

PHYTOCENOSIS FOUND IN THE LEGUMINOUS VALLEY MEADOW VEGETATION IN THE WINTER PASTURES OF THE MIL-KARABAKH MASSIF (BEYLAGAN AND AGJABADI) OF AZERBAIJAN, THEIR SPECIES COMPOSITION AND EFFECTIVE USE

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Abstract

The leguminous valley meadow vegetation (species composition and structure of formations), which spread in the winter pastures used as a natural feed source for nomadic sheep breeding within the administrative districts Beylagan and Agjabadi located in the Mil-Karabakh massif, was studied and classification schemes were developed during the geobotanical research. 1 tp, 10 formation classes, 10 formation groups and 16 associations were identified during the phytocenological study of vegetative groups and measures for their effective use were proposed. Conducting geobotanical research in the Mil-Karabakh massif is relevant in terms of the efficient use of summer and winter pastures, hayfields, prevention of desertification, etc. in the Republic of Azerbaijan.

Keywords: *phytocenosis; formation; association; dominant; subdominant*

1. Introduction

Geobotanical studies were conducted in the Karabakh economic region, established in accordance with the Decree by President Ilham Aliyev dated July 7, 2021 on the new division of economic regions in the Republic of Azerbaijan, as well as in selected exemplary “research objects” in the winter pasture areas of Beylagan and Agjabadi districts [2]. Geobotanical research is of great ecological and economic importance for the environmental protection and solving the problem of effective and rational use of vegetation cover in the studied winter pasture.

The species composition and structure of phytocenosis found in the leguminous valley meadow vegetation within the administrative districts of Beylagan and Agjabadi located in the Mil-Karabakh massif were studied during the research. Legumes are plants of particular importance in improvement of the natural fodder crop lands of the Republic of Azerbaijan [14, 15, 16, 31]. So, according to geobotanical studies, it is possible to enrich the herbaceous cover of the studied areas through legumes with high fodder value. In this regard, in accordance with the implementation of the Law “On State land cadastre, land monitoring and land management” [1], as well as the Presidential Decree “On the implementation of the State program on the effective use of summer and winter pastures, hayfields and prevention of desertification in the Republic of Azerbaijan” dated May 22, 2004, it is relevant to conduct geobotanical research in the Mil-Karabakh massif.

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2. Materials and methods

The object of the research was the study of phytocenosis, consisting mainly of legumes in the valley meadow vegetation widespread in winter pastures within Beylagan and Agjabadi administrative districts located in the Mil-Karabakh massif.

The valley meadow vegetation in the abovementioned districts is richer in species composition than deserts and semi-deserts. So, perennial mesophytes have an advantage due to their abundance in valley meadow phytocenosis.

According to A.P.Shennikov [31], meadow vegetation is characterized by the predominance of mesomorphic perennial herbs in its species composition. Information on conducting research on the widespread valley meadow vegetation in Azerbaijan is given in the maps and works compiled by L.I.Prilipko [24], V.J.Hajiyev [20], Abbasov N.K. [4], V.V.Hatamov [8], S.J.Ibadullayeva [9, 30], E.M.Gurbanov, M.T.Jabbarov [11, 15, 16], A.Sh.Ibrahimov [22], A.E.Ganbarli [10], H.E. Behbudov [5], Ganbarov D.Sh. [29], Z.J.Mammadova [14] and other botanists [6, 12, 31]. Some phytocenosis formed by legumes in the meadows used under natural pastures and hayfields in Azerbaijan have been partially studied by the abovementioned research botanists and others.

In total, 10 formation classes, 10 formation groups and 16 associations were classified according to edificator of legumes in the valley meadow vegetation in the winter pastures of Beylagan and Agjabadi districts studied by us. The geobotanical or phytocenological characteristics of the valley meadow vegetation are explained in accordance with the classification scheme. The classified types, formation classes, groups and associations are explained in the classification scheme No. 1.

Field research and geobotanical studies show that the diversity of soil conditions in the winter pasture areas of Beylagan and Agjabadi districts located in the Mil-Qarabagh massif, influenced the species composition and structure of natural vegetation. The species of vegetation cover, main research “objects” here, are observed in gray-meadow, meadow-gray and meadow-swamp soils, herbarium gathered during the geobotanical prospecting conducted in the spring and autumn of 2021 were determined. The gathered herbarium were assigned to systematic taxa [26, 27, 32] and the names of taxa were given based on the APG IV [33] and IPNI electronic databases [34, 35] in the systematization of plant names and the “Endemic flora of Azerbaijan” [15, 16, 20], “Plant world of Azerbaijan” [7] and the “Red Book” [3] of Azerbaijan were mainly used in the study of rare and endangered plants.

