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MOUNTAIN-XEROPHYTIC VEGETATION TYPE FOUND IN DARIDAG

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ГОРНО-КСЕРОФИТНЫЙ ТИП РАСТИТЕЛЬНОСТИ ДАРИДАГА

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Abstract. Information about the mountain-xerophytic type of vegetation of the Daridag area is presented. Areas at an altitude of 1200-1600 m above sea level are characterized by plant species with mountain xerophytic vegetation. Mountain xerophytic flora is not homogeneous and represents a set of individual phytocenosis. Ephemeral plants play an important role in this vegetation. In addition to ephemerals, the vegetation includes bulbous, tuberous, and various grasses, mainly: *Rhamnus pallasii* Fisch. & C. A. Mey., *Astragalus microcephalus* Willd., *Astragalus beckerianus* Trautv., *Astragalus aduncus* Willd., *Thymus kotschyanus* Boiss. & Hohen., *T. collinus* M. Bieb., *Euphorbia seguieriana* Neck., *Caragana grandiflora* (M. Bieb.) DC., *Atraphaxis spinosa* L., *Acanthophyllum mucronatum* C. A. Mey., *Zygophyllum atriplicoides* Fisch. & C. A. Mey., *Z. fabago* L., *Acantholimon araxanum* Bunge etc. In total, the study identified 6 groups of formations and 16 associations. These include thorn shrubs, monodominant tragacanth xerophytic shrubs, cushion xerophytic shrubs, subshrub phrygana and mixed shrubs, which are included in the mountain xerophytic vegetation type. The phytocenosis of mixed herbaceous shrubs is comprised of 35 species, of which 10 species are shrubs (28.56%), 1 species is a semi-shrub (2.86%), 1 species is a shrub (2.86%), 2 species are semi-shrubs (5.72%), and 21 species are perennial and biennial (60%) plants. With regard to their life forms, of the 21 species included in the monodominant tragacanth xerophytic shrub grouping, three species are shrub-like, two species are shrubs, two species are semi-shrubs, and 14 species are perennial grasses.

Аннотация. Представлены сведения о горно-ксерофитном типе растительности Даридага. Для участков на высоте 1200–1600 м над уровнем моря характерны виды растений с горно-ксерофитной растительностью. Горная ксерофитная флора не однородна и представляет собой набор отдельных фитоценозов. Эфемерные растения играют важную роль в этой растительности. Помимо эфемеров, в состав растительности входят луковичные, клубневые, различные злаки, в основном это: *Rhamnus pallasii* Fisch. & C.A. Mey., *Astragalus microcephalus* Willd., *Astragalus beckerianus* Trautv., *A. aduncus* Willd., *Thymus kotschyanus* Boiss. & Hohen., *T. collinus* M. Bieb., *Euphorbia seguieriana* Neck., *Caragana grandiflora* (M. Bieb.) DC., *Atraphaxis spinosa* L., *Acanthophyllum mucronatum* C. A. Mey., *Zygophyllum atriplicoides* Fisch. & C. A. Mey., *Z. fabago* L., *Acantholimon araxanum* Bunge и т. д. Всего в ходе исследования было выявлено 6 групп формаций и 16 ассоциаций. К ним относятся терновые кустарники, монодоминантные трагакантовые ксерофитные кустарники, подушковидные ксерофитные кустарники, полукустарниковая фригана и смешанные кустарники, которые входят в горно-ксерофитный тип растительности. Фитоценоз смешанных травянистых кустарников состоит из 35 видов, из которых 10 видов — кустарники (28,56%), 1 вид — полукустарники (2,86%), 1 вид — кустарнички (2,86%), 2 вида

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— полукустарники (5,72%), 21 вид — многолетние и двулетние (60%) растения. Из 21 вида, входящего в монодоминантную группу ксерофитных кустарников, 3 вида являются кустарниковыми, 2 вида — кустарниками, 2 вида — полукустарниками и 14 видов — многолетними травами.

Keywords: Daridag, mountain-xerophyte vegetation type, phytocenosis, formation, association.

Ключевые слова: Даридаг, горно-ксерофитный тип растительности, фитоценозы, формации, ассоциации.

