International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 04-08-2021, Accepted: 18-08-2021, Published: 10-09-2021
Volume 6, Issue 5, 2021, Page No. 27-30

Introzonalıty of *Glycyrryza glabra* L. specıes ın wet-meadow plantatıon

Sona Ibrahimli[1], Tubukhanim Gasimzade[2], Zulfiyya Mammadova[3], Sayyara Ibadullayeva[4*]
[1] Department of Biology, Azerbaijan State Agrarian University, Ganja, Azerbaijan
[2] Botanical Garden of ANAS, Baku, Azerbaijan
[3] Department of Biology, Baku State University, Baku, Azerbaijan
[4] Department of Ethnobotany, Institute of Botany of ANAS, Badamdar, Baku, Azerbaijan

Abstract
Introzonality of the *Glycyrrhiza glabra* L. species in the meadow vegetation of the lowlands of Azerbaijan has been discussed in the paper. The plant is a satellite of the meadows, which are constantly supplied with water, and is characteristic for all formations. 1 type, 2 formation classes, 4 formation groups, 5 association classes, 7 association groups with the abundance of *G.glabra* species were registered in the wet-meadow vegetation.
Phenological monitoring was carried out during the study using modern and classical methods. Geobotanical researches were carried out in Agdash, Goychay, Ujar, Agjabadi, Yevlakh districts, Mil Duzu (Mil plain), Jeyranchol winter pastures of Azerbaijan, in the lowlands of the relief, in the form of spots on temporarily moistened soils in meadows and alluvial meadows.
As a result, the introzonality created by xerophytic and mesophytes plants of *G.glabra* species in the pits formed in the lowlands under micro- and meso-relief conditions created by collecting water was determined.

Keywords: meadow vegetation, introzonality, formation, *Glycyrrhiza glabra*

Introduction
Fabaceae Lindl is one of the most abundant herbaceous plants in Azerbaijan flora among the colorful vegetation covered in Azerbaijan depending on the type of soil. The most valuable and useful representatives of the tree, shrub and grass species are used in medicine, in various fields of industry, people and agriculture, in the enrichment of soil with nitrogen, in the planting of greenery, etc. is of great importance. The distribution of 460 species belonging to 70 genus of the *Fabaceae* family in the flora of Azerbaijan has been determined, from which 13 species belong to the *Caesalpinioideae* subfamily, 7 species belong to the *Mimosoideae* subfamily, and 440 species belong to the *Faboideae* subfamily [Mammadova, 2014] [7]. First of all these plants are a healthy life for humans and a strong source of food. Among them, the *Glycyrrhiza* L. genus is one of the most important resources due to its special medicinal value [Ibadullayeva *et al*., 2013] [6].
Leguminous plants of various formations, including associations consisting mainly of legumes have a high forage value in the phytocenoses and play an important role in the development of livestock, hayfields and pastures. Legumes, along with other plants in phytocenoses have a high impact on forage productivity in agriculture. As it is known, soil and vegetation are degraded due to strong anthropogenic and man-made influences. Carrying out ecological-phytocenological researches in the relevant phytocenoses is widely given in the world of science [Hajiyev *et al*., 1996; Qurbanov *et al*., 2015, Gasimzade, 2015] [1, 3].
The study of legumes, which are second only after cereals in terms of food and fodder is important in ensuring food security in the country. They are improving the fodder base in summer and winter pastures and developing beekeeping because they are beekeeping plants [Hatamaov, 2000]. At the same time, legumes are drought-resistant, and have special importance in the restoration of fodder resources in desert areas, crop rotation systems, soil nitrogen enrichment, anti-erosion, livestock, industrial development, greenery, as well as scientific medicine. With this in mind, we set a goal to study the bioecological and phytocenological features of the *Glycyrrhiza glabra* species, which are considered to be satellites of meadow vegetation.

