

Research article

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Important Plant Area “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*” (Central Kazakhstan): site identification and conservation recommendations

Field surveys conducted in 2025 in the Ulytau low-mountain massif (Ulytau Region, Kazakhstan) support the identification of the Important Plant Area (IPA) “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*.” The site comprises two polygons totaling 1,372 ha (557 and 815 ha), located largely within Ulytau State National Nature Park, at elevations of 508–1,140 m a.s.l., and includes a mosaic of petrophytic communities on rocky substrates. The primary conservation target is the narrow-range endemic *Tanacetum ulutavicum* Tzvelev (Red Data Book of Kazakhstan), occurring in discrete population patches of 207–1,200 m² with densities of 0.06–3 individuals per m². Communities supporting this species show high floristic richness (82 vascular plant species) and concentrate multiple taxa of conservation concern, including several rare and regionally significant species. The site meets the Kazakhstan-adapted IPA subcriteria A3 and A4 (endemic and subendemic species) and B2 and B3 (assemblages of high conservation and socio-economic value). Principal threats include grazing pressure, trampling, unregulated recreation, and localized substrate disturbance. Formal boundary delineation, long-term population monitoring, and regulation of grazing and visitor use are recommended to ensure effective conservation management.

Keywords: Ulytau, Important Plant Area (IPA), petrophytic steppes, endemics, *Tanacetum ulutavicum*, plant conservation, Ulytau State National Nature Park.

Introduction

The Important Plant Area (IPA) methodology is applied as a science-based tool for prioritizing sites of significance for the conservation of flora and vegetation. It is grounded in the Plantlife International framework, which includes criterion A—threatened and geographically restricted species; criterion B—diverse, unique and valuable plant communities; and criterion C—threatened habitats [1, 2].

In Kazakhstan, recent years have seen active testing and adaptation of the IPA criteria, coupled with alignment between the IPA approach and the Key Biodiversity Area (KBA) Standard. This integration enables the translation of botanical research outcomes into management decisions and spatial conservation planning [1–4, 12–14]. An important task is the identification of IPAs within existing protected areas to strengthen the conservation of plant diversity, as these areas typically retain the most intact natural complexes and provide conditions for targeted conservation management [15].

The Ulytau Mountains are characterized by a rocky terrain, a well-developed network of gorges, canyons, ravines, intermontane valleys, and a broad spectrum of low-mountain habitats. This environmental heterogeneity results in pronounced vegetation mosaicism, combining petrophytic steppes, shrub thickets, and extra- and intrazonal communities, including birch and aspen groves and mesophytic meadows. Within Ulytau, the most vulnerable elements are narrowly localized populations of endemic and rare taxa that are sensitive to changes in grazing pressure and recreational disturbance [5–10, 16].

Of particular conservation concern is Ulytau tansy (*Tanacetum ulutavicum* Tzvelev), a perennial herb of the family Asteraceae with declining population size. The species is listed in the Red Data Book of Kazakhstan as a rare (vulnerable) taxon of regional importance. Its distribution is restricted to rocky outcrops composed of slabs and scree, typically associated with both steep and gentle slopes of the Ulytau low-mountain massif and adjacent uplands [6, 7, 11].

The objective of this study is to provide a scientific justification for the designation of the IPA “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*”, to refine its boundaries and key conservation

features, to describe habitats and threats according to a standardized framework, and to propose practical recommendations for conservation and long-term monitoring.

Experimental

Field surveys of flora and vegetation were conducted in 2025 (30 June — 5 July) within the Ulytau low-mountain massif (within the boundaries of the State National Park and beyond), where the IPA was allocated (Fig. 1, Table 1).

Slope aspect and morphological characteristics were recorded, and the coordinates of key locations were collected using the Garmin GPS navigator. Coordinates are presented in decimal format to facilitate use in GIS-based analyses. The list of vascular plants was compiled from route-based surveys and targeted geobotanical relevés carried out using classical field methods; it was published as a checklist in GBIF. Taxonomic validation and nomenclatural updates were performed using current reference databases (POWO, WCVF, IPNI) and regional identification manuals [17–27].

Geobotanical descriptions were conducted at 100 sq. m plots in communities with participation of *T. ulutavicum* [Bykov, B.A. (1978). Geobotanika [Geobotany]. Alma-Ata: Nauka [in Russian]. For this purpose, special geobotanical forms are used, which provide detailed descriptions of relief, soils, and vegetation. The following aspects were considered for describing the plant communities: 1) floristic composition; 2) total projective coverage; 3) phenophase; 4) abundance of species by the Drude scale; 5) species distribution patterns; 6) vitality. The impact of both natural and anthropogenic factors on vegetation was also considered.

Additional information on the floristic diversity and vegetation of the Ulytau mountain system was obtained from publications by A.N. Kupriyanov [16] and M.Yu. Ishmuratova et al. [5].

IPA justification followed the framework of the nationally adapted IPA criteria (A–C), with the application of subcriteria relevant to the environmental and biogeographic conditions of Kazakhstan. To ensure comparability and facilitate subsequent integration into management and planning documents, habitats were classified using EUNIS terminology, with broader correspondence to IUCN Habitats v3.1. Threats and impact factors were coded according to the IUCN–CMP Threats Classification Scheme v3.2. IPA boundaries are proposed as two polygons encompassing the most representative and vulnerable areas of petrophytic steppes and the core localities of populations of the focal endemic species [2–4, 13, 14, 17].

