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ARTICLE

Ontogenetic Structure of Ceonopopulations of *Tulipa korolkowii* Regel in Uzbekistan

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ABSTRACT

Ontogenetic structure of eight coenopopulations of *Tulipa korolkowii* Regel were studied in Uzbekistan. Resistance mechanisms of *Tulipa korolkowii* coenopopulations are shown: seed and vegetative methods of self-maintenance of coenopopulations. Coenopopulations (CP) of *T. korolkovii* studied in normal. CP 1, 2, 6, 7,8 complete, and the rest (3, 4, 5) are incomplete, no senile individuals. Absence of old specimens in coenopopulation connected with die-off great number plants in generative period of ontogenesis.

1. Introduction

Due to the growing anthropogenic impact on ecosystems, there is a need to conduct research to identify and preserve biological diversity. Much attention is paid to rare communities and the species that make up them, as well as species that grow on the edge of the range. The ontogenetic structure is one of the essential features of a population; this side of the structural organization provides the ability of the population system to self-support and determines its stability. The analysis of the ontogenetic structure of plants gives an idea of the future fate of species populations [1,2].

During the study, the ontogenetic structure of 8 ceonopopulations of the *Tulipa korolkowii* in Uzbekistan was studied (Figure.1). To date, the ontogenetic structure on this species has not been studied [3-5]. *T. korolkowii* is included in all editions "Red Book" of Uzbekistan [6-9]. This species is one of the rare species in the flora of Uzbekistan. Currently, the population is declining.

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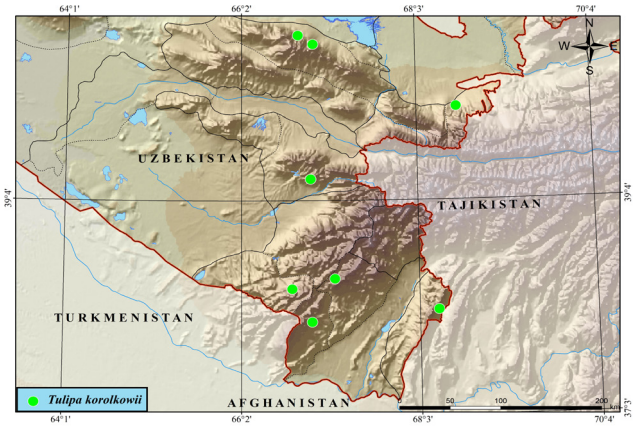

Figure 1. Map of the location of *Tulipa korolkowii* coenopopulation

Different indicators of each coenopopulation were identified. The plants and dominant species in it were identified under laboratory conditions (**Table.1**).

During the study period in Uzbekistan, the population of the species was not found Bukhara region (Kyzylkum desert). The species is known for herbarium collections from several two points of the Bukhara region: 1. Between Shafirkan and the desert station Institute of Botany (herbarium specimen, 1964, geographical coordinate N 40.40.13.3 E 063.47.566) and 2. Central Kyzylkum, Kokchatau (herbarium specimen, 1905, geographical coordinate N 40.31.82.2 E 065.14.083).

Table 1. Phytoceonotic characteristics of cenopopulations

№ of CP	Geographical location of coenopopulation	Geographical coordination	Altitude, m	Plant community	Total projective cover of vegetation, %	Projective cover of species, %
1	Jizzakh region, Turkistan ridge near village Turkman	E 68,510837 N 39,940269	840	*Crataegus turkestanica - Artemisia sogdiana - Poa bulbosa*	50-55	2
2	Navai region, Nurata ridge, village Sentabsay	E 66,690414 N 40,615935	970	*Amygdalus spinosissima - Allium altissimum*	55-60	3
3	Navai region, Nurata ridge, Ustaxon	E 66,863255 N 40,532965	1020	*Amygdalus spinosa - Erodium ciconium - Carex pachystylis*	35	1
4	Kashkadarya region, Zerafshan ridge	E 66,825131 N 39,26838	1223	*Amygdalus spinosissima - Ferula varia - Allium suvorovi*	30	1
5	Surkhandarya region, Baysuntau, Yuqari Machay	E 67,092985 N 38,332464	1516	*Alhagi pseudalhagi - Onobrychis chorassanica - Poa bulbosa*	35-37	2
6	Kashkadarya region, Western Gissar, Tarkapchigay	E 66,608504 N 38,23705	1293	*Amygdalus spinosa - Ferula sp - Carex pachystylis*	65	3
7	Surkhandarya region, Kuhitang, Surxan reserve	E 66,831654 N 37,927275	1230	*Amygdalus bucharica - Geranium collinium - Ferula sp.*	35-40	1
8	Surkhandarya region, Babatag	E 68,263868 N 38,03785	1436	*Crataegus sogdiana - Alhagi pseudalhagi - Poa bulbosa*	40-45	1

2. Material and methods

Our research was conducted in Uzbekistan. Object of research – *Tulipa korolkowii*. Commonly accepted methods were used to assess ceonopopulations [10-14].

