

## THE LEVEL OF STUDY OF MOUNTAIN PASTURE PLANTS IN SOUTH UZBEKISTAN

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**Introduction.** In the world, special attention is paid to the inventory of pasture resources, the assessment of resource potential and the improvement of the condition of pastures in crisis. In this regard, among other things, pasture resources of different climatic regions were assessed, an international database of nutritious pasture plants was created, a system of sustainable development of the livestock system in natural-territorial complexes was developed, methods of pasture restoration through phytomelioration measures were created. It should be noted that due to the zonal characteristics typical for the Central Asian region, the sharp formation of mountain pastures is characterized by a combination of several abiotic factors, including climate, edaphic, orographic factors. The complexity and uniqueness of the mountain vegetation cover in Central Asia is that the area of the Tian-Shan and Pamir-Aloy ridges, which are large orographic units, are located in the middle and subtropical temperature zones, and in the eastern Mediterranean and Central Asian rainfall areas. However, in recent years, the convenient placement of production facilities has ensured that the areas of walnut groves, sparse shrubs, juniper groves, and grass-grass meadows have been reduced in these regions, taking away the historically developed ephemeral and ephemeroïd groves. In addition, the expansion of the scale of human activity in the area causes the transformation of natural pastures, which is associated with an increase in the share of alien and poisonous species. Accordingly, it is of great scientific and practical importance to assess the modern condition of pastures in mountain and sub-mountain areas, to determine changes in pastures related to human influence, to reveal the ecological situation and to develop protection measures.

**The level of study of the problem.** N.T. Nechaeva (1958, 1962), L.P. Sinkovsky (1959), I.F. Momotov (1962), V.A. Burygin, L.E. Markova (1975), R.S. Wernick, T. Rakhimova (1982), O.Kh. Hasanov and T. Rakhimova (1996, 2000, 2003, 2006), Z.Sh. Shamsutdinov (2015), H.F. Scientists such as Shomurodov (2018) conducted research on the pasture flora.

Information on the flora, phytocenotic structure, ecology of the pastures of the mountain and sub-mountain areas of the Kashkadarya basin are reflected in the research works of V.A. Komarov (1891-1893), B.A. Fedchenko (1913), M.G. Popov (1925), S.N. Kudryashov (1941, 1950), E.P. Korovin (1934, 1956, 1962), K.Z. Zakirov (1955), I.I. Granitov, A.D. Pyataeva (1956, 1959), I.F. Momotov, A.D. Lee (1965), A.N. Babushkin (1964), E.M. Demurina (1975), S.M. Mustafaev (1966), O'. Allanazarova (1969), A.Z. Genusov (1972), O.Kh. Khasanov (1972), N.I. Akzhigitova (1976), R.V. Kamelin (1979), E. Ashurov (1988), T. Norbobaeva (1990), T.V. Ovchinnikova (1995),

F.Kh. Dzhangurazov (1965), B.E. Khojamkulov (1998), F. Khasanov (2013, 2014) and others.

In recent years, the development of land in the Kashkadarya basin, the development of the mining industry, and the expansion of the cattle breeding network have caused the transformation of the area's pastures. In this regard, the information on the structure and composition of the pastures given in the above literature sources cannot reflect the modern condition of the pastures of the mountain and sub-mountain regions of the Kashkadarya Basin. In this case, it is important to inventory the pastures of the area, to determine the topo-typological structure, and to develop effective measures for the protection of pasture species.

**The purpose of the research is** to evaluate the modern condition of the mountain pastures of the Kashkadarya basin and to develop ways of efficient use of the pastures.

**Tasks of the research:**

Determination of the floristic composition of highland pastures of the Kashkadarya basin;  
identification of highly exposed areas under the influence of anthropogenic factors and study of productivity of phytocenoses;

developing a modern description of pastures, taking into account factors affecting pastures;

Studying the current state of the xenopopulations of the species included in the “Red Book” of the Republic of Uzbekistan distributed in the highland pastures of the Kashkadarya basin and developing measures for their protection;

study of some phytochemical properties of medicinal species common in pastures.

**Research methods.** Field research, remote sensing of the Earth, mapping, population, biochemical and statistical methods were used in the research work.

**Results and analyzes.** The importance of pasture plants in the development of animal husbandry is very great. The scientific bases and methods of increasing the productivity of natural fodder grass in the desert conditions of Central Asia and South Kazakhstan were carried out by studying the biology and ecology of natural pasture plants.

