UO'K (58.006)502.75

CONSERVATION STATUS OF THE SPECIES *JURINEA SCHACHIMORDANICA* (ASTERACEAE)

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The article presents the results of the assessment and distribution of Jurinea schachimordanica species according to the IUCN methodology, as well as threats to them. Based on field research and herbarium samples, the protection indicator of the species was evaluated. It was determined that J. schachimordanica (EOO; Extent of Occurrence) =1868 km², (AOO; Area of Occupancy) =16 km². It can be found in 4 growth areas defined by a distance of 2 km2, the distance between each population is 50-100 km. Taking into account the above indicators, the species was assessed by the criteria of B2ab (ii, iii, iv) category Endangered (EN) developed by IUCN. The obtained results serve to form a list of species that are recommended to be included in the Red Book, distributed naturally in the Fergana region, and to prepare a new edition of the Red Book, which is planned to be published in 2025.

Keywords: *IUCN, GeoCAT, Red book, Jurinea schachimordanica, Species*.

В статье представлены результаты оценки и распределения видов Jurinea Schachimordanica в соответствии с методологией МСОП, а также угрозам для них. На основе полевых исследований и образцов гербария был оценен индикатор защиты вида. Было установлено, что *J. Schachimordanica* (EOO; степень возникновения) = 1868 км², (AOO; Площадь занятости) = 16 км². Его можно найти в 4 областях роста, определенных расстоянием 2 км², расстояние между каждой популяцией составляет 50-100 км. Принимая во внимание приведенные выше показатели, этот вид оценивался по критериям категории B2ab (ii, iii, iv), находящейся под угрозой исчезновения (EN), разработанных IUCN. Рекомендации по защите были разработаны. Полученные результаты служат для формирования списка видов, которые рекомендуются быть включены в Красную книгу, естественным образом распространяются в регионе Ферганы и подготовить новое издание Красной книги, которое планируется опубликовать в 2025 году.

Ключевые слова: *МСОП, GeoCAT, Красная книга, Jurinea schachimordanica, виды*.

Introduction

The Fergana Valley is of particular importance as one of the densely populated areas in the Central Asian region, where the natural landscape is shrinking. This situation determines both the diversity of species and the urgency of the issue of preserving natural landscapes. Here, the impact of humans on the environment has increased significantly in the last decade. The expansion of settlements, the increase of industrial zones, the reduction of pasture areas and other factors led to the weakening of the population of rare and endemic species of the Ferghana Valley. The lack of protected nature reserves in the Uzbek part of the valley complicates the current situation. From this point of view, the new research conducted on the study of plant diversity, the introduction of new methods, and the establishment of regional cooperation are of urgent scientific and practical importance [1, 2]. These indicators require the improvement of protection measures throughout the valley, the practice of maintaining the Red Book for the preservation of rare and endemic species, the expansion of the areas of protected natural areas, and the creation of a living collection of species in need of protection in botanical gardens.

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The obtained results are the creation of a list of species that are recommended to be included in the Red Book, which are distributed naturally in the Fergana Valley, the preparation of a new edition of the Red Book, which is planned to be published in 2025, the Cabinet of Ministers of the Republic of Uzbekistan No.1034 of 2018 “Preparation of the Red Book of the Republic of Uzbekistan, serves to implement the tasks defined in the decision “On measures to organize publication and maintenance” [3].

Research Critical assessment of the state of the Red Book of the Republic of Uzbekistan. It was carried out within the framework of the project “Preparation of data on species distributed in Jizzakh, Samarkand and Fergana, Andijan, Namangan regions” (2023-2025) and within the framework of the main scientific research conducted at the Department of Biology of Namangan State University.

Research objective; *Jurinea schachimordanica* Iljin, which is distributed in Shakhimardan region, is assigned the task of evaluating the rarity status of according to the international IUCN (International Union for Conservation of Nature) principles, preparing GeoCAT (Geospatial Conservation Assessment) maps, analyzing the impact of anthropogenic factors and issues related to protected areas.

Literature analysis

Jurinea it is one of the most important genera within the Asteraceae family, containing about 200 species [4]. The species is widespread throughout southwestern Europe, Siberia, northern China, and northwestern Africa. Central Asia, Iran, Turkey and the Mediterranean Sea are recognized as the main centers of species diversity [5]. Today, the bioecology of representatives of the genus, including the ability of apomixis, which increases their anthropotolerance, is better studied [6, 7]. Systematic problems of the genus *Jurinea* have not been resolved. This is explained by taxonomic complexity among morphologically close genera (*Saussurea*, *Cirsium*, *Centaurea*, *Cousinia*, *Carduus*)(Fig.1) [8].