3. Results and Discussion

In this article, we talk about the ontogenetic structure of various ceonopopulations of *Tulipa korolkowii* Regel, distributed in Uzbekistan. During the study, the age structure of *Tulipa korolkowii* in different ceonopopulations was analyzed. The age structure of the plant was divided into 5 (juvenile-j, immature-im, virginile-v, generative-g and senile-s). I was noted that isolated ceonopopulations are specific to 3 different types. Left-sided, centralized and bimodal ontogenetic spectrum.

Left-sided ontogenetic spectrum. Was found to be a peak in most cases, and the peak (or peak) to virginal plants (CP, 2, 6, 7). The predominance of virginal-age tufts in these ceonopopulations is explained by the fact that this stage lasts longer than the earlier stages. The duration of the juvenile and immature phase is 1-2 years. The duration of the virginal phase is relatively - longer, lasting up to 5-7 years. Left-sided ontogenetic spectrum specificity-virginal stage period in ceonopopulations were noted to be in range of 35.3-39.31 % (Figure 2)

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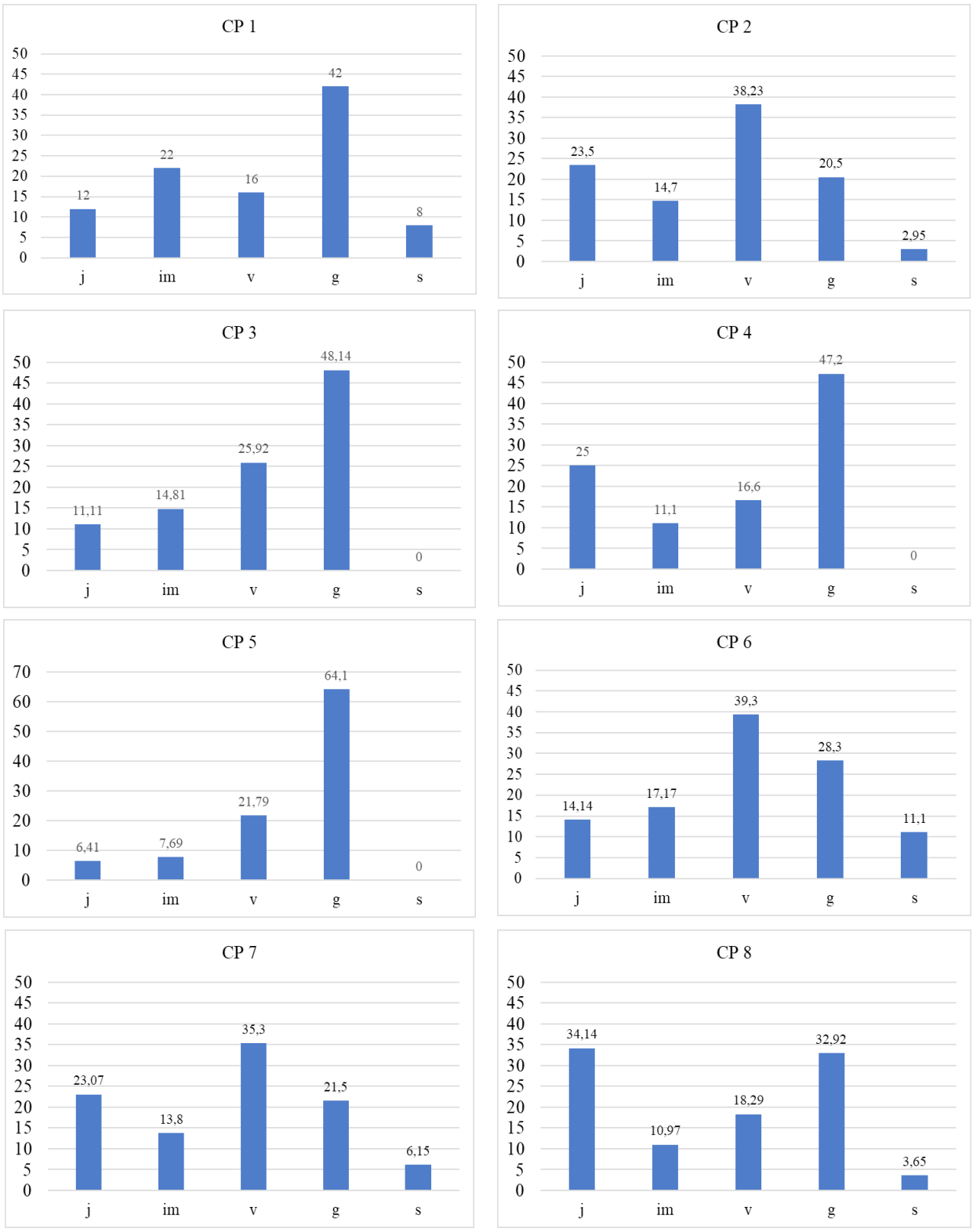