Since our scientific research works are carried out on the monitoring of the foothill pastures of the Kashkadarya basin, we preferred to present information about the study of the flora of the Kashkadarya basin. Vegetation cover of the southern districts of our republic, primarily the floristic aspect of N.R. Regel, V.I. Lipsky, O.A. Fedchenko, B.A. Studied by the Fedchenkos in 1881-1882.

A.E. Regel collected herbariums and conducted geobotanical researches in Hisar, Zarafshan mountainous districts of Kohistan, passed Mura pass and in Surkhandarya region districts.

V.I. Starting from 1887, Lipsky conducted botanical studies in Central Asia, and later in 1896-1897 in the upper part of the Kashkadarya basin and Sherabad, Boysun districts.

O.A. Fedchenko, B.A. The Fedchenkos gave information about the plants of the southern regions of our Republic in the work “Synopsis of the Flora of Turkestan”.

Since 1931, the study of the vegetation cover in the grasslands of all regions of Uzbekistan by region was carried out by the employees of the “Soil Science and Geobotany” Institute.

The flora of the foothills of the Kashkadarya basin is typical of the flora of the mountainous

regions of Central Asia, and the flora of the Zarafshan and Hisar mountains is similar.

The flora of Kashkadarya region was studied several times by botanists at the end of the 19 th and 20 th centuries. A large number of herbarium specimens for the Kashkadarya region are stored in the fund of the Central Herbarium of Uzbekistan. The scientists who collected the herbarium included M.G. Popov, A.Ya. Butkov, V.P. Bochantsev, M.V. Kultiasov, E.E. Korotkova, A.D. Pyataeva, S.M. Mustafaev and F.O. Hasanovs can be included. Since the beginning of the 20th century, a large number of herbarium specimens have been collected in these places. Unfortunately, these samples have not been fully processed, and a complete synopsis of the flora of Kashkadarya region has not been published to date. Botanically and geographically, the territory of Kashkadarya region is typical of Urgut district of Kuhitang district, Kashkadarya and Tarqopchigai districts of West-Hisar district of Mountain Central Asia province, and it is adjacent to Karshi-Karnobchul districts of Bukhara district of Turan province. At the border of Kashkadarya region, the West-Hisar district is divided into two botanical-geographic districts - Kashkadarya and Tarqopchigay districts.

According to the cadastral list of the flora of Kashkadarya region, there are 2022 types of plants, which belong to 613 genera and 97 families (as aboriginal and as naturalized adventives. Large areas of Kashkadarya consist of dry lands, and the vegetation is covered with ephemeral-ephemeroid, sedge-ephemeroid and wormwood-ephemeroid communities and they were degraded as a result of intensive cattle grazing. In addition, the recent active development of oil and gas reserves in the foothills of the Hisar mountain range is the reason. Besides, various herbaceous dry steppes and shrubs (from 800-900 m to 1800 m above sea level), which are dominated by *Agropyron trichophorum* (Link) K. Richt.), *Hordeum bulbosum* L.), *Artemisia tenuisecta* Nevsky), *Amygdalus spinosissima* Bunge) and *A. bucharica* Korsh. participate. From the height of 1300-1500 m above sea level, Zarafshan spruce begins to appear in the vegetation cover, from 1800 m to 2500-2800 m above sea level, dense areas of spruce begin. Deciduous plant species grow as subordinates to this species (*Lonicera*, *Rosa*, *Cotoneaster*, *Acer* and *Crataegus* species). Water ridges and dry gravel slopes of the subalpine zone (from 2400-2500 m above sea level to 3000 m above sea level) are covered with a group of high mountain xerophytes (*Astragalus lasiosemius*, *A. leiiosemius*, *Onobrychis echidna*, *Acantholimon*, *Cousinia* species), as well as coniferous steppes, juniper. There are also participating fields. In the high mountain vegetation, overgrazing has increased the abundance of non-carnivorous plants such as *Adonis turkestanica*, *Ligularia thomsonii* and *Eremurus kaufmannii* Regel. At an altitude of 3000 m above sea level, the vegetation cover is covered with low herbaceous alpine meadows (*Lagotis korolkowii*, *Carex melanantha*, *Kobresia persica*) and pillow-like cryophilic plants [11,12,13,14]. The international “Red Book” (Eastwood et al., 2009; IUCN Red List, 2015) includes 10 plant species distributed in the territories of Kashkadarya region. In addition, 8 species are listed as globally endangered (divided into categories CR, EN, VU), 4 of them are included in the “Red Book” of Uzbekistan, and 2 species are included in the World Red List in the category close to extinction. According to the available information, 88 species of plants included in the “Red Book” of Uzbekistan (2009) can be found

