O‘zbekiston Respublikasi Fanlar akademiyasi

BOTANIKA INSTITUTI

O‘simliklar populyatsion biologiyasi va ekologiyasi laboratoriyasi

MADANIY O‘SIMLIKLARNING O‘ZBEKISTON FLORASIDAGI ALOHIDA XO‘JALIK AHAMIYATGA EGA YOVVOYI AJDODLARI POPULYASIYALARINING ZAMONAVIY HOLATINI BAHOLASH VA TIRIK KOLLEKSIYASINI YARATISH

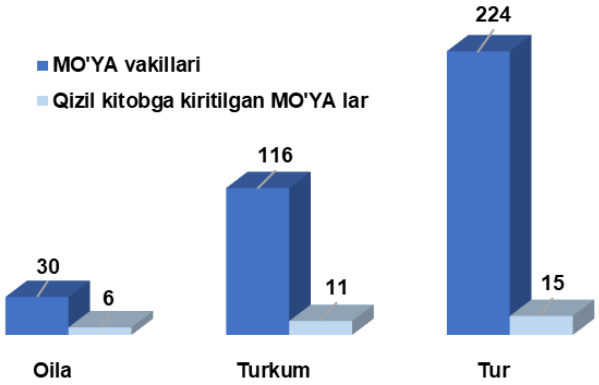
mavzusidagi ilmiy tadqiqot dasturining
YAKUNIY HISOBOTI
(*2021-2024 yy.*)

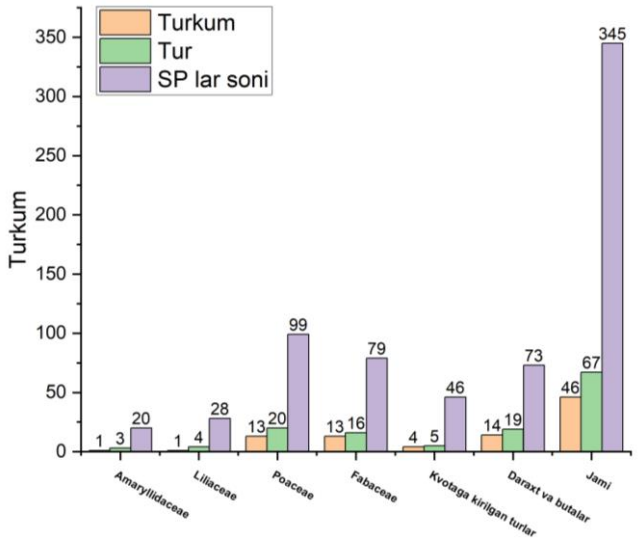
DASTUR ISHTIROKCHILARI			
№	F.I.SH.	Lavozimi	Ish stavkasi
1	O.S. Abduraimov	Laboratoriya mudiri	1,0
2	X.F. Shomurodov	Bosh ilmiy xodim	1,0
3	A.V. Maxmudov	Katta ilmiy xodim	1,0
4	Sh.U. Saribaeva	Katta ilmiy xodim	1,0
5	B.J. Mavlanov	Kichik ilmiy xodim	1,0
6	A.L. Allamurotov	Kichik ilmiy xodim	1,0

Toshkent 2024

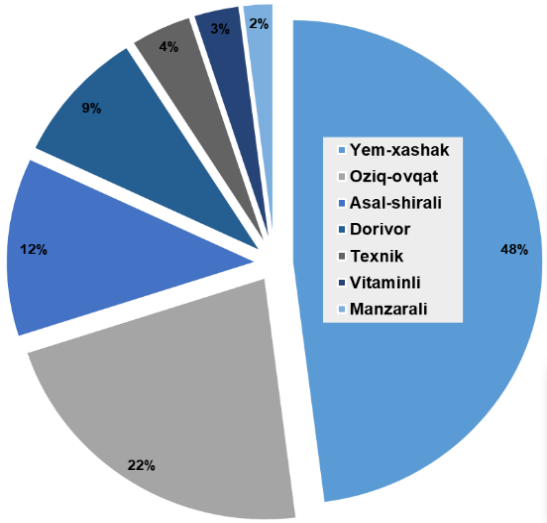
REZYUME

Ilk bor O’zbekiston florasidagi madaniy o‘simliklar yovvoyi ajdodlarining 29 oila, 119 turkumga mansub 224 turining ro’yxati skakllantirildi. Alohida xo‘jalik ahamiyatga ega Amaryllidaceae oilasining 20 ta, Liliaceae oilasining 28 ta, Poaceae oilasining 99 ta, Fabaceae oilasining 79 ta, Yillik kvota tarkibiga kiritilgan vakillarining 46 ta va Daraxt hamda buta vakillarining 73 ta, jami 345 ta senotik populyatsiyalarining zamonaviy holati baholandi.