The territory of the Nakhchivan Autonomous Republic is a distinctive region in terms of the richness and variety of its vegetation. The primary factor contributing to this diversity is the region's diverse physical-geographical and natural-historical conditions. From this perspective, the Daridag area in the Nakhchivan Autonomous Republic stands out for its rich and distinctive vegetation. The elevation above sea level in these areas is characterized by the development of various types of semi-desert, mountain xerophyte (gariga, frigana) and mountain steppe vegetation, as is the case throughout the entire territory of the republic. The vegetation of this area contains a considerable quantity of essential oil, which can be poisonous and thorny. As one progresses towards the plains, this vegetation is observed to intermingle with semi-desert species. Conversely, as one ascends in altitude, it is observed to form transitional groups by intermingling with mountain xerophyte species. Nevertheless, mountain xerophyte vegetation constitutes a distinct zone and is typified by its own distinctive flora.

One of the most distinctive features of the vegetation in the Nakhchivan Autonomous Republic is the prevalence of xerophytic elements, including grass polycarpia, numerous ephemerals, widespread xeromorphic shrubs and semi-shrubs, and mountain-xerophyte vegetation found in mountainous areas. This vegetation is particularly prevalent in areas between 1,200 and 1,300 meters above sea level and 1,600 meters, with the greatest density observed in the foothills. However, in some areas, it is represented by small fragments, limited to dry, well-lit rocky and gravelly slopes. The diversity of these groups is characterized by the presence of pillow-shaped, dwarf, shrub and semi-shrub forms or small trees, which can be distinguished by their gradual transitions. A considerable number of species belonging to the genera *Astragalus, Onobrychis,* and *Acantholimon* exhibit prickly pillow-shaped forms. They typically do not develop semi-bush, hard-leaved plant formations, closed cenoses, such as phrygana and tragacanths. This vegetation is often referred to as garigue vegetation, which is defined as a community of shrubs and semi-shrubs that do not exceed knee height.

Material and methodology of the research

The research object was the study of the plants included in the mountain xerophyte vegetation type of the Daridag flora and the phytocenosis formed by them between 2018 and 2024. The flora of Darıdag, the study area, is notable for its extensive area of gray and light chestnut-colored soils, which occur at altitudes ranging from 800 to 1927 meters above sea level.

Researchers who have been studying the vegetation of the Nakhchivan Autonomous Republic for an extended period, including A. Sh. Ibrahimov, have provided detailed descriptions of the types of vegetation that are found in the region. A. Sh. Ibrahimov, who has recently conducted research on the Nakhchivan Autonomous Republic, has observed that the region comprises 1,700 associations, which are divided into 430 formations belonging to 17 distinct vegetation types [4, 16–19].

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It is important to note that while the mountain xerophyte vegetation of the flora of the autonomous republic, as well as the Daridag flora, has been studied in general, these studies do not fully reflect the mountain xerophyte vegetation of the Daridag flora.

Experimental section

The flora of the Daridag region, situated at an altitude of 1200-1500 meters above sea level, is distinguished by the presence of plant species belonging to mountain xerophytic vegetation. Mountain xerophyte vegetation is not a homogeneous entity, but rather a complex assemblage of distinct phytocenosis. In fact, the characteristics of the phytocenosis that comprise freegana vegetation can be modified depending on the exposure of the areas where the phytocenoses are located, the slope of the mountain slopes, the bioecological characteristics of the species that comprise the phytocenosis, and the abundance of stony-rocky and outcrops in the area. Conversely, the prevalence of these phytocenosis is also contingent upon the diversity of species present in the surrounding vegetation. It is also noteworthy that ephemeral plants play a significant role in this vegetation. The presence of these plants in the composition, like that of other species, contributes to the species richness of the area. In addition to ephemerals, bulbs, tubers, various grains and mainly *Rhamnus pallasii* Fisch. & C. A. Mey., *Astragalus microcephalus* Willd., *Astragalus beckerianus* Trautv., *A. aduncus* Willd., *Thymus kotschyanus* Boiss. & Hohen., *T. collinus* M. Bieb., *Euphorbia seguieriana* Neck., *Caragana grandiflora* (M. Bieb.) DC., *Atraphaxis spinosa* L., *Acanthophyllum mucronatum* C. A. Mey., *Zygophyllum atriplicoides* Fisch. & C. A. Mey., *Z. fabago* L., *Acantholimon araxanum* Bunge and other types of plants that form the main cenoses, a wide range of other plant species are also found in Phrygana [1, 20].

At the time of the study, the mountain xerophyte vegetation type was found to include six distinct formations and 16 associations within the following formation classes: thorny bushes, monodominant tragacanth xerophytic bushes, pillow-shaped xerophytic bushes, semi-bush phrygana, and mixed bushes.

