

Forage Value of Wild Relatives of Cultivated Plants from The Family Fabaceae L. In the Flora of Ustyurt

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Abstract

This article analyzes wild relatives of cultivated plants from the Fabaceae Lindl. family in the Ustyurt flora and their forage value. Analysis of the abstract revealed that the wild relatives of cultivated plants in the Ustyurt flora consist of 36 species, and it was found that all of these species are readily consumed by animals in the region. It was established that the studied species (including representatives of the genera Alhagi L., Glycyrrhiza L., Ammodendron L., Medicago L., and some species of Astragalus L.) possess a unique set of adaptations to the extreme conditions of the arid zone—high drought resistance and salt tolerance.

Keywords: Wild relatives of cultivated plants, flora, Usturt Plateau.

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1. Introduction

The drying of the Aral Sea and the reduction in the flow of the Amu Darya River have dramatically altered natural conditions, causing increased salinity and re-salinization of soils.

The disruption of the Aral Sea ecosystem requires active measures aimed at improving the living conditions of the population of Karakalpakstan. The study of salt- and drought-tolerant plant species in these conditions is becoming increasingly important. It is also necessary to develop a theoretical foundation for plant resistance to the extreme conditions of the Aral Sea region, study their role in forming the environment, and

develop a scientific basis for phytomelioration to actively improve the environment.

The study of forage lands for livestock farming is relevant and has high practical value for agriculture, ecology, and plant breeding in the Ustyurt Plateau (especially in the context of climate change and desertification). Wild relatives of cultivated plants (WRCP) of the legume family (Fabaceae L.) on the Ustyurt Plateau possess unique resistance to drought and salinity, representing a valuable genetic reserve.

2. Methods

Ustyurt is located between the Caspian and Aral Seas

(within 45°50 and 41°21 N and 53°25 and 5000 E). It is an elevated plateau with absolute heights of 160-300 m above sea level, bordered on all sides by cliffs, the so-called chink, with heights of 190-256 m. In the north, it borders the Caspian Lowland, in the east by the Aral Sea, in the southeast and south by the Amu Darya Delta and the Sarykamysch Depression, and in the west by the Caspian Sea. Its total area is 21.2 million hectares. There are no permanent rivers or streams in Ustyurt, but there are seasonal (temporary) surface runoff basins fed by precipitation that accumulates in shallow streams or streams.

Ustyurt soils are characterized by low humus content, significant carbonate content (decreasing with depth), gypsum content, and varying degrees of salinity with readily soluble salts. Groundwater is shallow (3-5 m).

The field moisture capacity of these soils is 19-20%, with dead moisture in the upper half-meter horizon being 5-8%. With depth, the field moisture capacity increases slightly (to 23-25%), and the amount of unabsorbed moisture increases sharply (to 11-12%) due to the increased content of readily soluble salts and gypsum. Light loams and sandy loams are found only on the southern outskirts of Ustyurt [1].

Ustyurt is a territory of significant economic importance. Until recently, it was merely a vast, albeit sparsely developed, pastureland. Oil and gas exploration is now underway there, and a gas and water pipeline, as well as a railway network, have been laid through it, connecting it with the central regions of the country. Studying various pasture types, their yields, seasonality, and identifying the forage properties of individual plants is the basis for the rational use of the

Ustyurt Plateau, which, given its natural conditions, can be transformed into a promising economic region. This primarily concerns livestock farming.

Wild relatives of cultivated plants constitute a natural gene pool from which humanity continually draws, and will continue to draw, source material for breeding. This gene pool is the heritage not only of your country but of humanity across the planet. Scientists have long known that each species is a "unique experiment of nature," a custodian of the gene pool and a repository of phylogenetic information. Its extinction is an irreparable loss.

When discussing the plants of the Ustyurt Plateau, it is important to mention the state of floristic study of Ustyurt as a whole. The flora of Ustyurt was studied by E.P. Korovin and I.I. Granitov (1949), N.P. Ageeva and A.S. Solomchenko (1961), Sh.I. Kogan (1964), O.N. Bondarenko (1964), K. Koybagarov (1972), O.N. Korovina, and others. According to B. Sarybaev, 724 plant species belonging to 295 genera and comprising 59 families grow in this region. The works of A.B. Azhiev, who made a significant contribution to the study of wild relatives of cultivated plants in this region, should also be mentioned [2, 3, 4, 5, 6]. One of the important botanical problems that can be solved at the present time is to determine the species composition of the region's flora and to study the economic significance of plants.

