Phytocenotic Characteristics *Acanthophyllum cyrtostegium* Vved. (Caryophyllaceae) Distributed in Bukhara Region (Uzbekistan)

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**Abstract**

The article provides a phytocenotic description of *Acanthophyllum cyrtostegium*, distributed in the sandy and gypsum soils of Bukhara region (Uzbekistan). During the study, 6 plant communities were studied with the participation of the field work. There were 70 pcs vascular plants in these communities. The area of this plant, which is rare in the region, is 10 - 12 hectares, and the total number of 750 - 850 pcs. The results obtained from the evaluation of populations are used in carrying out monitoring studies for long years on rare plants. At the same time, he used it as a material for local "Red books".

**Keywords**

*Acanthophyllum Cyrtostegium*, Phytocenotic, Plant Community, Rare, Endangered, Uzbekistan

**1. Introduction**

Today, the state of plants in the world is undergoing significant changes as a result of climate change. This condition also affects their seasonal development [1] [2] [3]. Much work is being done worldwide to study rare and endangered species. As a result, a number of innovations for science emerged [4] [5] [6]. A lot of research has been done in Uzbekistan in this regard. In particular, Abduraimov et al. [6] [7] [8], Shomurodov et al. [9], Rakhimova et al. [10].

**2. Material and Methods**

Our field researches were conducted in 2015-2021 on the arid zones of Uzbekis-
tan. These studies were carried out using geobotanical and population methods. The objects of research were: *Acanthophyllum cyrtostegium* listed in the Red book of the Republic of Uzbekistan [11]. Geobotanical descriptions were made in all communities where the population structure of species was studied, according to the generally accepted method [12]. When identifying the plant species, was used by the “Key to plants of Central Asia” [13].

3. Result and Discussion

More than 60 species of the genus are distributed throughout the world, and in Central Asia there are 30 species. In the flora of our republic, 11 species of the category are noted. To date, no specific purposeful research work has been carried out on the ontogenetic structure of the *Acanthophyllum cyrtostegium* species and the state of its cenopopulations, which have spread in Uzbekistan. In the course of the study, a total of 6 cenopopulations were allocated with the participation of the species.

*Acanthophyllum cyrtostegium* Vved.—half-shrub with a lot of stems, the lower part of the stem is wooded, the height reaches 20 - 30 cm. *A. cyrtostegium*. Rare endemic species of the Kyzylkum. It is spread at the Kyzylkum: the Kuldjuktau, the Auminzatau, the Kingirtau, the Kokchatau (Navoi and Bukhara region). Inhabits sands, stony-sandy substrates, outcrops of gypsaceous beds. Solitary specimens or small groups of 3-5 plants can be found sporadically in sandy places. Limiting factors: trampling down of seedlings by cattle. Measures of protection: it is necessary to control populations and protect young seedlings from trampling down. The leaves are needle-like, three-edged, prickly. Blooming in May, the fruit ripens in June. In the course of the research, 6 cenopopulations were allocated with this participation. A total of 70 plants were recorded in these plant communities. This species is mainly spread in the plains of Bukhara region and the foothills of the residual mountains.

The first cenopopulation was separated from the plains in the eastern part of the village of Churuk (Shofirkon district) (N 40.40.13.3 E 063.47.566, h-399). On the territory *Eremurus korolkovii* and *Peganum harmala* were noted as the dominant. In this region, the level of soil cover with plants is 20%, the share of the investigated species is 1%. In this territory 36 species are registered, the basis of which is herbaceous plants. Cases of feeding livestock during the year were observed in the territory (Figure 1).

The next cenopopulation Shofirkon district was separated from the side of the Turtkuduk-Agitma (Kingirtau) road. The plant community of the territory consists of various grassy-cowberry-wormwood. The level of vegetation cover of the soil was 30%, 20 species were registered in the territory. As the Dominant species, it is possible to bring *Artemisia diffusa*, *Ferula foetida*, *Convolvulus hamaeae, Carex pachystylis* and others.

