Euphorbia*

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szowitsii, *E. marschalliana*) and others. It participates in phytocenoses formed by the dominance of the species.

Picture
Dianthus orientalis Adams



Dianthus orientalis Adams. The species is widely used in decorative gardening due to its long flowering period.

Conclusion

As a result of the trips made to different regions of Shahbuz district of Nakhchivan Autonomous Republic in 2024 research year, taxonomy, distribution regions, phytocenological and bioecological properties of species included in the genus *Dianthus* L. were examined and the following conclusion was reached.

After determining the taxonomic composition of the genus *Dianthus*, it was determined that there are 4 species [*Dianthus Calocephalus* Boiss., *Dianthus aristatus* Boiss., *Dianthus cretaceus* Adams., *Dianthus orientalis* Adams.] distributed from low mountain belt to high mountain belt in Shahbuz region.

Phytocenological properties of *Dianthus Calocephalus* Boiss., *Dianthus aristatus* Boiss., *Dianthus cretaceus* Adams., *Dianthus orientalis* Adams. species were examined and the plant groups they form were determined.

Dianthus orientalis Adams. The new distribution areas of the species (around Bicenak and Gizil Gishlag villages) were determined by us.

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