in Kashkadarya region. 8 species to category 0 (probably extinct), 31 species to category 1 (endangered), Category 2 includes 40 species (rare), category 3 includes 8 species (decreasing). Among them, 39 species are national endemics of Uzbekistan, 1 species is included in the International Red List, and 1 species is included in Appendix 2 of CITES. Most of the rare endemic species of the flora of Kashkadarya region are designated for the Hisar mountain range (44 species in Kashkadarya botanical-geographic district and 32 species in Tarqopchigay). 26 species included in the “Red Book” grow on the southern slopes of the Zarafshan ridge. 10 rare species were identified in the plain part of the region. 44% of the rare and endangered species included in the flora of Kashkadarya region are involved in the “Red Book” (39 species) and are protected in the territories of Hisar and Kitab reserves [15,16,17]. M.M. Sovetkina, E.P. Korovin’s (1941) map “Natural pastures and hayfields of Uzbekistan” M:1500000 lists 9 types, 28 cartographic units and their productivity and grazing seasons. N.W. Koshurnikova (1945-1947) gave the types of desert, hill, mountain, pasture in the map called “Map of pastures of Kashkadarya and Surkhandarya regions”.

In 1949-1960, the vegetation cover of Kashkadarya and Surkhandarya regions was studied by the employees of the Institute of Botany, Central Asian State University and Uzgiprozem, and “Grasslands” maps were developed. In 1956-1960, “Vegetation Cover” and “Grasslands” maps of all regions were compiled by I.I. Granitov, V.A. Grebenshchikov and V.P. Proshlyakov. In 1956-1960, the map of “A plant vegetation of Kashkadarya region” (M1:200000) was issued by E.I. Alexandrova, M.G. Belenovskaya, V.A. Vostrikov, I.I. Granitov, V.A. Kuznetsov. In 1995, T.V. Ovchinnikova created a map of “Plants” of Kashkadarya region (1:500000), showing their transformation. In 1998, B.E. Khojamkulov made a map (1:200000) of “Juniperites” of the Kashkadarya basin. The map includes 24 cartographic units, 2 formations, 1 type. These data were used to create a map of foothill pastures of the Kashkadarya Basin. In 2000, V.V. Litvinova, N.I. Akzhigitova and others compiled a map called “A plant vegetation of Central Asia and Kazakhstan” (M1:2500000). These data were used as a reference [4,5,6,7,8,9,10].

Pastures are ecologically an empirical object that develops in harmony with biological systems with social and economic factors. Any relationship related to the use of pastures can change its biological laws and ensure its crisis. Accordingly, pastures can be considered as a changing dynamic system, and on this basis, the processes taking place in it can be modeled [1,2,3].

In the process of scientific research, the leading families and genera of plants distributed in the foothills of the Kashkadarya basin were studied and tabulated (Table-1).

*Table-1*

*The leading families and genera of plants distributed in the foothills of the Kashkadarya basin*

No.	Familia	A quantity of genus	%	A quantity of species	%	Genus	A quantity	%
1	Poaceae	39	26	63	25,61	<i>Astragalus</i>	21	31,34
2	Asteraceae	23	15,34	33	13,41	<i>Gagea</i>	8	11,94
3	Fabaceae	17	11,33	45	18,30	<i>Hordeum</i>	6	8,96
4	Boraginaceae	17	11,33	22	8,94	<i>Bromus</i>	6	8,96
5	Apiaceae	15	10	16	6,50	<i>Artemisia</i>	5	7,46
6	Caryophyllaceae	12	8	23	9,35	<i>Aegilops</i>	5	7,46
7	Lamiaceae	9	6	15	6,10	<i>Convolvulus</i>	4	5,97
8	Brassicaceae	8	5,34	9	3,66	<i>Delphinium</i>	4	5,97
9	Liliaceae	5	3,33	12	4,88	<i>Polygonum</i>	4	5,97
10	Rosaceae	5	3,33	8	3,25	<i>Allium</i>	4	5,97
<b>Total</b>		<b>150</b>	<b>100</b>	<b>246</b>	<b>100</b>	<b>Total</b>	<b>67</b>	<b>100</b>

In the analysis of the life forms of plants distributed in the highland pastures of the Kashkadarya basin, we have used from the simplified version of I.G. Serebryakov's classification (Fig. 1).

