

## ENDEMIC SPECIES UNDER POTENTIAL THREAT IN SHAHMARDAN AREA

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**Abstract.** This article provides information about endemics of the Fergana Valley. At the same time, distribution bitopes, life forms, areal types of 17 endemic species belonging to category A(iii) found in Shakhimardon AABH are given.

**Key words:** anthropogenic, ecotourism, enclave area, nature, endemic, species, flora, life form.

Endemism is considered one of the real indicators showing the evolutionary path of taxa for a specific area. A number of studies aimed at studying local flora have been conducted in our country [1]. But until now, the composition of species endemic to the flora of Uzbekistan has not been fully formed. In recent years, a complete list of species endemic to the flora of Uzbekistan has been formed by scientists of the Institute of Botany of the Ukrainian Academy of Sciences on the basis of long-term field research and scientific sources. According to this, the endemic flora of Uzbekistan consists of 32 families, 331 species belonging to 100 genera. The status of taxa is likely to change on the basis of field and laboratory research, as new species continue to be introduced to science every year using modern molecular methods [3].

The Fergana Valley is an intermountain lowland, the area of which is 22 thousand km<sup>2</sup>, together with the surrounding mountains it reaches 80 thousand km<sup>2</sup>. The valley is surrounded by Kurama and Chotkal mountain ranges from the north-west, Ferghana from the north-east, and Turkestan and Aloy mountain ranges from the south. The height of these mountains reaches 5000 m above sea level. The valley consists mainly of plains. In the botanical-geographical zoning scheme of Uzbekistan, this area is included in the Western Tien-Shan, Fergana, Fergana-Oloy districts of the Mountainous-Central Asia province, and the Central Fergana districts of the Turan province. The part of the Fergana valley belonging to the Republic of Uzbekistan corresponds to the Kurama, Chotkal and Aloy ridges, and administratively to the Namangan, Fergana and Andijan regions [10].

### **Research materials and methods**

When obtaining information in this article, the names of representatives of floristic species, information on distribution areas and ecology Plants of the world (<https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:528815-1>) site was used. Modern names of species are given according to The World Plants Catalog of Life (<https://www.catalogueoflife.org/>) [13,14]. Species distribution locations were determined using Google Earth coordinates. Shahimardon is located in the eastern part of the Republic of Uzbekistan, in the Fergana district of the Fergana region. The area of the enclave is 90 sq. km, and the population is more than 10,000. Several rivers flow through the enclave area, the largest of which are Oksu, Shahimardonsoi and Koxsu rivers. Koxsu river joins Aksu river. The Shahimardonsoy river begins near the village park and flows into Margilonsoy. The main source of these rivers is glaciers in the Kyrgyz Republic. The flow of Aksuv starts from the North Alouddin, Archa-Boshi and West Karakozig glaciers. At the beginning, the river named Alouddin joined with Alouddin Archa-Boshi stream and got the name Aksu. It is joined by the Dugoba stream in the village of Yordon. There are two villages in the enclave, Shahimardon and Yordon. The average temperature in the mountainous regions is relatively lower than in Uzbekistan, and as a result, it is difficult to farm in Shahimardan. Apple, peach

and apricot orchards are widespread in rural areas [9]. Breeding of livestock, milk and milk products, meat and vegetables is sufficient only for domestic consumption and satisfies only domestic needs. Shahimardan is developing as an ecotourism destination along with pilgrimage tourism. The tourist season lasts from June to the end of September [3].

### Analysis and results

In this enclave, the lowest temperature in January is  $-23.0^{\circ}\text{C}$ , and the highest temperature is in July, when the temperature reaches  $+42.0^{\circ}\text{C}$ . The average amount of precipitation is 350-400 mm. The average temperature in July is  $22^{\circ}\text{C}$ , and in January it is between  $-3$  and  $3^{\circ}\text{C}$ .

The region of Shahimardan enclave is rich in floristic composition and is of special importance due to the large number of endemic species. The uniqueness of the area lies in the fact that 17 of the 18 endemic species found in the Fergana Valley under category A(iii) grow in the specially important botanical area of Shahimardon.