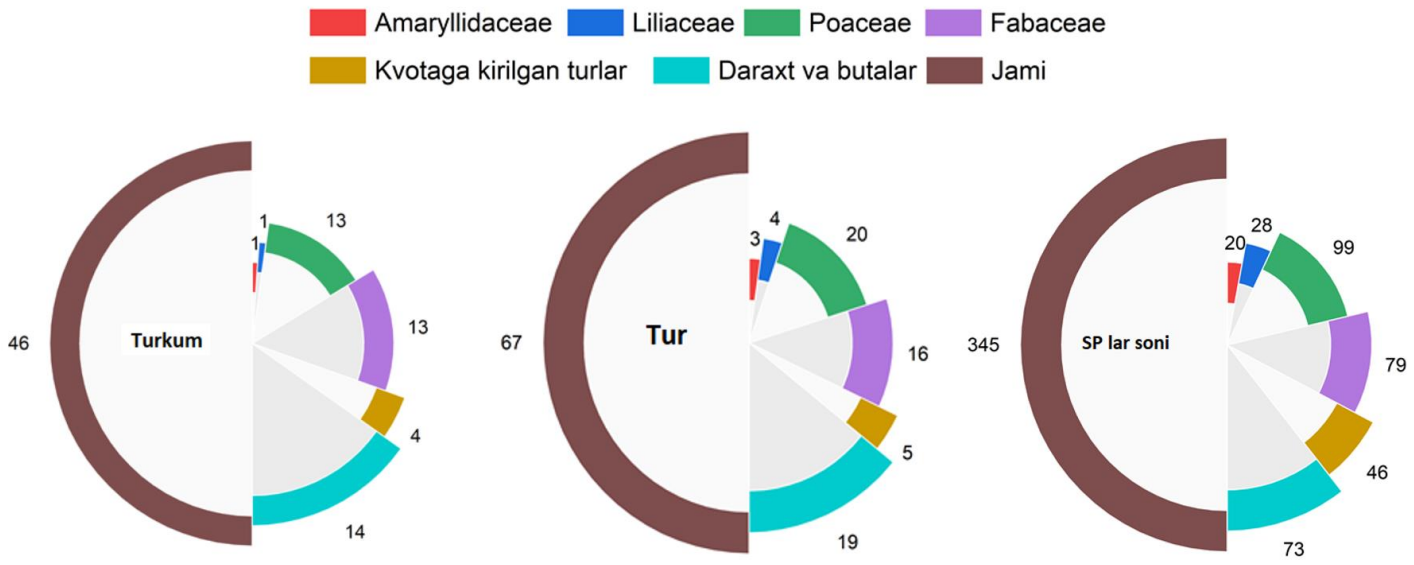
2021	2022	2023	2024
Amaryllidaceae	Poaceae	Fabaceae	Daraxt va butalar
Liliaceae		Kvota tarkibiga kiritilgan turlar	





Tadqiqotlar hududi:

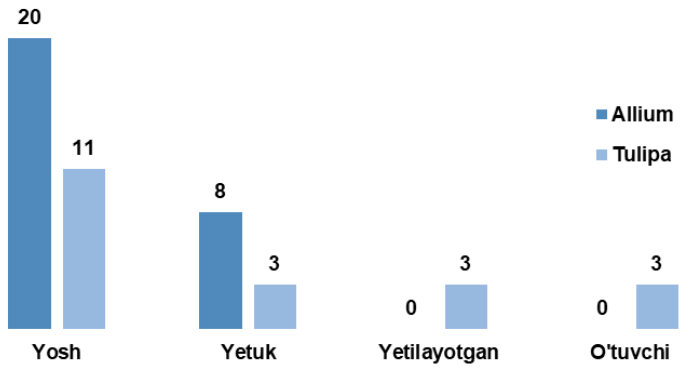


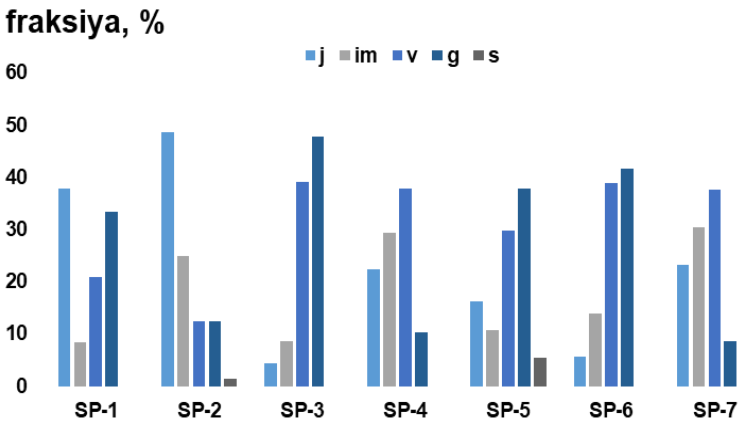


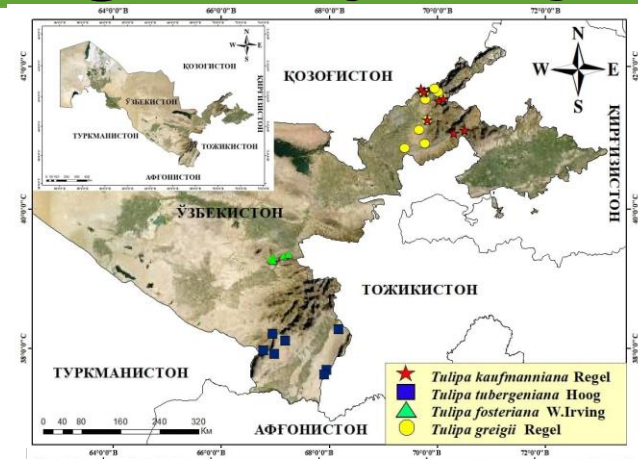
<u>2021-2024 yillarda</u> oib borilgan tadqiqotlarda **Tog‘li O‘rta Osiyo provinsiyasi** (***G‘arbiy Tiyon-Shon okrugi***ning Ugom-Pskom, G‘arbiy Chotqol, Qurama rayonlari; ***Nurota okrugi***ning Nurota, Oqtog‘, Nurotaoldi qoldiq tog‘lari rayonlari; ***Ko‘histon okrugi***ning Shimoliy Turkiston, Molguzar, Urgut rayonlari; ***G‘arbiy Hisor okrugi***ning Qashqadaryo, Tarqopchig‘ay, Ko‘hitang rayonlari; ***Panj okrugi***ning Bobotog‘ rayoni), **Turon provinsiyasi** (***Markaziy Farg‘ona okrugi***ning Qayroqum-Yozyovon, Sharqiy Farg‘ona rayonlari; ***Qizilqum okrugi***ning Qizilqum rayoni; ***Buxoro okrugi***ning Markaziy Zarafshon, Quyi Zarafshon, Qarshi-Qarnabcho‘l rayonlari; ***Ustyurt okrugi***ning Shimoliy Ustyurt rayoni) qamrab olindi.

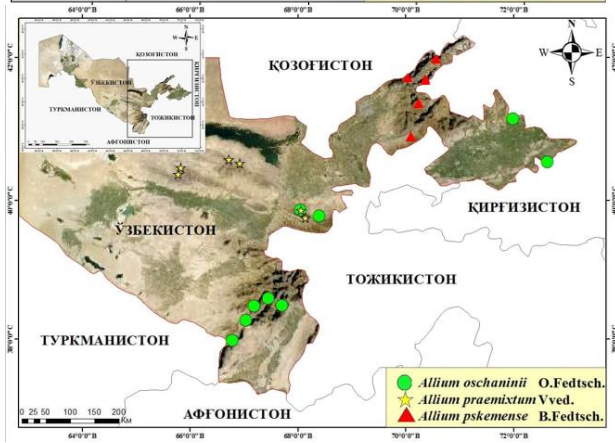
Fundamental tadqiqotlar sohasidagi asosiy natijalar:

Amaryllidaceae va **Liliaceae** oilasi vakillarining ontogenetik spektri chap tomonlama va markazlashgan spektrga xos. Mazkur oila vakillarining potensial urug‘ mahsuldorligi yuqori ekanligi hamda tabiiy sharoitda vegetativ ravishda ham ko‘paya olish xususiyatiga ega bo‘lganligi, ularning xarakterli spektri chap tomonlama bo‘lishiga imkon beradi. O‘rta generativ bosqichning uzoq davom etishi hamda mazkur bosqichdagi tuplarning turli tashqi omillar ta’siriga chidamli bo‘lishi ayrim senopopulyatsiyalarning markazlashgan tipga xosligi bilan izohlanadi.

