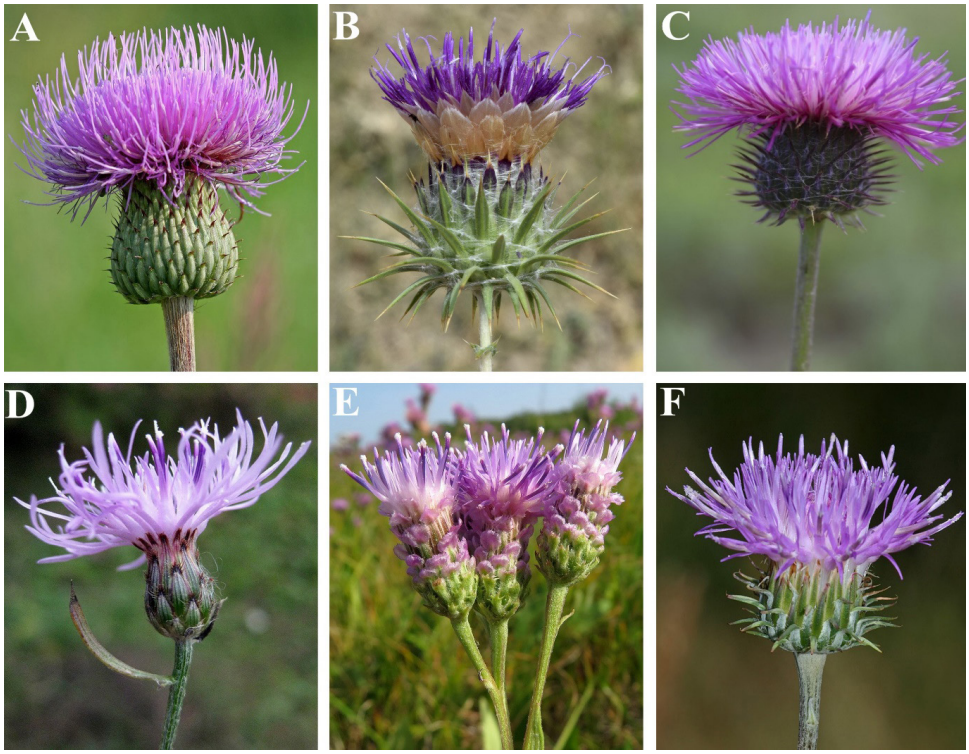


Figure 1. A) *Cirsium canum* (L.) All.; B) *Cousinia microcarpa* Boiss.; C) *Carduus hamulosus* Ehrh.; D) *Centaurea stoebe* L.; E) *Saussurea amara* (L.) DC.; F) *Jurinea cyanoides* (L.) Rchb. (https://www.plantarium.ru/page/view/item/42352.html)

J. schachimordanica was listed in the Kyrgyz flora by Nikitina for the Shakhimardan river basin (Alay ridge) [9]. M.Arifkhanova did not mention the composition of the flora of the valley in her research results, and there are no herbarium specimens (TASH, MW, LE) that she collected this species [10]. A list of 1353 species for the flora of the Shakhimardan water basin was given by P. Khalkoziyev [11]. *J. schachimordanica* is not mentioned in this synopsis, and there are no specimens of the species in national (TASH) and foreign herbarium funds (MW, LE). This species is not mentioned in the works "Cadastre of the flora of Kyrgyzstan" (2014) and "Endemic and rare species of flora of Kyrgyzstan" (2015) [12, 13]. For the flora of Tajikistan, M. Rasulova, S. Astanova analyzed the possibility of distribution in the Turkistan range [14], but in Illustrated Flora of Tajikistan and adjacent areas (2020), this information was not proven [15]. These sources question the distribution of the species in the Turkistan range and require checking the TAD herbarium fund located in Dushanbe (Fig. 2).