Materials and Methodology
The research was carried out in 2021 in the lowlands of Azerbaijan (Agdash, Goychay, Ujar, Agjabadi, Yevlakh, Kurdamir, Mil plain, Shirvan plain, Jeyranchol, etc.). Classical and modern methods were used in the study of meadows where *Glycyrrhiza glabra* is widespread [Methodical recommendations for geobotanical, 1974; Capten, 1983; Goryaev, 2019] [9, 5], phenological observations were made [Rabotnov, 1950] [10]. A number of scientific and methodological literature, materials of the Herbarium of the Institute of Botany of ANAS and the Herbarium of the Azerbaijan State Agrarian University were used to determine the collected plants. Bioecological features of plants were studied [Serebryakov, 1964] [11]. Geobotanical methods were used to determine associations and formations [Shennikov, 1964] [12].

Results and Discussion
Meadow vegetation in wet-meadows is formed with special features. Meadow type cenoses with especially distribution in mix form of mesophyte and xerophytes plants in micro- and meso- relief conditions form under water accumulates.

In this regard, it should be noted that in the studied areas mainly in the lowlands of the relief in the territory of Tugay forests along the Kura River, in the temporarily moistened soils, in the form of spots, meadows and alluvial meadows are found. *Glycyrrhiza glabra* forms formations in such meadow-like meadows and floodplains. Their main edificators from xerophytic elements *Cynodon dactylon*, *Alhagi pseudoalhagi*, and *Artemisia szowitziana* form mesophyte groups. The pits fill by water and the humidity increases, where mesophytic plants form an introzonal due to the proximity of groundwater to the soil surface in the localities where the *Tamarixeta-Salsoleto-Glycyrrhizetum*, *Glycyrrhizeta-Cynodonosum* and *Alhagieta-Glycyrrhizetum* formations are distributed, as well as the effects of snow and rain in winter, the pits are filled with water and the humidity increases as shown from the research carried out in Agdash, Goychay, Ujar, Agjabadi, Yevlakh, Mil plain, Jeyranchol pastures of Azerbaijan. In this regard, the classification of phytocenoses formed by *Glycyrrhiza* genus from legumes in the meadows has been studied by us on the basis of ecological-phytocenological principles and is described below. Ecological-geobotanical indicators of the phytocenoses belonging to specific relevant formation classes have been determined. Species belonging to the Legume family, which predominate in the meadow vegetation, are mainly found as edificators, sometimes as dominants, as well as subdominants is found from this classification. A detailed overview of the ecological and geobotanical parameters of phytocenoses on the classification units of steppe-meadow vegetation studied on the basis of field geobotanical researches conducted by us is given below (Table 1).

Table 1: Species composition and structure of *Glycyrrhixeta-Alhagiosa-Lagonychietum* formation

№	Name of biomorph species	Ecological groups	Abundance (by points)	Average height (in cm)	Phenological phases
Bushes					
1.	*Tamarix ramosissima* Ledeb.	mesoxerophyte	1-2	I (140)	flow.
Semi-bushes					
2.	*Salsola dendroides* Pall.	mesoxerophyte	1	II (70)	veg.
Shrubs					
3.	*Lagonychium farctum* (Banks. et Soland.) Bobr.	mesoxerophyte	3	II (50)	ripening of beans
Perennial grases					
4.	*Glycyrrhiza glabra* L.	mesophyte	4	II (70)	ripening of beans
5.	*Cynodon dactylon* (L.) Pers.	mesophyte	4	III (30)	flow.
6.	*Alhagi pseudoalhagi* (Bieb.) Fisch.	mesophyte	2-3	II (45)	veg.
7.	*Aeluropus littoralis* (Gouan) Parl.	halophyte	1-2	III (10)	veg.
8.	*Limonium meyeri* (Boiss.) O.Küntze	halophyte	1-2	II (40)	Flow
9.	*Phleum nodosum* L.	mesoxerophyte	1	II (60)	flow.
10.	*Tragopogon tuberosus* C.Koch	xerophyte	1	II (50)	flow.
Annual grases					
11.	*Hirschfeldia incana* (L.) Lagr.-Foss.	xerophyte	1-2	II (40)	flow.
12.	*Lepidium ruderale* L.	xerophyte	1-2	II (35)	flow.
13.	*Hordeum leporinum* Link	xerophyte	1	III (30)	flow.
14.	*Lolium rigidum* Gaudin	xerophyte	1	III (25)	flow.
15.	*Bromus japonicus* Thunb.	xerophyte	1	III (20)	flow.
16.	*Cichorium glandulosum* Boiss. et Huet	mesoxerophyte	1	III (20)	flow.
17.	*Xanthium strumarium* L.	mesoxerophyte	1	III (18)	flow.
18.	*Eremopyrum orientale* (L.) Jaub. et Spach	halophyte	1	III (15)	seed dropping
19.	*Petrosimonia brachiata* (Pall.) Bunge	halophyte	1	III (10)	veg.
20.	*Vicia sativa* L.	xerophyte	1	III (70)	ripening of beans
21.	*Gamanthus pilosus* (Pall.) Bunge	halophyte	1	III (5)	veg.
The total projective coverage is 70-90%.					