The third cenopopulation was separated from the side of the Karata-Jongeldi (Romitan) road, from the various grassy-shrubs community. The level of vegetation cover of the territory is 30%, the Botanical composition consists of 30 species.
Figure 1. Cenopopulations of *A. cyrtostegium* (Kyzylkum desert, Uzbekistan).

The soil is made up of sand. The dominant species are *Ferula foetida*, *Convolvulus hamadae*, *Carex pachystylis* and others (*Table 1*).

The fourth cenopopulation was separated from the Kyzylkum steppe at a distance of 18 km, along the Jongeldi-Shafirkon road. The plant community of the area consists of various grassy-wormwood (N 40° 77.718 E 063° 58.843 h-373). The level of soil cover with plants is 17%. The Botanical composition of the territory was rich, 32 species were registered. *Salsola arbuscula* as the dominant species, *Artemisia diffusa* Krasch.ex Poljakov, *Acanthophyllum stenostegium* Freyn. also participating species *Astragalus ammotrophus* Bunge, *Ferula foetida* (Bunge) Regel, *Cousinia hammadae* cuz., *Astragalus villosissimus* Bunge and other plants.

The next cenopopulation was separated from the western slopes of the Kuljuktag, from the sand surrounding the village of Kalata (Peshku) (N 40° 53.36 E 063° 09.08, h-168). The plant community of the territory consists of amatumus-white saxaul. The level of vegetation cover of the 14%, the Botanical composition consists of 17 species. As the Dominant species *Haloxylon persicum*, *Salsola arbuscula*, *Astragalus villosissimus*, *Ammothamnus lehmanii*, *Carex physodes* Bieb. and we can admit others.

The sixth cenopopulation was separated from the submersible water at a distance of 7 km (N 39° 49.27.8 E 064° 39.57.4, 273). The plant community of the region consists of *Convolvulus korolkovii*, *Lagochilus inebrians*. The soil is sandy soil. The level of soil cover with plants is 10%. The botanical composition of consists of 20 species. *Convolvulus korolkovii*, *Lagochilus inebrians*, *Zygophyllum oxianum* and others were recorded as dominant species (*Table 1*).
**Table 1.** Species composition of the studied cenopopulations.

