ECOLOGICAL ANALYSIS OF COENOTIC POPULATION OF THE SPECIES *TULIPA FOSTERIANA* AND *ALLIUM JESDIANUM* IN THE SOUTHERN PART OF UZBEKISTAN

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Abstract. *The paper involves the ontogenetic structures and ecology of Tulipa fosteriana and Allium jesdianum species. Based on the demographic indicators of the cenopopulation, the data collected during field studies were used to assess theirs conditions. The total projection cover of plants and vegetation cover of the species, such as floristic composition are studied in this paper. And critical state of the cenopopulation is analyzed.*

Keywords*: Tulipa fosteriana, Allium jesdianum, ecology, cenopopulation, conservation, endemic, Red Book, ontogenetic structure.*

ЭКОЛОГИЧЕСКИЙ АНАЛИЗ ЦЕНОТИЧЕСКИХ ПОПУЛЯЦИЙ ВИДОВ TULIPAOSTERIANA И ALLIUM JESDIANUM В ЮЖНОЙ ЧАСТИ УЗБЕКИСТАНА

Аннотация. *В статье рассматриваются онтогенетические структуры и экология видов Tulipa Fosteriana и Allium jesdianum. На основании демографических показателей ценопопуляции данные, собранные в ходе полевых исследований, были использованы для оценки их состояния. В работе изучены общий проекционный покров растений и растительный покров вида, а также флористический состав. Анализируется критическое состояние ценопопуляции.*

Ключевые слова: *Tulipa Fertiana, Allium jesdianum, экология, ценопопуляция, сохранение, эндемик, Красная книга, онтогенетическая структура.*

INTRODUCTION

It is known that the analysis of plant species from the population point of view requires practical observations with their cenopopulation firstly. The fact that the studied area is used for pastures almost the whole year leads to a deeper study of the issue. The low percentage of washed-out bushes in the cenopopulation is connected, on the one hand, with the washing away of young vegetation during spring floods, and on the other hand, with intensive cattle grazing. A large proportion of immature bushes in the cenopopulation is associated with vegetative reproduction. The predominance of generative bushes in the cenopopulation is related to the long viability of bushes in a certain ontogenetic state.

MATERIALS AND METHODS

2022 of plant species growing in Kashkadarya region are grouped into 97 families and 613 genera. The life form, ecology, distribution, conservation status of each species are presented. Also, 88 rare and unique species are included in the “Red Book” of Uzbekistan (2009) for this region [5].

When studying the ecology of *Eremurus robustus* Regel (Xanthorrhoeaceae), *Iris Magnifica* Vved, distributed in the mountain and sub-mountain regions of the Kashkadarya basin, the ontogenetic spectrum of the communities found in their composition was revealed [1,2,3]. Also, the current status of endemic species in mountain flora and conservation measures have been developed [4].

RESULTS

From our side, two coenotic populations of *T. fosteriana* species were studied in different ecological and phytocoenotic conditions of the Zarafshan range (Fig. 1). Both cenopopulations of the species were studied in the Takhta-Karacha Pass area of the Zarafshan Range. The first cenopopulation grows on the southeastern slope of the Zarafshan Ridge along with the *Iris magnifica* cenopopulation in a diverse herbaceous-blanket community. As mentioned above, the soil of the described plot is a typical gray soil with large stones. The total projected grass cover is 75%.

The high density in the meadow is due to the absence of anthropogenic influence (the depicted area is surrounded by fences). The share of the researched species does not exceed 1%. The floristic composition of the community consists of 27 species (Table 1).

The second cenopopulation of *Tulipa fosteriana* grows as part of the carpet-almond community in the eastern exposure of the Zarafshan ridge, separated by water.

The soil of the depicted area is fine soil, and there are also rocky areas. The total projection cover of plants reaches 51%. The vegetation cover is dominated by *Ferula kuhistanica* and *Amygdalus spinosissima*. The floristic composition of the community consists of 24 species (Table 1).