21 species of plants were found in the species composition of the phytocenosis. Of these, 1 species (4.8%) - bushes, 1 species (4.8%) - semi-bushes, 1 species (4.8%) shrubs, 7 species (33.3%) - perennials and 11 species (52.4%) - annual specific to grasses. 7 species (33.3%) are xerophytes, 5 species (23.8%) are halophytes, 6 species (28.6%) are mesoxerophytes and 3 species (14.3%) are mesophytes according to the analysis of ecological groups.

The abundance of the dominant *Cynodon dactylon* and *Clycyrrhiza glabra* species was estimated at 4 points in the geobotanical description, the abundance of *Alhagi pseudoalhagi* at 2-3 points and *Lagonychium farctum* at 3 points as can be seen from Table 1. *Cynodon dactylon*, which is considered an edificator of the formation. forms a projective cover of 70-80% in the topsoil. In particular, the meadow plant *Alhagi pseudoalhagi*, *Clycyrrhiza glabra* and *Tragopogon tuberosus* formed mixed cenoses as shown from Classification Scheme 1 and geobotanical descriptions. This phytocenosis has three floors according to its structure: *Tamarix ramosissima* on the first floor by height 140 cm,

Salsola dendroides semi-shrub on the second floor (grass layer), *Clycyrrhiza glabra* by height 70 cm, *Alhagi pseudoalhagi* by height 45 cm; *Lolium rigidum* and others on the third floor. The height of the grass reaches 30-5 cm. The total projective coverage varies between 70-90%.

It should be added that the reserves of *Clycyrrhiza glabra* is one of the main edificators of meadow vegetation, are declining from year to year, and therefore the natural forest of this cenosis must be preserved. In particular, *Clycyrrhiza glabra* has been offered protection because is a quality fodder and medicinal plant.

Species composition and bioecological characteristics of the *Alhagieta-Cynodonosum-Glycyrrhizetum* formation have been shown in table 2 (Table 2). This vegetation is formed on saline light gray-meadow soils. 18 species were registered in the species composition of the formation. Of these, 2 species (10.5%) are bushes, 1 species (5.3%) is semi-bushes, 1 species (5.3%) are semi-shrub, 9 species (47.4%) are perennials, 1 species (5.3%) is biennials and 5 species (26.3%) are annual grasses. 6 species (31.6%) belong to xerophytes, 2 species (10.5%) - to halophytes, 6 species (31.6%) - to mesoxerophytes and 5 species (26.3%) - to mesophytes according to the analysis of ecological groups.

Table 2: Species composition and structure of the *Alhagieta-Cynodonosum – Glycyrrhizetum* formation