Kiss et al., 2024. Understanding the effects of weather parameters on the population dynamics of an endangered geophyte supports monitoring efficiency. Scientific reports. 14. 25974.

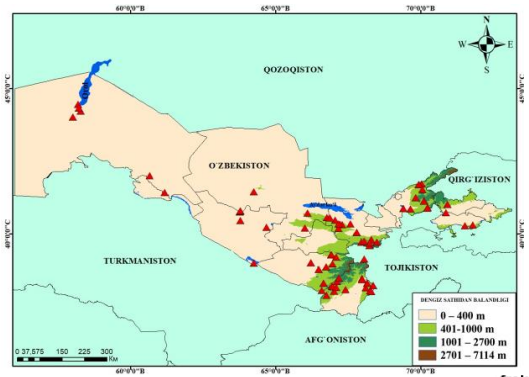
Tojibaev et al., 2018 . A checklist of the geophytes of Fergana Valley, Middle Asia—A monocotyledonous plant and biogeographical analysis. Journal of Asia-Pacific Biodiversity. Vol.11.Iss.3

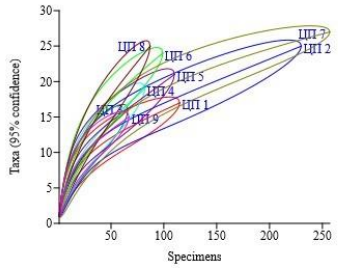
Fundamental tadqiqotlar sohasidagi asosiy natijalar:

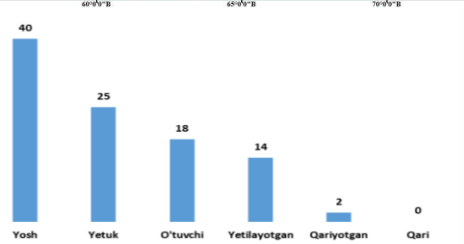
Poaceae oilasi vakillarining **13 turkum**ga oid **20 tur** ishtirokida **99 SP** ajratildi.

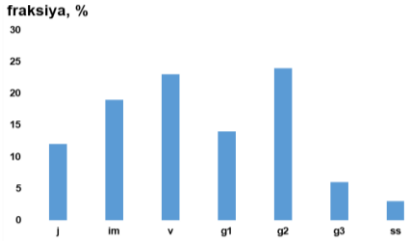
Poaceae oilasi vakillarining katta hayotiy sikli 1 yildan 22 yilgacha davom etadi. Oilaning o‘rganilgan barcha senotik populyatsiyalari normal, lekin to‘liqsiz a’zoli hisoblanadi.

Poaceae oilasining ko‘p yillik hayotiy shaklga ega bo‘lgan vakillarining natijalari shuni ko‘rsatadiki, senopopulyatsiyalar asosan chap tomonlama va markazlashgan spektrga xos ekanligi qayd etildi. Ma’lumki, oila vakillari turlar potensial urug‘ mahsuldorliigining yuqori ekanligi hamda tabiiy sharoitda vegetativ ravishda ham ko‘paya olish xususiyatgiga ega bo‘lganligi, ularning xarakterli spektri chap tomonlama bo‘lishiga imkon beradi. Generativ bosqichdagi tuplarning ko‘pligi hamda ular davomiyligining uzoq davom etishi, senopopulyatsiya tiplarining markazlashuviga olib keladi. Shu bilan birga turli xil iqlim omillari ta’sirida, ayrim hollarda bimodal spektrga xos bo‘lgan xususiyatlar ham shakllanadi.