Research methodology

The research was carried out within the framework of the project "Critical assessment of the status of the Red Book of the Republic of Uzbekistan, preparation of data on species distributed in Jizzakh, Samarkand and Fergana, Andijan, Namangan regions" (2023-2025). In 2023, targeted and field research was conducted in the Shakhimardan area (Fig.2). The location coordinates of the species were determined using a GPS navigator (Garmin Gpsmap 64s navigator). The natural illustration of the species was made on the basis of the Photoshop CS6x64 program. Herbarium data from National Herbarium of Uzbekistan (TASH), Global Biodiversity Database (GBIF; https://www.gbif.org), taxon nomenclature Plants of the World Online (POWO; https://www.plantsoftheworldonline.org), according to the International Plant Name Index (IPNI; https://www.ipni.org), between protected areas (WDPA; https://www.protectedplanet.net/en) analysis were performed. Conservation status was assessed based on criterion B (B2) of the IUCN [16] methodology. The GeoCAT map of the species was prepared based on Bachman's methodical recommendations [17].

Results and Disscussion. The holotype (Fig.3a) of *J. schachimordanica* is kept in the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan Type Collection of the National Herbarium of Uzbekistan (Uzbekistan: Alay ridge. Basin of the Kara-Kazyk river. Resort Shakhimardan, 1935.07.30, *Sovetkina*, №169 (Holotype; TASH003609!). The next samples are by Pyataeva Alai ridge, Shakhimardan river basin. Neighborhood of the village of Iordan, 1961, №148 dialed (TASH!). Samples from the flora of Kyrgyzstan were also collected. Kyrgyzstan: Batken Oblast, Northern foothills of Alay Range, hill in Orozbekov village ca. 9 km SW of Kadamjay, Alt.: 1360m. 2016.07.18, Leg.: E. Raab-Straube, G.A. Lazkov, A.N. Sennikov, A.P. Seregin & A. Szukala (GBIF). Moscow University Herbarium (MW; https://plant.depo.msu.ru/open/public/item) Kyrgyzstan, foothills of the Alai Range, floristic region (after: Lazkov, Sultanova, 2011), southern outskirts of the village of Ohna (Orozbekovo), northern slope above the village (MW0889491, MW0889492, MW0889493, MW0889494!).

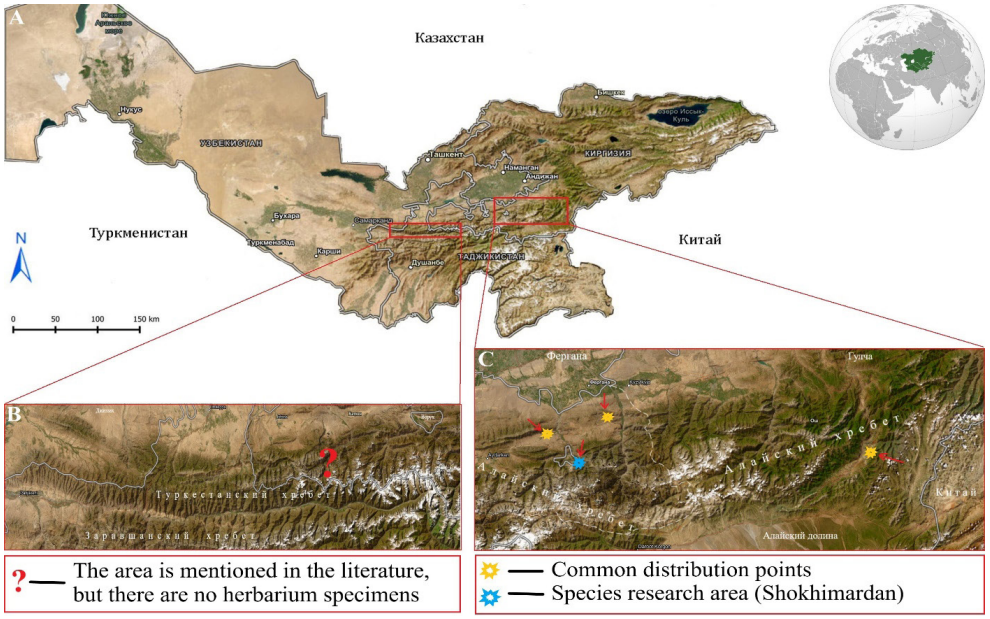


Figure 2. GIS map of species distribution.

For more than 60 years, herbarium specimens of this species have not been re-collected and targeted field research has not been conducted. In 2023, as a result of targeted field research conducted in Shakhimardan region of Fergana Valley, it was possible to redefine the population of *J. schachimordanica*, and samples of its leaves were taken for the purpose of herbarium and DNA barcoding (Fig. 3b). Based on the field research and herbarium samples, the protection indicator of the species was evaluated.