№	Name of biomorph species	Ecological groups	Abundance (by points)	Average height (in cm)	Phenological phases
			Bushes		
1.	*Tamarix ramosissima* Ledeb.	Mezokserofit	1-2	I (180)	flow.
2.	*Rubus anatolicus* (Foske) Foske ex Haussikn.	Kserofit	1	I (120)	fruiting
			Semi-bushes		
3.	*Salsola dendroides* Pall.	Mezokserofit	1	II (70)	veg.
			Shrubs		
4.	*Suaeda microphylla* Pall.	Halofit	1-2	II (50)	veg.
			Perennial grases		
5.	*Alhagi pseudoalhagi* (Bieb.) Fisch.	Mezokserofit	4	II (40)	veg.
6.	*Cynodon dactylon* (L.) Pers.	Mezofit	2-3	III (30)	flow.
7.	*Glycyrrhiza glabra* L.	Mezofit	2-3	II (40)	ripening of beans
8.	*Atropis gigantea* (Grossh.) Grossh.	Mezokserofit	1-2	II (35)	veg.
9.	*Euphorbia boisseriana* (Woronow) Prokh.	Kserofit	1-2	I (100)	flow.
10.	*Limonium meyeri* (Boiss.) O.Küntze.	Halofit	1-2	II (45)	veg.-flow.
11.	*Tragopogon graminifolius* DC.	Mezokserofit	1	II (60)	flow.
12.	*Plantago lancelota* L.	Mezofit	1	II (50)	flow.- seed dropping
			Biennial grases		
13.	*Scorzonerala ciniata* L.	Kserofit	1-2	II (50)	flow.
			Annual grases		
14.	*Avena clauda* Durieu.	Kserofit	1	II (70)	flow.
15.	*Phalari saqatica* L.	Mezokserofit	1	II (45)	flow.
16.	*Filagopyr amidata* L.	Kserofit	1	III (30)	flow.
17.	*Hordeum geniculatum* All.	Kserofit	1	III (25)	flow.
18.	*Erigeron crispus* Pourr.	Mezofit	1-2	III (10)	flow.
			The total projective coverage is 70-90%.		

Cynodon dactylon, *Glycyrrhiza glabra* and *Alhagi pseudoalhagi* are the edificators and form the main cover in the phytocenosis. Abundance of the dominant *Alhagi pseudoalhagi* of the formation was 4 points, the abundance of the subdominants *Cynodon dactylon* and *Glycyrrhiza* glabra, and were estimated at 2-3 points as noted in geobotanical table 2.

Phytocenosis has 3 floors according to the structure: *Tamarix ramosissima*, *Rubus anatolicus* on the first floor, by height 180-120 cm; *Euphorbia boissieriana* by height 100 cm, and *Salsola dendroides*, *Limonium meyeri*, *Glycyrrihiza glabra* by height 70-40 cm on the second floor, *Cynodon dactylon*, *Hordeum geniculatum* and etc. by height 30-10 cm. The total projective coverage varies between 70-90%. This formation is also spread in Mil plain (Imishli district) and in Mugan massif of Saatli districts. According to the literature, *Glycyrrhiza glabra* is a perennial herb with good forage quality, and cattle eat it enough well.

The *Cynodonetum-Glycyrrhizosum* formation group consists of *Cynodonetum dactylon- Glycyrrhizosum glabra* association. The vegetation of the association is distributed in the form of spots on the territory of Agjabedi district, gray-meadow and alluvial-meadow (found in winter pastures of Yevlakh district) within the Mil plain along the Kura. This formation forms forests with appropriate legumes, especially in the depressions and hollows, as well as in the fields of Tugay forests along the Kura river. The association's dominant *Glycyrrhiza glabra* abundance was rated at 3 points, and the subdominant *Cynodon dactylon* abundance was rated at 2 points. 15-20 species of plants are described. The total projective coverage varies between 60-90%.

Limonietum-Alhagiosum-Glycyrrhizosum formation group - one of the representatives of the formation class of various legumes, includes *Limonietum-Alhagiosum* formation group and *Limonietum meyeri-Alhagiosum pseudoalhagi* association. The satellite of both associations is *Glycyrrhiza glabra* species. Dominant species of this phytocenosis is *Alhagiosum pseudoalhagi*, the subdominant is *Limonietum meyeri* have been shown geobotanical descriptions. The

abundance of *Alhagiosum pseudoalhagi* was estimated at 3-4 points and the abundance of *Limonietum meyeri* at 2-3 points. The average height of grass cover is 40-60 cm. The total projective coverage varies between 70-80%.

The main fodder plants in the species composition of the phytocenosis are *Lolium rigidum, Bromus japonicus, Salsola dendroides* and others. In addition, *Lagonychium farctum*, *Xanthium spinosum*, etc. are found in the vegetation. Weeds are also common.

Leguminous-cereals of wet-meadow formation class have presented by 2 formations (Table 3): *Alhagietum-Cynodonosum* and *Glycyrrhizetum-Cynodonosum*, as well as *Alhagietum pseudalhagi-Cynodonosum dactylon* and *Glycyrrhizetum glabra-Cynodonosum dactylon* assosiation.

