

Geobotanical Description of Leguminous Plants on Dry Steppes of Steppe Plateau

Gunay Nasibova

Azerbaijan State Agrarian University, 450, Ataturk avenue, Ganja, AZ2000, Azerbaijan

ABSTRACT

Data about formations and associations of legume fodder crop group of the steppe vegetation cover of Steppe Plateau have been shown in the paper. Classification of dry steppe plants is limited by 1 type (Steppe), 2 formation classes (shrub-bean-cereal dry steppes and moutley grasses-leguminous dry steppe); 3 formations groups (Astragalum-Stiposum, Onobrychisetum-Festucosum and Artemisetum-Astragalosum), 4 association class (Astragalum mollis-Stiposum capillata; Onobrychisetum vaginalis - Festucosum ovina; Onobrychisetum iberica-Festucosum giganteum; Artemisetum fragrans-Astragalosum microcephala) and 4 association groups (Astragalus mollis+Stipa capillata+ephemeretum; Onobrychis vaginalis+ Festuca ovina +ephemeretum; Onobrychis iberica+Festuca giganteum+herbosum; Artemisia fragrans+ A. Caucasica+A.campestris+Astragalus microcephala+Trifolium striatum+Lotus tenuis). Each association contains about 30-45 plant species, in each of which the legumes play role of ecosystem engineering (or plant edificator). Classification of the leguminous group spread around dry steppe area have been compiled.

Keywords: Leguminous plants, steppe vegetation, formation, association

INTRODUCTION

More than 12 speci plants types are found in the Azerbaijan Republic [Hajiyev, 2007]. These vegetation are rich by various areal elements. The xerophile and steppe areals is widely distributed basically in the Steppe Plateau and the Kur-Araz lowland. Floristic and geobotanical studies of steppe vegetation after A.A. Grosssheim [1932] and L.I. Prilipko [1970] has been interest

area of modern scientist [Hatamov, 2000; Shukurov, 2003; Ibrahimov, 2007; Gurbanov et al., 2013; Ibadullayeva, 2013; Qasimzade, 2015]. Desert, semi-desert, mountain xerophyte-freegana, meadow and forest vegetation types are meets in the Steppe Plateau. Dry steppe vegetation formed by legumes at 500-1100 meters above sea level, in different reliefs, in light gray-brown soils as shown results of study.

According to L.I.Prilipko [1970] A.P.Sennikova under the term "steppe" implied xerophytes edipicators in steppe associations, especially grass-forming cereals and single bushes. At the same time, V.V. Hatamov [2000] shows that steppe vegetation is predominant in calcium carbonate-rich soils, where the surface and underlying parts are interconnected, heat-and-frost-resistant, xerophyte, turf-forming, and root-bearing plants.

Steppe vegetation of Azerbaijan are formed in Gobustan, Bozdag-Jeyrancol (Steppe plateau), in low and middle mountaine part of Nakhchivan AR, Talysh (Lankaran), in the lower foothill zone of the Greater and Lesser Caucasus as can be seen from "Global Geographic Information Map of Azerbaijan" [2005], "Ecological-geobotanical map of some phytocenoses fomed by legume plants in the natural vegetation of Azerbaijan" [2013].

Scientists point out that dry, grain-mountly grass, cereal and meadows steppe vegetation are spread in Azerbaijan, where this crop has been widely distributed before zonality, and now it has shrunk in the form of spots. The main reason for this is the strong effect of human activity on the

relevant plant. Over time, V. Hajiyev and S. Musaev also noted role of legume species in the analysis of the formations [1996].

Considering all of this, it is intended to study the geobotanical description of associations of legume fodder plants in the steppe vegetation of the botanical geographical area of Azerbaijan -Steppe Plateau.

MATERIALS AND METHODS

The research of the steppe vegetation type covering the Steppe Plateau of the Azerbaijani flora was carried out in 2016-2019. Classical and modern botanical, floristical, ecological, and static methods have also been used: the floristical observations by Beydeman [1954]; developmental features of ontogeny by Rabotnov [1983]; ecological analysis of plants by Shengnikov [1950]; Life forms by Serebryakov [1964]; the ecological features are based on Yaroshenko [1969]. Plant names have been given in accordance to "Flora of Caucase" [2008], note the "Azerbaijani flora" [1950-1961], and by the latest nomenclature [Askerov, 2016].

