Scientific Research Publishing

American Journal of Plant Sciences, 2018, 9, 1725-1739
http://www.scirp.org/journal/ajps
ISSN Online: 2158-2750
ISSN Print: 2158-2742

The Current State of Cenopopulation of *Tulipa micheliana* Hoog in Uzbekistan

Ozodbek S. Abduraimov[1], Habibullo F. Shomurodov[1], Sultonkul A. Daniyarov[2]

[1]Institute of Botany, Academy Science of Uzbekistan, Tashkent, Uzbekistan
[2]Department of Ecology and Geography, Gulistan State University, Gulistan, Uzbekistan
Email: ozodbek88@bk.ru

How to cite this paper: Abduraimov, O.S., Shomurodov, H.F. and Daniyarov, S.A. (2018) The Current State of Cenopopulation of *Tulipa micheliana* Hoog in Uzbekista. *American Journal of Plant Sciences*, **9**, 1725-1739.
https://doi.org/10.4236/ajps.2018.98125

Received: June 21, 2018
Accepted: July 28, 2018
Published: July 31, 2018

Abstract

The current state of coenotic populations of rare and endangered species of Uzbekistan-*Tulipa micheliana* Hoog is given. Based on the analysis of demographic indicators and a number of organisms and population signs, the state of the cenotic populations of the species was assessed, during the 2012-2018 years studied 15 cenopopulations different ecological-phytocenotic conditions in Uzbekistan.

Keywords

T. micheliana, Cenopopulation, Current State, Ontogenetic Spectrum, Plant Community

1. Introduction

In practice, with the modern study of the species population, the main strategy for the protection of rare species is to protect their habitats, *i.e.* the creation of protected areas is one of the most important areas of human nature protection. However, the last 10 years in the world have seen a doubling in the number and increase in the area of specially protected natural areas of more than 30 million km^2 [1].

Tulipa L. is one of the largest genera of family Liliaceae. It is widespread in Southern Europe, North Africa, Middle East and Central Asia. According to the modern data, based on the measurement of nuclear DNA, it comprises 112 species [2]. In Central Asian countries of the former USSR, *i.e.* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, 63 species of wild tulips are found. These grow in various landscapes, from plain deserts to mountain highlands. The TienShan and Pamir-Alay mountains in Central Asia are considered

to be the primary center of origin and diversity for the genus *Tulipa*. 34 species grown in Uzbekistan [3] [4] [5] [6].

Information on the common areas of tulips spreading in Uzbekistan, the distribution and diversity of vegetation in Uzbekistan are represented by the Flora of Uzbekistan [1], V. Vvedensky [7], Z. Bochantseva [8], Kh. Buriev [9], A. Sharipov, O.P. Pratov [10], A. Ibragimov [11], N. Beshko [12] [13], K. Tojibaev [14] [6] and F. Karimov [15].

2. Research Objects and Methods

Stages of ontogenesis of the species T.A. Rabotnov [16], cenopopulation (CP) structure was studied the method of T.A. Rabotnov [16], Cenopopulation of Plants [17] [18], types of CP A. Uranov, O. V. Smirnova [19]. L. B. Zaugolnova [20] was used to evaluate the status of CP in terms of organism and population signs. Characters are selected according to their specificity and range of variability [21] [22]. The ecological density of the species U. Odum [23], the level of boiling point A. R. Ishbirdin [24] rates the aging coefficient using N. V. Glotov [25] methods. Biometric signs and variability of varieties has been identified N. Zaytsev [26].

During our 2012-2018 study, were recorded a total of 15 cenopopulations with *T. micheliana* in Uzbekistan (**Table 1**).

Tulipa micheliana is a perennial, herbaceous, polycarpic, bulbous plant. *Tulipa micheliana* is included in the Red Data Book of Uzbekistan [27]. For this species, the main threat is overgrazing, picking of flowers and recreation. In Uzbekistan, this species is protected in Nuratau and Surkhan nature reserves. According to the IUCN Red List Categories [28] and Criteria (ver. 3.1), the current status of this species meet the NT category (Near Threatened) [29].

The species was described in 1902 by Thomas Hoog on specimens collected in 1900 by German botanist Paul sintenis near Ashkhabad. It is widespread in North-Western Pamir-Alay and Kopetdag, in Uzbekistan, Tajikistan, Turkmenistan and Iran. In Uzbekistan, this tulip occurs on the Nurataumountains, on Zaravshan, Gissar and Kugitang ridges. It grows on stony-sceleton and clay slopes of foothills and low mountains. It is distinguished by leaves with violet stripes. In each coenopopulation, *T. micheliana* species was observed to develop four leaves. Those leaves are also marked with violet spots. Flower solitary, bright red to dark crimson, very large, finely shaped, resembling *Tulipagreigi* Regel, but differing clearly from the latter by the crimson color range and the conspicuous wedge-shaped, light margined black blotch on the outside of the inner petals; scentless. *T. micheliana* blooms in March-April and bears fruit in May (**Figure 1**).

3. Ontogenetic Structure

Conservation of rare and endangered species and the study of their current populations (distribution, population, density, especially age structure) not only

Table 1. Characteristics of the studied cenopopulation (CP) of *T. micheliana* inUzbekistan.

