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## CHARACTERISTICS AND SPECIES COMPOSITION OF THE SUBALPINE AND ALPINE GRASSLANDS OF GOYGOL NATIONAL PARK

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## ХАРАКТЕРИСТИКА И ВИДОВОЙ СОСТАВ СУБАЛЬПИЙСКИХ И АЛЬПИЙСКИХ ЛУГОВ ГЕЙГЕЛЬСКОГО НАЦИОНАЛЬНОГО ПАРКА

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*Abstract.* By the order of the President of the Republic of Azerbaijan dated April 1, 2008, Goygol National Park was established in the administrative territories of Goygol, Dashkasan and Goranboy districts from 6739 hectares to 12755 hectares. The grassland vegetation of Goygol National Park and the lake ecosystem it surrounds is one of the floristically rich regions of the Caucasus. The richness and diversity of flora is related to the geomorphological complexity of the area. On the other hand, the reserve regime allows the protection of vegetation. Modern subalpine vegetation has changed dramatically as a result of mowing and grazing. Thus, short (13-15 cm) grass or grass-steppe plant groups have formed in the place of relatively tall plants that existed earlier in many pasture areas. The flora composition of subalpine meadows is much richer than the meadow associations of other mountain zones. 70-80 (100) flowering plants were recorded in many vegetation groups. The climate of the Alpine belt is distinguished by its harshness. Short summer (2.0-2.5 months), low air and soil temperature, abundance of atmospheric precipitation, etc. are characteristic features of the alpine zone.

*Аннотация.* Распоряжением Президента Азербайджанской Республики от 1 апреля 2008 года на административных территориях Гейгельского, Дашкесанского и Геранбойского районов с 6739 га до 12755 га был создан Гейгельский национальный парк. Луговая растительность Гейгельского национального парка и окружающая его озерная экосистема являются одним из флористически богатых регионов Кавказа. Богатство и разнообразие флоры связано с геоморфологической сложностью района. С другой стороны, заповедный режим позволяет защитить растительность. Современная субальпийская растительность резко изменилась в результате скашивания и выпаса скота. Таким образом, на месте относительно высокорослых растений, существовавших ранее на многих пастбищных участках, сформировались низкорослые (13–15 см) травяные или травяно-степные группировки растений. Состав флоры субальпийских лугов значительно богаче луговых ассоциаций других горных поясов. Во многих растительных группах отмечено 70–80 (100) цветковых растений. Климат альпийского пояса отличается своей суровостью. Короткое лето (2,0–2,5 месяца), низкая температура воздуха и почвы, обилие атмосферных осадков и др. — характерные черты альпийского пояса.

*Keywords:* formation, association, national parks.

*Ключевые слова:* формация, ассоциация, национальные парки.



Goygol National Park is located on the northeastern slope of the Lesser Caucasus, in the Kurakchay basin of the Murovdag range. The territory of the district is bordered by Kura-Araz lowland, Goranchay to the east, Murovdag ridge to the south, and Ganjachay to the west. Ganja city and Goygol district are included in the administrative division. The territory has a different orographic structure and is closely related to the history of geological development. The features of the Murovdag and Karadag anticlinors, which are part of the Somkhet-Karabakh anticlinor, are evident in the relief here [1].

Goygol, Maralgot, Karagol, Zeligol, Aggol, Shamliggol, Ordekgol, Jeyrangol make up the ecosystem of the reserve lakes. Taking into account the fact that there is enough literature information about flora biodiversity around Goygol, the article [2–4] provides information about the flora biodiversity, subalpine and alpine vegetation of the ecosystems of Maralgot, Karagol, Zeligol, Aggol, Shamliggol, Ordekgol, Jeyrangol reserve lakes.

### *Material and Methodology*

The research object was the determination of the subalpine and alpine meadow vegetation of Goygol National Park at the level of formation and association. Research was carried out by semi-stationary and stationary methods, more than 70 geobotanical notes on the structure of phytocenosis were taken, and pictures of species and formations were taken separately in meadow. Route and stationary methods were used in the research. At the same time, floristic, floristic-systematic, areological, botanical-geographic, phytocoenological, statistical methods used in Botany were taken into account [4, 5]. During the study of the territory, information was collected about a number of ecological factors (water system, land cover, relief, etc.). Geobotanical analyzes were carried out during the routes organized in different zones (medium, subalpine and alpine). During the routes, the bioecological characteristics and vegetation types of the plant species distributed in the subalpine and alpine meadows of Goygol National Park, plant formations and associations in different zones were studied, and new areas of a number of species were determined in the areas.

Subalpine meadows: In the botanical literature of Transcaucasia, it has been repeatedly mentioned that forest vegetation was widespread in the subalpine belt. However, later those forests were destroyed by people without systematic cutting. A. A. Grossheim [5] notes that meadows in Eastern Transcaucasia were formed not before, but later (Figure 1).