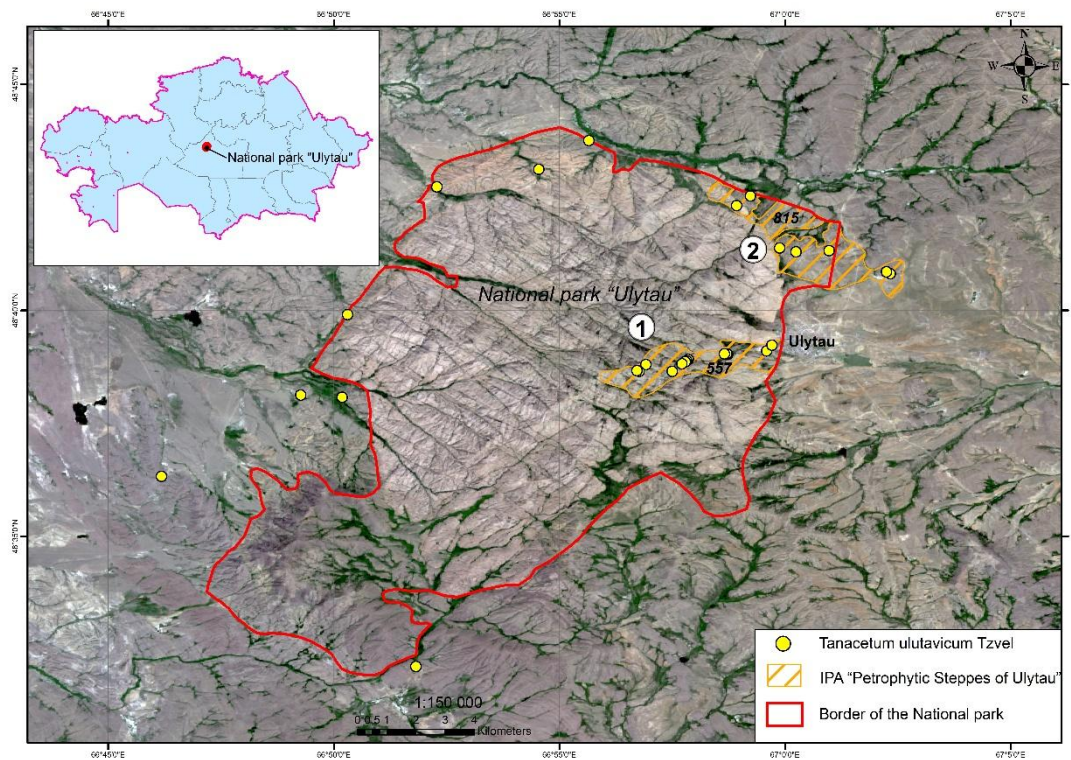


Figure 1. Location of the IPA “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*” within the Ulytau mountain system, proposed IPA boundaries (two sites), and key population localities of *Tanacetum ulutavicum*

Table 1

Geographic and administrative characteristics of the site

Russian name:	Петрофитные степи Улытау с <i>Tanacetum ulutavicum</i>		
English name:	Petrophytic Steppes of Ulytau with <i>Tanacetum ulutavicum</i>		
Kazakh name:	<i>Tanacetum ulutavicum</i> өсетің Ұлытау петрофитті далалары		
IPA code:	IPA-KZ-TU		
Country:	Kazakhstan		
Region:	Ulytau Region		
Center latitude, site 1 (decimal degrees):	48.6547°	Center longitude, site 1 (decimal degrees):	66.9757°
Center latitude, site 2 (decimal degrees):	48.6906°	Center longitude, site 2 (decimal degrees):	67.0099°
Elevation (minimum, m a.s.l.):	508	Elevation (maximum, m a.s.l.):	1140
Area (ha)	1,372	Vector boundaries available (*.kml/kmz or *.shp)	Yes

Results and Discussion

The main outcomes of this study include a detailed description of the Important Plant Area “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*” (IPA-KZ-TU) and the development of recommendations for its conservation.

1. Brief site description

The IPA “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*” was identified based on field surveys conducted in 2025 within the Ulytau low-mountain massif. The territory comprises two sites located near the village of Ulytau, predominantly within the boundaries of Ulytau State National Nature Park. The IPA includes rocky and stony–gravelly slopes, piedmont plains, and low upland areas where relatively intact petrophytic steppes and xerophytic shrub communities are preserved.

The principal conservation priority is the narrow-range endemic *Tanacetum ulutavicum*, listed in the Red Data Book of the Republic of Kazakhstan. The species occurs in fragmented populations confined to rocky substrates. Additional conservation value is provided by the presence of other Red Data Book species (*Tulipa patens* C. Agardh ex Schult. & Schult. f., *T. suaveolens* Roth), Kazakhstan subendemics (*Artemisia semiarida* (Krasch. & Lavrenko) Filatova, *Atraphaxis decipiens* Jaub. & Spach), and a substantial number of socio-economically important species, including 35 medicinal and 25 forage plants.

Communities containing *T. ulutavicum* exhibit relatively high floristic richness, with a total of 82 vascular plant species recorded.

2. Site boundaries

Site 1: northern point — 48.6548° N, 66.9592° E; southern point — 48.6736° N, 67.0149° E; western point — 48.6418° N, 66.9307° E; eastern point — 48.6486° N, 66.9980° E.

Site 2: northern point — 48.7032° N, 67.0101° E; southern point — 48.6736° N, 67.0149° E; western point — 48.7111° N, 66.9713° E; eastern point — 48.6745° N, 67.0433° E.

3. Botanical significance

The IPA represents a regionally representative, minimally disturbed complex of petrophytic steppes of Central Kazakhstan, interspersed with shrub thickets. The native vegetation of the low-mountain belt and adjacent piedmont plains is dominated by shrub thickets and petrophytic steppe communities, including bunch grass, bunch grass–forb steppes with shrubs, sagebrush–bunch grass, shrub–wormwood–bunch grass steppes, and fescue–forb meadow steppes.