№ CP	Geographical coordination	Geographic and/or administrative name	Altitude, m	Plant community	Species composition	Total projective cover of vegetation, %
1	N 40˚19.208˚ E 067˚38.457˚	Jizzakh region, Farish district, the vicinity of the village of Aktam (Nurata Ridge)	523	*Crambe kotschyana—Carex pachystylis*	20	55
2	N 40˚31.822˚ E 065˚02. 387˚	Bukhara region, Gijduvan district, Kuk-chatau relict mountain (Kyzylkum desert)	469	*Artemisia diffusa—Poa bulbosa*	24	30
3	N 39˚59.175˚ E 068˚49.621˚	Jizzakh region. neighborhood of northern spurs of the Turkestan Range	773	*Allium suvorovii—Phlomis tapsoides—Ixilirion tataricum*	17	35 - 40
4	N 39˚52.475˚ E 068˚52.105˚	Jizzakh region. Yangiabad district, neighborhood of the village Sarmich	1130	*Crataegus turkestanica—Artemisia sogdiana—Poa bulbosa*	16	40
5	N 39˚17.038˚ E 066˚56.609˚	Samarkand region, Urgut district, Amankutan locality (Zeravshan Ridge).	1694	*Amygdalus spinosissima—Ferula varia—Allium suvorovii*	18	50
6	N 38˚15.304˚ E 067˚08.726˚	Surkhandarya region. Boysun district, near the village of Darband (Baisun Ridge)	1064	*Alhagi pseudalhagi—Onobrychis chorassanica—Poa bulbosa*	22	35 - 40
7	N 40˚30.770˚ E 067˚02.461˚	Jizzakh region. Farish district, near the village Yangikishlak (Nurata Range)	461	*Phlomoides nopligera—Artemisia sogdiana—Phlomis tapsoides*	20	70
8	N 40˚35.126˚ E 066˚43.255˚	Jizzakh region, Farish district, the vicinity of the village Madzhrum (Nurata Ridge)	753	*Amygdalus spinosissima—Allium altissimum*	21	18 - 20
9	N 39˚52.421˚ E 068˚28.999˚	Jizzakh region, Zaamin district, near the village Kovunkestee (Turkestan Range)	834	*Rosa canina—Amygdalus spinosa—Artemisia sogdiana*	18	50 - 55
10	N 40˚31.126˚ E 066˚44.185˚	Jizzakh region, Farish district, the vicinity of the village Uhumsay (Nurata Ridge)	1184	*Amygdalus spinosa—Atrophasis sp-Eremurus sp.*	19	40
11	N 40˚47.088˚ E 067˚51.631˚	Jizzakh region, Relict mountain Pistalitau (Nurata Ridge)	650	*Amygdalus spinosa—Artemisia diffusa—Ferula foetida*	20	25 - 30
12	N 39˚718.11˚ E 065˚84.273˚	Samarkhand region village Tim (Ziyadin-Zirabulak ridge)	935	*Amygdalus spinosa—Erodium ciconium—Carex pachystylis*	17	60 - 70
13	N 39˚681.33˚ E 067˚03.342˚	Samarkhand region Choponota hill	816	*Artemsia sogdiana—Carex physodes—Iris norbutii*	18	40
14	N 38˚97.158˚ E 067˚15.074˚	Kashkadarya region, village Toshquduq (Hissar ridge)	1214	*Crataegus sogdiana—Alhagi pseudalhagi—Poa bulbosa*	17	70 - 80
15	N 38˚13.106˚ E 067˚ 08.410˚	Surkhandarya region, Surkhan reserve (Kuhitang Ridge)	950	*Amygdalusbucharica—Geranium collinium—Ferula sp.*	25	50 - 60

allow them to evaluate their current state, but also to make definite conclusions on the species in the future [30].

T. micheliana is found in natural conditions in Uzbekistan, Tadjikistan, Turkmenistan and Iran. Until now, there has been no research on the ontogenetic structure of *T. micheliana* cenopopulation. During our study, 15 cenopopulations with *T. micheliana* in Uzbekistan were studied. The above censorships were separated from different ecological conditions in Uzbekistan. *T. micheliana* is included in all publications of the Red Book of the Republic of Uzbekistan. Our studies have shown that ontogenetic spectra of species are left-sided, centralized and bimodal (**Figure 2**).

Figure 1. Different cenopopulations of *Tulipa micheliana* in Uzbekistan.

4. Left-Side Dontogenetic Spectrum

Only two of the studied cenopopulations were left-sided spectra (CP 3, 4). At CP 3the peak was at the level of juvenile (43.05%), and at CP 4 the peak was virginily (45.61). *T. micheliana* grows mainly in rocks and rains. This situation creates inconvenience in the reproduction of species by seed. During our observations it has been revealed that *T. micheliana* does not grow vegetatively in natural conditions. The table did not show the whole table. The left-handed spectrum