Taxonomy. Magnoliophyta – Magnoliopsida – Asterales – Asteraceae – *Jurinea* Cass. – *Jurinea schachimordanica* Iljin (Наголоватка шахимарданская).



Figure 3. A) Type of *J. schachimordanica* (TASH003609);
B) Herbarium specimen collected during field research (2023).

Status. It was determined that *J. schachimordanica* (EOO; Extent of Occurrence)=1868 km^2, (AOO)=16 km^2. It can be found in 4 growth areas defined by a distance of 2 km^2, the distance between each population is 50-100 km (Fig. 5). Taking into account the above indicators, the species was assessed by the criteria of B2ab (ii, iii, iv) category *Endangered* (EN) developed by IUCN.

A brief description and image of the species. Hemicryptophyte. Plant height 50-60 cm (Fig. 4). The root is many-headed; caudex lignified, with numerous remnants of old leaves, usually white-haired. Basal leaves (2-15 cm) in a dense multi-leafed rosette, petiolate, somewhat widened at the base, back-spatulate or oblong back-spatulate. Baskets are many-flowered, cup-shaped, 10-17 mm. Receptacle setae glabrous, smooth, about 3 mm. Corollas pink-purple, 11.5-13.5 mm. Achenes are back pyramidal, 5-6 mm, olive-brown [18].

