



FLORA OF SIRDARYA REGION

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Abstract: In this study, the inventory of the flora of the Syrdarya region and the flora of the protected natural areas of the region ("Saikhun" state wildlife reserve and "Qalgansir" state forest-hunting farm) were presented. The list of plants in the region is based on published scientific data and herbarium collections and was improved by field observations carried out in 2023–2024. As a result, it was determined that 827 types of plants belonging to 79 families and 377 genera can be found in the region. The diversity of the region's flora, life forms, leading families and genera, rare and endemic species, and protected natural areas were critically analyzed.

Taking into account the threats associated with global climate change, biodiversity inventory is an important task in the conservation strategy (Margules & Pressey, 2000; Sarkar et al. 2006). Biodiversity inventory is a very difficult and laborious process that requires a lot of resources (Balmford & Gaston, 1999). In order to optimize inspection, research, and inventory work, it is first necessary to study the territory well from a geographical and ecological point of view. It is then essential to conduct field surveys throughout the study area, sampling plants, identifying more species with less effort and cost, biodocumenting, and thereby building a complete list of species in the study area (Soberon & Llorente 1993). Efficiency is important in the inventory of biological diversity, in comparative analysis with the data presented in scientific sources, and most importantly, in the identification and protection of the composition of rare and endangered endemic species. In this regard, the staff of the Laboratory of Cadastre and Monitoring of Rare Plant Species of the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan are conducting field research and inventory work on studying the flora of the Syrdarya region.

The Syrdarya region borders the Republic of Kazakhstan to the north, the Tashkent region to the east, Tajikistan to the south, and the Jizzakh region to the west. The total land area is 4.28 thousand km² (Beshko et al. 2023, 2023a). Due to its location and climatic conditions, it belongs to the semidesert region, and according to the zoning scheme of the territory of Uzbekistan, it is part of the Mirzachul botanical-geographical region of Middle-Syrdarya district of Turan province (Tojibaev et al. 2016). The territory of the province is located mainly in the Mirzachul oasis and is fully used for planting agricultural crops. The flora of the region was studied for the first time by V.P. Bochantsev, A.Ya. Butkov, A.I. Vvedensky, N.B. Nikiforova, and V.K. Pazyi, and the composition of the flora of the region was published in the pamphlet "Opredelitel dikorastushchikh rastenii holodnoy stepi" (1960). In this pamphlet, a total of 905 plant species are found in the territory of the region. Further studies were conducted by Sulaymanov N.O. et al. The results of the research are covered in the monograph "Plants of the Syrdarya Oasis". This monograph contains a list of 347 plants belonging to 56 families in the flora of the region. On the one hand, the given data show the great differences between the species and that the flora of the region is poorly researched and studied. On the other hand, the high level of influence of anthropogenic factors requires special monitoring studies on the inventory of the flora of the region, determination of the composition of species, and biodocumentation.

In the course of large-scale research dedicated to the study of the flora cadastre of the Syrdarya region, first of all, scientific literature related to the flora of the region, works of state importance and floristic and geobotanical research conducted in the research area, as well as the herbarium stored in TASH, LE, MW, and other large herbarium funds for more than a century of collections, the data collected during the field research carried out in the territory of the region in 2023-2024 were summarized and analyzed, the taxonomic composition of the flora of the region was determined, and a general list was formed. In the flora of the region, 827 species belonging to 379 genera and 79 families were found, including 4 species of angiosperms, 2 types of

angiosperms, 155 species of monocotyledons, and 667 species of dicotyledons. Of these, six species (*Climacoptera amblyostegia*, *Climacoptera malyginii*, *Climacoptera merkulowiczii*, *Colchicum kesselringii*, *Nonea calceolaris*, and *Tulipa korolkowii*) are rare species included in the Red Book of the Republic of Uzbekistan; the number of invasive species is 51.

The composition of the regional flora is 53.3% (441 species) of annual and biennial herbs, 34.9% of perennial herbs (289 species), 4.8% of semi-shrubs (40 species), 4.4% of shrubs (36 species), and 2.5% (21 species) of trees, which consist of plants that have a living form. (Fig. 1).