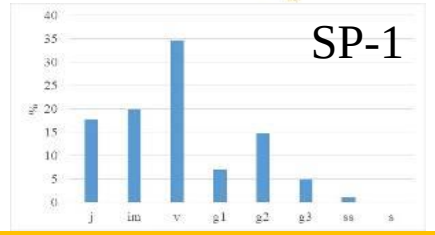


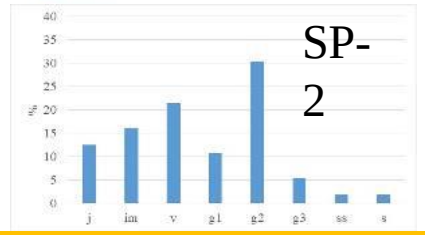


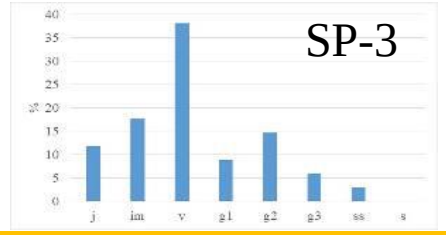
Agropyron cristatum

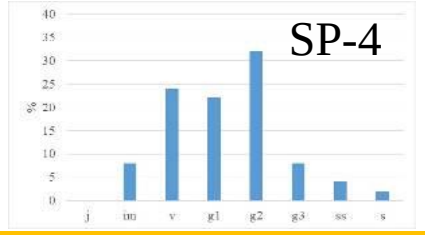


SP	Demografik ko’rsatkichlar								SP tiplari
	I_r	I_k	I_c	Tuplar zichligi, dona ($1m^2$)	P_{ekol} ($1m^2$)	Umumiy tuplar soni, dona	Δ	ω	
1	2,70	0,01	44,44	5,05	6,73	101	0,19	0,44	ёш
2	1,07	0,03	31,36	2,8	3,1	56	0,28	0,56	ёш
3	2,30	0,03	15,98	1,7	2,1	34	0,22	0,47	ёш
4	0,51	0,06	34,5	2,5	2,94	50	0,36	0,69	ўтувчи









Agropyron cristatum ishtirokidagi har hil o’tli saksavulzor senopopulyatsiyasi (Buxoro vil. Shofirkon tumani)

№	O’simlik nomi	Hayotiy shakli	Turlar mo’lligi, %
1	*Haloxylon ammodendron* (C.A.Mey.) Bunge ex Fenzl	Daraxt	15
2	*Anabasis salsa* (Ledeb.) Benth. ex Volkens	Yarim buta	1
3	*Artemisia diffusa* Krasch. ex Poljakov	Yarim buta	+
4	*Nanophyton erinaceum* (Pall.) Bunge	Yarim buta	+
5	*Agropyron cristatum* (L.) Gaertn.	Ko’p yillik	1
6	*Cistanche salsa* (C.A. Mey.) Beck	Ko’p yillik	+
7	*Ferula foetida* (Bunge) Regel	Ko’p yillik	+
8	*Fritillaria karelinii* (Fisch. ex D.Don) Baker	Ko’p yillik	+
9	*Leontice incerta* Pall.	Ko’p yillik	+
10	*Peganum harmala* L.	Ko’p yillik	1
11	*Poa bulbosa* L.	Ko’p yillik	2
12	*Zosima absinthiifolia* (Vent.) Link	Ko’p yillik	+
13	*Tragopogon capitatus* S.A.Nikitin	Ikki yillik	+
14	*Artemisia scoparia* Waldst. & Kit.	Bir yillik	+
15	*Astragalus ammophilus* Kar. & Kir.	Bir yillik	+
16	*Avena fatua* L.	Bir yillik	+
17	*Ceratocarpus arenarius* L.	Bir yillik	+
18	*Delphinium barbatum* Bunge	Bir yillik	+
19	*Euphorbia densa* Schrenk	Bir yillik	+
20	*Holosteum umbellatum* L.	Bir yillik	+
21	*Lactuca serriola* L.	Bir yillik	+
22	*Strigosella africana* (L.) Botsch.	Bir yillik	+
23	*Ziziphora tenuior* L.	Bir yillik	+



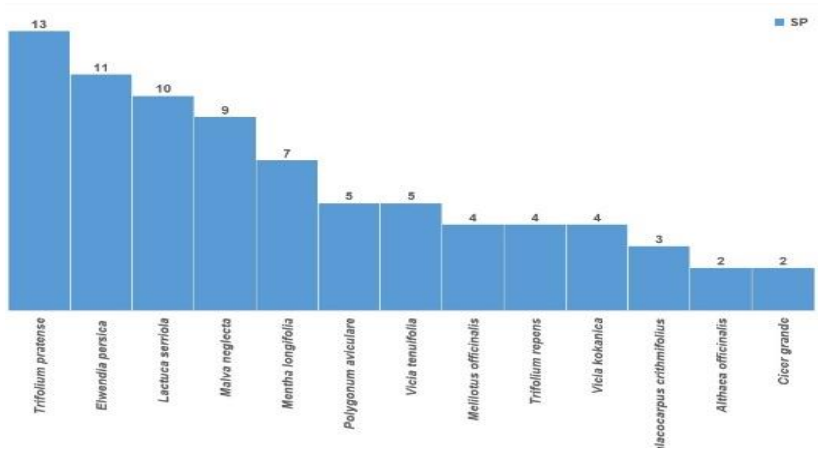
Majeed M, Tariq A, Haq SM, Waheed M, Anwar MM, Li Q, Aslam M, Abbasi S, Mousa BG, Jamil A. A detailed ecological exploration of the distribution patterns of wild poaceae from the Jhelum District (Punjab), Pakistan. **Sustainability (Switzerland)**. 2022;14(7):17.