Tanacetum ulutavicum Tzvelev (Asteraceae) is a narrow-range endemic of Kazakhstan, known primarily from the Ulytau massif and associated with petrophytic habitats, including rocky outcrops and fissures of granitic bedrock, where it occurs infrequently. In the Kew Plants of the World Online database, the species is recognized as an accepted taxon (protologue: [10]). Regional floristic syntheses and checklists of endemics identify it as a species listed in the Red Data Book of Kazakhstan, making it an anchor species for IPA justification under Criterion A and a focal target for long-term monitoring of populations and habitats.

Communities containing *T. ulutavicum* develop on both gentle (5–10°) and steeper slopes, as well as on level sections of the undulating piedmont plain covered by a stony mantle. The species occurs singly or in small groups (sol–sp). Local population patches range from 207 to 1,200 m², with densities of 0.06–3 individuals per m².

The coenoflora of the communities containing *T. ulutavicum* comprises 82 vascular plant species [10], with a notable concentration of resource-important and soil-stabilizing taxa typical of petrophytic steppe phytocenoses.

4. Habitats and geology

The IPA encompasses the rocky Mount Aulietau (789–1,140 m a.s.l.) and adjacent areas of the piedmont plain and low uplands. Bedrock outcrops in the form of slabs and gravelly scree cover 10–100 % of the surveyed surface. Slopes range from 30° to 50° and are characterized by frequent rock exposures and talus accumulations. Sharply dissected ridgelines are incised by deep, steep-sided ravines that contrast with the surrounding low upland and gently undulating piedmont relief.

The geological substrate of the IPA consists predominantly of granites subject to intense physical weathering under temperature fluctuations of up to 80 °C. Lithogenic soils developed on rocky slopes are shallow and gravelly, providing substrate conditions suitable for petrophytic species (e.g., *Artemisia*, *Ephedra*). The area is characterized by low-mountain chestnut soils (at higher elevations of Ulytau), as well as light chestnut, weakly developed, and skeletal stony soils [5, 10]. Humus content in the surface horizon ranges from 1.56 to 3.11 %.

According to the EUNIS habitat classification, the site includes: E1.1 — inland sandy and rocky habitats with sparse vegetation; E1.2 — perennial calcareous grasslands of the steppe zone; FD.1 — habitats dominated by xerophytic shrubs (Fig. 2) [1, 12].



Figure 2. Habitats within the IPA boundaries

For harmonization with IUCN Habitats v3.1 (for IPA documentation purposes), these habitat types can be broadly coded as *Temperate Grassland / Rocky areas* (petrophytic steppes and rocky outcrops) and *Shrubland* (xerophytic shrub communities), with subsequent refinement based on detailed field descriptions.

5. Conservation status and threats

The area lies predominantly within the boundaries of Ulytau State National Nature Park (approximately 80 %), which provides a baseline protection regime but does not eliminate localized pressures. The principal potential threats to the petrophytic steppes and local populations of *T. ulutavicum* are associated with grazing pressure, trampling, and recreational use near the settlement and along trails and access routes, as well as point disturbances of the substrate (including possible engineering works and plant collection).

An important site-specific impact is trampling and vegetation degradation along the trail leading to the summit of Mount Aulietau and at adjacent viewpoints; visitor flow management and interpretive signage are therefore recommended.

Preliminary threat coding according to the IUCN–CMP Threats Classification Scheme v3.2 includes: 2.3 Livestock farming & ranching (grazing/trampling); 6.1 Recreational activities (hiking, unregulated recreation); 4.1 Roads & railroads / 4.2 Utility & service lines (in the event of expansion of access routes or infrastructure).

6. Ecosystem services

The IPA provides several key ecosystem services:

- erosion control and slope stabilization, contributing to soil retention in rocky landscapes;
- maintenance of grazing resources and forage base, provided that sustainable stocking levels are observed;
- cultural and recreational services, reflecting the landscape value of Ulytau and its role in educational routes;
- scientific and educational functions as a reference site for monitoring rare and endemic steppe plants of Central Kazakhstan.

7. Justification of IPA status

The IPA “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*” meets several IPA subcriteria: A3, A4, B2, and B3 (Fig. 3, Table 2).

In accordance with the nationally adapted IPA framework for Kazakhstan and its established application (subcriteria A3, A4, B2, B3), the following criteria are justified for this site.

Criterion A: A3 — sites supporting a geographically restricted national endemic (narrow-range taxon), *Tanacetum ulutavicum*;

A4 — sites supporting subendemic species, *Artemisia semiarida* Krasch. and *Atraphaxis decipiens* Jaub. & Spach.

Criterion B: B2 — plant communities of high conservation value containing national endemics, subendemics, and species listed in the Red Data Book of Kazakhstan, including *Tanacetum ulutavicum*, *Artemisia semiarida*, *Atraphaxis decipiens*, *Tulipa patens* C. Agardh ex Schult. & Schult. f., *T. suaveolens* Roth.; B3 — plant communities containing species of cultural and socio-economic importance, including medicinal plants listed in the annotated inventory of medicinal plants of Kazakhstan [28] (*Achillea millefolium* L., *Echinops ritro* L., *Helichrysum arenarium* (L.) Moench, *Hypericum scabrum* L., *Juniperus sabina* L., *Peucedanum morisonii* Besser, *Ziziphora clinopodioides* Lam., *Thymus pannonicus* All., *Dodartia orientalis* L., *Cotoneaster melanocarpus* Fisch. ex Blytt.), as well as communities supporting crop wild relatives, particularly species of *Allium* (*A. galanthum* Kar. & Kir., *A. globosum* Bunge, *A. lineare* L., *A. strictum* Schrad., *Medicago falcata* L., and the genera *Agropyron*, *Festuca*, *Lolium*, and *Poa*).