Thorn bushes. Indeed, these phytocenosis comprise a heterogeneous assemblage of semi-desert vegetation and original mountain xerophyte plants. They extend to considerable heights in arid clay and stony, infertile soils, particularly in low hilly areas and along the sides of valleys. They also accommodate other xerophyte shrubs and wormwoods.

Thorny phytocenosis are dominated by *Prunus fenzliana, Atraphaxis angustifolia, Zygophyllum atriplicoides, Caragana grandiflora, Rhamnus pallasii* species, which are found in xerophytic shrubs. In addition to the aforementioned plants, *Hedysarum formosum, Isatis bungeana, Bromus scoparius, Nonea caspica, Senecio vernalis, Stipa lessingiana*, some *Astragalus* species, *Allium szovitsii* and other similar species are also found in phytocenosis (Table 1).

Table 1

PHYTOCOENOLOGICAL STRUCTURE AND SPECIES COMPOSITION
OF THORN BUSHES FORMATION

№	*Name of species*	*Abundance, point*	*Height with cm*	*Tier*
1	*Zygophyllum atriplicoides* Fisch. & C.A. Mey.	3-4	75-90	I
2	*Prunus fenzliana* Fritsch	2-3	200-300	I
3	*Rhamnus pallasii* Fisch. & C.A. Mey.	3-4	90-150	I
4	*Atraphaxis spinosa* L.	4-5	40-95	I
5	*Isatis iberica* Steven.	1-2	15-20	III
6	*Isatis ornithorhynchus* N. Busch	1-2	15-18	III
7	*Hedysarum formosum* Fisch. & C. A. Mey. ex Basin.	2-3	20-50	II
8	*Roemeria refracta* DC.	2-3	35-40	II

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9	*Gladiolus atroviolaceus* Boiss.	1	45-60	II
10	*Bromus japonicus* Houtt.	1-2	25-30	III
11	*Stipa lessingiana* Trin. & Rupr.	2	30-35	III
12	*Nonea rosea* Link.	1-2	6-15	IV
13	*Senecio vernalis* Waldst. & Kit	3-4	20-50	II
14	*Ajuga orientalis* L	2-3	10-15	IV
15	*Gypsophila szovitsii* Fisch. & C. A. Mey. ex Fenzl	1	25-45	II
16	*Iris caucasica* Hoffm.	1	6-8	IV
17	*Leopoldia caucasica* (Griseb.) Losinsk.	1	5-10	IV
18	*Tulipa biflora* Pall.	1-2	6-8	IV
19	*Odontarrhena muralis* (Waldst. & Kit.) Endl.	1-2	10-15	IV
20	*Ziziphora tenuior* L.	2-3	8-15	IV
21	*Euphorbia marschalliana* Boiss.	2-3	5-8	IV

Mixed bushes. The formation class in question comprises xerophytic plants and a variety of xerophytic shrubs, situated at an altitude of 1200-1500 meters above sea level.

Mixed thickets with various herbs. The formation of multi-herb thickets is composed of xerophytic shrub plants, which are found on the northern and northwestern slopes of the valleys in the area, especially towards the beds of the valleys, mainly at the bottom of the valleys. Small trees and shrubs are occasionally observed in small, isolated clusters in the narrow, rocky soil areas on the slopes of the valley. The *Rosa* L., *Crataegus* L. and *Rhamnus* L. species are distinguishable by their single, small bushes that are particularly prevalent in the rocky interstices. In areas of higher elevation, particularly in those with soil, bushy forms such as *Pyrus salicifolia* Pall. and *Rosa canina* L. are observed [5-7, 11-14].

The relatively large number of shrubs coenosis towards the interior of the valleys is likely a consequence of the high humidity caused by the accumulation of more water in the valleys during the spring and autumn rains. Although the shrub coenosis appear to be dense and compact, they are, in fact, distributed at considerable distances from one another and form mixed communities. *Tamarix ramosissima* Ledeb. bushes are observed in the area. Small bushes of *Ephedra procera* Fisch & C. A. May are interspersed in the relatively stony areas along the side of the stream towards the mountain slopes. In particular, the presence of small shrubs such as *P. microcarpa*, *Cotoneaster suavis*, *C. saxatilis*, *Acer monspessulanum*, *Rhamnus pallasii*, *Prunus fenzliana* although relatively uncommon, contributes to the distinctive character of the vegetation in stony-rocky areas. It also illustrates the intricate composition of shrub phytocenosis.