3. Results

Based on published data, we recorded 36 species of WRCP found in Ustyurt (Table 1). These plants are not only drought- and salt-tolerant but also provide forage for many herbivores.

Table 1

The forage value of species of wild relatives of cultivated plants of the Fabaceae L. family of the Ustyurt flora

№	Species
1	<i>Sophora lehmannii</i> (Bunge) Yakovlev
2	<i>Alhagi pseudalhagi</i> subsp. <i>persarum</i> (Boiss. & Buhse) Takht.
3	<i>Alhagi pseudalhagi</i> (M.Bieb.) Desv. ex Shap.
4	<i>Ammodendron bifolium</i> (Pall.) Yakovlev
5	<i>Ammodendron karelinii</i> Fisch. & C.A.Mey.
6	<i>Astragalus amarus</i> Pall.
7	<i>Astragalus ammophilus</i> Kar. & Kir.
8	<i>Astragalus ammodendron</i> Bunge
9	<i>Astragalus ankylotus</i> Fisch. & C.A.Mey.

10	<i>Astragalus bakaliensis</i> Bunge
11	<i>Astragalus brachylobus</i> DC.
12	<i>Astragalus chiwensis</i> Bunge
13	<i>Astragalus commixtus</i> Bunge
14	<i>Astragalus cornu-bovis</i> Lipsky
15	<i>Astragalus erioceras</i> Fisch. & C.A.Mey.
16	<i>Astragalus harpilobus</i> Boiss.
17	<i>Astragalus lasiophyllus</i> Ledeb.
18	<i>Astragalus leiophysa</i> Bunge
19	<i>Astragalus oxyglottis</i> Steven ex M.Bieb.
20	<i>Astragalus physodes</i> L.
21	<i>Astragalus scabrisetus</i> Bong.
22	<i>Astragalus villosissimus</i> Bunge
23	<i>Astragalus juratzkanus</i> Freyn & Sint.
24	<i>Caragana grandiflora</i> DC.
25	<i>Eversmannia subspinosa</i> (Fisch. ex DC.) B.Fedtsch.
26	<i>Eremosparton aphyllum</i> Fisch. & C.A.Mey.
27	<i>Caragana halodendron</i> (Pall.) Dum.Cours.
28	<i>Glycyrrhiza aspera</i> Pall.
29	<i>Glycyrrhiza glabra</i> L.
30	<i>Medicago sativa</i> L.
31	<i>Melilotus albus</i> Medik.
32	<i>Melilotus officinalis</i> Pall.
33	<i>Glycyrrhiza triphylla</i> Fisch. & C.A.Mey.
34	<i>Sphaerophysa salsula</i> (Pall.) DC.
35	<i>Trigonella arcuata</i> C.A.Mey.
36	<i>Medicago monantha</i> (C.A.Mey.) Trautv.

Based on the table, it should be noted that all recorded species are among the most important forage plants and are readily consumed by all types of livestock at all stages of development.

Members of this family are comparable in nutritional value to other families; young leaves and sometimes even shoots are readily consumed by sheep.

Dividing these plants by season of consumption, it should be noted that annual grasses are well-eaten in spring due to their short growing season.

In terms of area occupied, the most abundant species are the genera *Alhagi* L., *Glycyrrhiza* L., *Ammodendron* L., *Medicago* L., and some species of *Astragalus* L. These drought-resistant species are found almost everywhere on the Ustyurt Plateau.

4. Conclusion

A study of the Ustyurt Plateau flora revealed and analyzed the species composition of wild relatives of

cultivated plants (WRCP) in the legume family. It was established that the studied species (including representatives of the genera *Alhagi* L., *Glycyrrhiza* L., *Ammodendron* L., *Medicago* L., and some species of *Astragalus* L.) possess a unique set of adaptations to the extreme conditions of the arid zone—high drought resistance and salt tolerance.

The Ustyurt Plateau is one of the most important agricultural regions of Central Asia, where livestock farming is the dominant industry. Farms here have extensive areas of diverse forage lands, allowing for year-round livestock raising. The main advantages of natural forage lands are the diverse species composition of grasses containing all the elements necessary for animal nutrition. Therefore, considerable attention is paid to the study of natural forage lands, their economic productivity, and issues of rational use and improvement [4].

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