Criterion C: was not applied due to the current lack of a formally developed system for identifying unique or priority habitats in this region. Nevertheless, the petrophytic steppes of the Ulytau low mountains may reasonably be considered vulnerable habitats. Their vegetation, exposed to anthropogenic pressures (grazing, infrastructure-related disturbance, recreation), demonstrates slower recovery rates compared with lowland ecosystems. Species forming these communities typically exhibit relatively low reproductive potential, determined by local bioclimatic conditions and the characteristics of light chestnut soils in the low-mountain belt.

Overall, the IPA was delineated as the minimum area sufficient to ensure spatial connectivity while encompassing a substantial proportion of the known, compactly distributed occurrences of *Tanacetum ulutavicum* within the surveyed portion of the Ulytau low-mountain massif. The combination of a narrow-range endemic, additional nationally protected species, high floristic richness of petrophytic steppe communities, and the inherent vulnerability of rocky habitats establishes this territory as a priority for monitoring and targeted conservation management, even under the existing national park designation (Table 3).



A



B



Figure 3. Examples of key species within the IPA boundaries
(photographer and license indicated in parentheses for non-commercial use):

A — *Tanacetum ulutavicum* (V. Epiktetov, CC BY-NC 4.0); B — *Tulipa patens* (S. Lednev, CC BY-NC 4.0);
C — *Atraphaxis decipiens* (V. Epiktetov, CC BY-NC 4.0); D — *Allium galanthum* (L. Dimeyeva, CC BY-NC 4.0)

Table 2

Priority species (Criteria A and B)

Taxon / criteria, subcriteria			Compliance with Criterion A: The IPA contains ...			For compliance with the KBA criteria, the site contains ...		Importance / Occurrence
Taxon	A	B	≥ 1 % global population (yes/no)	≥ 5 % national population (yes/no)	1 of 5 best national sites (yes/no)	≥ 10 % global population (yes/no)	Entire global population (yes/no)	Socio-economic importance (yes/no)
<i>Tanacetum ulutavicum</i>	A3	B 2	Yes	Yes	Yes	Yes	No	No
<i>Artemisia semiarida</i>	A4	B 2	No	No	Yes	No	No	Yes
<i>Atraphaxis decipiens</i>	A4	B 2	No	No	Yes	No	No	No
<i>Tulipa patens</i>	-	B 2	No	No	No	No	No	No
<i>Tulipa suaveolens</i>	-	B 2	No	No	No	No	No	No
<i>Achillea millefolium</i>	-	B 3	No	No	No	No	No	No
<i>Allium galanthum</i>	-	B 3	No	No	Yes	No	No	No
<i>Artemisia juncea</i>	-	B 3	No	No	No	No	No	No
<i>Cotoneaster melanocarpus</i>	-	B 3	No	No	No	No	No	No
<i>Dodartia orientalis</i>	-	B 3	No	No	No	No	No	No
<i>Echinops ritro</i>	-	B 3	No	No	No	No	No	No
<i>Helichrysum arenarium</i>	-	B 3	No	No	No	No	No	No
<i>Hypericum scabrum</i>	-	B 3	No	No	No	No	No	No
<i>Juniperus sabina</i>	-	B 3	No	No	No	No	No	No

Continuation of Table 2

Taxon / criteria, subcriteria			Compliance with Criterion A: The IPA contains ...			For compliance with the KBA criteria, the site contains ...		Importance / Occurrence
Taxon	A	B	≥ 1 % global population (yes/no)	≥ 5 % na- tional population (yes/no)	1 of 5 best national sites (yes/no)	≥ 10 % global pop- ulation (yes/no)	Entire global population (yes/no)	Socio- economic importance (yes/no)
<i>Peucedanum morisonii</i>	-	B3	No	No	No	No	No	No
<i>Thymus pannonicus</i>	-	B3	No	No	No	No	No	No
<i>Ziziphora clinopodioides</i>	-	B3	No	No	No	No	No	No

Table 3

Relationship with existing protected areas

Protected area type	Name	Relationship with IPA	Area overlap (%)
State National Nature Park	Ulytau	Partial overlap	~80 %

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9. Recommendations for conservation management and monitoring

To ensure the long-term conservation of the petrophytic steppes of Ulytau and the core localities of *Tanacetum ulutavicum*, the following priority management actions are proposed:

- formally delineate and approve IPA boundaries in GIS (two sites) and ensure inclusion in the national IPA registry;
- develop, in cooperation with Ulytau State National Nature Park, a long-term monitoring program for *T. ulutavicum*, including annual (seasonal) population censuses, assessment of population structure, habitat condition monitoring, documentation of anthropogenic impacts, and analysis of interannual trends;
- regulate grazing pressure within sensitive habitats and population loci of rare species, with temporary grazing restrictions during critical periods if necessary;
- restrict construction and other economic activities within IPA boundaries, prioritizing the preservation of rocky substrates and prevention of erosion;
- install informational materials along main routes, including the trail to Mount Aulietau, and implement measures to reduce trampling (marked trails, visitor routing, localized protective barriers).

Conclusion

The IPA “Petrophytic Steppes of Ulytau with *Tanacetum ulutavicum*” represents a compact yet highly valuable complex of petrophytic and dry-steppe habitats within the low-mountain zone, supporting the persistence of the narrow-range endemic *Tanacetum ulutavicum* and maintaining regional floristic diversity. The site clearly meets the Kazakhstan-adapted IPA subcriteria A3, A4, B2, and B3.

Despite its location within the protected boundaries of Ulytau State National Nature Park, key practical priorities include formal recognition of IPA boundaries, regulation of grazing and recreational impacts, and the establishment of long-term monitoring of focal populations and habitats.

Designation of the IPA within the structure of Ulytau National Park will enable a more targeted and scientifically grounded model of plant conservation, ensuring the protection of rare and endemic taxa, maintenance of essential ecosystem functions, and improved effectiveness of regional conservation strategies through strengthened protection measures and the implementation of regular research, monitoring, and adaptive management.