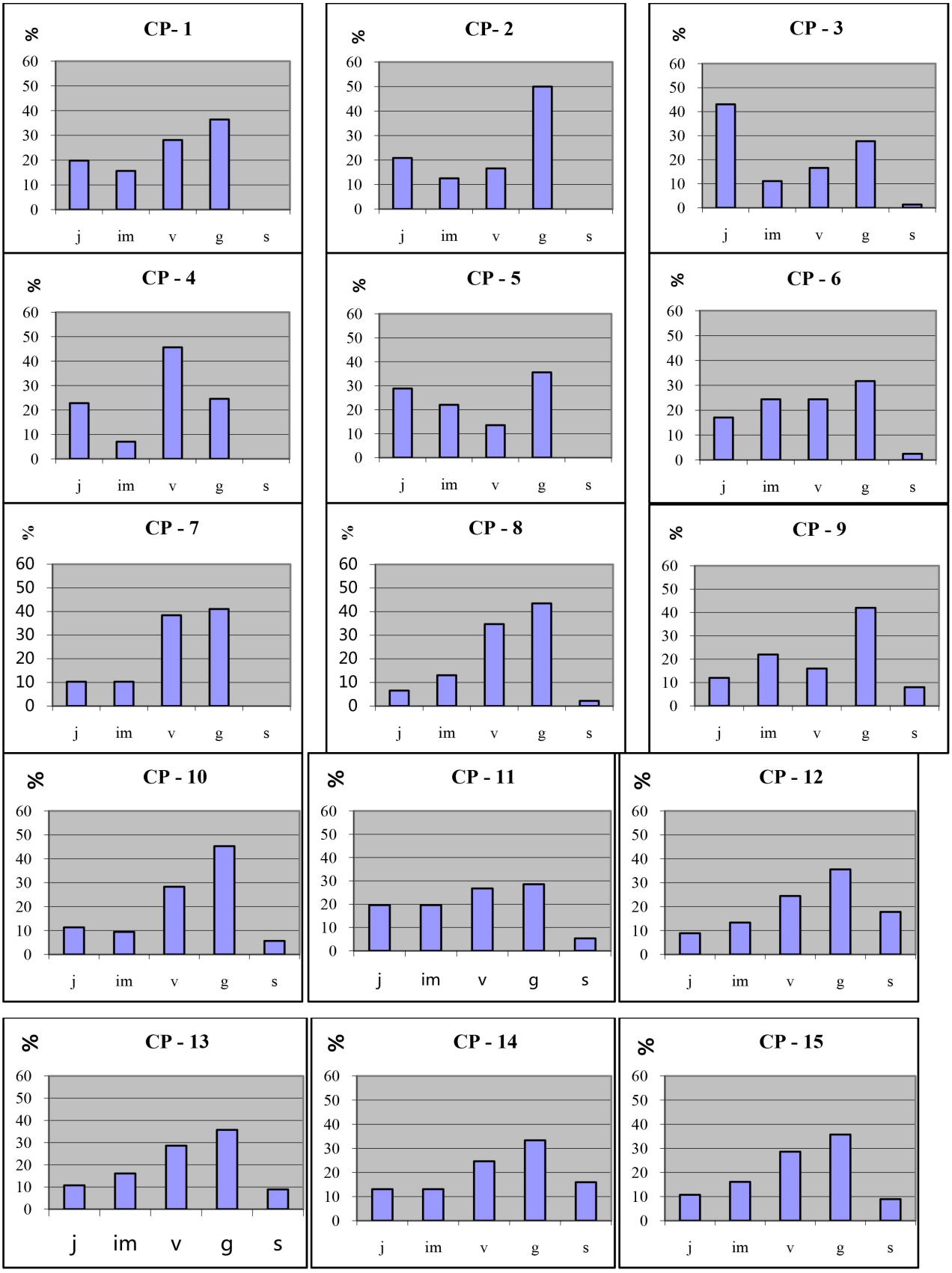

Figure 2. Ontogenetic structure cenopopulation of *T. Micheliana.* Y—age structure (%); X—age structure.

cenopopulation (CP 3, 4) is isolated from the adjacent regions where the annual precipitation is high. This, in turn, allows the sowing of the seeds to be good. This cenopopulation is one of the most important points for the tour, which is not recorded in the literature. In natural conditions, the seed yield of the species is 24.75%. In laboratory conditions this indicator is high and it is 65.5%.

5. Centralized Ontogenetic Spectrum

The duration of the *T. micheliana* generative cycle lasts 6 - 20 years. When the annual amount of precipitation is good, the plant moves to the flowering stage in 5 - 6 years. This is very important role in turning the species into a centralized spectrum of cenopopulations. 53.33% of studied cenopopulations were found to be characteristic for centralized spectrum (CP 1, 2, 5, 6, 9, 13, 14, 15). The genes in the generic stage range from 31.7 to about 50% can be explained by the ability of the adult to adapt to the adverse weather conditions and to sustain life. In this cenopopulation, seed reproduction is very low.

6. Bimodal Ontogenetic Spectrum

Along with the generational stage of the species, the virginil cycle also prolongs the bimodal spectrum of cenopopulations (CP 7, 8, 10, 11, 12). In both bimodal spectrum cenopopulations, both virginil (24.4% - 38.4%) and the generative period (26.67% - 43.47%) coincided. It is also reported that in the years that are unfavorable or humid, many species can not survive the flowering stage [31].

One or more of the main criteria for the assessment of their condition is the presence or absence of smaller amounts of cysts in cenopopulation. In the mentioned cenopopulations were studied the total number of *T. micheliana* species, their density, ecological density of roots and their index coefficients (recovery, aging, location). It was noted that cenopopulations separated from various ecological phytocenotic conditions at the altitudes of 461 - 1694 m. *T. micheliana* is not included in the "Red Book" of Uzbekistan [17], and today it is one of the most populous types of population. The beautiful and large plant flowers give rise to the unhealthy exposure of people in the spring. Knowing the current level of the species and developing measures to protect it are among the necessary tasks. In cenopopulations studied, the density of the dose is 1.9 - 4.8, indicating a smaller decrease in the species. The ecological density of the species is not high (2.56 - 6.4). The recovery rate of the species is 1 to 3.07, the aging index is 0 to 0.18, and the index of incidence ranges from 0.97 to 3.07, which suggests practical tasks for species populations (**Table 2**).

The basic ontogenetic structure of the tour is specific to the central spectrum and does not correspond to the characteristic spectrum. This is due primarily to the fact that the species can not be overgrown in vegetation, because of the low sowing ability in natural conditions, and that the generative period is longer than in other stages (**Figure 3**).

The characteristic spectrum for the category representatives is the left-sided spectrum.

Table 2. Demographic characteristics of *T. micheliana* coenopopulations.

№ CP	Demographic characteristics					
	I_r	I_a	I_{dc}	individuals density per 1m², pieces.	Ecological density per 1m², pieces.	The total quantity, (pc)
1	1.74	0	1.74	4.8	6.4	96
2	1	0	1	2.4	3.6	48
3	2.55	0.01	2.42	2.85	3.56	57
4	3.07	0	3.07	2.25	3	45
5	1.80	0	1.80	2.95	3.47	59
6	2.07	0.02	1.92	2.05	2.56	41
7	1.43	0	1.43	1.9	2.78	39
8	1.24	0.02	0.97	2.2	2.93	44
9	1.19	0.08	1	2.5	3.33	50
10	1.63	0.06	1.40	2.65	4.07	53
11	2.31	0.05	1.94	2.8	4.66	56
12	2.08	0.21	1.24	2.3	3.53	46
13	1.54	0.09	1.22	2.8	3.5	56
14	1.52	0.18	1.03	3.45	4.31	69
15	1.31	0.12	1.02	3.25	4.06	65

Note: (I_r)—recovery coefficient, (I_a)—aging index, (I_{dc})—data collection index, R_{eco}—ecological density.