RESULTS AND DISCUSSION

The study covered the Steppe Plateau area. The plants collected during the expeditions were identified and their relationship to environmental factors was studied. Modern environmental and phytocenological classification of plant cover is given at the level of species, formations and associations. The herbaria collected before (mainly dominant, subdominant and unknown) during field studies were assigned, and all taxons were characterized by analyzing the recorded geobotanical descriptions. The gray-brown, gray, gray-chestnut soils formed in the zone of dry steppe on the Steppe plateau have been studied by steppe type legume phytocenoses. It should be noted that in the botanical - geographical areas of the Azerbaijan Republic the richest region is Steppe Plateau due to superiority of legumes phytocenosis in steppe vegetation. During

the research, the main formation class includes formation and associations are specified, summarized and described below.

Bushes-legume-cereal dry steppe formation class. These formation includes two formation classes (*Astragaletum - Stiposum* and *Onobrychisetum-Festucosum*).

Astragaletum - Stiposum formation group represented by *Astragaletum mollis-Stiposum capillata* association. Vegetation cover of *Astragaletum-Stiposum* formation by domination of *Stipa capillata* has been recorded in light gray-brown soils at 600-700m above sea level in the lowland slopes and in winter pasture areas and the composition of the association is determined. Geobotanical description of leguminous plants of the *Astragaletum - Stiposum* formation have been studied during the geobotanical research.

40-45 plant species in this phytocenosis, from which only 14 species of legumes are used for dry steppe. "Peaks" of associations can be considered from bushes - *Suaeda dendroides* (C.A.Mey.) Moq., *Rhamnus pallasii* Fisch. et C.A.Mey., semi-bushes - *Kochia prostrata*(L.) Schrad., semi-shrubs - *Thymus karjaginii* Grossh., perennial herbs - *Stipacapillata*L., *Stipaszovitsiana* (Trin.) Griseb., *Artemisia fragran* L., *Bromus squarrosus* L., *Elytrigia trichophora* (Link) Nevski, *Lolium rigidum* Gaudin., *Bothriochloa ischaemum* (L.) Keng, *Teucriumpolium* L., *Poadensa Troitzk.*, biennial herbs - *Scorzonera laciniata* L.and annual herb - *Salviaviridis* L.

According to ecological groups, 16 species (72.7%) were xerophytes, 1 species (4.5%) was halophytes, and 5 species (22.7%) were mesoxerophytes, which are important in the forming of association. The total project coverage of the association is 60-80%.

The dominant species of the legume-lichen formation is *Stipa capillata* with abundance by 3-4 ball, subdominants are *Astragalus sp.* species with abundance by 2-

3 balls as shown the geobotanical description.

The appropriate phytocenosis is 3-storey according to the structure: I floor - *Rhamnus pallasii* bushes by height 120 cm; 2nd floor - *Salsola dendroides*; on the third floor - *Stipa capillata*, *S.szoritsiana* and etc. herbs (by height 20-40 cm). The overall project cover ranges between 60-80%. It is important to add that *Collema cristatim* (L.) Web. species is rarely scattered.

Onobrychisetum-Festucosum formation group formed by two associations: (*Onobrychisetum iberica-Festucosum gigantea* and *Onobrychisetum vaginalis - Festucosum ovina*).