Geobotanical taxa, including formations and associations are named on the basis of genera and species. A biomorphological and ecological analysis of the species was also carried out by showing the species composition and phytocenological structure (abundance, stages or stratification) of the formation groups typical of the valley meadow vegetation, as well as the phenological phases [13,21, 25].

3. Results and discussion

A modern classification of the leguminous valley meadow vegetation in the winter pastures of Beylagan and Agjabadi districts of the Mil-Karabakh massif in the territory of the Karabakh economic region was developed during the research. So, while studying the leguminous plants common in various valley meadow vegetation, the shrubby-semi-shrubby-leguminous, small shrubby-leguminous, shrubby-perennial herbaceous-leguminous, various herbaceous-perennial herbaceous-leguminous, various herbaceous-leguminous-cereal herbs, pure leguminous, perennial herbaceous-leguminous, salsola-leguminous-various herbs, leguminous-cereal herbs and cereal herbaceous-leguminous valley meadow formation classes, including formation groups and associations were determined in the conducted geobotanical and phytocenological studies (Classification scheme 1).

It should also be stated that *Alhagi pseudoalhagi* (Bieb.) Fissch, a legume found in winter pastures (based on the range of valley meadow vegetation) of both administrative regions where the study was conducted, and also observed as dominant and subdominant in large areas can be considered a “cosmopolitan” plant.

It was determined that 10 formation classes found in the valley meadow vegetation of both administrative regions are concentrated in the formation groups and associations. They are following:

1. Formation class - Shrubby-semi-shrubby-leguminous

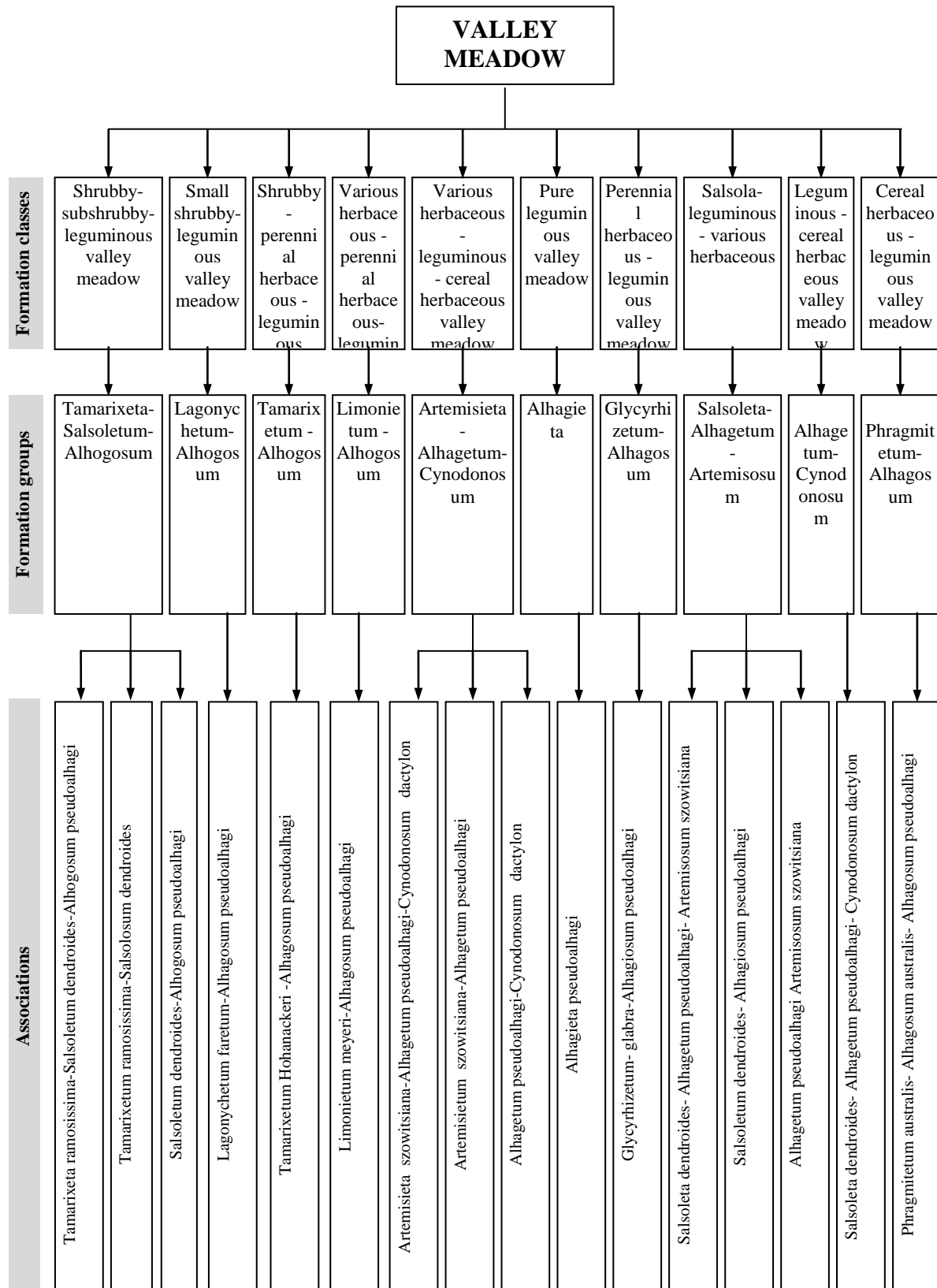
A. Formation group - Tamarixeta-Salsoletum-Alhogosum;