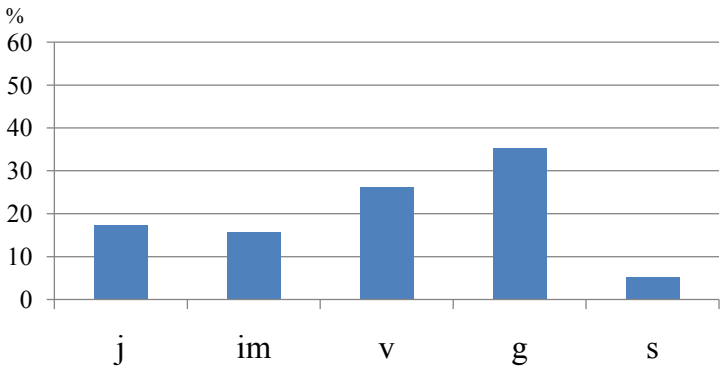

Figure 3. Basic ontogenetic structure of *T. micheliana.*

7. Evaluation of the State of Cenopopulation

Rare species, considered to be important elements of the flora, need to be constantly monitored. Such studies will serve as an important source for the Continuous Publications of the Red Book of Regions [21] [22]. Until now, data on the status of this cenopopulation have not been documented in the literature. This species, which is found in Uzbekistan, Tajikistan, Turkmenistan and Iran, is included in the "Red Book" of all republics. *T. micheliana* during the research, new growth points were found in the Jizzakh, Samarkand and Kashkadarya regions of the species (CP—3, 4, 12, 14).

In the evaluation of cenopopulation status, organisms with high reliability were selected (Table 3).

Population markers were selected based on generally accepted methods. The tour was recorded at the highest level of reliability of the organisms, biomass (20.2 gramms) and reproductive effort (16.3%) of the organism signs (Table 4).

The state of the cenotic populations of *Tulipa micheliana* has not been evaluated by anyone before. To assess the condition of the coenopopulation as an organism trait, we selected: the reproductive effort of the individual (R/E); biomass of the individual; plant height; leaf length; perianth length. As population characteristics, the density of individuals per 1 m^2; ecological density of individuals per 1 m^2; the fraction of individuals of the young fraction (j - v); fraction of individuals of the generative fraction (g); fraction of the old fraction (s). To assess the condition of the coenopopulation, the range of selected characteristics was divided into five classes with the same volume on a uniform scale; then each class was awarded a score; the smallest score corresponded to the smallest indicators (Table 5).

The results of the evaluations are presented in the form of multi-axis diagrams (Figure 4).

The analysis of organisms in various cenopopulations of the *T. micheliana* showed that the high values were recorded in cenopopulation 3, 4, 9. These cenopopulations were separated from the Turkestan ridge and its adjacent areas,

Table 3. Indicators variation coefficient of *Tulipa micheliana.*

№ CP	Indicators (variation coefficient)					
	Reproductive effort, %	Individual biomass, gr	Plant height, mm	Length leaf, mm	Perianth length, mm	Diameter of the bulb, mm
1	23.8	15.3	7.48	15.6	18.9	15.6
2	26.8	18.2	11.8	7.33	7.80	8.38
3	20.3	24.7	21.1	17.6	19.4	8.63
4	12.9	10.6	9.63	12.2	11.4	8.55
5	21.1	14.1	22.1	7.44	10.1	7.92
6	20.1	11.7	21.3	6.16	7.27	4.99
7	37.7	22.5	14.4	18.8	13.6	11.2
8	16.1	11.6	11.6	8.25	10.6	6.20
9	25.4	21.0	26.7	16.3	13.8	8.41
10	16.1	11.8	7.69	9.18	6.72	8.86
11	18.6	17.2	22.4	17.5	18.1	12.2
12	21.8	11.8	16.3	7.61	10.1	8.59
13	14.3	14.7	21.5	17.3	20.6	12.0
14	9.81	10.9	11.1	13.7	14.5	9.51
15	13.8	14.8	20.6	12.1	10.9	5.76

Table 4. Evaluating the differential censorship different cenopopulations of *T. micheliana* by Student criteria.

CP / CP	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Leaf length														
1	**2.91**	**2.79**	**3.77**	**2.27**	**2.09**	**4.28**	1.77	**3.01**	**2.26**	1.65	**2.30**	0.78	**3.53**	1.72
2		**5.44**	**7.90**	1.17	1.73	**2.65**	1.87	**5.93**	0.92	**4.35**	1.09	1.79	1.45	1.29
3			0.30	**4.96**	**4.85**	1.19	**4.57**	0.07	**4.91**	1.13	**4.98**	**3.39**	**5.81**	**4.40**
4				**7.22**	**7.15**	**8.33**	**6.61**	0.24	**7.03**	1.64	**7.23**	**4.47**	**7.94**	**6.19**
5					0.45	**3.33**	0.77	**5.67**	0.12	**3.82**	0.06	1.18	**2.27**	0.45
6						**3.68**	0.42	**5.31**	0.52	**3.69**	0.52	0.98	**2.68**	0.15
7							**3.73**	**7.68**	**3.10**	**5.40**	**3.27**	**3.34**	1.23	**3.21**
8								**4.98**	0.81	**3.41**	0.83	0.73	**2.76**	0.15
9									**5.34**	1.24	**5.43**	**3.63**	**6.26**	**4.77**
10										**3.79**	0.06	1.21	**2.04**	0.51
11											**3.84**	**2.30**	**4.80**	**3.28**
12												**2.12**	**2.21**	0.49
13													**2.52**	0.77
14														**2.24**
Plant height														
CP	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**4.29**	0.53	**3.17**	1.21	0.97	**9.23**	**6.76**	1.25	**7.03**	**2.13**	1.62	0.87	1.16	1.03
2		**5.10**	**7.22**	**2.37**	**2.71**	**8.08**	**3.88**	**4.02**	**4.37**	**5.32**	**2.77**	**2.78**	**4.44**	**4.66**
3			**2.38**	1.58	1.36	**8.05**	**6.08**	0.77	**6.23**	1.53	1.95	1.27	1.57	**0.46**
4				**4.07**	**3.87**	**11.2**	**9.24**	1.22	**9.47**	0.60	**4.75**	**3.77**	**4.60**	1.91
5					0.24	**6.66**	**4.49**	**2.08**	**4.62**	**2.99**	0.19	0.32	0.38	**2.04**
6						**7.07**	**4.87**	1.91	**5.02**	**2.80**	0.47	0.08	0.08	1.83
7							**4.68**	**6.91**	**5.62**	**8.56**	**8.49**	**7.07**	**12.08**	**8.54**
8								**5.46**	0.03	**6.94**	**5.60**	**4.91**	**8.27**	**6.60**
9									**5.53**	0.61	**2.39**	1.83	**2.09**	0.38
10										**7.06**	**5.91**	**5.05**	**9.10**	**6.76**
11											**3.42**	**2.71**	**3.16**	1.12
12												0.56	0.75	**2.46**
13													0.02	1.74
14														**2.13**
Individual biomass														
CP	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**3.58**	**7.46**	**13.1**	0.14	0.05	**7.87**	**6.08**	**9.08**	**6.68**	**7.14**	0.20	1.82	1.37	1.13