Fig.1 General view of *Tulipa fosteriana*

Table 1

The species composition of the ferula-almond community (Cenopopulation 2 of *T. fosteriana*)

№	Species	Life forms	Share of cover, %
1	*Amygdalus spinosissima*	Bush	5
2	*Amygdalus bucharica*	Bush	2
3	*Cerasus erythrocarpa*	Bush	1

4	*Acanthophyllum serawschanicum*	Bush	+
5	*Ferula kuhistanica*	Perennial	20
6	*Ferula diversivittata*	Perennial	2
7	*Gagea capusii*	Perennial	+
8	*Gagea gageoides*	Perennial	+
9	*Tulipa fosteriana*	Perennial	4
10	*Tulipa turkestanica*	Perennial	+
11	*Astragalus sp.*	Perennial	+
12	*Scarioila orientalis*	Perennial	+
13	*Carydalis lededbouriana*	Perennial	+
14	*Iris stolonifera*	Perennial	+
15	*Allium pratense*	Perennial	+
16	*Hypericum perforatum*	Perennial	4
17	*Thymus seravschanicus*	Perennial	2
18	*Poa bulbosa*	Perennial	5
19	*Poa pratensis*	Perennial	4
20	*Centaurea squarrosa*	Perennial	1
21	*Cousinia radians*	Perennial	+
22	*Geranium pusillum*	annual	+
23	*Ranunculus paucidentatus*	annual	+
24	*Turgenia latifolia*	annual	+

The ontogenetic structure of *Tulipa fosteriana* has not been studied by anyone before. Based on the demographic indicators of the cenopopulation, the data collected during field studies were used to assess its condition. According to the classification of A.A.Uranova and O.V.Smirnova, the studied cenopopulations are normal, incomplete (Fig. 2). Senile bushes are absent in both cenopopulations. The absence of senile plants in onion cenopopulations is associated with the death of most plant bushes in the generative ontogenetic state.

Due to the specific features of the biology of the species (high productivity of seeds, the presence of vegetative reproduction due to stolons, the slowing down of the pace of development of bushes in the virginal state), the characteristic spectrum of the cenopopulation of this species is a left-sided type with a high point in the vegetative bushes. Ontogenetic spectrum during the study, the ontogenetic spectrum of cenopopulations is consistent with characteristic features (only the highest point corresponds to immature bushes).

In the first cenopopulation, age groups are distributed as follows: juvenile -29.3%, immature -57.2%, virginil -9.3 and 4.1% of generative bushes (no senile bushes), and 31.0% in the second one; 23.3%; 41.2%; 4.4% and 0.0% respectively.

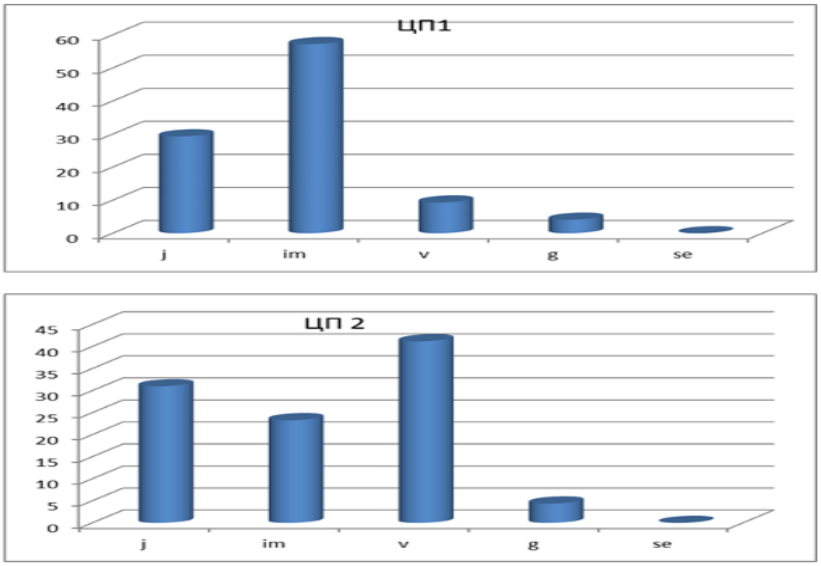

Fig 2. Ontogenetic structures of *T. fosteriana cenopopulation*

The high value of yuvinil tufts in the first cenopopulation is due to the high seed yield of generative tufts and high seed germination. The predominance of immature shoots in the first cenopopulation is the result of high survival of young shoots and the presence of vegetative reproduction due to stolons in the immature state. However, due to the high pressure of competing species, not all the immature bushes will be able to transition to the virginal young state (Fig. 3).

The share of generative bushes, which did not occupy a significant percentage during the study, is also dependent on the collection of flowering plants as bouquets. It should be noted that both xenopopulations grow in the Takhta-Koracha pass area, where dozens of young people are engaged in selling tulip bouquets during the tulip flowering period.