A-1-a) Association - Tamarixeta ramosissima-Salsoletum dendroides-Alhogosum pseudoalhagi;

A-1-b) Association - Tamarixetum ramosissima-Salsolosum dendroides;

- A-1-c) Association - Salsoletum dendroides-Alhagosum pseudoalhagi;
2. Formation class - Small shrub-leguminous
 B. Formation group - Lagonychetum-Alhagosum;
 B-1-a) Association - Lagonychetum faretum-Alhagosum pseudoalhagi;
3. Formation class - Shrub-perennial herbaceous-leguminous
 C. Formation group - Tamarixetum -Alhagosum;
 C-1-a) Association - Tamarixetum Hohanackeri-Alhagosum pseudoalhagi;
4. Formation class - various herbaceous-perennial herbaceous-leguminous
 D. Formation group - Limonietum-Alhagosum;
 D-1-a) Association - Limonietum meyeri-Alhagosum pseudoalhagi;
5. Formation class - various herbaceous-leguminous-cereal herbs
 E. Formation group - Artemisieta – Alhagetum-Cynodonosum;
 E-1-a) Association - Artemisieta szowitsiana-Alhagetum pseudoalhagi-Cynodonosum dactylon;
 E-1-b) Association - Artemisietum szowitsiana-Alhagetum pseudoalhagi;
 E-1-c) Association - Alhagetum pseudoalhagi-Cynodonosum dactylon;
6. Formation class - Pure leguminous
 F. Formation group - Alhagieta;
 F. -1-a) Association - Alhagieta pseudoalhagi;
7. Formation class - Perennial herbaceous – leguminous
 G. Formation group - Glycyrhizetum-Alhagosum;
 G. -1-a) Association- Glycyrhizetum- glabra-Alhagiosum pseudoalhagi;
8. Formation class - salsola-leguminous-various herbaceous
 H. Formation group - Salsoleta-Alhagetum-Artemisosum;
 H. -1-a) Association - Salsoleta dendroides - Alhagetum pseudoalhagi - Artemisosum szowitsiana;
 H. -1-b) Association - Salsoletum dendroides - Alhagiosum pseudoalhagi;
 H. -1-c) Association - Alhagetum pseudoalhagi Artemisosum szowitsiana;
9. Formation class - leguminous-cereal herbs
 I. Formation group - Alhagetum-Cynodonosum;
 I. -1-a) Association - Salsoleta dendroides- Alhagetum pseudoalhagi- Cynodonosum dactylon;
10. Formation class - cereal herbaceous-leguminous
 J. Formation group - Phragmitetum-Alhagosum;
 J. -1-a) Association - Phragmitetum australis- Alhagosum australis- Alhagosum pseudoalhagi;

Classification scheme 1 Modern classification scheme of leguminous valley meadow vegetation in the Beylagan and Agjabadi districts of the Mil-Karabakh massif



The total area of winter pastures in the districts is 8478.0 hectares, and the area of the tamarisk-salsola-alghi formation found here is 294.0 hectares (Table 1).

It should also be stated that the total area of winter pastures attached to Yevlakh, Ter-Ter, Barda, Agdam, Beylagan, Agjabadi and Imishli (Mil plain) districts in the Mil-Mugan massif is 254.2 thousand hectares.

Table 1 Areas of formations observed in the vegetation cover of winter pastures in Beylagan district

No.	Vegetation type and formations	Pasture type	Area	
			ha	%
I Valley-Meadow vegetation				
1	Tamarixeta-Salsoletum-Alhagosum	With shrub	294,0	3,47
2	Salsoleta-Alhagetum-Artemisiosum	Pure	167,0	1,97
3	Artemiseta- Alhagetum- Cynodonosum	-	121,0	1,43
4	Phragmitetum-Alhagosum	-	81,0	0,96
	Explored field	-	663,0	7,82
	Unexplored field	-	7815,0	92,18
	Total area	-	8478,0	100,0

The areas of the plant formations shown in the table are based on the land management plans of the Beylagan district (scale 1:50,000) [6]. The dominant species of the formation was *Alhagi pseudoalhagi* with an abundance of 3-4 points, the subdominants *Salsola dendroides* with an abundance of 2-3 points and *Tamarix ramosissima*, abundance of which was also assessed as 2 points.