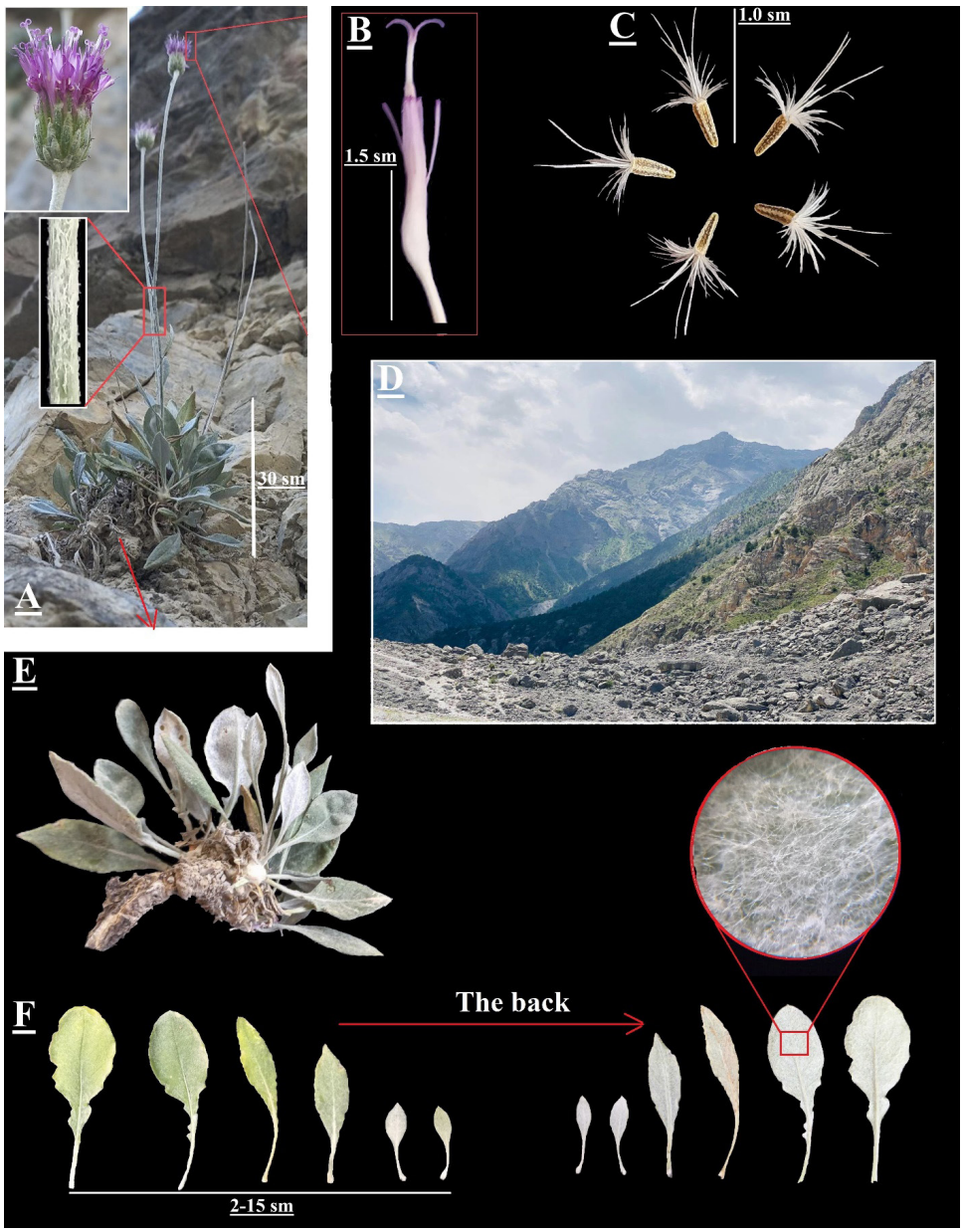


Figure 4. Natural illustration of *J. schachimordanica* (Prepared by Gulomov)
Flowering May – June, fruiting July. Reproduces through seeds.

Spreading. The species is distributed in the eastern Alay ridge, samples were collected by G. Lazkov from the territory of Kyrgyzstan. Below is a GeoCAT (Fig.5).

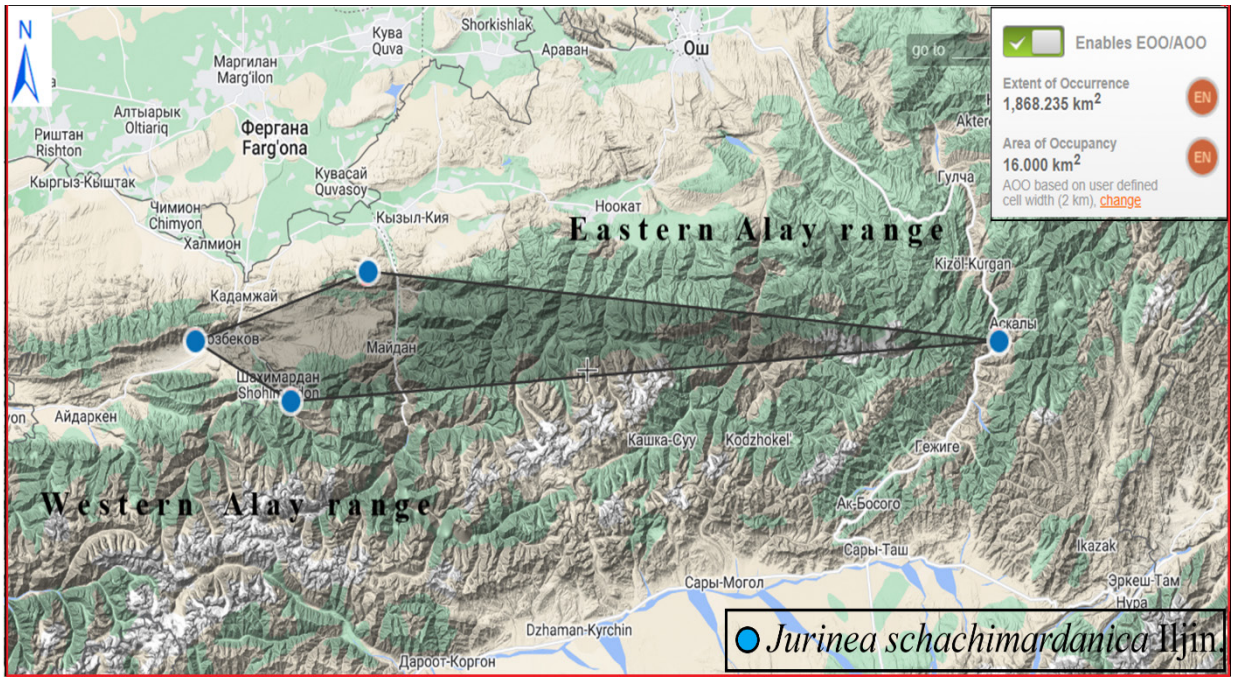


Figure 5. GeoCAT map of species distribution.

Habitats. Data on trends in habitat reduction and/or degradation are not available. On rocky slopes, shale, sandstone outcrops, conglomerates and products of their destruction in the middle belt of mountains, at an altitude of 1600 m. The population is fragmented and vulnerable. Studies on the index of individuals and their dynamic increase or decrease have not been conducted.

