

Spreading of plants due to the character of the habitat in the cliffs and rocky areas of north-eastern part of the lesser Caucasus

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Abstract

The article provides information about spreading of rocky and cliff vegetation in the north-eastern part of the Lesser Caucasus due to the nature of the habitat. Growing condition depends on sloping of the slopes, as well as the nature of the habitat. The rocks and cliffs of the studied area are mainly silicate rocks consisting of granite, gneiss and Paleozoic sediments. There are also carbonate rocks of Upper Jurassic limestone, marl and dolomite.

Keywords: rock and cliff vegetation, habitat, carbonate rocks, silicate rocks

1. Introduction

As in other parts of the Caucasus, in the north-eastern part of the Lesser Caucasus rock and cliff vegetation form a huge ecosystem. The study of rock and cliff vegetation is considered important for the study of a number of theoretical issues. There are many species on the rocks and cliffs that have their own edaphic and microclimatic conditions, reflecting the characteristics of geological periods. Rocks and cliffs are natural reservoirs for plants that have taken refuge in unfavorable climatic conditions.

As a result of the collapse and fragmentation of rocks, cliffs are formed. Overcrowding of pastures and inefficient grazing of livestock prevent the formation of grass balances of the cliffs. Hardened cliffs are mainly found in protected areas and reserves.

Cliff vegetation is formed in the humus layer between the rock crevices as a result of erosion in the rocks. Vegetation of such cliffs occurs mainly in shady areas and river basins. The primary vegetation of the rocks is concentrated on the hilly peaks of some mountains, on the steep southern slopes with a number of rocks and cliffs.

The formation of rocks in very different conditions creates conditions for the formation of ecologically colorful vegetation. The Caucasus rocks consist of various rocks and are found in the upper forest, subalpine, alpine and subnival zones. Regardless of where the rocks are found, their vegetation consists of primitive, higher spores and flowering plants.

Research Material and Methodology

The researches were carried out in 2011-2020 in the North-Eastern part of the Lesser Caucasus in the systems of Goshgar (3361 m), Hinal mountain (3367), Kapaz mountain (3065 m), in Tovuz and Gadabay high mountains at 1600-3300 m above sea level.

Dependence of the occurrence of different species on the rocks and cliffs, the chemical properties of the habitats are found in the works of researchers such as Altukhov MD, Litvinskaya S.A. Bush N.A., Ivanov A.L., Shkhagapsoev S.X. and others ^[1, 2, 4]. According to the researches, rocks such as dolomite, limestone, granite, gneiss, diorite

Play an important role in spreading of species. There are species that move away from carbonate rocks. Such kind of species are found within species that include into *Symphyloloma*, *Trigonocaryum* and other genus.

Referring to the above, there have been studied the chemical characteristics of the habitat of rock and cliff plants in the highlands of the North-Eastern part of the Lesser Caucasus.

Experimental Part

Growing condition depends on the sloping of the slopes, as well as the nature of the habitats. Therefore, the requirements of rock and cliff vegetation to environmental factors are not the same. The occurrence of different species on the rocks and cliffs also depends on the chemical properties of the habitats ^[1]. Rocks such as dolomite, limestone, granite, gneiss, diorite play an important role in spreading of the species. Plants found on the rocks and cliffs in the severe extreme conditions are more sensitive to the chemical composition of the habitat. In addition to the chemical composition, the physical structure of rocks is also an important factor.

On rocks and cliffs, the depth of the soil which impedes rooting, is also different. The depth of penetration of the roots of gliarophytes growing in the cliffs is up to 20-35 cm. In different species, the colors of the upper part of the root are not the same. Colors range from reddish brown to light purple.

Table 1: Attitude of species to the nature of habitat

Habitat	Quantity of the species	%
Rocks	108	57,8
Cliffs	38	20,3
Rocks and Cliffs	41	21,9
Total:	187	100

Four types of habitats have been identified on the rocks and cliffs of the north-eastern part of the Lesser Caucasus:

1. Rocks and cliffs;
2. Open grassland composition of high mountains;
3. Dry rocky (arid) slopes of the middle mountains;
4. Humid growing areas.

The transition options between these habitats are also defined. The habitats affect the general ecological spectrum and the corresponding species composition is determined. Analysis of spreading of the species by habitats show that the flora studied is dominated by plants adapted to grass and rock-cliff ecotypes.

The rocks and cliffs of the studied areas are mainly silicate rocks consisting of granite, gneiss and Paleozoic sediments. There are also carbonate rocks of Upper Jurassic limestone, marl and dolomite. Undoubtedly, the process of adaptation of plants to silicate and carbonate rocks is complicated. We determined that the formation of vegetation of primary species was formed on 2 silicates (granite and gneiss) and 3 carbonate (dolomite, marl, limestone) rocks. According to the classification scheme by Shxaqapsoyevin S.X. [5] the chemical composition of the habitats, the following spreading patterns are found in rock and cliff vegetation.

Table 2: Dependence of habitats on the chemical composition of the rocks and cliffs

№		The Number of species	%
1	Lapishistofits	85	45,45
2	Facultative xasmofits	30	16,04
3	Facultative marenofits	27	14,44
4	Obligate glyarofits	15	8,03
5	Obligate xasmofits	11	5,88
6	Facultative glyarofits	10	5,35
7	Xasmoglyarofits	9	4,81

In general, dolomite, marl, and limestone are the main habitats for rock and cliff vegetation. Some of the earliest species escape from carbonate rocks, which are mainly found in granite and gneiss rocks.

Some species *Valeriana alpestris* Stev, *Plantago saxatilis* Bieb are directly related to the chemical composition of the habitat and have a wide biological potential. Observations show that the chemical composition of the habitat greatly affects the regularity of natural plant spreading. In extreme mountain conditions, it is necessary to approach the habitats from the point of view of selectivity.

The occurrence of *Rhododendron caucasicum* Pall, a relict species on the rocks and sediments in the alpine zone of the Goshgar mountain system, shows that the species has been actually pushed to the lower areas since the ice age. In the highlands of the North-Eastern part of the Lesser Caucasus, the primary types of rock and debris vegetation are divided into 3 groups depending on the chemical characteristics of the habitat:

1. Acidophils
2. Basifils
3. Individuals.

In the extreme conditions of high mountains, rock and cliff vegetation show themselves as indifferent species. In the lower belts, they themselves adapt to the specific rocks.

Conclusion

1. The results obtained are the main basis for the inventory of flora and vegetation of rock and cliff vegetation of the North-Eastern part of the Lesser Caucasus. Also, the description of the formation of vegetation on bare rocks can be used in the effective use and study of the rock and cliff vegetation of the Caucasus.

References

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