A. Tamarixeta-Salsolum-Alhogosum formation group

The vegetation cover of the Tamarixeta-Salsoletum-Alhagosum formation of the valley meadow vegetation type was observed on saline gray-meadow soils in winter pasture area No. 86 of the Beylagan district on May 10, 2021 (Geobotanical description 1).

It was found during the study that the Tamarixeta-Salsoletum-Alhagosum formation consists of three associations ((Tamarixeta ramosissima-Salsoletum dendroides-Alhogosum pseudoalhagi); (Tamarixetum ramosissima-Salsolosum dendroides); (Salsolosum dendroides-Alhogosum pseudoalhagi)) (Classification scheme 1).

Geobotanical description 1. Species composition and structure of the Tamarixeta-Salsoletum-Alhagosum formation

No.	Name of biomorphic species	Ecological groups	Abundance (in points)	Average height (in cm)	Phenological phases
1	2	3	4	5	6
<i>Shrubs</i>					
1.	<i>Tamarix ramosissima</i> Ledeb.	Mesoxerophyte	2	I (250)	flow.
2.	<i>Rubus anatolicus</i> (Foske.) Foske ex Hausskn.	Xerophyte	1-2	I (120)	flow.
3.	<i>Lycium ruthenicum</i> Muzz.	Xerophyte	1	II (90)	Veg.
4.	<i>Suaeda dendroides</i> (C.A.Mey) Moq.	halophyte	1	II (80)	Veg.
<i>Subshrubs</i>					
5.	<i>Salsola dendroides</i> Pall.	Mesoxerophyte	2-3	II (75)	Veg.
<i>Small shrubs</i>					
6.	<i>Suaeda microphylla</i> Pall.	Xerophyte	1-2	II (60)	Veg.
<i>Small subshrubs</i>					
7.	<i>Artemisia szowitsiana</i> (Bess).	Mesophyte	1-2	II (55)	Veg.

	Grossh.				
8.	<i>Capparis herbacea</i> Willd.	Xerophyte	1	III (30)	flow.
<i>Perennial herbs</i>					
9.	<i>Alhagi pseudoalhagi</i> (Bieb.) Fissch.	Mesophyte	3-4	II (40)	Veg.
10.	<i>Medicago caucasica</i> Vass.	Mesophyte	1-2	II (35)	flow.
11.	<i>Cynanchum acutum</i> L. (Bess.) Grossh.	Mesophyte	1-2	III (25)	Veg.
12.	<i>Cynadon dactylon</i> (L.) Pers.	Mesophyte	1-2	III (20)	flow.
13.	<i>Aeluropus reflex-aristata</i> (Nevski.) Nevski.)	Xerophyte	1-2	III (15)	flow.
14.	<i>Glycyrrhiza glabra</i> L.	Mesophyte	1	II (65)	flow.
15.	<i>Euphorbia boissieriana</i> Woronow.Prokh.	Mesophyte	1	II (45)	flow.
16.	<i>Limonium meyeri</i> (Boiss.) O.Kuntze	halophyte	1	II (40)	Veg.
17.	<i>Tragopogon graminifolius</i> DC.	Xerophyte	1	II (35)	flow.
<i>Annual herbs</i>					
18.	<i>Hordeum leporinum</i> Link.	Xerophyte	1-2	III (30)	flow.
19.	<i>Lolium rigidum</i> Gaudin.	Xerophyte	1-2	III (25)	flow.
20.	<i>Galium spurium</i> L.	Mesoxerophyte	1-2	III (20)	flow.
21.	<i>Chenopodium album</i> L.	Mesophyte	1-2	III (15)	Veg.
22.	<i>Psylliostachys spicata</i> (Willd.) Nevski.	halophyte	1	III (30)	Veg.
23.	<i>Erodium cicutarium</i> (L.) L Her.	Xerophyte	1	III (25)	flow.
24.	<i>Lepidium rudemale</i> L.	Mesoxerophyte	1	III (10)	flow.
The total project cover is 40-70%.					

The species composition of the phytocenosis here consisted of 24 species of higher flowering plants, of which 4 species (16.6%), shrubs 1 species (4.2%), subshrubs 1 species (4.2%), small shrubs 2 species (8.3%), small subshrubs 9 species (37.5%), perennial and annual herbs 7 species (29.2%). The analysis by ecological groups revealed that of the same number of plants, 9 species (37.5%) belong to xerophytes, 3 species (12.5%) to halophytes, 4 species (16.7%) to mesoxerophytes, and 8 species (33.3%) to mesophytes. The analysis according to ecological groups revealed that 9 species (37.5%) of the same number of plants belong to xerophytes, 3 species (12.5%) to halophytes, 4 species (16.7%) to mesoxerophytes and 8 species (33.3%) to mesophytes.