Pyrus medvedevii a rare plant species within the phytocenosis, is observed in only two locations [10].

It is evident that the development of grass and shrub-like polycarpy in the northern and northwestern exposures of the mountain slopes appears to be mesophytic. However, both grass and shrub plants found in these areas are elements of a highly xerophytic nature. It can be reasonably assumed that, given the high angle of sunlight received by these areas, elements of a mesophytic nature should have developed. In the higher zones, especially in the middle and other areas at this altitude (1927 m), mesophytic elements, mainly in the northern and northwestern exposures of the area, should have been noticeable at least to some extent. However, the inclination of the mountain range where Daridag is located towards the plain area of the autonomous republic creates conditions that favour the development of xerophytic elements in the studied area.

The bush senoses exhibit a diverse composition, with the grasses displaying varying compositions that have been influenced by the elements of polycarpy in different areas and in varying forms. This has led to a relatively complex composition of the senoses. Among the

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representatives of the polycarpia genus, the most common herb in phytocenoses, mixed-herb mixed-shrub senoses are found in the Darıdag region, which is located on brown mountain soils and on mountain slopes at an altitude of 1200-1600 m above sea level.

The phytocenosis comprised 35 species, of which 10 were shrubs (28.56%), 1 was a semi-shrub (2.86%), 1 was a shrub (2.86%), 2 were semi-shrubs (5.72%), and 21 were perennial and biennial plants (60%). The phytocenosis, which comprises 35 species, is dominated by xerophytic elements. The formation is dominated by shrubs. Level IV is discernible in the structure of the phytocenosis. The first layer of the phytocenosis is composed of shrubs. Tier III is composed of shrubs and tall grasses. In certain areas, thorn bushes may form the second layer. In phytocenosis, the project cover of grass polycarpia is estimated to be between 60 and 70%. The formation is composed of a single association.

Cereal mixed-herb thickets with stony-gravel and poorly developed soil layers are prevalent on the slopes of valleys and mountainsides. The composition of the phytocenosis is more diverse than that of other cenoses, with a greater prevalence of xerophytic elements. In fact, these phytocenosis are semi-closed phytocenosis. In particular, in stony and rocky areas, they become sparser and more become open phytocenosis. As the plant group becomes more diverse in thick soil and relatively north-facing exposures, it forms closed communities. Although stratification is clearly visible in areas rich in soil and species richness of phytocenosis, in stony and gravelly areas, stratification is not very clearly distinguished, depending on the species richness.

This phenomenon is particularly evident in areas where shrub vegetation is sparsely distributed. In some instances, the phytocenosis can be divided by natural factors, particularly in rocky and rocky areas, ravines, and ravines. Despite the fact that grass cover is more densely located in more areas within the cenoses, shrub plants are very sparsely distributed. In areas with dense grass cover, species are taller than in open areas. In particular, the height difference is more pronounced in the shrubbery of the valleys. It is evident that the species composition of the phytocenosis in the Daridag area becomes increasingly diverse with increasing altitude. This phenomenon is associated with the observed migration of high mountain steppe species to the area. In areas where there is no shrubbery at the edges of the stream, tall cereal plants are often replaced by *Eryngium campestre, Ziziphora biebersteiniana, Achillea nobilis, Thymus collinus, Nepeta meyeri, Silene arenosa, Eremostachys molucelloides*, *Th. kotschyanus, Phlomis orientalis, Prangos acaulis* species, particularly in the gravelly areas of the pomegranate. In particular, the gradual increase of various legume species (*Astragalus beckerianus* Trautv*., A. caraganae* Fisch. & C.A. Mey*, A. prilipkoanus* Grossh. *Onobrychis montana* DC. etc.) towards sandy and rocky areas, and the increase of legumes and more towards the edges, mainly of *Tragacanthus* species (*Thymus collinus, Th. kotschyanus*) in sandy and stony rocky areas, demonstrates the dominance of thyme associations. The presence of ephemeral and ephemeroid plant species plays a distinctive role in the enrichment of phytocenosis in areas where plant diversity is limited.