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Author Contributions

The manuscript was written through the contributions of all authors. All authors have approved the final version of the manuscript. CRediT: **Izbassarova Zh.S.** — conceptualization, data curation, investigation, analysis, methodology, writing draft; **Dimeyeva L.A.** — conceptualization, data curation, investigation, methodology, analysis, supervision, writing draft, editing; **Dubynin A.V.** — formal analysis, writing draft, registered in checklist dataset.

Conflict of Interest

The authors declare no conflict of interest.

References

- 1 Anderson S. Identifying and conserving Important Plant Areas. — Salisbury (UK): Plantlife International, 2002. — 52 p.
- 2 Darbyshire I. Important Plant Areas: revised selection criteria for a global approach to plant conservation / I. Darbyshire, A. Anderson, A. Asatryan, A. Byfield, M. Cheek, C. Clubbe, E.A. Radford // *Biodiversity and Conservation*, 2017. — Vol. 26. — P. 1767–1800.
- 3 Plantlife. Identifying and conserving Important Plant Areas (IPAs) around the world: guide for botanists, conservationists, site managers, community groups and policy makers. — Salisbury (UK): Plantlife International, 2018. — 71 p.
- 4 Plantlife International. Important Plant Areas: Target 5 of the Global Strategy for Plant Conservation. — Salisbury (UK): Plantlife International, 2004. — 24 p.
- 5 Ишмуратова М.Ю. Флора гор Улытау (Центральный Казахстан) / М.Ю. Ишмуратова, Г.Ж. Мырзалы, В.И. Ивлева, А.Н. Матвеев. — Караганда, 2016. — 108 с.
- 6 Ишмуратова М.Ю. Эндемичные виды растений флоры Карагандинской области (Центральный Казахстан): монография / М.Ю. Ишмуратова, С.У. Тлеукенова, А.Ш. Додонова, Е.А. Гаврилькова. — Караганда, 2016. — 109 с.
- 7 Кубентаев С.А. Чек-лист редких растений флоры Улытауской области / С.А. Кубентаев, Д.Т. Алибеков, Ш.Т. Тустубаева, Б.Б. Кубентаева // *Вестник Карагандинского университета. Серия: Биология. Медицина. География*, 2024. — Т. 29. — Вып. 3(115). — С. 113–121.
- 8 Мырзалы Г.Ж. Анализ флоры гор Улытау / Г.Ж. Мырзалы, М.Ю. Ишмуратова, В.И. Ивлев, А.Н. Матвеев // *Вестник Карагандинского университета. Серия: Биология. Медицина. География*, 2014. — № 4. — С. 45–52.
- 9 Куприянов А.Н. Особенности флоры Большого Улытау / А.Н. Куприянов, И.А. Хрусталева // *Материалы VI Международной научной конференции, посвященной 100-летию со дня рождения А.В. Положий*. — Томск, 2017. — С. 67–69.
- 10 Ишмуратова М.Ю. Новые сведения о флоре гор Улытау (Центральный Казахстан) / М.Ю. Ишмуратова, В.И. Ивлев, Г.Ж. Мырзалы, А.Н. Матвеев // *Проблемы ботаники Южной Сибири и Монголии: материалы XIII Международной научно-практической конференции*, 2019. — С. 93–94.
- 11 Красная книга Казахстана. — Т. 2. — Ч. 2. Растения. Астана, 2014. — 452 с.
- 12 Артемов И.И. Критерии выделения ключевых ботанических территорий в Алтае-Саянском экорегионе / И.И. Артемов, А.Ю. Королук, Н.Н. Лашинский, И.Э. Смелянский. — Новосибирск: Сибирский экологический центр, 2007. — 106 с.
- 13 Димеева Л.А. Роль ключевых ботанических территорий в реализации стратегий сохранения биоразнообразия Казахстана / Л.А. Димеева, Г.М. Кудабаева, П.В. Веселова // *Труды XIII съезда РБО*. — Тольятти, 2013. — Т. 3. — С. 17–18.
- 14 Дубынин А.В. Ключевые ботанические территории Казахстана: адаптация критериев выделения / А.В. Дубынин, Л.А. Димеева // *Актуальные вопросы сохранения биологического разнообразия и рационального природопользования. Интродукция растений: материалы Международной конференции*. — Риддер, 2025. — С. 277–292.