Formation is found in steppe vegetation, gray-brown soils (bushy pastures). Abundance of *Festuca ovina* - dominant of *Onobrychisetum vagin*s - *Festucosum ovina* association - and subdominant *Onobrychis vaginalis* species are the same - 2 balls. 30-35 plants species are present in in the plant cover. The overall project cover ranges between 60-70%. Abundance of dominant *Onobrychis iberica* of *Onobrychisetum iberica - Festucosum gigantea* association is 3 ball and subdominant *Festuca gigantea* species by 2 ball. 30-35 species of plants were found in this association. The overall project cover is between 70-90%. The main feed crops are distributed in the bushy-legume-cereal dry steppe crop vegetation, including *Astragalus mollis*, *Onobrychis vaginalis*, *O.iberica*, *Festuca ovina*, etc. legume fodder plants in winter pastures, also resistant to drought and frost. *Artemisetum - Astragalosum* formation group and *Artemisetum fragrans-Astragalosum microcephala* association are presented in the study area. It is mainly "peaks" of winter pasture. Various species of wormwoods are found in *Astragaletum* formations (*Artemisia fragrans* Willd., *A.caucasica* Willd., *A.campestris* L., *A.scoparia* Waldst. & Kit.) and Caucasian brome (*Bothriochloa bladhii* (Retz.) S.T.Blake), Japanese brome (*Bromus japonicus* Thunb.), Blue hair grass

(*Koeleria albobii* Domun.), cock's-foot (orchard grass, or cat grass) (*Dactylis glomerata* L.), foxtail grass (*Alopecurus pratensis* L.) also more distributed.

The vegetation cover of association was recorded in the foothills at 900-1000 m above sea level in mountain gray-brown soils. *Astragalus microcephala* is dominant of the formation with abundance - 3 ball, subdominant *Artemisia fragrans* - 2 ball. Bushes-legumes-cereal and moutly grass-legume formation classes are distribudet at 500 to 900 m above sea level, on low territories extends on semi-desert phytocenosis. The study concluded that the species composition and structure of both plantation types differ greatly.

Classification of dry steppe vegetation have given:

TYPE: STEPPE

FORMATION CLASS: 1. Bushes-legume-cereal dry steppe

FORMATION GROUP: *Astragaletum-Stiposum*

ASSOCIATION CLASS: *Astragaletum mollis-Stiposumcapillata*

ASSOCIATION GROUP:*Astragalus mollis + Stipa capillata+ ephemeretum*

FORMATION GROUP: *Onobrychisetum-Festucosum*

ASSOCIATION CLASS:*Onobrychisetum vaginalis - Festucosum ovina*

ASSOCIATION GROUP:*Onobrychis vaginalis+ Festuca ovina +ephemeretum*

ASSOCIATION CLASS:*Onobrychisetum iberica-Festucosum giganteum*

ASSOCIATION GROUP: *Onobrychis iberica+Festuca giganteum+herbosum*

FORMATION CLASS: 2. moutley grasses-legunimous dry steppe

3.FORMATION GROUP:*Artemisetum-Astragalosum*

ASSOCIATION CLASS:*Artemisetum fragrans-Astragalosum microcephala*

ASSOCIATION GROUP: *Artemisia fragrans+ A.caucasica + A.campestris +Astragalus microcephala + Trifolium striatum+Lotus tenuis*

Classification of dry steppe vegetation of botanical-geographical area Steppe Plateau is limited by 1 type, 2 formation class, 3 formations group and 2 associations. As can be seen from the classification scheme of

the steppe vegetation, these phytocenose-specific groups consist of bushy-legume-cereal and different dry legume formations. Geobotanical descriptions of mane leguminous plants in dry steppe of Steppe plateau have shown in table 1.

Table 1. Geobotanical description of leguminous plants in dry steppe.

№	Name of the Biomorphic species	Ecological groups	Abundance (by ball)	Medium height (by cm)	Phenological phase
1	2	3	4	5	6
Bushes					
1.	<i>Astragalus microcephala</i> Willd.	xerophyte	1-2	II (60)	flow.
2.	<i>Astragalus oleifolius</i> DC.	xerophyte	1-2	II (40)	veget.
3.	<i>Lagonychium farctum</i> (Banks & Soland.) Bobr.	xerophyte	1	I (120)	flow.
4.	<i>Ononis pusilla</i> L.	xerophyte	2-3	III (30)	flow.-beans grow.
Shrubs					
5.	<i>Astragalus xiphidium</i> Bunge.	xerophyte	1-2	II (70)	flow.
Perennial (herbs)					
6	<i>Astragalus mollis</i> Bieb.	xerophyte	1-2	III (30)	beans grow.
7	<i>Lotus tenuis</i> Waldst. et Kit. ex Willd	xerophyte	1	II (30)	beans grow.
8	<i>Medicago caerulea</i> Less. ex Lebed.	xerophyte	1	II (45)	flow.
9	<i>Dorycnium intermedium</i> Ledeb.	mesoxerophyte	1	III (25)	flow.
Biennial herbs					
10	<i>Melilotus dentatus</i> (Waldst. et Kit.) Pers.	mesoxerophyte	1-2	II (20)	flow.
11	<i>Glycyrrhiza aspera</i> Pall.	xerophyte	1-2	II(15)	beans grow.
Annual herbs					
12	<i>Medicago arabica</i> (L.) Huds.	mesoxerophyte	1-2	III (25)	beans grow.
13	<i>Lotus angustissimus</i> L.	mesoxerophyte	1-2	III (15)	flow.
14	<i>Astragalus tribuloides</i> Delile	xerophyte	1	III (10)	beans spillage