Continued

2		**8.66**	**16.3**	**3.61**	**4.02**	**4.28**	1.91	**10.4**	**2.53**	**9.48**	**3.87**	1.96	**2.86**	**4.67**
3			**1.73**	**7.54**	**7.56**	**9.95**	**9.29**	0.61	**9.44**	**3.37**	**7.61**	**8.09**	**7.98**	**7.05**
4				**13.6**	**14.1**	**20.2**	**19.3**	**2.73**	**19.8**	**3.11**	**14.2**	**15.1**	**15.5**	**12.1**
5					0.11	**8.18**	**6.37**	**9.18**	**7.02**	**7.36**	0.05	1.77	1.29	1.31
6						**9.09**	**7.36**	**9.22**	**8.11**	**7.49**	0.18	**2.04**	1.57	1.30
7							**3.36**	**11.8**	**2.72**	**12.1**	**8.96**	**6.57**	**8.24**	**8.92**
8								**11.1**	0.87	**11.0**	**7.20**	**4.48**	**6.29**	**7.29**
9									**11.3**	**4.45**	**9.28**	**9.80**	**9.70**	**8.62**
10										**11.3**	**7.96**	**5.14**	**7.13**	**7.87**
11											**7.59**	**8.45**	**8.38**	**6.36**
12												1.88	1.39	1.46
13													0.71	**2.99**
14														**2.65**

Perianth length

CP	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**5.07**	**2.45**	**2.70**	**3.97**	**3.49**	0.96	1.13	**3.02**	1.42	1.67	**4.03**	**2.59**	**2.01**	**2.76**
2		**7.10**	**11.0**	**2.06**	**3.95**	**5.69**	**6.75**	**9.85**	**8.85**	**6.82**	1.93	**2.03**	**4.03**	**4.02**
3			0.43	**6.19**	**5.83**	**3.57**	**3.82**	0.08	**4.17**	0.87	**6.24**	**4.81**	**4.45**	**5.18**
4				**9.19**	**8.89**	**4.55**	**5.16**	0.64	**6.08**	0.64	**9.27**	**6.0**	**5.87**	**4.72**
5					1.26	**4.02**	**4.58**	**8.44**	**5.44**	**5.77**	0.11	0.89	**2.44**	1.97
6						**3.41**	**3.95**	**8.09**	**4.90**	**5.37**	1.38	0.24	1.73	1.06
7							0.15	**4.65**	0.46	**2.83**	**4.10**	**2.09**	1.33	**2.32**
8								**5.13**	0.36	**3.09**	**4.67**	**2.13**	1.34	**2.52**
9									**5.80**	1.11	**8.50**	**6.0**	**5.80**	**6.98**
10										**3.47**	**5.57**	**2.10**	1.24	**2.72**
11											**5.82**	**4.23**	**3.81**	**4.62**
12												0.95	**2.53**	**2.07**
13													0.95	0.38
14														0.81

Reproductive effort

CP	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**3.92**	**10.3**	**12.2**	1.36	1.69	**6.09**	**4.33**	**7.99**	**4.78**	**7.96**	0.11	**2.79**	1.57	1.43
2		**12.2**	**18.0**	**5.43**	**5.87**	1.91	0.09	**9.59**	0.45	**11.1**	**4.06**	**2.05**	**4.01**	**6.74**
3			**3.29**	**9.66**	**9.54**	**13.3**	**12.4**	0.91	**12.6**	**4.76**	**10.4**	**11.8**	**11.4**	**10.0**
4				**11.0**	**10.8**	**18.2**	**17.6**	1.83	**18.0**	**2.46**	**12.7**	**16.3**	**15.7**	**12.5**
5					0.31	**7.56**	6.0	**7.41**	**6.44**	**6.92**	1.54	**4.47**	**3.34**	0.20
6						**8.04**	**6.52**	**7.29**	**6.98**	**6.74**	1.88	**4.96**	**3.83**	0.57