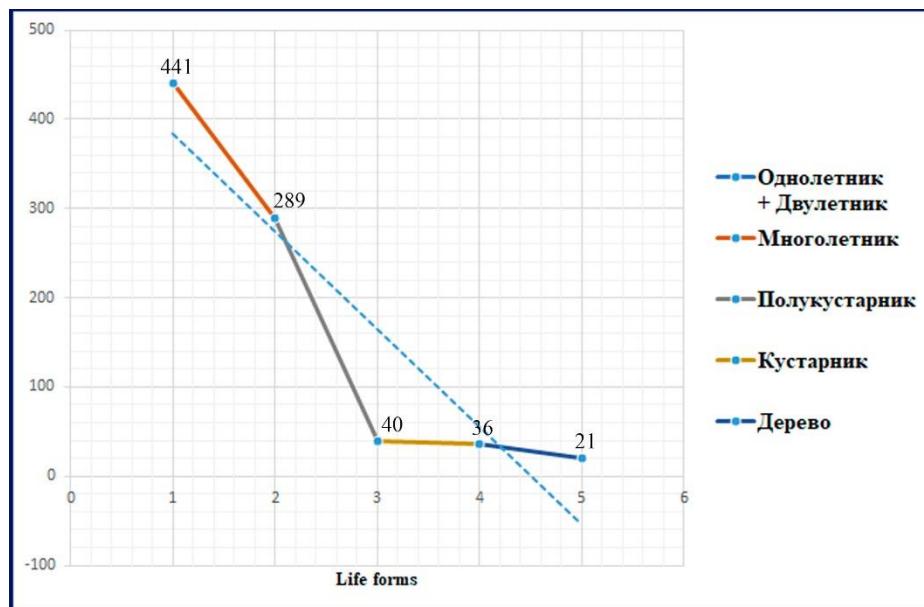


Figure 1 – Vital forms of flora in the Syrdarya region

The spectrum of the leading families of the flora of the Syrdarya region is headed by the Asteraceae family (Fig. 2). Rosaceae, Amaranthaceae, and Fabaceae families take the next places. Also, genera containing 10 or more species were separated into the spectrum of leading genera. The spectrum of leading genera is led by the genus *Astragalus* L. *Artemisia* L., *Ranunculus* L., *Climacoptera* Botsch. and other genera took the next places. The rest of the flora includes 98% of the total flora. It was noted that populations of species such as *Caragana halodendron*, *Tamarix hispida*, *T. hohenackeri*, *T. laxa*, *T. ramosissima*, *Populus pruinose*, and *Elaeagnus angustifolia* are more common than other species.

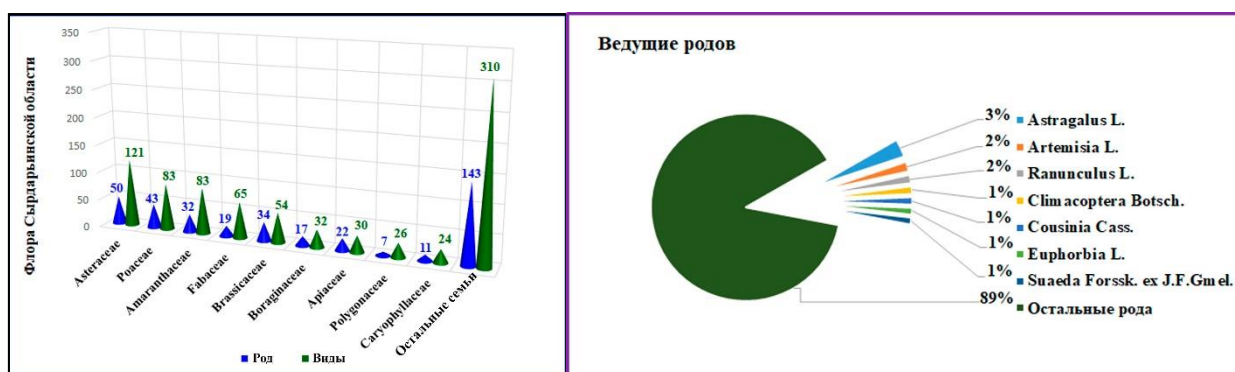


Figure 2 – The spectrum of leading families and genera of flora in the Syrdarya region.