According to the structure of the phytocenosis, *Tamarix ramosissima*, *Rubus anatolicus* are found in the I stage, *Lycium ruthenicum*, *Suaeda dendroides*, *Salsola dendroides*, *Alhagi pseudoalhagi*, etc. in the II stage, as well as *Cynadon dactylon*, *Aeluropus reflex-arista* in the lower III stage of the herbaceous cover, *Hordeum leporinum*, etc. in the annual herbs.

It should also be stated that the average height in the I stage of this phytocenosis is 120-250 cm, the the average height is 40-80 cm in the II stage and the average height is 10-30 cm in the III stage. *Artemisia szowitsiana* (Bess.) Grossh., which is found in the species composition of the formation, can develop better in the study area due to favorable humid conditions.

B. Lagonychetum-Alhogosum formation group

When studying the Lagonychetum-Alhogosum formation found in the valley meadow vegetation type, it was found that the formation is represented by only one association Lagonychetum farctum-Alhogosum pseudoalhagi. The vegetation cover of the formation was observed on gray-meadow soils in the winter pasture area No. 39 in the Agjabadi district on May 20, 2021 (Geobotanical description 2).

Geobotanical description 2. Species composition and structure of the Lagonychetum-Alhogosum formation

No.	Name of biomorphic species	Ecological groups	Abundance (in points)	Average height (in cm)	Phenological phases
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1	2	3	4	5	6
<i>Shrubs</i>					
1.	<i>Lagonychium farctum</i> (Banks et Soland.)Bobr.	xerophyte	2	II (60)	flow.
2.	<i>Suaeda dendroides</i> (C.A.Mey)Moq.	halophyte	1-2	II (80)	Veg.
<i>Subshrubs</i>					
3.	<i>Salsola dendroides</i> Pall.	mesoxerophyte	1-2	II (90)	Veg.
<i>Perennial herbs</i>					
4.	<i>Alhagi pseudoalhagi</i> (Bieb.) Fissch.	mesophyte	3-4	II (40)	Veg.
5.	<i>Limonium meyeri</i> (Boiss.) O.Kuntze.	halophyte	1-2	II (35)	flow.
6.	<i>Artemisia lerchiana</i> Web.	xerophyte	1-2	III (25)	Veg.
7.	<i>Euphorbia tetradena</i> Haub. Et Spach	mesoxerophyte	1	II (55)	flow.
8.	<i>Aeluropus littoralis</i> (Gavan.) Parl.	halophyte	1	III (20)	flow.
<i>Biennial herbs</i>					
9.	<i>Cirsium vulgare</i> (Savi.) Ten.	mesophyte	1-2	II (65)	flow.
<i>Annual herbs</i>					
10.	<i>Bromus japonicus</i> Thunb.	xerophyte	1-2	III (30)	flow.
11.	<i>Anisantha rubens</i> (L.) Nevski.	xerophyte	1-2	III (25)	flow.
12.	<i>Eremopyrum orientale</i> (L.) Laub. et Spach.	halophyte	1-2	III (15)	flow.
13.	<i>Carduus cinerea</i> Bieb.	mesoxerophyte	1-2	III (10)	flow.
14.	<i>Carthamus lanatus</i> L.	mesophyte	1-2	III (5)	flow.
15.	<i>Lolium rigidum</i> Gaudin.	xerophyte	1	III (30)	flow.
16.	<i>Chenopodium urbicum</i> L.	mesophyte	1	III (25)	flow.
17.	<i>Psylliostachys spicata</i> (Willd.) Nevski.	halophyte	1	III (20)	flow.
18.	<i>Xanthium strumarium</i> L.	xerophyte	1	III (15)	veg.
19.	<i>Petrosimonia brachiata</i> (Pall.) Bunge.	halophyte	1	III (10)	veg.
The total project cover is 30-70%.					

The species composition of this phytocenosis consisted of 19 species of higher flowering plants, of which 2 species (10.5%) are shrubs, 1 species (5.3%) are subshrubs, 5 species (26.3%) are perennials, 1 species (5.3%) are biennials and 10 species (52.6%) are annuals. The analysis conducted according to ecological groups revealed that 6 species (31.6%) of the same amount of plants belong to xerophytes, 6 species (31.6%) to halophytes, 3 species (15.8%) to mesoxerophytes and 4 species (21.0%) to mesophytes.