### List of Ferghana valley endemics belonging to category A(iii) distributed in Shahimardan AABH.

1-tabel

№	Familiy.	Genus	Spesies
1	<i>Amaryllidaceae</i>	<i>Allium L</i>	<i>Allium sochense</i>
2	<i>Fabaceae</i>	<i>Astragalus L</i>	<i>Astragalus lachnolobus</i>
3	<i>Plumbaginaceae</i>	<i>Acantholimon Boiss</i>	<i>Acantholimon muchamedshanovii</i>
4	<i>Plumbaginaceae</i>	<i>Acantholimon Boiss</i>	<i>Acantholimon schachimardanicum</i>
5	<i>Plumbaginaceae</i>	<i>Acantholimon Boiss</i>	<i>Acantholimon katrantavicum</i>

6	<i>Liliaceae</i>	<i>Gagea Salisb</i>	<i>Gagea schachimardanica</i>
7	<i>Ranunculaceae</i>	<i>Delphinium Tourn. ex L</i>	<i>Delphinium vvedenskyi</i>
8	<i>Polygonaceae</i>	<i>Calligonum L</i>	<i>Calligonum calcareum</i>
9	<i>Fabaceae</i>	<i>Chesneya Lindl. ex Endl</i>	<i>Chesneya ternate</i>
10	Fabaceae	Hedysarum L	Hedysarum alaicum
11	Fabaceae	Oxytropis DC	Oxytropis schachimardanica
12	Poaceae	Stipa L	Stipa magnifica
13	Rosaceae	Sorbaria tomentosa	Sorbaria tomentosa
14	Brassicaceae	Lepidium curvinervium	Lepidium curvinervium
15	Lamiaceae	Phlomis Moench	Phlomis isochila
16	Scrophulariaceae	Nathaliella B.Fedtsch	Nathaliella alaica B.Fedtsch
17	Asteraceae	Jurinea Cass	Jurinea schachimordanica

The conducted analyzes showed that 17 species belonging to 13 families and 14 genera of Ferghana Valley endemics belonging to A(iii) category were found in Shahimardan (Table 1).

1. *Allium sochense* R.M. Fritsch & U. Turak Stapfia 80: 387 (2002);

**Life form:** perennial;

**Significance:** decorative plant;

**Biotope:** grows on rocky, gravelly slopes. It is found in the middle mountains according to its occurrence on the slopes;

**Distribution area:** Aloy ridge, Fergana Aloy ridge, where it is distributed in Uzbekistan.

**Species ID-0151213, GenusID-0151.**

2. *Astragalus lachnolobus* Kovalavsk & Vved. Fl. Uzbekistan. 3: 799 (1955);

**Life form:** perennial;

**Biotope:** Middle mountains, mountain slopes according to their meeting on the slopes. Aloy ridge (Shahimardan river basin);

**Distribution area:** Mountains of Central Asia. The distribution area in Uzbekistan is Fergana Aloy ridge, Eastern Aloy;

**Species ID-0555436, Genus ID -0555.**

3. *Acantholimon muchamedshanovii* Lincz. Bot. Mater. Gerb. Bot. Inst. Komarova Acad. Nauk S.S.S.R. 21: 495 (1961);

**Life form:** Short bush;

**Biotope:** It grows on rocky slopes. northern slope of the Oloy ridge: Ortachi mountains in the upper reaches of the Shakhimardan river and Shakhimardon river basin;

**Distribution area:** High mountains according to the meeting on the slopes, Oloy ridge, Pamir-Oloy, Oloy ridge (Shakhimardon river basin), The distribution area in Uzbekistan is Fergana Aloy ridge, Eastern Aloy;

**Species ID-0956053, Genus ID -0956.**

4. *Acantholimon schachimardanicum* Lincz. Bot. Mater. Gerb.Bot. Inst. Komarova Acad. Nauk S.S.S.R. 21: 492 (1961);

**Life form:** Short bush;

**Biotope:** It grows on rocky slopes. Northern foothills of the Aloy mountains, between Sokh and Shahimardon rivers and Oloy range (basin of Sokh and Shahimardon rivers);

**Distribution area:** Low mountains, middle mountains, Aloy range, Pamir-Aloy, Central Asia mountains, its distribution in Uzbekistan is Fergana Aloy ridge, Western Aloy, Eastern Aloy;

**Species ID** - 0956033, **Genus ID** -0956.

5. *Acantholimon catrantavicum* Lincz. Bot. Mater. Gerb. Bot. Inst. Komarova Acad. Nauk S.S.S.R. 21: 493 (1961);

**Life form:** Short bush;

**Biotope:** Foothills of the Aloy Range, Katrantau Mountains and northern foothills of the Aloy Range, Katrantau Mountains between the Sokh and Shakhimardan rivers;

**Distribution area:** Middle mountains according to meeting on slopes. Northern Pamir-Aloy, distribution in Asia Pamir-Oloy, Aloy ridge (basin of Sokh and Shakhimardan rivers). Distribution in the mountains of Central Asia, Fergana Aloy ridge, Western Aloy, Eastern Aloy;