Figure 1. Subalpine vegetation of Goygol National Park



Figure 2. Alpine vegetation of Goygol National Park

Y. S. Medvedyev divides the composition of subalpine vegetation into three vegetation elements. The first group includes species that enter the subalpine zone from below, forest, steppe and mountain-xerophyte vegetation types. Plants belonging to the second group enter the subalpine zone from above, from the alpine zone. These plants reflect the characteristic features of the highlands to the subalpine zone, they are not found in either forests or steppes. The third group mainly includes plants that form only in the subalpine zone and form the core of the vegetation of this zone [6].

In subalpine meadows, the separation of grass into layers (floors) is well chosen [2, 4, 5]. Three and sometimes four-layered grasslands are found here, depending on the associations. Perennial plants dominate the species composition of meadows. The participation of annuals, trees and shrubs in the grassland is very low. The species composition of typical subalpine meadows of Goygol National Park is given in the Table.

SPECIES COMPOSITION OF CHARACTERISTIC SUBALPINE MEADOWS

Table

Names of plants			Names of plants		
	Number	Height, cm		Number	Height, cm
<i>Helianthemum tomentosum</i> (Scop.) S. F. Gray	3-4	35-45	<i>Circaea alpina</i> L.	2-3	35-50
<i>Alchemilla retinervis</i> Buser	2-3	18-20	<i>Stachys spectabilis</i> Choisy ex DC.	1-2	35-40
<i>Ranunculus caucasicus</i> M. Bieb.	1-2	10-12	<i>Betonica macrantha</i> K. Koch	1-2	30-35
<i>Rumex acetosa</i> L.	1	40	<i>Carum carvi</i> L.	1-2	12-16
<i>Origanum vulgare</i> L.	1-2	35	<i>Trollius ranunculinus</i> (Sm.) Stearn	1	1-12
<i>Luzula spicata</i> (L.) DC.	1	8-10	<i>Leontodon hispidus</i> L.	1-2	20-25
<i>Trifolium canescens</i> Willd.	1-2	10-12	<i>Amoria bordzilovskyi</i> (Grossh.) Roskov	1	40
<i>Poa alpina</i> L.	1-2	12-16	<i>Cephalaria gigantea</i> (Ledeb.) Bobrov	1	45-75
<i>Phleum alpinum</i> L.	1	12-16	<i>Viola somchetica</i> K. Koch	1-2	15-30
<i>Amoria ambigua</i> (M. Bieb.) Soják	1-2	6-8	<i>Agrostis tenuis</i> Sibth.	1-2	20
<i>Cirsium tomentosum</i> C. A. Mey.	1	35-40	<i>Inula grandiflora</i> Willd.	1	40
<i>Bromopsis variegata</i> (M. Bieb.) Holub	3-4	45	<i>Hordeum violaceum</i> Boiss. et Hohen.	3-4	40
<i>Chrysaspis spadicea</i> (L.) Greene	2-3	30	<i>Bromopsis variegata</i> (M. Bieb.) Holub	2-3	45
<i>Agrostis gigantea</i> Roth	1-2	35	<i>Coeloglossum viride</i> (L.) C. Hartm.	1	40
<i>Festuca ovina</i> L.	1	25	<i>Festuca woronowii</i> Hack.	1	40
<i>Phleum phleoides</i> (L.) Roth	1-2	27	<i>Calamagrostis arundinacea</i> (L.) Roth	1	35
<i>Poa araratica</i> Trautv.	1	23	<i>Poa meyeri</i> Trin. ex Roshev.	1-2	30
<i>Carex diandra</i> Schrank	1-2	18	<i>Ranunculus oreophilus</i> M. Bieb.	1-2	10
<i>Ajuga orientalis</i> L.	1-2	6-8	<i>Geranium platypetalum</i> Fisch. et C. A. Mey.	1-2	10
<i>Taraxacum stevenii</i> (Spreng.) DC.	1-2	10-11	<i>Anthyllis lachnophora</i> Juss.	1-2	10
<i>Vicia grossheimii</i> Ekvim.	1-2	12	<i>Alchemilla sericata</i> Rchb.	1-2	6
<i>Trifolium pratense</i> L.	1-2	15	<i>Polygala sosnowskyi</i> Kem.-Nath.	1	15
<i>Amoria ambigua</i> (Bieb.) Soják	1-2	8	<i>Trifolium trichocephalum</i> M. Bieb.	1	16

Names of plants			Names of plants		
	Number	Height, cm		Number	Height, cm
<i>Salvia verticillata</i> L.	1-2	15	<i>Lavatera thuringiaca</i> L.	1	16
<i>Pimpinella saxifraga</i> L.	1	18	<i>Potentilla lomakinii</i> Grossh.	1	18
<i>Lathyrus cyaneus</i> (Steven) K. Koch	1	15	<i>Carex canescens</i> L.	2	6
<i>Plantago mayor</i> L.	1	3	<i>Alchemilla grossheimii</i> Juz.	2	16
<i>Gentiana septemfida</i> Pall.	1	18	<i>Luzula spicata</i> (L.) DC.	1	12