So, xerophytes and halophytes were observed more often in phytocenosis in the studied area, which indicates desertification of the area.

Alhagi pseudoalhagi (Bieb.) Fisch., the dominant species of the formation, has an abundance of 3-4 points, and *Lagonychium farctum* (Banks et Soland.) Bobr., the subdominants, have an abundance of 2 points.

The vegetation cover has two stage based on its structure. *Salsola dendroides*, *Suaeda dendroides*, *Lagonychium farctum* (Banks et Soland.) Bobr. etc. are found in the II stage of the phytocenosis, annual herbs *Bromus japonicus* Thunb., *Eremopyrum orientale* (L.) Laub. et Spach., *Lolium rigidum* Gaudin. etc. are found in the III (lower) stage. The average height of the herbaceous cover of the phytocenosis reaches 10-3 cm. The total project cover is 30-70%.

C. Tamarixetum-Alhagosum formation group

It was revealed during the study that the Tamarixetum-Alhagosum formation is represented by one association – Tamarixetum Hohanackeri-Alhagosum pseudoalhagi. The vegetation cover of this association is widespread in the winter pasture area on the border of the pastures around the village of "Najafgulubeyli" in the Tugay forest on the banks of the Kura River in the Agjabadi district (Geobotanical description 3).

Geobotanical description 3. Species composition and structure of the Tamarixetum-Alhagosum formation

No.	Name of biomorphic species	Ecological groups	Abundance (in points)	Average height (in cm)	Phenological phases
1	2	3	4	5	6
<i>Shrubs</i>					
1.	<i>Tamarix Hohanackeri</i> Bunge.	mesoxerophyte	2-3	I (150)	flow.
2.	<i>Lycium ruthenicum</i> Murr.	xerophyte	1	II (90)	Veg.
<i>Subshrubs</i>					
3.	<i>Salsola dendroides</i> Pall.	mesoxerophyte	1-2	II (60)	Veg.
<i>Small subshrubs</i>					
4.	<i>Artemisia szowitsiana</i> (Bess.) Grossh.	mesophyte	1	II (50)	Veg.
<i>Perennial herbs</i>					
5.	<i>Alhagi pseudoalhagi</i> (Bieb.) Fissch.	mesophyte	3-4	III (30)	Veg.
6.	<i>Cynadon dactylon</i> (L.) Pers.	mesophyte	1-2	III (15)	flow.
7.	<i>Glycyrrhiza glabra</i> L.	mesophyte	1	II (75)	flow.
8.	<i>Plantago lanceolata</i> L.	mesophyte	1	II (35)	flow.
9.	<i>Cichorium intybus</i> L.	mesoxerophyte	1	III (25)	flow.
10.	<i>Tragopogon graminifolius</i> DC.	xerophyte	1	III (20)	flow.
11.	<i>Centaurea transcaucasica</i> Sosn. ex Grossh.	mesophyte	1	III (15)	flow.
<i>Biennial herbs</i>					
12.	<i>Carduus seminudus</i> Bieb.	mesoxerophyte	1-2	III (30)	flow.
<i>Annual herbs</i>					
13.	<i>Avena eriantha</i> Durieu.	xerophyte	1-2	III (25)	flow.
14.	<i>Bromus japonicus</i> Thunb.	xerophyte	1-2	III (20)	flow.
15.	<i>Eremopyrum triticum</i> (Gaertn.) Nevski.	xerophyte	1-2	III (10)	flow.
16.	<i>Lolium rigidum</i> Guidin.	xerophyte	1	II (35)	flow.
17.	<i>Filago pyramidata</i> L.	xerophyte	1	III (25)	flow.
18.	<i>Hordeum leporinum</i> Link.	xerophyte	1	III (15)	flow.
19.	<i>Xanthium strumarium</i> L.	mesoxerophyte	1	III (10)	flow.
20.	<i>Erodium cicutarium</i> (L.) L Her.	xerophyte	1	III (5)	flow.
The total project cover is 40-80%.					

The species composition of the phytocenosis consisted of 20 species of higher flowering plants, of which 2 species (10%) are shrubs, 1 species (5%) are subshrubs, 1 species (5%) are small subshrubs, 7 species (35%) are perennials, 1 species (5%) are biennials and 8 species (40%) are annuals. The analysis conducted according to ecological groups revealed that 9 species (45%) of the same amount of plants belong to xerophytes, 5 species (25%) to mesoxerophytes, and 6 species (30%) to mesophytes.

So, xerophytes and halophytes observed in phytocenosis in the studied area were more common, which indicates desertification of the area.

The dominant species of the formation, *Alhagi pseudoalhagi*, was assessed 3-4 points, and the subdominant, *Tamarix Hohanackeri*, was assessed 2-3 points.