- 15 Масловский О.М. Ключевые ботанические территории Беларуси / О.М. Масловский, Г.А. Пронькина, В.И. Парфенов, А.В. Пугачевский. — Минск; Москва: Представительство МСОП для России и стран СНГ, 2005. — 79 с.
- 16 Куприянов А.Н. Конспект флоры Казахского мелкосопочника / А.Н. Куприянов. — Новосибирск: Академическое изд-во «Гео», 2020. — 424 с.
- 17 Дубынин А.В. «Ландшафты Чу-Илийских гор»: первый опыт выделения ключевой ботанической территории по обновленным критериям / А.В. Дубынин, В.Г. Эпиктепов, Л.А. Димеева А.А. Курмантаева // Проблемы и перспективы сохранения биоразнообразия Центральной Азии. Международной конференции. Пленарные доклады (6–8 ноября). — Алматы, 2025.
- 18 Павлов П.Н. Флора Казахстана / П.Н. Павлов. — Алма-Ата: Изд-во АН КазССР, 1956. — Т. 1. — 354 с.; 1958. — Т. 2. — 292 с.; 1960. — Т. 3. — 460 с.; 1961. — Т. 4. — 548 с.; 1961. — Т. 5. — 515 с.; 1963. — Т. 6. — 465 с.; 1964. — Т. 7. — 497 с.; 1965. — Т. 8. — 447 с.; 1966. — Т. 9. — 640 с.
- 19 Мырзалы Г.Ж. Определитель сосудистых растений гор Улытау / Г.Ж. Мырзалы, В.И. Ивлев, М.Ю. Ишмуратова, А.Н. Матвеев. — Жезказган, 2016. — 221 с.
- 20 Ишмуратова М.Ю. Определитель сосудистых растений Центрального Казахстана / М.Ю. Ишмуратова, С.У. Тлеукенова, Е.А. Гаврилькова, А.Ш. Додонова. — Караганда: ТОО «Полиграфист», 2017. — 302 с.
- 21 Plantarium. — [Электронный ресурс]. — Режим доступа: <https://www.plantarium.ru/page/view/item/42736.html>
- 22 КазФлора. — [Электронный ресурс]. — Режим доступа: https://kazflora.kz/catalog/?ELEMENT_ID=122858
- 23 Plants of the World Online. — POWO, 2025. — [Electronic resource]. — Access mode: <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:252559-1>
- 24 Комаров В.Л. (ред.). Флора СССР / В.Л. Комаров. — Москва; Ленинград: Изд-во АН СССР, 1961. — Т. 26. Сложноцветные (Asteraceae). — 938 с.
- 25 Стороженко Д.М. Почвы Карагандинской области / Д.М. Стороженко // Почвы Казахской ССР [в 16 вып.]. — Алма-Ата: Издательство Академии наук КазССР, 1967. — Т. 8. — 331 с.: ил.
- 26 Izbassarova Z. Checklist of vascular plant species in communities hosting the narrow-range Kazakh endemic *Tanacetum ulutavicum* Tzvelev (Version 1.1) [Dataset] / Z. Izbassarova, L. Dimeyeva, A. Dubynin. — Wings — Animal and Plant Conservation and Protection Fund, 2026. <https://doi.org/10.15468/n765pf>
- 27 Izbassarova Z. Occurrence records of *Tanacetum ulutavicum* Tzvelev from the Ulytau Mountains (Kazakhstan), supporting IUCN Red List assessment / Z. Izbassarova, L. Dimeyeva, A. Dubynin. — Wings — Animal and Plant Conservation and Protection Fund, 2026. Occurrence Dataset. <https://doi.org/10.15468/vr777q>
- 28 Грудзинская Л. М. Аннотированный список лекарственных растений Казахстана: Справочное издание / Л.М. Грудзинская, Г.Н. Гемеджиева, Н.В. Нелина, Ж.Ж. Каржаубекова // Труды Института ботаники и фитоинтродукции. — Алматы, 2014. — Т. 20(1). — 200 с.

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**«*Tanacetum ulutavicum* өсетін Ұлытау петрофитті далалары»
негізгі ботаникалық аумақ (Орталық Қазақстан):
анықтау негіздемесі және қорғау жөніндегі ұсыныстар**

Ұлытау аласа таулы массивіндегі (Ұлытау облысы, Қазақстан) 2025 жылғы далалық зерттеулер нәтижесіне сүйене отырып, «*Tanacetum ulutavicum* өсетін Ұлытау петрофитті далалары» негізгі ботаникалық аумағын анықтау негізделді. Аумақ екі участкені қамтиды, жалпы ауданы 1372 гектар (557 және 815 гектар). Көпшілігі «Ұлытау» Мемлекеттік ұлттық табиғи паркінің (МҰТП) шекарасында орналасқан және теңіз деңгейінен 508–1140 м биіктікте тасты субстраттардағы петрофитті қауымдастықтардың мозаикасын қамтиды. Қорғаудың негізгі нысанасы — тас жердегі эндемик *Tanacetum ulutavicum* Tzvelev (Қазақстанның Қызыл кітабы). Ол жергілікті популяциялық учаскелерді 207–1200 м² көлемінде құрайды, тығыздығы 0,06–3 дана/м². *Tanacetum ulutavicum* Tzvelev өсетін өсімдік қауымдастықтары флоралық байлығымен (82 тамырлы өсімдік түрі) және бірқатар сирек кездесетін және аймақтық маңызды түрлерді қоса алғанда, қорғауға қатысты таксондардың шоғырлануымен сипатталады. Аумақтың Қазақстанға бейімделген негізгі ботаникалық аумақ кіші критерийлеріне сәйкестігі дәлелденді: А3 және А4 (эндемикалық және субэндемикалық түрлердің мекендеу ортасы), В2 және В3 (жоғары қорғалатын және әлеуметтік-экономикалық құндылығы бар түрлердің қауымдастықтары). Негізгі қауіптер — жайылымдық жүктеме, жердің тапталуы, ұйымдастырылмаған демалыс, сондай-ақ соқпақтар мен кіреберіс жолдардың жанындағы жергілікті субстраттың бұзылуымен байланысты. Шекараларды ГАЖ және негізгі ботаникалық аумағының тізілімінде тіркеу, *T. ulutavicum* популяциясын ұзақ мерзімді бақылау, жайылымдық және

рекреациялық ағындарды реттеу және бағыттар бойынша ақпаратты қолдау үшін басқару және мониторинг шаралары ұсынылды.

Кілт сөздер: Ұлытау, негізгі ботаникалық аумақ, петрофитті далалар, эндемикалық өсімдіктер, *Tanacetum ulutavicum*, флораны қорғау, «Ұлытау» МҰТП.