Continued

7						**3.28**	**10.3**	**2.80**	**12.6**	**6.38**	**5.19**	**7.39**	**9.49**
8							**9.70**	0.73	**11.6**	**4.57**	**2.60**	**5.53**	**8.14**
9								**9.84**	**3.22**	**8.09**	**9.19**	**8.80**	**7.68**
10									**11.9**	**5.06**	**3.37**	**6.54**	**8.84**
11										**8.24**	**10.6**	**10.0**	**7.68**
12											**2.89**	1.57	1.66
13												**2.46**	**5.94**
14													**4.54**
Diameter of the bulb														
CP	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.01	**3.92**	**3.42**	0.29	0.72	0.48	0.01	0.84	1.19	1.35	0.91	0.39	0.59	1.15
2		**6.93**	**6.30**	**2.02**	**3.12**	1.93	1.76	**8.14**	0.29	**2.92**	0.15	0.71	**2.27**	**3.72**
3			0.68	**5.20**	**5.29**	4.14	**6.04**	1.16	**7.08**	**2.71**	**6.73**	**5.15**	**4.36**	**4.48**
4				**4.53**	**4.55**	3.54	**5.35**	1.86	**6.45**	**2.15**	**6.10**	**4.58**	**3.73**	**3.74**
5					0.44	0.13	0.75	**6.24**	**2.49**	1.30	2.06	1.06	0.27	1.17
6						0.20	1.47	**6.66**	**3.38**	1.12	**2.88**	1.51	0.08	0.95
7							0.71	**5.21**	**2.14**	1.05	1.79	1.02	0.11	0.78
8								**7.35**	**2.05**	1.89	1.57	0.57	0.94	**2.24**
9									**8.27**	**3.71**	**7.93**	**6.20**	**5.51**	**5.82**
10										**3.11**	0.44	0.94	**2.49**	**3.95**
11											**2.79**	1.98	1.01	0.57
12												0.59	**2.11**	**3.48**
13													1.21	**2.03**
14														0.73

Note: studied 10 individuals of a mature generative state in each cenopopulation, in bold type significant differences were noted.

Table 5. Ranking point of *T. micheliana* signs value.

№	Signs	Points				
		I	II	III	IV	V
1	Reproductive effort, (RE), %	18.57 - 20.74	20.75 - 22.92	22.93 - 25.10	25.11 - 27.28	27.29 - 29.5
2	Individual biomass, g	12.90 - 23.55	23.56 - 34.20	34.21 - 44.85	44.86 - 55.50	55.51 - 66.19
3	Plant height, mm	62 - 84.56	84.57 - 107.12	107.13 - 129.68	129.69 - 152.24	152.25 - 174.8
4	Leaf length, mm	112.8 - 129.78	129.79 - 146.76	146.77 - 163.74	163.75 - 180.72	180.73 - 197.7
5	Perianth length, mm	36.7 - 42.7	42.71 - 48.70	48.71 - 54.70	54.71 - 60.70	60.71 - 66.70
6	The individuals density, 1 m^2 pieces.	1.9 - 2.48	2.49 - 3.06	3.07 - 3.64	3.65 - 4.22	4.23 - 4.8
7	Ecological density of 1 m^2, pieces.	2.56 - 3.32	3.33 - 4.08	4.09 - 4.84	4.85 - 5.60	5.61 - 6.4
8	Proportion s, %	0 - 3.55	3.56 - 7.10	7.11 - 10.65	10.66 - 14.20	14.21 - 17.77
9	Proportion g, %	24.56 - 29.64	29.65 - 34.72	34.73 - 39.80	39.81 - 44.88	44.89 - 50
10	Proportion j-v, %	49.93 - 55.02	55.03 - 60.11	60.12 - 65.21	65.22 - 70.30	70.31 - 75.42