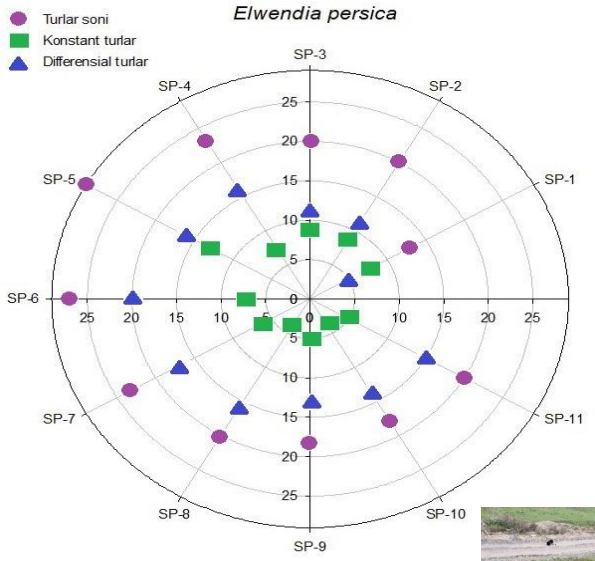
Muhammad M, Khizar HB, Muhammad SA, Arshad MA, Rainer WB, Fahim N, Audil R, Ansar M, Majid M, Wisal MK, Khawaja SA. Ethno-vertinary uses of Poaceae in Punjab, Pakistan. **PLoS One.**2020;15(11):e0241705

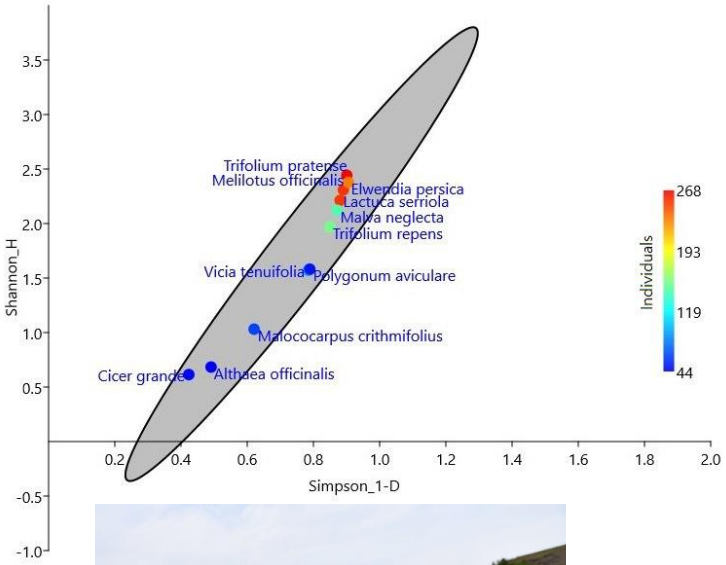
Fundamental tadqiqotlar sohasidagi asosiy natijalar:

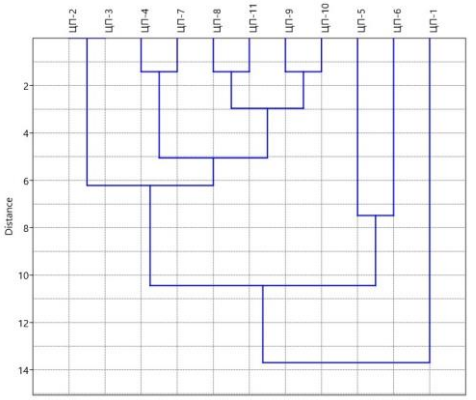
Fabaceae oilasi 6 turi (*Cicer grande, Melilotus officinalis, Trifolium pratense, Trifolium repens, Vicia kokanica, Vicia tenuifolia*), **tarqalish areali tor bo‘lgan** *Malacocarpus crithmifolius* va **Kvota tarkibiga kiritilgan 6 tur**ning (*Althaea officinalis, Elwendia persica, Lactuca serriola, Malva neglecta, Mentha longifolia, Polygonum aviculare,*) **79 ta** senotik populyasiyalarining zamonaviy holati baholandi.