In general, the flora of these areas is composed of plants that have evolved to thrive in the xerophytic environment, exemplified by semi-desert plants. These species exhibit xerophytic characteristics in their general structure. These plant species have evolved certain characteristics in response to the extreme conditions of the area. The highest plant mass is observed in subshrubs, while the lowest is observed in ephemerals and ephemeroids. The water content of the leaves exhibited a range of 47.6% to 68.5%. The most water-deficient plants were observed to be the ephemerals, with the least water-deficient plants being the perennials, particularly the subshrubs. Xerophytes demonstrate adaptation to drought through the general reduction of the transpiration surface with the metamorphosis of the above-ground part, accompanied by an increase in the root sphere.

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The aforementioned areas are most susceptible to anthropogenic influences during the spring and autumn seasons. The regular grazing of these areas, particularly following the autumn rains and during the peak of humidity in the spring, is a significant contributing factor to the degradation of vegetation and soils. In the contemporary era, the dynamics of semi-desert, mountainous xerophyte, and mountain steppe vegetation are largely influenced by anthropogenic factors, including reclamation, construction of hydrotechnical facilities, reforestation, grazing, and other activities.

The association encompasses a total of 35 species. The following table illustrates the composition of the phytocenosis (Table 2).

Table 2

PHYTOCOENOLOGICAL STRUCTURE AND SPECIES COMPOSITION OF MIXED SHRUBS WITH CEREAL GRASSES

№	*Name of species*	*Abundance, point*	*Height, cm*	*Tier*
1	*Prunus fenzliana* (Fritsch) Lipsky	2	150-200	I
2	*Prunus microcarpa* C. A. Mey.	1-2	80-120	I
3	*Cotoneaster suavis* Pojark.	1-2	75-95	I
4	*Cotoneaster saxatilis* Pojark.	1-2	50-70	I
5	*Pyrus medvedevii* Rubtzov	1-2	300	I
6	*Pyrus salicifolia* Pall.	1-2	250-300	I
7	*Rosa canina* L.	1-2	80-100	I
8	*Rhamnus pallasii* Fisch. & C. A. Mey.	1-2	125-180	I
9	*Astragalus microcephalus* Willd.	3	50	II
10	*Acantholimon araxanum* Bunge	1-2	15-20	III
11	*Astragalus argyroides* Beck	1-2	20-25	III
12	*Astragalus beckerianus* Trautv.	1-2	25-30	II
13	*Thymus kotschyanus* Boiss. & Hohen.	1-2	9-10	IV
14	*Thymus collinus* M. Bieb.	2	15-25	III
15	*Eryngium campestre* L.	1-2	20-28	III
16	*Ziziphora biebersteiniana* Grossh.	1-2	15-25	III
17	*Achillea nobilis* L.	1-2	25-30	II
18	*Onobrychis montana* DC.	1-2	30-35	II
19	*Prangos acaulis* (DC.) Bornm	1	20-25	III
20	*Silene arenosa* K.Koch	1	15-20	III
21	*Eremostachys molucelloides* Bunge	1	70-95	I
22	*Nepeta meyeri* Benth.	1-2	15-30	II
23	*Phlomis orientalis* Mill.	1-2	23-26	III
24	*Astragalus prilipkoanus* Grossh.	1	25-30	II
25	*Medicago varia* Martyn.	1-2	25-30	II
26	*Medicago minima* (L.) Bartal.	1-2	18-25	III
27	*Tamarix ramosissima* Ledeb.	1-2	80-90	I
28	*Celtis glabrata* Stev. ex Planch.	1	120-150	I
29	*Euphorbia marschalliana* Boiss.	1-2	12-15	IV
30	*Reseda lutea* L.	1-2	20-25	III
31	*Cymatocarpus grossheimii* N.Busch	1	15-20	III
32	*Lepidium draba* L.	1-2	12-15	IV
33	*Scutellaria darriensis* Grossh.	1	15-20	IV
34	*Rubia rigidifolia* Pojark.	1-2	18-25	III
35	*Verbascum pyramidatum* M.Bieb.	1-2	40-50	II

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Monodominant tragacanth xerophytic thickets. The plant species included in this class are tragacanth plants, which are found in most parts of the autonomous republic.

Tragacanth plants are primarily composed of species of *Astragalus* L. They are typically found on open rocky and clayey erosion slopes, cliffs, and on the edges of conglomerates. They are also present to a lesser extent on plains and humus soils.