According to its structure, the I stage of the phytocenosis is dominated by shrubs such as *Tamarix Hohanackeri*, the II stage by *Lycium ruthenicum*, *Artemisia szowitsiana*, *Glycyrrhiza glabra*, and the III stage by *Alhagi pseudoalhagi*, *Carduus seminudus*, *Bromus japonicus*, etc. So, the average height in the I stage reaches 150 cm, the average height reaches 35-60 cm in the II stage, and the average height reaches 15-25 cm in the III stage. The total project cover is 40-80%.

D. Limonietum-Alhagosum formation group

It became clear during the study that the vegetation cover of the Limonietum-Alhogosum formation in the valley meadow vegetation type was represented by the association Limonietum meyeri-Alhogosum pseudoalhagi. The vegetation cover of the formation was observed with the dominance of *Alhagi pseudoalhagi* on saline heavy-clay gray-meadow soils in the winter pasture area No. 2 of the Agjabadi district on October 15, 2021 (Geobotanical description 4).

Geobotanical description 4. Species composition and structure of the Limonietum-Alhogosum formation

No.	Name of biomorphic species	Ecological groups	Abundance (in points)	Average height (in cm)	Phenological phases
1	2	3	4	5	6
<i>Shrubs</i>					
1.	<i>Suaeda dendroides</i> (C.A.Mey) Moq.	halophyte	1-2	I (80)	flow.
2.	<i>Lycium ruthenicum</i> Murr.	xerophyte	1	II (50)	Veg.
<i>Subshrubs</i>					
3.	<i>Salsola dendroides</i> Pall.	mesoxerophyte	1-2	II (80)	flow.
<i>Small shrubs</i>					
4.	<i>Capparis herbacea</i> Willd.	mesophyte	1-2	II (50)	Veg.
<i>Perennial herbs</i>					
5.	<i>Alhagi pseudoalhagi</i> (Bieb.) Fissch.	mesophyte	3-4	III (60)	legu.ripe
6.	<i>Limonium meyeri</i> (Boiss.) O.Kuntze.	halophyte	2	II (40)	flow.
7.	<i>Artemisia lerchiana</i> Web.	xerophyte	1-2	II (45)	flow.
<i>Biennial herbs</i>					
8.	<i>Centaurea avenaria</i> Bieb.	xerophyte	1-2	II (25)	veg.
<i>Annual herbs</i>					
9.	<i>Petrosimonia brachiata</i> (Pall.) Bunge.	halophyte	1-2	III (20)	flow.
10.	<i>Psylliostachys spicata</i> (Willd.) Nevski.	halophyte	1	II (35)	flow.
11.	<i>Climoceptera crassa</i> (Bieb.) Botsch.	halophyte	1	III (30)	flow.
12.	<i>Xanthium strumarium</i> L.	mesoxerophyte	1	III (20)	veg.
13.	<i>Lolium rigidum</i> Guidin.	xerophyte	1	II (15)	veg.
14.	<i>Hordeum leporinum</i> Link.	xerophyte	1	III (10)	veg.
15.	<i>Bromus japonicus</i> Thunb.	xerophyte	1	III (5)	veg.
The total project cover is 40-80%.					

As can be seen from geobotanical description No. 4, the species composition of the phytocenosis consists of 15 species of higher flowering plants, of which 2 species (13.3%) are shrubs, 1 species (6.7%) are subshrubs, 1 species (6.7%) are small subshrubs, 4 species (26.7%) are perennials and 7 species (46.6%) are annual herbs. The analysis conducted according to ecological groups revealed that 8 species (53.3%) of the same amount of plants belong to xerophytes, 5 species (33.3%) to halophytes, 1 species (6.7%) to mesophytes and 1 species (6.7%) to mesoxerophytes.

So, xerophytes and halophytes observed in phytocenoses in the studied area were more common, which indicates desertification of the area.

The dominant species of the formation is *Alhagi pseudoalhagi* with an abundance of 3-4 points, and the subdominant *Limonium meyeri* with an abundance of 2 points.

The phytocenosis has two stages according to its structure. So, *Salsola dendroides*, *Alhagi pseudoalhagi*, *Artemisia lerchiana*, etc. are observed in the II stage of the phytocenosis, and *Capparis herbacea*, *Petrosimonia brachiata*, etc. are observed in the III (lower) stage. The average height of the herbaceous cover reaches 20-45 cm. The total project cover is 30-70%.

E. Artemisieta-Alhagetum-Cynodonosum formation group

It became clear during the study that the Artemisieta-Alhagetum-Cynodonosum formation in the valley meadow vegetation type is represented by 3 associations: Artemisieta szowitsiana-Alhagetum pseudoalhagi-Cynodonosum dactylon, Artemisietum szowitsiana-Alhagetum pseudoalhagi and Alhagetum pseudoalhagi-Cynodonosum dactylon.