**Species ID**-0956075, **Genus ID** -0956.

6. *Gagea schachimardanica* Levichev. Turczaninowia 4(1-2): 25 (2001);

**Life form:** perennial;

**Significance:** decorative plant;

**Biotope:** grows on rocky, gravelly slopes, stony, alluvial fans and grows in the middle of the mountains because it is found on the slopes;

**Distribution area:** Aloy ridge, mountains of Central Asia, distributed in Uzbekistan Fergana Aloy ridge, Eastern Aloy;

**Species ID** - 0150078, **Genus ID** -0150.

7. *Delphinium vvedenskyi* Pachom. Opred. Rast. Sred. Azii 3: 238 (1972);

**Life form:** perennial;

**Biotope:** fine soil, rocky slopes, sheds, spruce forests, deciduous forests, montane steppes, subalpine and alpine on it grows in wet places near meadows, glaciers and

snow deposits. Middle mountains and high mountains, depending on where they meet on the slopes Alkaloid;

**Distribution area:** Northern Pamir-Aloy. In Central Asia, it meets Pamir-Aloy (Aloy Range: Shahimardan River Basin), Aloy Range (Sokh and Shahimardan River Basin). It is endemic to the mountains of Central Asia, Uzbekistan, Fergana Aloy ridge, Western Aloy, Eastern Aloy, Northern Pamir-Aloy;

**Species ID** - 0313013, **Genus ID** -0313

8. *Calligonum calcareum* Pavlov. Repert. Spec. Nov. Regni Veg. 33: 149 (1933);

**Life form:** bush;

**Biotope:** growing on limestone slopes, sandy and rocky river banks. Due to the fact that they are found on the slopes, the fodder found in the foothills is a rare species that can be grown in forest reclamation. The northern slopes of the Turkestan and Aloy ranges (basins of the Sokh and Isfara rivers);

**Distribution area:** Pamiro-Alay, Uzbekistan, Tajikistan. Aloy ridge (Sokh river basin). It is found in the mountains of Central Asia, in the Western Highlands;

**The need for protection;** Red Book of Uzbekistan (2009), category 2;

**Species ID**-0206007, **Genus ID** -0206

9. *Chesneya ternate* (Korsh) Popov. Bull. Sredne-Aziatsk. Gosud. Univ. 15(Suppl.): 10 (1927);

**Life form:** perennial;

**Biotope:** fine soil, gravelly, rocky slopes, rocks, boulders, conglomerates, gravels, river banks grows in whites. It is found in the foothills, low mountains, and middle mountains, depending on the slope;

**Distribution area:**Tien-Shan, Pamir-Olai (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan), mountains of Central Asia, Western Tien-Shan, Ferghana, Ferghana-Aloy, Kuhiston, Nurota, Western Hisar, Tashkent, Namangan, Fergana, Jizzakh, Surkhandarya. Endemic to mountainous Central Asia, found in Zomin and Chotkal reserves, Zomin and Ugom-Chotkal national parks;

**Species ID-0554001, Genus ID -0554.**

10. *Hedysarum alaicum* B. Fedtsch. Bot. Mater. coat of arms Bot. Inst. Komarova Acad. Nauk S.S.S.R. 11: 116 (1949);

**Life form:** perennial;

**Biotope:** rocky slopes, spruce forests. found in foothills and lowlands;

**Distribution area:** Aloy ridge. Pamir-Aloy (Aloy range: Ankhor section, Arpa gorge), Central Asian mountains, distributed in Uzbekistan Fergana Aloy range, Eastern Aloy, endemic to the Aloy range;

**Species ID-0561021, Genus ID-0561**

11. *Oxytropis schachimardanica* Film. Opred. Rast. Sred. Azii 7: 379 (1983);

**Life form:** perennial;

**Biotope:** Pamir-Aloy (Aloy range - around the village of Shahimardan, Aksuv river valley, Izbosar mountains);

**Distribution area:** Middle mountains according to meeting on slopes. Aloy ridge, Central Asian mountains, distributed in Uzbekistan Fergana Aloy range, Eastern Aloy, endemic to the Aloy range, endemic to Uzbekistan.