Figure 2. Ontogenetic structure of *Tulipa korolkowii* coenopopulations

In addition to a number of ecological and phytocenotic factors, the large number individuals belonging to the young fraction in ceonopopulations is also related to the biology of the species. *T.korolkowii* have a high seed productive. According to the analysis of the obtained data, 180-320 seeds are formed in the generative period of the

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species, which is turn has a direct impact on the recovery of the number of young fractions in the ceonopopulations (Table 2).

3.1 Centralized Ontogenetic Spectrum

T.korolkowii ontogenesis – enters the flowering stage in 4-5 years, and the duration of this stage is 11-14 years. This is turn means that the main part of the ontogenesis of Tulipa L. species belonging to generative ceonopopulations, seed multiplication does not exceed one norm and the length of the generative phase allows the structure of some ceonopopulations to be centralized. During the observations, it was noted that in the ceonopopulations of 1, 3, 4, and 5 the generative stage period was more than in the rest of the age period, their share was around 42-64 %.

3.2 Bimodal Ontogenetic Spectrum

9 ceonopopulations were observed to be specific to the bimodal ontogenetic spectrum. The ontogenetic spectrum has two peaks: the first peaks to the juvenile period (34,14%) and second to the generative period (32,92%). Such spectra are usually formed in ceonopopulations where reproduced from seed is moderate. The success of grasses formed in previous years due to mass germination has led to the prolongation of the generative period under favorable conditions has led to an increase in the number of periods of the same age.

The average of ontogenetic structure of ceonopopulations isolated from different ecological-geographical conditions was compared (Figure 3).

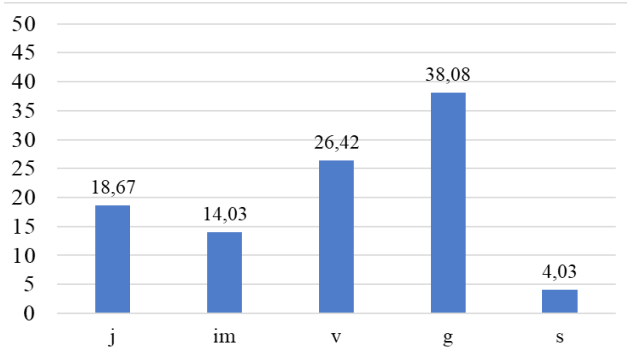

Figure 3. Averaged ontogenetic spectrum of *T. korolkovii*

The results showed that the mean value of the ontogenetic structure was a peak and was specific to the centralized (percentage of generative period 39,6%) ontogenetic spectrum. The mean value of the ontogenetic structure does not correspond to the characterictic spectrum. The predominance of generative bushes in ceonopopulations is often explained by the high elimination of young bushes (water erosion, use of pastures during the development of grasses in the early spring, or high projective cover).

Due to different ecological and phytoceonotic conditions, the density of individuals in ceonopopulations was 1.8-4.94 per $1m^2$, ecological density was 2.11-5.82. According to the results to the analysis, the total number of individuals in the ceonopopulations (99) and their density $1m^2$ was higher in the coenopopulation isolated from the hills around the village of Tarkapchigay (CP-6). The lowest rate was observed in the coenopopulation isolated from the rocky, gypsum soils around the Zerafshan ridge of Kashkadarya region. The total number of individuals in this coenopopulation is 36, the density is 1.8 per. This coenopopulation around the village.