Threats. The main threat factors (according to the IUCN classification) and their impact on the population of the species were evaluated. 1) Residential & commercial development; 1.3) Tourism & recreation areas. Threat Type - Timing: 4 = Future, 5 = Unknown; Scope: 4=Unknown; Severity: 4=Causing/could cause fluctuations; Stresses - 1) Ecosystem stresses; 1.2) Ecosystem degradation; 2) Species stresses; 2.3.2) Competition, 2.3.8) Other; 11) Climate change & severe weather; 11.3) Temperature extremes.

Usage. No data

Cultivation. Not used as a cultural crop.

Protection measures. Today, it is used as a pasture by the local population in Shakhimardan and adjacent areas (Gulomov, unpublished data). This can have a serious impact on species populations. Therefore, to carry out monitoring work on the indicators of individuals in the population, to preserve the species by growing it *in-situ* in the experimental plots of the Uzbeksiton Botanical Garden and transplanting it to nature in *ex-situ* conditions, and the seed should be stored in special conditions.

Conclusions and recommendations

The obtained results serve to form a list of species that are recommended to be included in the Red Book, distributed naturally in the Fergana region, and to prepare a new edition of the Red Book, which is planned to be published in 2025.

In cooperation with the Institute of Botany of the Academy of Sciences of Uzbekistan, the regional departments of the Fergana Valley of the Ministry of Ecology, Environmental Protection and Climate Change and the leading scientists of the higher educational institution (Ferga-

na, Andijan and Namangan State University) the following measures intensive implementation of measures is recommended (Fig.6).

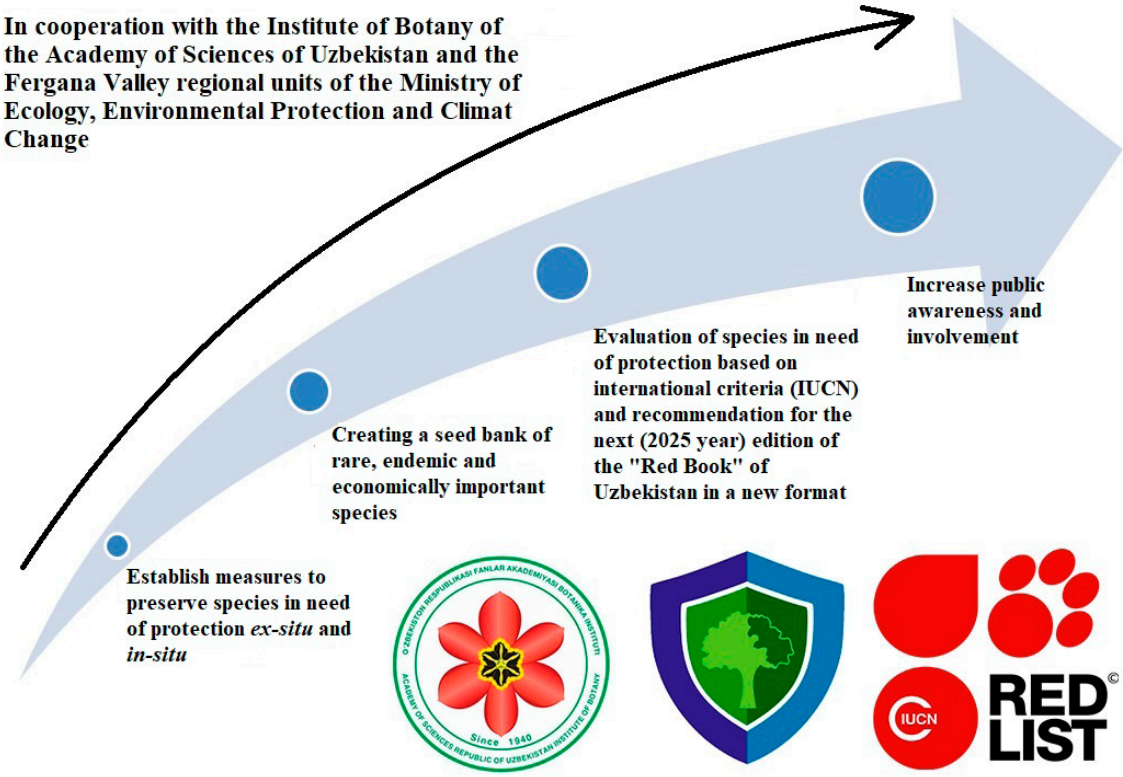


Figure 6. Recommendations for the conservation of endemic and rare species (including *J. schachimordanica*).