Tragacanths, the most prevalent species of chasmophyte groups, serve as the foundation for petrophytic tragacanthous plants of mountain xerophyte and mountain steppe vegetation. In local populations, their numbers range from a single specimen to several hundred individuals. It is noteworthy that this grouping is particularly susceptible to decline due to anthropogenic pressure. In fact, this formation class is manifested in the form of several associations, but the dominance of mixed *Astragalus* L. species is evident [3, 8].

The composition of the formation is primarily *Astragalus* L. and various *Acantholimon* Boiss.. These species are particularly prevalent in the north-east, south and south-east exposures of the area. The presence of a variety of ephemeral and grain plants, as well as other fodder species, within the phytocenosis renders these areas more susceptible to anthropogenic influences. In particular, the utilisation of these areas as pasture during the winter months serves to accelerate this process. Although the majority of the groupings are composed of tragacanthic elements, the growth in the area is notably weak, regardless of the seeding process. The species included in the grouping are xerophytic elements that are widely distributed in stony-gravel and relatively poor soil areas. The plants are typically small in size and exhibit some characteristics commonly observed in xerophytic plants, including leaf thickening, leaf transformation into thorns, and other distinctive traits. Notwithstanding these considerations, the species composition of the group is notably diverse. However, it is an open grouping. From an ecological perspective, the majority of the group's constituent elements are xerophytic plants. Of the 21 species included in the grouping according to life forms, 3 species (14.3%) are shrub-like, 2 species are shrubs (9.5%), 2 species are semi-shrubs (9.5%), and 14 species are perennial herbs (66.7%). In certain instances, the composition of the group may vary depending on the level of exposure. Nevertheless, in all cases of phytocenosis formation, the dominant plant species are the thorny *Astragalus* L. species. The phytocenosis includes *Astragalus beckerianus* Trautv., *A. crenatus* Schult., *A. caraganae* Fisch. & C. A. Mey and other species from the *Astragalus* L. species. Additionally, this composition encompasses *Teucrium polium*, *Hypericum scabrum*, *Acantholimon karelinii*, *Thymus kotschyanus*, *Atraphaxis spinosa* and other analogous species [2, 3, 8]. The total project coverage of phytocenosis is estimated to range from 55% to 60%.

Cushion-shaped plants. The group of cushion-shaped xerophytic shrubs includes species such as the smaller *Acantholimon karelinii, A. araxanum, Astragalus microcephalus* Willd. (*A. pycnophyllus* Stev.) and *A. karjaginii* (Boriss.) Podlech. The roots of cushion plants extend deeply into the soil. These plants branch above the root throat to form short branches with dense leaves. The branches are dense and thin, approximately equal in length, and give the plants a pillow-like shape. The small leaves of the plant are located within the cushion, thereby protecting the plant from the effects of drought and lack of water. The layer of dead leaves that accumulate inside the cushion over an extended period of time can serve as a protective barrier for the plant, as they retain moisture for an extended period due to the influence of the water they receive during the rainy season. The mineral substances contained in the humus and dust brought by the wind are of great benefit to plant nutrition. Conversely, the temperature is relatively lower than the ambient temperature due to the air circulation within cushion-shaped plants. This allows plants to thrive in environments with high solar radiation.

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Although the composition of these phytocenoses is not floristically rich, it varies depending on the exposure of the mountain slopes, the slope of the area, the height above sea level, and the composition of the substrate. The design cover of vegetation typically ranges from 45% to 50% and 60% to 70%, respectively, contingent on the exposure of the area. The mixing of *Onobrychis cornuta* (L.) Desv. species towards the upper zones relative to the composition of phytocenoses results in qualitative variation of the species composition of phytocenoses..

The grouping of thistles is primarily observed in stony rocky areas and on soils with low humus content. Nevertheless, the content of these phytocenoses is more diverse than that of other areas. In particular, the migration of mountain steppe elements to the area serves to enhance the richness of the area. The phytogrouping of *Acantholimon araxanum* Bunge, *Astragalus karjaginii* Boriss., *A. microcephalus* Willd., *Thymus collinus* M.Bieb., *Th. kotschyanus* Boiss. & Hohen. species is a recognized phenomenon. In certain instances, the incorporation of species belonging to *Nepeta, Phlomis, Salvia* and other genera within the claystone regions of the territory contributes to the further diversification of the phytocenosis. In areas with a stony-rocky terrain, the composition of the tsetse grouping may be heterogeneous, comprising different types of tsetse.