Table.2 Age structure of T. korolkovii ceonopopulations

№ of CP	Age structure, pcs. (%)					Density of individuals, pcs, 1m2	P есол (1m2)	Ir	Ia	Total number of individuals, pieces
	j	*im*	*v*	*g*	*s*					
1	12	22	16	42	8	2,5	3,33	1,19	0,08	50
2	23,5	14,7	38,23	20,5	2,94	3,7	4,35	3,72	0,03	74
3	11,11	14,81	25,92	48,14	0	2,8	3,5	1,07	0	56
4	25	11,1	16,6	47,2	0	1,8	2,11	11,1	0	36
5	6,41	7,69	21,79	64,1	0	3,9	5,2	0,55	0	78
6	14,14	17,17	39,3	28,3	11,1	4,95	5,82	2,49	0,12	99
7	23,07	13,8	35,3	21,5	6,15	3,25	4,06	3,35	0,06	65
8	34,14	10,97	18,29	32,92	3,65	4,1	4,4	1,9	0,04	82

Note:
$P_{есол}$ – ecological density. I_r– recovery index I_a- aging index

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Recovery and aging indices showing the dynamic process of ceonopopulations were also studied. In the studied ceonopopulations, the recovery rate of the species was found to be around 0,55-11,1. The high value of the recovery rate is explained by the high seed productive. The low value of the aging index (0-0.12) in all ceonopopulations studied is due to the fact that most the of the individuals die during the generative period.

4. Conclusion

The mean value of the ontogenetic structures of the studied ceonopopulations is centralized and does not reflect the biology of the species. The ontogenetic structure of ceonopopulations is normal, in most cases incomplete due to the absence of senile individuals. This suggests that, despite the high recovery index of ceonopopulations, the current state of the species population has become a matter of concern and the need for systematic protection of areas where *T.korolkowii* is distributed. The deviation of the ontogenetic spectrum of specific ceonopopulations from the characteristic one is associated with the ecological and phytoveonotic conditions of the habitat.

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References

[1] Cheremushkina V.A. Biology bulb of Eurasia. Novosibirsk, 2004: 277.

[2] Osmanova G.O. Morphological features of individuals and the structure of coenopopulation Plantago lanceolate L. Yoshkar-ola. Mariy state university, 2007: 184.

[3] Beshko, N.Yu., Tojibaev, K.Sh. and Batoshov, A.R. Tulips of the Nuratau Mountains and South-Eastern Kyzylkum (Uzbekistan). Stapfia , 2013, 99: 198-204.

[4] Tojibaev, K., Beshko, N. Reassessment of Diversity and Analysis of Distribution in Tulipa (Liliaceae) in Uzbekistan. Nordic Journal of Botany, 2014, 33: 224-234. https://doi.org/10.1111/njb.00616

[5] Ozodbek S. Abduraimov, Habibullo F. Shomurodov, Sultankul A. Daniyarov, Odilbek T. Mamatkasimov, Muxriddin I. Teshaev. Demographic indices rare species of *Tulipa* L. (Liliaceae) arid zones of Uzbekistan. American Journal of Plant Sciences, 2020, 11: 736-744.

[6] The Red Data Book of the Uzbek SSR. Plants. FAN Press, Tashkent, 1984, 2: 80-96.

[7] The Red Data Book of the Republic of Uzbekistan. Plants. Chinor ENK, Tashkent, 1998, 1: 150-165.

[8] The Red Data Book of the Republic of Uzbekistan. Plants. Chinor ENK, Tashkent, 2006, 1.

[9] The Red Data Book of the Republic of Uzbekistan. 1. Plants and Fungi. Chinor ENK, Tashkent, 2009, 1: 152-156.

[10] Uranov, A.A. Age Spectrum of Phytocoeno-Population as a Function of Time and Energy Wave Processes. Scientif ic Lectures of Higher Schools, Biological Sciences, 1975, 2: 7-34.

[11] Zaugolnova, L.B. The Structure of the Populations of Seed Plants and Monitoring. Resume of Dissertation of Doctor of Biological Sciences, St. Petersburg, 1994, 70.

[12] Ishbirdin, A.R., Ishmuratova, M.M. By the Estimation of Vitality Cenopopulation Rhodiola iremelica Boriss for Dimensional Spectrum. Nijniy Tagil, 2004, 80-85.

[13] Lavrenko, E.M., Korchagina A.A. Field Geobotany. Academy Sciences SSSR, Leningrad, 1972, 4: 336.

[14] Czerepanov, S.K. Vascular Plants of Russia and Adjacent States (The Former USSR). Cambridge University Press, New York, 1995, 152.

 DOI: https://doi.org/10.30564/jrb.v2i4.2282