**Species ID- 0556082, Genus ID-0556**

12. *Stipa magnifica* Junge. Izv. Imp. S.-Peterburgsk. Bot. Sada 10: 128 (1910);

**Life form:** perennial;

**Biotope:** it grows on stony, gravelly slopes. Low mountains, medium mountains according to the meeting on the slopes;

**Distribution area:** Aloy Range, Pamir-Aloy (Aloy Range), Fergana Aloy Range, distributed in Uzbekistan, endemic to the Aloy Range;

**Species ID-0067006, Genus ID-0067**

13. *Sorbaria tomentosa* (Lindl.) Al-Shehbaz & Mumm. Leader. J. Arnold Arbor. 19: 74 (1938);

**Significance:** decorative, honey succulent plant;

**Life form:** bush;

**Biotope:** it grows on middle mountains according to Gorges and Slopes;

**Distribution area:** Aloy ridge (Shahimardan river basin), distribution in Uzbekistan the northern slope of the Aloy ridge (Shahimardan river basin); Mountains of Central Asia, Fergana Aloy Range in Uzbek, Eastern Aloy, Apparently, an extinct endemic of the Aloy Range;

**The need for protection;** Red Book of Uzbekistan (2019), category 1;

**Species ID-0493001, Genus ID-0493**

14. *Lepidium curvinervium* (Botsch. & Vved.) Edinburgh J. Bot. 68: 168 (2011);

**Life form:** perennial;

**Biotope:** It grows on the slopes with fine soil, gravel, and stones. Low mountains as they meet on slopes;

**Distribution area:** Aloy Range, Pamir-Aloy (Aloy Range: Shahimardan, Shalyangtog), Eastern Aloy, endemic to the Aloy Range;

**Species ID- 0437006, Genus ID-0437.**

15. *Phlomoides isochila* (Pazij. & Vved.) Salmaki. Taxon 61: 176 (2012);

**Significance:** honey succulent plant;

**Life form:** perennial;

**Biotope:** sandy, clayey deserts, mountain plains, fine soil, gravelly, rocky slopes, gravels, foothills, low mountains, and mid-mountains according to its appearance on the slopes;

**Distribution area:** South Caucasus, Central Asia, Asia Minor, Iran, Afghanistan, Western China, Mongolia. Island deserts, Moyunqum, river valley. Chu, Priili plain, Zakaratau and Prikaratau plains, Pritashkent chuli, Jung'or Olatau, Tien-Shan (Chu-Ili mountains, Transiliy Olatau, Kyrgyz Olatau, Talas Olatau, Qoratau, Karjantau, Ugamsky, Pskemsky, Chatkalga, Mughal Range, Mughal Mountains), Pamir-Aloy (Turkestan, Aloy Ranges);

**Species ID-0848002, Genus ID-0848.**

16. *Nathalella alaica* B. Fedtsch Bot. Zhurn. S.S.S.R. 17: 327 (1932);

**Life form:** perennial;

**Biotope:** rocky slopes, stones. Middle mountains according to meeting on slopes;

**Distribution area:** Pamir-Aloy (Aloy range: around Lake Kurbankul, basin of Isfayram and Shakhimardan rivers). Aloy ridge (Shahimardan river basin). Eastern Aloy, endemic to the Aloy range;

**The need for protection;** Red Book of Uzbekistan (2009), category 1.

**Species ID-0902001, Genus ID-0902.**

17. *Jurinea schachimordanica* Iljin. Bot. Mater. Gerb. Bot. Inst. Komarova Acad. Nauk S.S.S.R. 21: 386 (1961);

**Life form:** perennial;

**Biotope:** it grows on rocky, gravelly slopes, stones, and conglomerates. Middle mountains according to meeting on slopes;

**Distribution area:** Pamir-Aloy (Aloy ridge: vicinity of Kurbankul lake, vicinity of Shakhimardon resort, vicinity of Pulgan resort). The place of distribution in Uzbekistan is the Oloy ridge (Shahimardan river basin). Eastern Aloy, endemic to the Aloy range;

**Species ID-1040011, Genus ID-1040.**

### **Summary**

In short, the main part of endemic species belongs to the Fabaceae family (Astragalus L., Chesneya., Hedysarum and Oxytropis species), followed by the Plumbaginaceae family (Acantholimon., 3 species families). The results of taxonomic, botanical-geographical and phytocenological analysis show that the Ferghana Valley is one of the centers of modern species formation for Allium, Acantholimon, Gagea species, and the endemism indicator of the geophytes of the valley is relatively young and progressive. Due to their distribution in mountain heights, endemic species are widespread in the foothills and mid-mountain regions, and the plains and high mountain regions of the valley are poor in terms of the number of endemic species. Analyzing the distribution of endemic species by soil types, the open slopes of the southern exposures show species richness on stony and cobblestone slopes. Only some

endemic species of the Chotkal and Fergana ridges are adapted to grow in the humid plant types developed on fertile soils - juniper forests and deciduous forests.

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