Ж.С. Избасарова, Л.А. Димеева, А.В. Дубынин

Ключевая ботаническая территория «Петрофитные степи Улытау с *Tanacetum ulutavicum*» (Центральный Казахстан): обоснование выделения и рекомендации по охране

По итогам полевых исследований 2025 года в низкогорном массиве Улытау (Улытауская область, Казахстан) обосновано выделение ключевой ботанической территории (КБТ) «Петрофитные степи Улытау с *Tanacetum ulutavicum*». Территория включает два участка общей площадью 1372 га (557 и 815 га), большая часть которой находится в границах Государственного национального природного парка (ГНПП) «Улытау», в высотном диапазоне 508–1140 м над у.м. и охватывает мозаику петрофитных сообществ на каменистых субстратах. Ключевым объектом охраны является узколокальный эндемик *Tanacetum ulutavicum* Tzvelev (Красная книга Казахстана), образующий локальные популяционные пятна площадью 207–1200 м² при плотности 0,06–3 экз./м². Растительные сообщества с участием пижмы улытавской характеризуются значительным флористическим богатством (82 вида сосудистых растений) и концентрацией значимых для охраны таксонов, включая ряд редких и регионально важных видов. Для территории обосновано соответствие адаптированным для Казахстана подкритериям КБТ А3 и А4 (местообитания эндемичных и субэндемичных видов), В2 и В3 (сообщества видов высокой природоохранной и социально-экономической ценности). Основные угрожающие факторы связаны с пастбищной нагрузкой, вытаптыванием и неорганизованной рекреацией, а также локальными нарушениями субстрата вблизи троп и подъездных дорог. Предложены меры по управлению и мониторингу: фиксация границ в ГИС и реестре КБТ, долговременный мониторинг популяций *T. ulutavicum*, регламентация выпаса и рекреационных потоков, информационное сопровождение на маршрутах.

Ключевые слова: Улытау; ключевая ботаническая территория (КБТ/ИРА); петрофитные степи; эндемики; *Tanacetum ulutavicum*; охрана флоры; ГНПП «Улытау».

References

- 1 Anderson, S. (2002). *Identifying and conserving Important Plant Areas*. Salisbury, UK: Plantlife International.
- 2 Darbyshire, I., Anderson, A., Asatryan, A., Byfield, A., Cheek, M., Clubbe, C., & Radford, E. A. (2017). Important Plant Areas: Revised selection criteria for a global approach to plant conservation. *Biodiversity and Conservation*, 26, 1767–1800.
- 3 (2018). *Plantlife. Identifying and conserving Important Plant Areas (IPAs) around the world: Guide for botanists, conservationists, site managers, community groups, and policy makers*. Salisbury, UK: Plantlife International.
- 4 (2004). *Plantlife International. Important Plant Areas: Target 5 of the Global Strategy for Plant Conservation*. Salisbury, UK: Plantlife International. 24 p.
- 5 Ishmuratova, M. Yu., Myrzaly, G. Zh., Ivlev, V. I., & Matveev, A. N. (2016). *Flora gor Ulytau (Tsentralnyi Kazakhstan)* [Flora of the Ulytau Mountains (Central Kazakhstan)]. Karaganda [in Russian].
- 6 Ishmuratova, M. Yu., Tleukenova, S. U., Dodonova, A. Sh., & Gavrilkova, E. A. (2016). *Endemichnye vidy rastenii flory Karagandinskoi oblasti (Tsentralnyi Kazakhstan): monografiia* [Endemic plant species of the flora of Karaganda Region (Central Kazakhstan): monograph]. Karaganda [in Russian].
- 7 Kubentaev, S. A., Alibekov, D. T., Tustubaeva, Sh. T., & Kubentaeva, B. B. (2024). Chek-list redkikh rastenii flory Ulytauskoi oblasti [Checklist of rare plants of the flora of Ulytau Region]. *Vestnik Karagandinskogo universiteta. Seriya «Biologiya. Meditsina. Geografiya» — Bulletin of the Karaganda University. "Biology. Medicine. Geography" Series*, 29, 3(115), 113–121 [in Russian].
- 8 Myrzaly, G. Zh., Ishmuratova, M. Yu., Ivlev, V. I., & Matveev, A. N. (2014). Analiz flory gor Ulytau [Analysis of the flora of the Ulytau Mountains]. *Vestnik Karagandinskogo universiteta. Seriya «Biologiya. Meditsina. Geografiya» — Bulletin of the Karaganda University. "Biology. Medicine. Geography" Series*, 4, 45–52 [in Russian].
- 9 Kupriyanov, A. N., & Khrustaleva, I. A. (2017). Osobennosti flory Bolshogo Ulytau [Features of the flora of Bolshoy Ulytau]. *Materialy VI Mezhdunarodnoi nauchnoi konferentsii, posviashchennoi 100-letiiu so dnia rozhdeniia A.V. Polozhii — Proceedings of the VI International Scientific Conference dedicated to the 100th anniversary of A.V. Polozhiy* (pp. 67–69). Tomsk [in Russian].