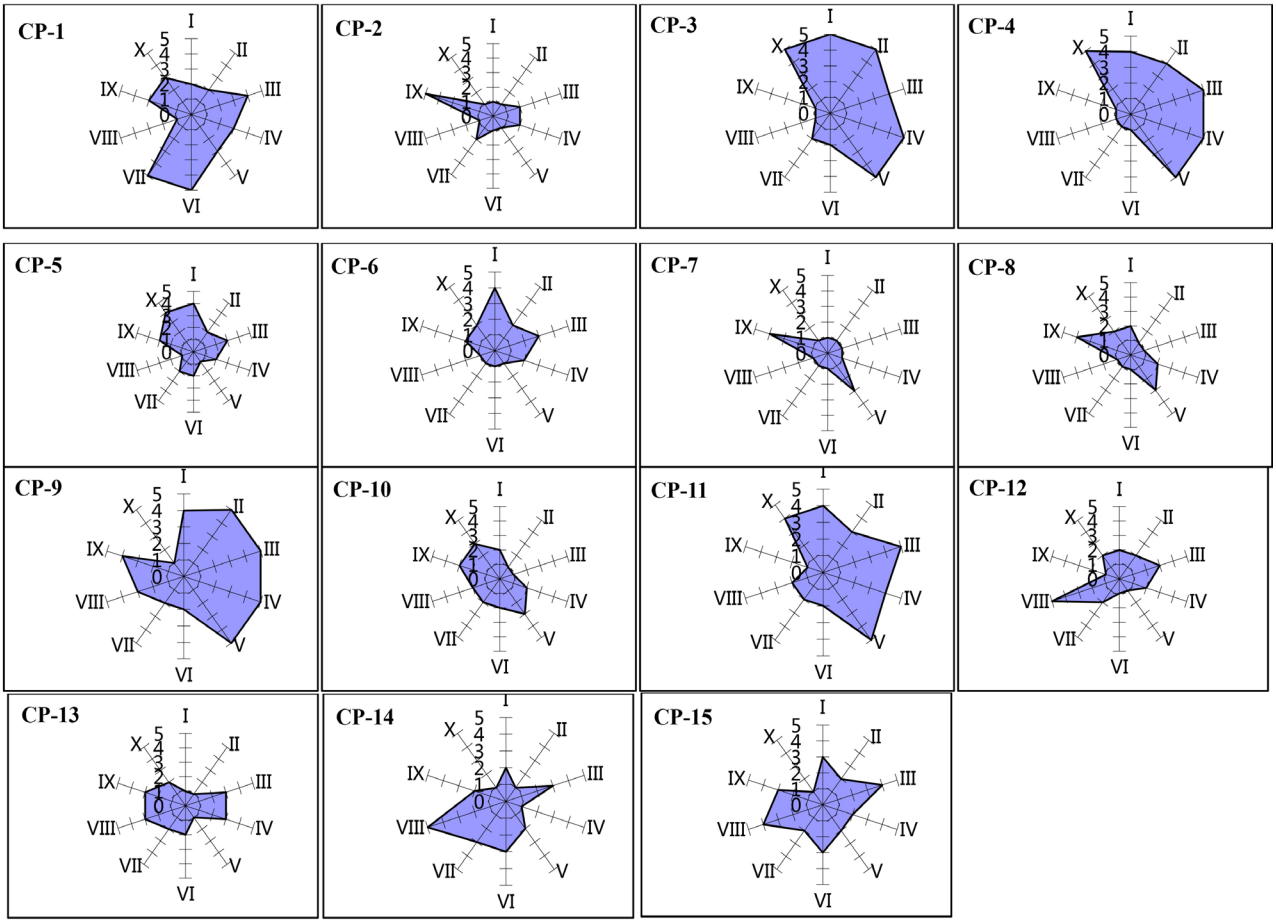

Figure 4. Assessment cenopopulations of *T. micheliana* (in points).

sufficient annual precipitation, and a good growth and development. In the cenopopulation (CP 11), which ranged from 3 - 5 points in the organism to the same incidence.

The normal signs of the organism were recorded in 1, 5, 6, 15 cenopopulations. A large number of plants that have a bushy vital structure in the plant make the organisms of the species good. Because bushy plants are able to protect ephemeroids from strong colds and winds, they also help keep the moisture content of the rainwater on the other hand.

The lower markers of the organism were recorded in the 2, 7, 8, 10, 12, 13, 14 cenopopulations. 2 cenopopulation Kukchatag is separated from the remains of the remains. This cenopopulation is the western boundary of the species distribution. This region is a constant temperature and constant wind. At times the wind speeds up to 30 m/s. The *Phlomoides nopligera* dominates the CP plant communities. The presence of many other types of ephemeroids in the spring will have an impact on the development of *T. micheliana* species. The remaining censorship indicators are due to the soil condition of the area (high number of crushed stones and large stones). CP 7, 8 are very close to the area where the annual precipitation is sufficiently adequate for cenopopulation. In the spring

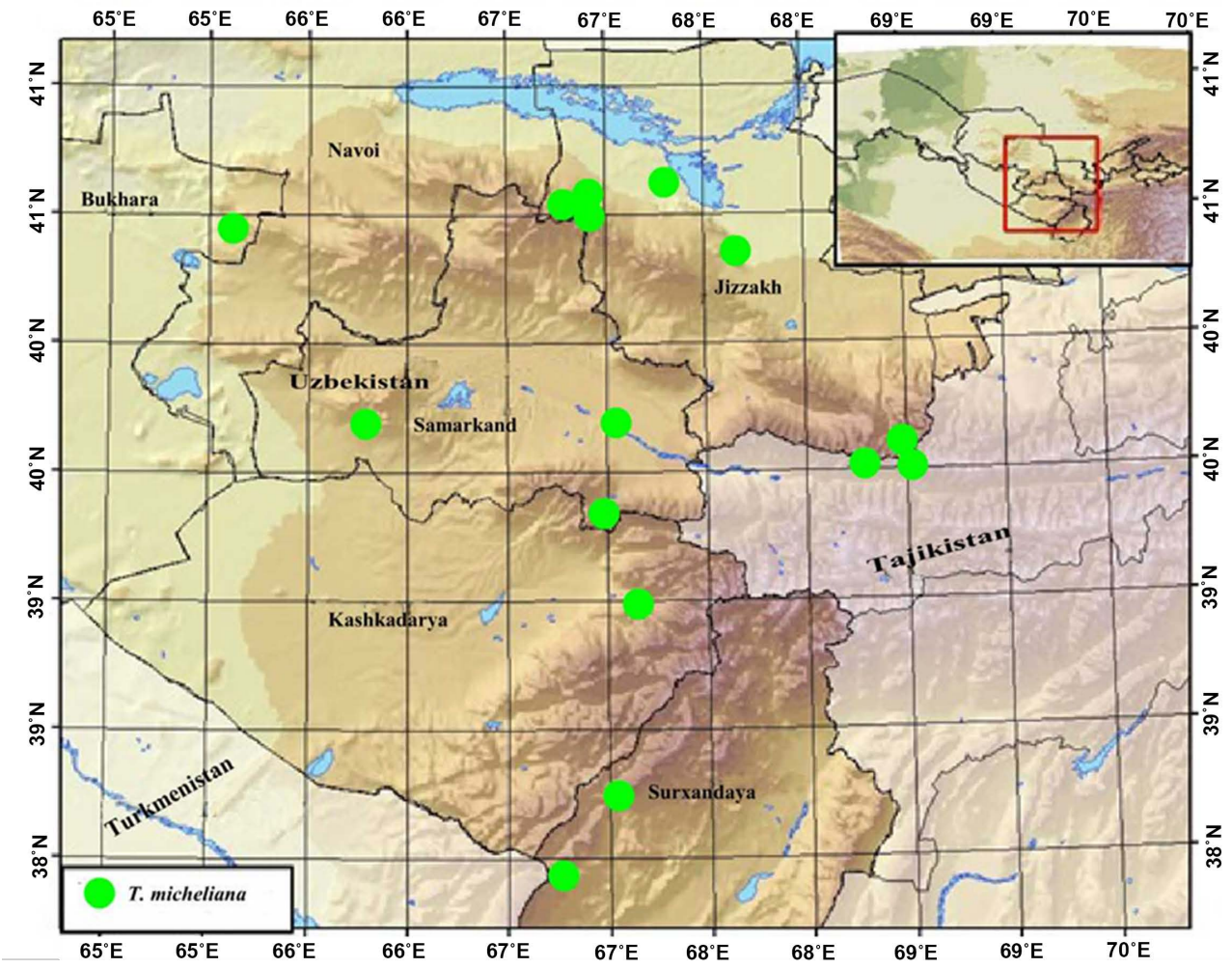

Figure 5. Schematic map of the study area.

months, the accumulation of odorous sprouts negatively affected the development of the generative stage of the species.