O‘zbekiston florasidagi MO’YA larining **kvota tarkibiga kiritilgan vakillari** senotik populyatsiyalarida tur tarkibining hayotiy shakllariga ko‘ra, ko‘p yillik (61,9%) yetakchilik qilib, keyingi o‘rinlarda bir yillik (15,1%), buta (10,82%), daraxt (6,49%), yarim buta (4,76%) va so‘nggi o‘rinda ikki yillik o‘simliklar (0,86%) tashkil qiladi.











***Elwendia persica* (Boiss.) Pimenov & Kljuykov**



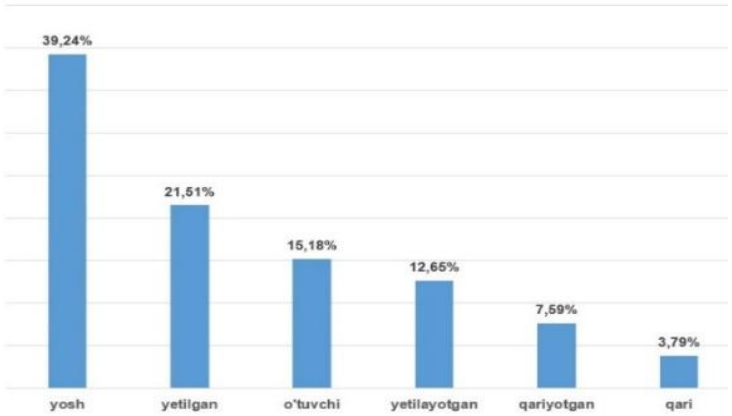
Shreya et al., 2023. Ethnomedicinal importance of Fabaceae family(Angiosperms) among the tribes of Rajasthan, India. **Natural Resources forHuman Health.** 2023; 3 (2): 237-247

Maroyi Alfred. 2023. Medicinal Uses of the Fabaceae Family in Zimbabwe: A Review. **Plants.** *12*(6), 1255;

Fundamental tadqiqotlar sohasidagi asosiy natijalar:

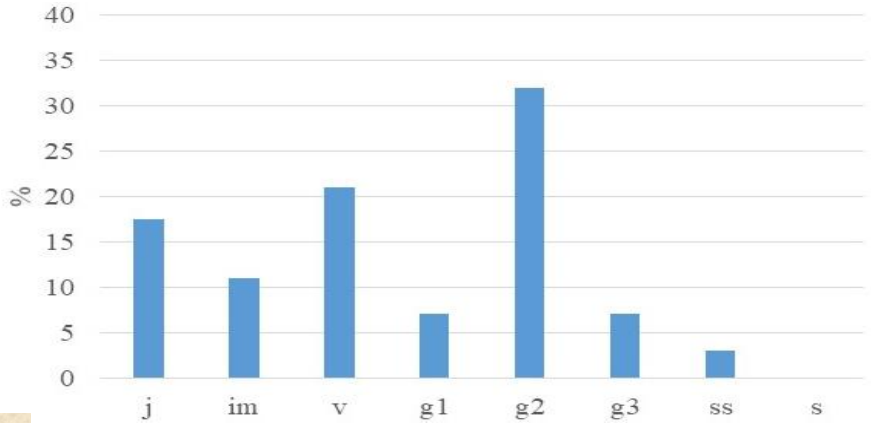
O’rganilgan turlar bir yillik (6,25%), ikki yillik (12,5%), ko’p yillik (75%) va yarim buta (6,25%) hayotiy shakllariga ega bo’lib, ularning katta hayotiy sikli 1 yildan 25 yilgacha davom etadi. Senopopulyatsiyalarning aksariyati normal, lekin to’liqsiz a’zoli ekanligi qayd etildi. Senopopulyatsiyalarning yosh holati va samaradorlik indeksiga ko‘ra, yosh (39,24%), yetilgan (21,51%), o‘tuvchi (15,18%), yetilayotgan (12,65%), qariyotgan (7,59%) va qari (3,79%) tipga xos.

Ontogenetik spektr asosan markazlashgan va chap tomonlama tipga xos. O‘rta yoshdagi generativ tuplar ulushining yuqori ekanligi, yosh nihollarning eliminatsiyasi hamda mazkur bosqich davomiyligining uzoq davom etishi bilan bog‘liq. Chap tomonlama sketrga xos bo’lgan senopopulyatsiyalarda vegetativ ko‘payish jarayoni ham qayd etildi.
Bimodal spektga xos bo’lgan senopopulyatsiyalarda o’tgan yillar mobaynida yalpi unib chiqish hisobiga hosil bo’lgan maysalarning keyingi bosqichga muvaffaqiyatli o’ta olgani senopopulyatsiyada virginil tuplarning yig’ilishiga olib kelgan bo’lsa, ikkinchi tomondan qulay sharoitda generetiv davrning uzayishi kuzatilgan.