- 10 Ishmuratova, M. Yu., Ivlev, V. I., Myrzaly, G. Zh., & Matveev, A. N. (2019). Novye svedeniia o flore gor Ulytau (Tsentralnyi Kazakhstan) [New data on the flora of the Ulytau Mountains (Central Kazakhstan)]. *Problemy botaniki Yuzhnoi Sibiri i Mongolii: materialy XIII Mezhdunarodnoi nauchno-prakticheskoi konferentsii — Problems of Botany of Southern Siberia and Mongolia: Proceedings of the XIII International Scientific-Practical Conference* (pp. 93-94) [in Russian].
- 11 (2014). *Krasnaia kniga Kazakhstana* [Red Data Book of Kazakhstan]. Vol. 2, Part 2. *Rasteniia* [Plants]. Astana [in Russian].
- 12 Artemov, I. I., Korolyuk, A. Yu., Lashchinskiy, N. N., & Smelyanskiy, I. E. (2007). *Kriterii vydeleniia kliuchevykh botanicheskikh territorii v Altae-Saianskom ekoregione* [Criteria for identifying Important Plant Areas in the Altai–Sayan ecoregion]. Novosibirsk: Sibirskii ekologicheskii tsentr [in Russian].
- 13 Dimeyeva, L. A., Kudabaeva, G. M., & Veselova, P. V. (2013). Rol kliuchevykh botanicheskikh territorii v realizatsii strategii sokhraneniia bioraznobraziia Kazakhstana [The role of Important Plant Areas in the implementation of biodiversity conservation strategies in Kazakhstan]. *Trudy XIII sezda Rossiiskogo Botanicheskogo Obshchestvo — Proceedings of the XIII Congress of the Russian Botanical Society* (Vol. 3, pp. 17-18) [in Russian].
- 14 Dubynin, A. V., & Dimeyeva, L. A. (2025). Kliuchevye botanicheskie territorii Kazakhstana: adaptatsiia kriteriev vydeleniia [Important Plant Areas of Kazakhstan: Adaptation of selection criteria]. *Aktualnye voprosy sokhraneniia biologicheskogo raznobraziia i ratsionalnogo prirodopolzovaniia. Introduktsiia rastenii: materialy Mezhdunarodnoi konferentsii — Current issues of biodiversity conservation and rational nature use. Plant introduction: Proceedings of the international conference* (pp. 277–292). Ridder [in Russian].
- 15 Maslovskiy, O. M., Pronkina, G. A., Parfenov, V. I., & Pugachevskiy, A. V. (2005). *Kliuchevye botanicheskie territorii Belarusi* [Important Plant Areas of Belarus]. Minsk–Moscow: Predstavitelstvo Mezhdunarodnogo Soiuza Okhrany Prirody dlia Rossii i stran SNG [in Russian].
- 16 Kupriyanov, A. N. (2020). *Konspekt flory Kazakhskogo melkosopohnika* [Synopsis of the flora of the Kazakh uplands]. Novosibirsk: Akademicheskoe izdatelstvo «Geo» [in Russian].
- 17 Dubynin, A. V., Epiktetov, V. G., Dimeyeva, L. A., & Kurmantaeva, A. A. (2025). «Landshafty Chu-Iliiskikh gor»: pervyi opyt vydeleniia kliuchevoi botanicheskoi territorii po obnovlennym kriteriiam [“Chu-Ili Mountains Landscapes”: the First experience in Kazakhstan of designating in important Plant Area under updated criteria]. *Problemy i perspektivy sokhraneniia bioraznobraziia Tsentralnoi Azii. Mezhdunarodnoi konferentsii. Plenarnye doklady (6–8 noiabria) — Challenges and Prospects for Biodiversity Conservation in Central Asia. International scientific and practical conference. Plenary Reports (6–8 November)*. Almaty [in Russian].
- 18 Pavlov, P. N. (Ed.). (1956–1966). *Flora Kazakhstana* [Flora of Kazakhstan] (Vols. 1–9). Alma-Ata: Izdatelstvo Akademii Nauk Kazakhskoi SSR [in Russian].
- 19 Myrzaly, G. Zh., Ivlev, V. I., Ishmuratova, M. Yu., & Matveev, A. N. (2016). *Opredelitel sosudistykh rastenii gor Ulytau* [Identification guide to vascular plants of the Ulytau Mountains]. Zhezkazgan [in Russian].
- 20 Ishmuratova, M. Yu., Tleukenova, S. U., Gavrilkova, E. A., & Dodonova, A. Sh. (2017). *Opredelitel sosudistykh rastenii Tsentralnogo Kazakhstana* [Identification guide to vascular plants of Central Kazakhstan]. Karaganda: TOO «Poligrafist» [in Russian].
- 21 Plantarium (n.d.). *www.plantarium.ru*. Retrieved from <https://www.plantarium.ru/page/view/item/42736.html> [in Russian].
- 22 KazFlora (n.d.). *www.kazflora.kz*. Retrieved from https://kazflora.kz/catalog/?ELEMENT_ID=122858 [in Russian].
- 23 (2025). Plants of the World Online (POWO). (n.d.). *www.powo.science.kew.org*. Retrieved from <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:252559-1>
- 24 Komarov, V. L. (Ed.). (1961). *Flora SSSR* [Flora of the USSR]. Vol. 26. *Slozhno-tsvetnye (Asteraceae)* [Difficult-colored (Asteraceae)]. Moscow–Leningrad: Izdatelstvo Akademii Nauk SSSR [in Russian].
- 25 Storozhenko, D. M. (1967). Pochvy Karagandinskoi oblasti [Soils of Karaganda Region]. *Pochvy Kasakhskoi SSR — Soils of the Kazakh SSR* (Vols. 1–16, Vol. 8). Alma-Ata: Izdatelstvo Akademii Nauk Kazakhskoi SSR [in Russian].
- 26 Izbassarova, Z., Dimeyeva, L., & Dubynin, A. (2026). *Checklist of vascular plant species in communities hosting the narrow-range Kazakh endemic Tanacetum ulutavicum Tzvelev (Version 1.1) [Dataset]*. Wings — Animal and Plant Conservation and Protection Fund. <https://doi.org/10.15468/n765pf>
- 27 Izbassarova, Z., Dimeyeva, L., & Dubynin, A. (2026). *Occurrence records of Tanacetum ulutavicum Tzvelev from the Ulytau Mountains (Kazakhstan), supporting IUCN Red List assessment*. Wings — Animal and Plant Conservation and Protection Fund. Occurrence Dataset. <https://doi.org/10.15468/vr777q>
- 28 Grudzinskaya, L. M., Gemedzhieva, N. G., Nelina, N. V., & Karzhaubekova, Zh. Zh. (2014). Annotirovannyi spisok lekarstvennykh rastenii Kazakhstana: Spravochnoe izdanie [Annotated list of medicinal plants of Kazakhstan: A reference edition]. *Trudy Instituta botaniki i fitointroduktsii — Proceedings of the Institute of Botany and Phytointroduction*, 20(1), 200 [in Russian].

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