The vegetation cover of this formation was observed with the dominance of *Alhagi pseudoalhagi* on gray-meadow soils in the winter pasture area No. 1 with 121.0 hectare of the Beylagan district on October 20, 2021 (Geobotanical description 5).

Geobotanical description 5. Species composition and structure of the Artemisieta-Alhagetum-Cynodonosum formation

No.	Name of biomorphic species	Ecological groups	Abundance (in points)	Average height (in cm)	Phenological phases
1	2	3	4	5	6
<i>Shrubs</i>					
1.	<i>Tamarix ramosissima</i> Ledeb.	Mesoxerophyte	1-2	I (150)	flow.
<i>Subshrubs</i>					
2.	<i>Salsola dendroides</i> Pall.	Mesoxerophyte	1	II (70)	flow.
<i>Small shrubs</i>					
3.	<i>Suaeda microphylla</i> Pall.	xerophyte	1-2	I (65)	flow.
<i>Small subshrubs</i>					
4.	<i>Artemisia szowitsiana</i> (Bess.) Grossh.	Mesophyte	2	II (55)	flow.
<i>Perennial herbs</i>					
5.	<i>Cynodon dactylon</i> (L.) Pers.	Mesophyte	3-4	III (25)	veg.
6.	<i>Alhagi pseudoalhagi</i> (Bieb.) Fissch.	Mesophyte	2-3	II (30)	veg. legu.ripe
7.	<i>Elytrigia elangatiformis</i> (Drob.) Nevski.	xerophyte	1-2	II (60)	veg.
8.	<i>Limonium meyeri</i> (Boiss.) O.Kuntze.	halophyte	1-2	II (50)	flow.
9.	<i>Aeluropus littoralis</i> (Gavan.) Parl.	halophyte	1-2	III (20)	flow.
<i>Annual herbs</i>					
10.	<i>Lolium rigidum</i> Guidin.	xerophyte	1-2	III (30)	veg.
11.	<i>Hordeum leporinum</i> Link.	xerophyte	1-2	III (20)	veg.
12.	<i>Erodium cicutarium</i> (L.) L Her.	xerophyte	1-2	III (15)	veg.
13.	<i>Carthamus lanatus</i> L.	Mesophyte	1-2	III (10)	veg.
14.	<i>Xanthium strumarium</i> L.	Mesophyte	1	II (40)	veg.
15.	<i>Aegilops cylindrica</i> Host.	Mesoxerophyte	1-2	III (35)	veg.
16.	<i>Galium palustre</i> L.	Mesophyte	1	III (20)	veg.
The total project cover is 40-80%.					

As can be seen from the recorded geobotanical description No. 5, the species composition of the phytocenosis consisted of 16 species of higher flowering plants, each shrub, subshrub, small shrub and small subshrub of which were represented by 1 species (25.0%), perennials by 5 species (31.3%) and annual herbs by 7 species (43.7%). The analysis according to ecological groups revealed that 5 species (31.2%) of the same amount of plants belong to xerophytes, 2 species (12.5%) to halophytes, 6 species (37.5%) to mesophytes and 3 species (18.8%) to mesoxerophytes.

The dominant species of the formation is *Cynodon dactylon* with an abundance of 3-4 points, the subdominant *Alhagi pseudoalhagi* with an abundance of 2-3 points and *Artemisia szowitsiana* with an abundance of 2 points.

According to the phytocenosis structure, *Tamarix ramosissima* bush is found in the I stage, *Salsola dendroides*, *Suaeda microphylla*, *Elytrigia elangatifomis*, etc. in the II stage and *Alhagi pseudoalhagi*, *Cynodon dactylon*, *Lolium rigidum*, etc. annual herbs are found in the III (lower) stage. The average height of the herbaceous cover reaches 150 cm in the I stage, 70 cm in the II stage and 10-30 cm in the III stage. The total project coverage is 40-60%.

4. Conclusion

The conducted research allow us to conclude that the composition of the leguminous valley meadow vegetation in the winter pastures of Beylagan and Agjabadi districts of the Mil-Karabakh massif has a rich fodder value, where mainly sod-forming cereals, especially representatives of legumes and various herbs are found. So, despite the fact that the phytocenoses found in various lagunmes valley meadow within the territory of Azerbaijan are formed in different reliefs, they can be used as winter pastures at a high level due to the valuable fodder plants contained in them. However, as a result of the long-term use of meadows by humans, i.e. the grazing of livestock, the current situation is far from satisfactory. We should also state that one of the crucial problems in increasing livestock production is strengthening the feed base and, especially improving natural fodder areas in our republic, where nomadic cattle breeding is developed.

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