| №  | Species                                      | Life form       | Projective cover, % (CP) |
|----|---------------------------------------------|-----------------|--------------------------|
|    |                                             |                 | I | II | III | IV | V | VI |
| 1  | *Haloxylon aphyllum* (Minkw.) Iljin         | Tree            | – | +  | –   | –  | – |  – |
| 2  | *Haloxylon persicum* Bunge ex Boiss. & Buhse | Tree            | – | –  | –   | –  | 3 |  – |
| 3  | *Ammothamnus lehmani* Bunge                | shrub           | – | –  | –   | –  | 6 |  – |
| 4  | *Salsolaarbuscula* Pall.                   | shrub           | 1 | +  | –   | 3  | 2 |  – |
| 5  | *Tamarix hispida* Willd.                   | shrub           | – | –  | –   | –  | – |  + |
| 6  | *Astragalus villosissimus* Bunge            | shrub           | 1 | –  | 1   | +  | 1 |  + |
| 7  | *Reaumuria turkestanica* Gorschik.         | Semi shrub      | – | –  | –   | –  |  – |  + |
| 8  | *Artemisia diffusa* Krasch.ex Poljakov      | Semi shrub      | 5 | 10 | 5   | 1  |  – |  + |
| 9  | *Acanthophyllum stenostegium* Freyn        | Semi shrub      | + | –  | +   | –  |  – |  – |
| 10 | *Halothamnus subaphyllus* (C.A. Mey.) Botsch.| Semi shrub    | + | –  | –   | –  |  + |  – |
| 11 | *Lagochilus inebrians* Bunge               | Semi shrub      | – | –  | –   | –  |  – |  + |
| 12 | *Eremurus korolkovii* Regel                | Perennial       | 3 | –  | –   | –  |  – |  – |
| 13 | *Rhinopetalum karelinii* Fisch.ex D. Don   | Perennial       | + | –  | +   | +  |  – |  – |
| 14 | *Acanthophyllum cyrtostegium* Vved.        | Perennial       | 1 | 2  | 2   | 2  | 1 |  + |
| 15 | *A. pungens* (Bunge) Boiss.                | Perennial       | + | +  | +   | +  |  + |  – |
| 16 | *Astragalus subbijugus* Ledeb.             | Perennial       | – | –  | –   | +  |  – |  – |
| 17 | *Astragalus amnotropus* Bunge              | Perennial       | – | –  | 1   | –  |  – |  – |
| 18 | *Cousinia hammadae* Juz.                   | Perennial       | – | –  | –   | +  |  – |  – |
| 19 | *Cousinia sogdiana* Bornm.                 | Perennial       | – | –  | –   | +  |  – |  – |
| 20 | *Cousinia dichotoma* Bunge                 | Perennial       | – | –  | –   | +  |  – |  – |
| 21 | *Climacoptera lanata* (Pall.) Botsch.      | Perennial       | – | –  | –   | –  |  – |  + |
| 22 | *Salsola implicate* Botsch.                | Perennial       | – | –  | –   | –  |  – |  + |
| 23 | *Zygophyllum oxianum* Boriss.              | Perennial       | – | –  | –   | –  |  – |  + |
| 24 | *Allium kzylykumii* Kamelin                | Perennial       | – | –  | +   | –  |  – |  – |
| 25 | *Tulipa lehmanniana* Merckl.               | Perennial       | + | –  | +   | +  |  – |  – |
| 26 | *Tulipasogdiana* Bunge                     | Perennial       | + | +  | –   | –  |  – |  – |
| 27 | *Poa bulbosa* L.                          | Perennial       | 2 | +  | +   | +  |  – |  – |
| 28 | *Carex pachystylis* J. Gay.               | Perennial       | + | +  | –   | –  |  – |  – |
| 29 | *Carex physodes* Bieb.                    | Perennial       | – | –  | –   | +  | 1 |  – |
| 30 | *Peganum harmala* L.                      | Perennial       | 5 | +  | –   | +  |  – |  + |
| 31 | *Ixiolirion tataricum* (Pall.) Schult. & Schult. Fil. | Perennial | + | +  | +   | –  |  – |  – |
| 32 | *Convolvulus hamadae* (Vved.) V. Petrov    | Perennial       | + | +  | –   | +  |  – |  – |
| 33 | *Convolvulus korolkovii* Regel & Schmalh. | Perennial       | – | –  | –   | –  | 6 |  – |
| 34 | *Merenderarobusta* Bunge                   | Perennial       | + | +  | –   | –  |  – |  – |
| 35 | *Ferula foetida* Bunge (Regel)             | Perennial       | 3 | 3  | 1   | –  |  – |  – |
| 36 | *Eremurus korolkovii* Regel               | Perennial       | – | –  | –   | +  |  – |  – |
| 37 | *Stipa hohenackeriana* Trin. & Rupr       | Annual          | – | –  | +   | –  |  – |  – |
| 38 | *Takhtajananthapussila* (Pall.) Nazarova  | Annual          | – | –  | –   | +  |  – |  – |
### 4. Conclusion

The result of the studies shows that *Acanthophyllum cyrtostegium* is a species of endem, preserved in the residual mountains of the Kyzylkum and its environs. The territory is used as a spring. At the same time, it was observed that geological exploration work was also carried out. It was determined that this plant, which is considered rare in this region, has a spread area of 10 - 12 hectares, the total number of 750 - 850 pcs. The results obtained will be used in carrying out monitoring work on this species for many years. Sixth cenopopula-
tions used for pasture all year round, the pasture load is more than twice higher than the permissible one, and this naturally leads to the depletion of the plant population. The absence of young individuals in this coenopopulation is primarily the result of trampling.

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**Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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