Legumes spread on dry steppes are xerophytes and mesoxerophytes adapted to xerophytization as can be seen from the table.

REFERENCES

1. Azerbaijan Geographic Information Map (2005). (scale 1: 500 000) Baku, ICRC
2. Map of vegetation cover of Azerbaijan. (2007). Maker by V.J. Hajiyev M.: 1: 600000. State Land and Cartography Committee of the Azerbaijan Republic. Baku,
3. Babakishiyeva T., Ibadullaeva S., J. (2013). Current state of the plant cover plate of Azerbaijan./ International Caucasian Forestry symposium. October 24-26, Artvin-Turkey
4. Hajiyev V.J., Musayev S.H. (1996). Pulses of Azerbaijan (systematics, ecology, phytoeny, economic importance, etc.). Baku: Elm, 112 p.
5. Hatamov V.V. (2000). Pasture ecosystems of Azerbaijan and their protection. Baku: Science, 184 p.
6. Gasimzade T.E. (2015). Flora and vegetation of Shirvan. Baku: Elm, 400 p.
7. Kurbanov E.M., Mammadova Z.C. (2013) Ecological and geobotanical map of some phytocenoses formed by pheasants in the natural vegetation of Azerbaijan. Copyright Agency of the Republic of Azerbaijan. Certificate of registration of work. No. 7462. Baku.
8. Askerov A.M. (2016). The flora of Azerbaijan (High plants - Embryophyta). "TEAS Press" Publishing House. Baku: 444 p.
9. Shukurov E.S. Flora, vegetation, biodiversity conservation and rational use in the north-eastern regions of Azerbaijan. PhD Biol. science dissertation. Abstrat. Baku, 2003. 26 p.
10. Beadhan I.N. (1974). The methodology of phenological radiation of rhenium and corneal compounds. Novosibirsk: Nauka, 153 p.
11. Grossheim A.A. (1932). Extremely low temperatures of Azerbaijan and the Middle East. Vol. 1, Baku, Pbl. house. Narcomzem, p. 5-38.
12. Ibragimov A.Sh. (2007) Vegetation of Nakhchivan Autonomous Republic, productivity and botanical-geographical zoning. PhD abstract. 44 p.

13. Flora of the Caucasus: (2003-2006) 3 Vol. / Ed. J.L. Menitsky, T.N. Popova. SPB: St. Petersburg. unin-ty, Geobotanics. M.: Nauka, Vol.3, 1964. pp. 144-202.
14. Prilipko L.I. (1970). Expedition of Azerbaijan. Baku, Elm, 170 p.
15. Rabotnov T.A. (1947). Determination of age and life expectancy in perennial herbaceous plants. Successes of modern biol., 26 v., No. 4, p. 133–149.
16. Serebryakov I.G. Life forms of higher plants and their study // Field geobotany. M.: Nauka, vol. 3, 1964.p.146-202.// // 17. Flora of Azerbaijan. (1950-1961). Acad. of Science of Azerb. SSR, Baku, Vol. I-VIII.
18. Yaroshenko P.D. (1969). Geobotany. M.: Problems, 200 p.

How to cite this article: Nasibova G. Geobotanical description of leguminous plants on dry steppes of steppe plateau. International Journal of Research and Review. 2020; 7(3): 453-457.