Thus, 1 type, 2 formation class, 4 formation group and 5 association class, 7 association group with abundance of *Glycyrrhiza glabra* species are found in the registered meadow plant as reflected in the following classification scheme. These were:

Plant type

Wet-meadow

Formation class

Bushes-moutley grass-legume-meadows and Mixed legume-wet-cereals meadows.

Association class

Tamarixeta ramosissima-Salsoletum dendroides-Glycyrrhizetum glabra-Alhagiosum pseudalhagi; Tamarixetum hohenackeri-Glycyrrhizetum glabra-Alhagiosum persarum; Lagonychieta farctum-Glycyrrhizetum glabra-Cynodonosum dactylon; Tamarixeta ramosissima-Glycyrrhizetum glabra-Aeluropusosum repens; Glycyrrhizetum glabra-Alhagiosum pseudalhagi

Association group

Tamarixeta ramosissima- Glycyrrhizetum glabra; Alhagiosum pseudalhagi- Glycyrrhizetum glabra; Salsoletum dendroides- Glycyrrhizetum glabra; Glycyrrhizetum glabra-Alhagiosum persarum; Lagonychieta farctum-Glycyrrhizetum glabra; Cynodonosum dactylon-Glycyrrhizetum glabra; Glycyrrhizetum glabra-Aeluropusosum repens

As a result, it can be said that *Glycyrrhiza glabra* species is contained as an infrasonal plant in the study area. It is considered a satellite of the area's meadow vegetation and its roots are constantly collected and sold by the population. Although the plant feels self-healing, its range is relatively narrow. Thus, in Agdash, Ujar, Imishli, Saatli districts, there are many collection points of the species, where the harvested licorice is received and exported to the surrounding licorice plants and abroad. Therefore, there is a need to protect the plant.

References

1. Hajiyev VJ, Musayev SH. Legumes of Azerbaijan (systematics, ecology, phytogenesis, economic importance, etc.). Baku: Elm, 1996, 112.
2. Hatamov VV. Pasture ecosystems and protection of Azerbaijan. Baku, Elm, 2000, 184.
3. Gasimzade T. Flora and Vegetation of Shirvan, “Elm” Publ. house of ANAS, 2015, 510.
4. Gurbanov EM, Mammadova ZJ, Asadova KA. Modern condition of Tugay forests of Kur-Araz lowland. Innovative development of agrarian science and education: World experience and modern priorities Materials of the International scientific-practical conference is dedicated to the proclamation of 2015 as the "Year of Agriculture" in the Azerbaijan Republic of. I vol. Ganja, 2015, 222-224.
5. Goryaev IA. Patterns of distribution in the Caspian lowland (within Kalmykia) // Botanical Journal,2019:104(1):93-106 (in russian)
6. Ibadullayeva SJ, Alakbarov R. Medicinal plants (Ethnobotany and phytotherapy) medical plants // Ethnobotany and phytotherapy // Baku, 2013, 330.
7. Mammadova Z.J. Importance of phytocenoses formed by leguminous plants in the steppe meadows of Azerbaijan. Azerbaijan Agrarian Science. Scientific-theoretical journal of the Ministry of Agriculture of the Azerbaijan Republic. Baku, 2014, 40-45.
8. Kapten Yu.L. On the method of determining the projective cover in florogenetic studies. Vestn. Leningrad. University,1983:6(3):115-116.
9. Guidelines for geobotanical and cultural-technical survey of natural forage lands. M., VNIIK, 1974, 168.
10. Rabotnov TA. Life cycle of perennial herbaceous plants in meadow cenoses. Mat. of Bot. Institute of the USSR Academy of Sciences, ser. 3. Issue. 6, Geobotany. M.-L., Ed. Academy of Sciences of the USSR, 1950, 7-204.
11. Serebryakov I.G. Life forms of higher plants and their study // Field Geobotany. Moscow: Nauka,1964:3:146-202.
12. Shennikov AP. Introduction to Geobotany. L. Publishing house. Leningrad State University, 1964, 447.