Thus, the diagnosis of *T. micheliana* cenopopulations states that none of the surveyed populations showed a maximum coincidence of the sum of characteristic values. *T. micheliana* other genus representatives, the fact that they can not grow vegetatively in natural conditions has had an impact on demographic parameters of cenopopulation. The accurate geographical coordinates of these cenopopulations will then be used to conduct monitoring activities in those areas (Figure 5).

The low value of the average density and ecological density of individuals, as well as the share of the young fraction in this population can be considered a temporary indicator related to the weather conditions of the year of field trip.

Acknowledgements

The current research is done under the project PZ—20170919165 Inventory of rare and endangered species of vascular plants of Navoi and Bukhara regions.

Conflicts of Interest

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

References

[1] USSR Academy of Sciences (1935) Flora of the USSR. V.IV. USSR Academy of Sciences, St. Petersburg, 341.

[2] Zonneveld, B.J.M. (2009) The Systematic Value of Nuclear Genome Size for All Species of *Tulipa* L. (Liliaceae). *Plant Systematics and Evolution*, **281**, 217-245. https://doi.org/10.1007/s00606-009-0203-7

[3] Abduraimov, O.S. and Shomurodov, H.F. (2015) Biometrical Indexes of the *Tulipa micheliana* Hoog in Different Cenopopulations. 2*nd International Conference on Arid Lands Studies*, Samarkand, 2.

[4] Abduraimov, O.S. and Shomurodov, H.F. (2015) The Ontogenesis and Ontogenetic Structure of *Tulipa micheliana* Th. Hoog (Liliaceae) Coenotic Populations in Uzbekistan, UAE. *Journal of Novel Applied Sciences*, **4-10**, 1089-1096.

[5] Hoog, M.N. (1973) On the Origin of *Tulipa*. Lilies and Other Liliaceae. Royal Horticultural Society, London, 47-64.

[6] Tojibaev, K. and Beshko, N. (2015) Reassessment of Diversity and Analysis of Distribution in *Tulipa* (Liliaceae) in Uzbekistan. *Nordic journal of Botany*, **33**, 224-234. https://doi.org/10.1111/njb.00616

[7] Vvedensky, A.I. and Kovalevskaya, S. (1971) Genus of *Tulipa* L. Conspectus of Central Asia Flora. Fan, Tashkent, Vol. 2, 94-109.

[8] Bochantseva, Z.P. (1962) Tulips. Fan, Tashkent, 407.

[9] Buriev, Kh.K. (1995) Bioecological Features of Some Rare and Endemic Plant Species of the Samarkand Region and Their Protection: Author's Abstract, PhD., Tashkent, 27.

[10] Sharipov, A. and Pratov, U. (1997) Tulips. Uzbek National Encyclopedia. Tashkent, 32.

[11] Ibragimov, A.Zh. (2010) Flora of the Surkhan Reserve (The Kugitang Ridge). Abstract, PhD. Tashkent, 20.

[12] Beshko, N.Yu. (1999) Flora of the Nurata Reserve. Abstract, PhD.,Tashkent, 45-49.

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

[14] Tojibaev, K. and Kadirov, R. (2010) Tulips of Uzbekistan. Chinor ENK, Tashkent, 153-162.

[15] Karimov, F.I. (2012) Geographical Analysis of Species of the Genus *Tulipa* L. (Liliaceae) of the Flora of the Fergana Valley. *Uzbek Biological Journal*, 29-32.

[16] Rabotnov, T.A. (1950) The Life Cycle of Perennial Herbaceous Plants in the Meadow Cenoses. *Bulletin of Botanical Institute of USSR*, **6**, 7-204.

[17] Coenopopulations of Plants (1976) Basic Concepts and Structure. Moscow, 216 p.

[18] Coenopopulations of Plants (1988) Population of Biology. Moscow, 183 p.

[19] Uranov, A.A. and Smirnova, O.V. (1969) Classification and Main Features of Development of Populations of Perennial Plants. *Bulletin of Moscow Society of Naturalists* (*Department of Biology*), **2**, 119-134.

[20] Zaugolnova, L.B., Denisova, L.V. and Nikitina, S.V. (1993) Approaches to the Assessment of Plant Coenopopulations. *Bulletin of Moscow Society of Naturalists*, **98**, 100-108.

[21] Zaugolnova, L.B. (1994) The Structure of the Seed Plants Populations and Monitoring of Their Problems. Doc. Dis. St. Petersburg, 70 p.

[22] Zlobin, Yu.A. (2009) Population Ecology of Plants: Current State, Growth Points. 263 p.

[23] Odum, U. (1986) Ecology. Vol. 2, Mir, Moscow, 209 p.

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

[25] Glotov, N.V. (1998) On the Evaluation of the Parameters of the Age Structure of the Plant Population. Life of Populations in a Heterogeneous Environment. Part I. 146-149.

[26] Zaitsev, G.N. (1991) Mathematical Analysis of Biological Data. Nauka, Moscow, 183 p.

[27] Red Book of Uzbekistan (2009) Plants and Fungi. Chinor Publishing House, Tashkent, Vol. 1, 356.

[28] (2001, 2012) The IUCN Red List Categories and Criteria. Version 3.1. http://www.iucnredlist.org

[29] (2011) The IUCN Red List of Threatened Species. http://www.iucnredlist.org

[30] Ivashchenko, A.A. (2005) Tulips and Other Bulbous Plants of Kazakhstan. Almaty, 192 p.

[31] Baranova, M.V. (1999) The Bulbous Plants of Liliaceae (Geography, Biomorphological Analysis, Growing). S. Peterburg. Science, 140-154.