Fig 3. Virginal specimens of *T. fosteriana*

The ontogenetic spectrum of the second cenopopulation is also left-sided. The highest point in the spectrum corresponds to virgin plants. This variant of the spectrum is formed in a young state with abundant fruiting and high viability of the bushes. In this cenopopulation, as in the previous one, the percentage of generative bushes is low. It does not exceed 4.4 percent. The low value of the share of generative bushes in the cenopopulation is associated with the recreational process.

Thus, the studied *T. fosteriana* cenopopulations are normal and incomplete. Absence of senile trunks in the studied cenopopulations depends on the biological characteristics of the species. Most tulips in the generative state complete their upper life cycle in the generative state. The ontogenetic spectra of the studied cenopopulations correspond to the character and thus reflect the biological characteristics of the species.

During the field expeditions, a single coenotic population of Allium jesdianum was found in the Tolly Pass of the Kashkadarya Basin (in the upper part of the Zindansai River Basin), and it was previously reported only for Kuhitang (Fig. 4). It grows in the western part of the mountain range close to the water. The soil of the described area is gray soil with large stones. The cenopopulation grows as part of a diverse grassy-sermy-aspen community. The total projected grassland cover is about 56%. The species composition of the community consists of 29 flowering plants, most of which are perennial plants (Table 2).

A.A. According to the classification of Uranova and O.V. Smirnova, the studied *Allium jesdianum* cenopopulation is normal, incomplete. Senile bushes were not observed.

V.A. As noted by Cheremushkina, the characteristic spectrum of the cenopopulation for most of the onion species is left-sided reproduction with the highest point of uvinil bushes. This is the presence of abundant yield and vegetative reproduction. Self-management in xenopopulation occurs through seed and vegetative reproduction.

Fig.4. *Allium jesdianum* near Tolly Pass

Table 2

Species composition of various grass- wormwood- mustard plant communities
(*Allium jesdianum* cenopopulation)

№	Species	Life forms	Share of cover, %
1	*Acer pubescens*	Tree	5
2	*Artemisia tenuisecta*	Semi half a bush	25
3	*Crambe kotschyana*	Perennial	5
4	*Ferula kuhistanica*	Perennial	5
5	*Carex pachystylis*	Perennial	10
6	*Eremurus olgae*	Perennial	+
7	*Verbascum songaricum*	Perennial	+
8	*Arum korolkowii*	Perennial	+
9	*Cousinia radians*	Perennial	+
10	*Poa bulbosa*	Perennial	3
11	*Poa pratensis*	Perennial	+
12	*Phlomis olgae*	Perennial	+
13	*Poa trivialis*	Perennial	+
14	*Taraxacum brevirostre*	Perennial	+
15	*Astragalus sp.*	Perennial	+
16	*Corydalis sewerzowii*	Perennial	+
17	*Gagea gageoides*	Perennial	+
18	*Linaria popovii*	Perennial	+
19	*Crocus korolkowii*	Perennial	+
20	*Pseudosedum sp.*	Perennial	+
21	*Talictrum sultanabadense*	Perennial	+
22	*Alyssum campestre*	Perennial	+
23	*Roemeria refracta*	Annual	+
24	*Ceratocephala falcata*	Annual	+
25	*Bromus tectorum*	Annual	2
26	*Malcolnia grandiflora*	Annual	+
27	*Taeniatherum orinitum*	Annual	+
28	*Thlaspi perfoliatum*	Annual	+

29	*Rochelia cardiosephala*	Annual	+

The ontogenetic spectrum of *Allium jesdianum* is centered, with generative shoots reaching a high point. The percentage of pregenerative age bushes in the cenopopulation is not high; depending on age groups, it is around 6 to 11%. The total number of bushes in this cenopopulation is 46 pcs.

DISCUSSION

Thus, within the framework of this study, for the first time, a single population of *Allium jesdianum* was found from the Hisar range (in the literature, it is given only for the Kuhitang range). The population of this type consists of 46 bushes, most of which have generative development. The percentage of bushes in the left part of the spectrum is low, the ontogenetic spectrum of the studied cenopopulation does not correspond to the characteristic feature.

CONCLUSIONS

In general, the cenopopulation is in a critical state. This is affected by year-round cattle grazing in this area. Nevertheless, this area is one of the unique botanical-geographic areas of the republic. In addition to *Allium jesdianum*, rare local endemic plants such as *Tulipa uzbekistanica*, *Allium botschantzevii*, *Eversmannia botschantzevi* (endemics of the Zindansay river basin), *Salvia lilacinocoerulea* and *Hedysarum magnificum* grow here. In order to protect the populations of these rare species, local authorities must control these areas by regulating pasture management.

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