The total project coverage of phytocenosis is estimated to range from 70 to 80%. However, in rocky areas, the phytocenoses become more sparse and form open groups. In areas with thick soils, the composition of the grouping is relatively homogeneous due to the high diversity of plant species. Given the richness of the soil in these areas and the high competitiveness of these species, it can be expected that the grass communities formed in the soils of these areas will be degraded, especially as a result of various anthropogenic effects.

Vegetation formed by mountain xerophytic elements is composed of species that have adapted to the harsh ecological conditions of highly extreme environments, such as semi-desert and rock vegetation. Conversely, the harsh living conditions result in the selection of a limited number of species, or ecotopic selection, which are capable of surviving in these conditions. Consequently, highly specialized groups of species evolved in these mountain areas, exhibiting genotypic and phenotypic adaptations to specific environmental conditions and life strategies. The most notable adaptive features of xerophytic plants adapted to these areas are efficient dispersion forms, the capacity to recuperate rapidly following rest, drought tolerance, diverse growth forms, the hardness of leaves, the development of thorns, hairiness, the secretion of essential oils, and pillow-like forms. As a consequence of ecotopic selection, each species will occupy a distinct ecological niche within the mountain xerophyte area. Consequently, the succession of mountain-xerophyte vegetation is primarily influenced by the alteration of edaphic conditions resulting from the accumulation of mineral compounds and humus in the substrate.

Mountain xerophyte vegetation occupies a unique position within the Nakhchivan Autonomous Republic. Subsequently, the semi-desert vegetation of the region evolved in the arid zones of the low mountain belt, particularly in areas with limited water availability due to the high permeability of the underlying rocks or where a significant amount of moisture is lost from the bare rocky and gravelly slopes. The southern slopes, in particular the lower mountain belt of the region, are the most arid areas. In these areas, more resilient and drought-resistant plants, including semi-desert and steppe species, are prevalent. In the region's flora, the most prevalent xerophytic forms, such as those belonging to the genus Tragacantha, are observed in the form of cushion-shaped thorny semi-shrub plants. These plants possess long roots that extend to the moist layers of the subsoil. The uniform temperature maintained between the cushion-shaped, dense stems and spines of *Astragalus* reduces evaporation. Additionally, the area is home to a number of shrub species that are characteristic of the region.

Type: Mountain-xerophyte vegetation classification
Formation class: *Astragaleta tragacanthus*
Formation: Pure *Astragaleta*
Association: 1 *Astragaletum microcephalus*;
2. *Astragaletum caraganae*;
3. *Astragaletum prilipkoanus*;
4. *Astragaletum beckerianus*
Formation class: Thorn bushes
Formation: *Zygophylleta atriplicoidae*
Association: 1. *Zygophylletum - varioherboso - peganosum*)
2. *Zygophylletum – graminoso - reaumuroso - atraphaxosum*)
Formation: *Caraganeta grandiflorae*
Association: 1. Pure *Caragana grandiflora*
2. *Caraganetum – varioherboso - zygophyllosum*
3. *Caraganetum - varioherboso - graminosum*
Formation class: Cushion-shaped xerophytic thickets
Formation: *Astragaletum acantholimonosum*
Association: 1. Pure *Acantholimonetum araxanum*
2. *Acantholimonoso - astragalosum*
3. Pure *Astragaletum microcephala*
4. *Acantholimonetum – artemiso - eremostachosum*
Formation class: Friganas with half sleeves
Formation: *Thymeta kotschyanus*
Association: 1. Pure *Thymus kotschyanus*
2.*Thymetum - astragaloso - acantholimonosum*
Formation class: Mixed bushes
Formation: *Variofruticosetum - varioherbosum*
Association: *Variofruticosetum – varioherboso - graminesum*

Conclusion

The flora of Daridag at an altitude of 1200-1600 m above sea level exhibited mountain xerophyte vegetation and was classified according to five formation classes, six formation groups, and 16 associations.

The phytocenosis of multi-herb mixed bushes consisted of 35 species, of which 10 species were shrubs (28.56%), 1 species was a semi-shrub (2.86%), 1 species was a shrub (2.86%), and 2 species were semi-shrubs (5.72%). Twenty-one of the identified types were composed of perennial and biennial plants (60%).

A total of 3 species (14.3%) of the 21 species included in the Monodominant tragacanth xerophytic shrub grouping are shrub-like, 2 species are shrubs (9.5%), 2 species are semi-shrubs (9.5%), and 14 species are perennial grasses (66.7%).

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