*Alpine meadows:* Alpine vegetation of Goygol National Park is spread at altitudes of 2500-2600 and 3200-3500 m above sea level. In some places (Kepaz) the vegetation even rises up to 3700 m. On the northern slopes, the lower border of alpine meadows rises up to 2600 m, and on the southern slopes above 3000 m. Mountain-meadow vegetation, which is more or less in contact, is reflected in the mentioned heights. Above this strip or in its territory, alpine meadow coenosis are scattered in the form of small patches on rocks and outcrops. Subnival and nival zones are dominated by rocks, outcrops, and glaciers, where there are few flowering plants, and a lot of symbionts.

Due to the diversity of living conditions and flora, a variegated vegetation has formed in the alpine zone. Here, along with the primary vegetation, a second type of vegetation was formed as a result of grazing. As a result, weed plants alien to the alpine flora were included in the meadow associations. The main constituents of meadow phytocenosis are grains, various grasses, sedges and sometimes small bushes.

One of the characteristic features of the vegetation of the alpine zone is that the grass is small in height (on average 6-8 cm). The height of some plants reaches 10-12 cm. The flowers of many alpine plants are large, bright and resistant to frost [2, 6, 7].

The basis of alpine plants are perennials that form a strong lawn and reproduce through vegetative organs in the species composition of phytocenosis. The flora of the alpine vegetation association is not as rich as in the subalpine. Only 20-25 (30) higher plants participate in alpine associations.

In the alpine zone, *Carex dacica* Heuff. is more widespread than the last species and creates a microcoenosis in moist water places. Apart from these, although several species of the genus *Carex* are found in the alpine zone, they do not form associations and participate in almost all alpine associations. Spreading from the lower limits of the Alpine belt to the uppermost subnival belt, it reflects dozens of alpine representatives in its coenosis. *Bromopsis variegata* (M. Bieb.) Holub, *Poa alpina* L., *Anthoxanthum odoratum* L., *Ranunculus oreophilus* M. Bieb., *Amoria ambigua* (M. Bieb.) Soják, *Alchemilla caucasica* Buser, *Taraxacum stevenii* (Spreng.) DC. and many other species grow normally near the lawn of two edificators (*Carex tristis* M. Bieb. and *Festuca ovina* L.) in the coenosis. Apart from several species of Sabiaceae, 18-20 flowering alpine plants can be found in the coenosis. Layering is difficult to choose. *Carex* and *Festuca* occupy the first floor, which are 10-12 cm tall. The project cover of the association formed by the abundance of *Festuca versicolor* Tausch, *Kobresia schoenoides* (C. A. Mey.) Steud., *Kobresia macrolepis* Meinsh., *Carex tristis* M. Bieb. and *Festuca ovina* L. is 77-80% on the southern slopes and 80-90% on the northern slopes. The soil is mountain-meadow and weakly peaty, with a humus layer of 18-20%. Coenosis as a whole is xeromorphic [4, 5, 7].

The occurrence of *Festuca ovina* and *Carex tristis* with abundance of 3 points in the poor soil eroded by cattle on the southern slope of the alpine peak of Kepaz showed the emergence of a new



association here. We made it clear once again that this type of edifice vegetation is at many alpine heights of the Goygol group.

However, although we saw little change in their floristic composition, we called it not as a separate association, but as the same coenosis, because we have little material. *Festuca supina* is also found in the species composition of many associations in Alpine.

*F. supina* is found mostly in stony-rocky areas. Unlike the other species, this species produces less grass.

In alpine meadows, waterlogged and swampy meadows are often found in small areas. This type of meadows creates special mosaics with grass cover for 2-3 months in the summer around springs, in permafrost areas, and in snowy areas (Figure 2).

In the alpine zone, there are swamps where the genus *Carex* forms a micro-association. This type of swamps is often found in the hole-type area on the northern slope of Maralgol (at an altitude of 1902 m). The thickness of peat formed in swamps reaches 0.5-1.0 m.

The height of the grass cover is 15-20 cm, it varies with the project cover. Project cover of wetland vegetation in Anut is 90-95%. *Carex medvedevii*, *C. oreophila*, *Kobresia macrolepis*, *Bistorta carnea*, etc. are included in the coenosis are spread out.

### Conclusion

The sphere of influence of the protection regime of Goygol National Park is multifaceted. One of its characteristic features is the presence of specific biotopes for each area. Goygol National Park is characterized by tall grass, forest, meadow, steppe, rock and scarp vegetation.

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