Acknowledgments

We express our gratitude to the scientific staff of the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan, who provided practical assistance in using the samples stored in the National Herbarium of Uzbekistan (TASH).

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JURINEA SCHACHIMORDANICA (ASTERACEAE) TURINING MUHOFAZA HOLATI

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Ilmiy xabarnoma. Seriya: Biologik tadqiqotlar – Scientific Bulletin. Series: Biological Research. 2023. 8(76). 14-22.

Kalit so‘zlar: IUCN, GeoCAT, Qizil kitob, Jurinea schachimordanica, tur.

Maqolada IUCN meterologiyasiga muvofiq *J. schachimordanica* turini baholash va tarqalish natijalari, shuningdek, ularga tahdidlar keltirilgan.

Jurinea Cass. Asteraceae oilasidagi eng muhim turkumlardan biri bo‘lib, unda 200 ga yaqin tur mavjud. Turlar janubi-g‘arbiy Yevropa, Sibir, Shimoliy Xitoy va shimoli-g‘arbiy Afrikada keng tarqalgan. Markaziy Osiyo, Eron, Turkiya va O‘rta yer dengizi turlarning asosiy markazlari sifatida tan olingan. Bugungi kunda turkum vakillarining bioekologiyasi, shu jumladan, apomiksis qobiliyati yaxshi o‘rganilgan. *Jurinea* turkumi bilan bog‘liq sistematik muammolar hal qilinmagan. Bu morfologik va taksonomik jihatdan murakkab turkumlar mavjudligi bilan izohlanadi (*Saussurea, Cirsium, Centaurea, Cousinia, Carduus*).

Farg‘ona vodiysi tabiiy landshaft qisqarayotgan va O‘rta Osiyo mintaqasida aholi zich joylashgan hududlardan biri sifatida alohida xususiyatga ega. Ushbu vaziyat turlarning xilmaxilligini va tabiiy landshaftlarni saqlab qolish masalasining dolzarbligini belgilaydi. Bu yerda so‘nggi o‘n yillikda insonlarning atrof-muhitga ta’siri sezilarli darajada oshdi. Aholi punktlarining kengayishi, sanoat zonalarining ko‘payishi, yaylov maydonlarining kamayishi va boshqa omillarning ta’siri Farg‘ona vodiysining

noyob va endemik turlarining zaiflashishiga olib keldi. Vodiyning O‘zbekiston qismida qo‘riqxonalarning yo‘qligi hozirgi vaziyatni murakkablashtiradi. Shu nuqtayi nazardan o‘simlik xilmaxilligini o‘rganish bo‘yicha yangi tadqiqotlar, yangi usullarni joriy etish va mintaqaviy hamkorlikni yo‘lga qo‘yish ilmiy va amaliy ahamiyatga ega. Ushbu ko‘rsatkichlar vodiyda himoya choralarini takomillashtirish, kamyob va endem turlarni saqlash, qo‘riqlanadigan tabiiy hududlarni kengaytirish va yaratish uchun botanika bog‘larini tashkil etish talab etiladi.

60 yildan ortiq vaqt davomida ushbu turning gerbariy namunalari qayta terilmagan va maqsadli dala tadqiqotlari o‘tkazilmagan. 2023-yilda Farg‘ona vodiysining Shohimardon hududida o‘tkazilgan maqsadli dala tadqiqotlari natijasida populyatsiyalarini topishga muvaffaq bo‘lindi va gerbariy namunalari olindi. Dala tadqiqotlari va gerbariy namunalari asosida turlarning himoya ko‘rsatkichi baholandi. *J. schachimordanica* (EOO; paydo bo‘lishi darajasi) = 1868 km^2, (AOO; egallash joyi) = 16 km. Buni 4 km^2 masofa bilan belgilangan 4 o‘sish maydonida topish mumkin, har bir populyatsiya orasidagi masofa 50–100 km. Yuqoridagi ko‘rsatkichlarni hisobga olgan holda, tur xavf ostida kategoriyasining (EN) tegishli mezonlari B2ab (ii, iii, iv) asosida baholandi.

Olingan natijalar 2025-yilda nashr etiladigan Qizil kitobning yangi tahririni tayyorlash uchun xizmat qiladi.

Mualliflar haqida ma’lumot:

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