There are protected natural areas in the territory of the Syrdarya region, such as the Saykhun reserve and the Qolgansir forest-hunting farm (Beshko et al. 2023, 2023a). These areas are among the few areas of the Syrdarya region under the jurisdiction of the Ministry of Ecology, Environmental Protection, and Climate Change of the Republic of Uzbekistan where forest ecosystems have been preserved. (Beshko et al. 2024). In 2023–2024, field research was conducted to inventory the flora of protected natural areas, and the following results were obtained:



The list of the flora of the Saykhun reserve includes 141 species belonging to 45 families, of which 4 are introduced. The spectrum of the leading families in the composition of the flora is led by the Asteraceae family; the representatives of the family make up 16.31% (23 species) of the total flora of the Saikhun Nature Reserve. The next places are occupied by the families Rosaceae (14.89%, 21 species) and Brassicaceae (7.8%, 11 species). The percentage of the remaining families in the flora is relatively low. The spectrum of leading genera is dominated by *Typha* L., *Hordeum* L., *Artemisia* L., etc. The percentage of the remaining genera is relatively low.

In the flora of the Qalgansir forest-hunting farm, there are 163 species belonging to 45 families, 12 of which are foreign (adventive) species. The spectrum of polymorphic families in the flora of the studied area is dominated by Poaceae (23 species, 14.1%), followed by Asteraceae (22 species, 13.5%), and Brassicaceae (14 species, 8.6%). The remaining 42 families listed in the Flora list are composed of a relatively small number of species. *Artemisia* L. and *Typha* L. dominate the spectrum of the flora of this protected natural area. The percentage of the remaining categories is relatively low.

The flora of both protected areas is dominated by plant species typical of the forest and swamp habitats of Uzbekistan and Central Asia. 17% (Saykhun) and 19.5% (Qalgansir forest-hunting farm) of the total flora of the region belong to protected natural areas (Daminova 2024). The area of protected areas occupies 0.2% of the territory of the region.

In conclusion, it can be said that for more than 60 years, under the influence of anthropogenic factors, 99.8% of natural landscapes in the region have been exploited, and 0.2% have been preserved in nature due to their inclusion in the list of protected areas of the Republic in order to protect the forests along the Syrdarya river. Currently, as a result of increasing threats related to anthropogenic factors, the area of the flora of the region and the flora of protected areas is decreasing every year. For example, according to V.P. Bochantsev et al. (1960), the flora of the region was diverse, and about 1000 plant species grew in this area. More than 170 plants (*Utricularia vulgaris* L., *Lemna trisulca* L., *Nymphoides peltatum* (S. G. Gmel.), *Batrachium pachycaulum* Nevski., *Ceratophyllum submersum* L., *Zannichellia pedunculata* Rchb., *Najas graminea* Delile, *Cuscuta babylonica* Aucher ex Choisy, *Alhagi sparsifolia* Shap., *Lotus frondosus* Freyn., *Trifolium fragiferum* L., *T. neglectum* CAM., *Melilotus dentatus* (Waldst. & Kit.) Desf., *Melilotus indicus* (L.) All., *Onobrychis chorassanica* Bunge ex Boiss., *Hedysarum nuratense* Popov, *Chesneya ternata* (Korsh.) Popov, *Astragalus tribuloides* Delile, *A. camptoceras* Bunge, *A. eximius* Bunge) have become extinct. These data were confirmed in the research conducted by N.O. Sulaymanov and others, as well as in the results of the research conducted in 2023–2024. In addition, in the protected natural areas of our country, there is no buffer zone (intermediate distance between the habitats of the local population), and some protected area lands are permanently leased to the local population and farms as a result of burning the remains of agricultural crops grown in the area. As a result of sending it, the soil quality in the fertile layer of the land in this area will decrease, the growth and development of plants growing in the area will decrease or stop completely, and it will cause large fires in the area. At this point, I would like to cite as an example the incident that took place on March 7, 2023, in the Qalgansir forest-hunting farm, when 35 farmers burned plant residues on the land cleared of rice and carelessly treated the fire, causing a flood on 10 hectares of this area. As a result, plantations, ornamental trees, and other plants on 2 hectares were burned, and as a result, a total of 167.7 million soums were damaged to the flora of this area. In addition, a number of negative consequences can be cited as examples of anthropogenic factors.

In the protection of flora and fauna objects, it is very important to first study the area well from a geographical and ecological point of view, and then it is necessary to develop effective protection strategies.

The ongoing research in the Syrdarya region is not fully completed; therefore, at the end of the research, the results may change due to new findings and species that have become extinct in the area, as well as adventitious species.

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