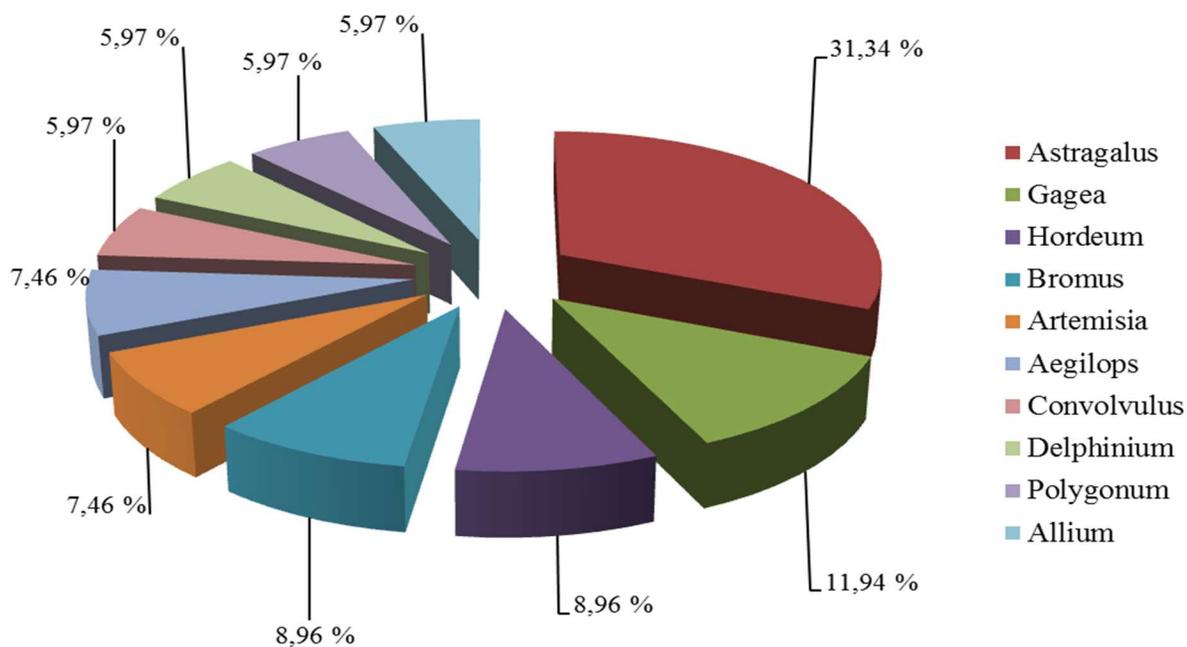


Figure 1. The number of leading families of plants distributed in the foothills of the Kashkadarya basin.

As a result of the conducted research, for the first time, a system of ecological assessment

of pastures was developed based on the quality assessment of pastures, factors affecting pasture qualities and criteria for their effective use. “Map of mountain and sub-mountain pastures of the Kashkadarya Basin” (M 1:200000) was created, reflecting the modern condition of the pastures. A new description of the rare and endemic species *Plocama alshehbazii* was developed for the next edition of the “Red Book” of the Republic of Uzbekistan [19,20,21,22,23].

**Conclusion.** At the time of sudden changes in climatic factors and the process of desertification in our republic, it is the demand of the time to preserve the vegetation area of foothill pastures and carry out recultivation processes without disturbing the historically established natural balance. Based on the study of the above-mentioned maps and succession lines observed by foreign scientists, the number and quality indicators of phytocenotic units and pasture types of the area where scientific work was carried out were determined and evaluated. Also, the literature and cartographic data listed above are taken as benchmarks in the assessment of the current situation of the studied area. The current status of the cartographic units given in the listed maps has changed considerably over the years. However, they serve as a basis for determining the degree of transformation of the most dynamic elements of the landscape components of the area: vegetation and pasture units. However, the uniqueness and richness of the flora in the foothills of the Kashkadarya basin, its nutritional value, its usefulness, its medicinal value, its rarity, its aesthetics, and its economic significance are important.

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