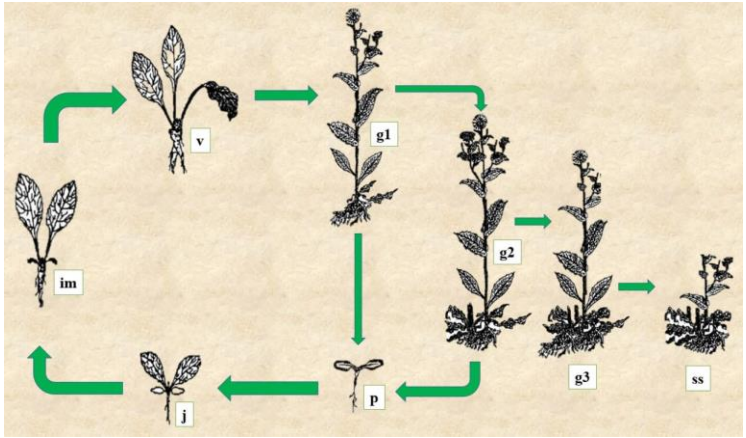


***Inula* L. turkumi turlarining ontogenezi**











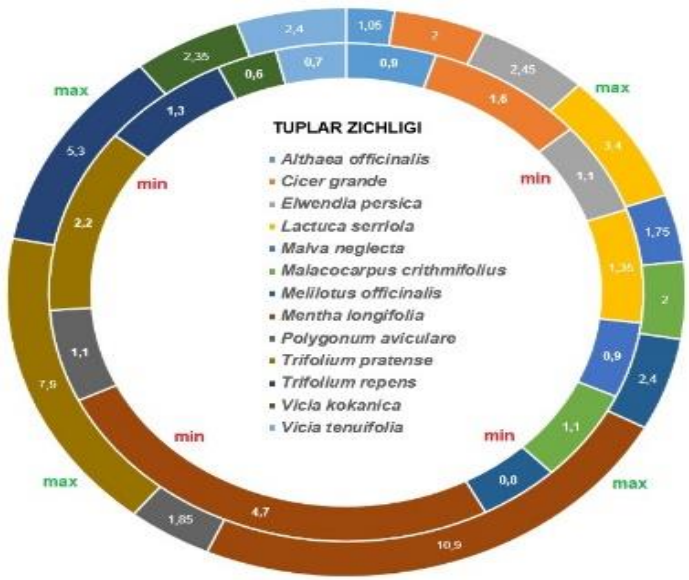


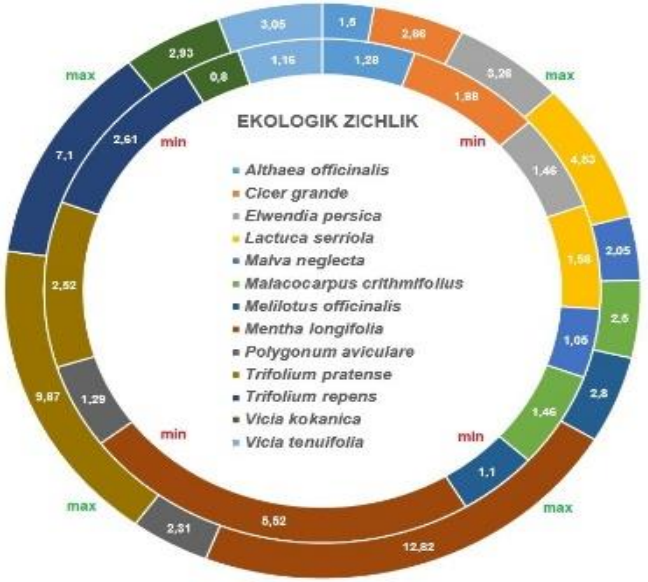
Plants, People, Planet., 2024

Fundamental tadqiqotlar sohasidagi asosiy natijalar:

Senopopulyatsiyani demografik ko‘rsatkichlari va yashovchanlik indeksining ko‘rasatkichlari to‘g‘ri korrelyatsiyada (R^2=0,76) kuzatiladi. Bunda, turlaning 1m^2 dagi **tuplar zichligi** 0,6-10,9 va ekologik zichligi 0,8-12,82 ta bo‘lishi izohlanadi.

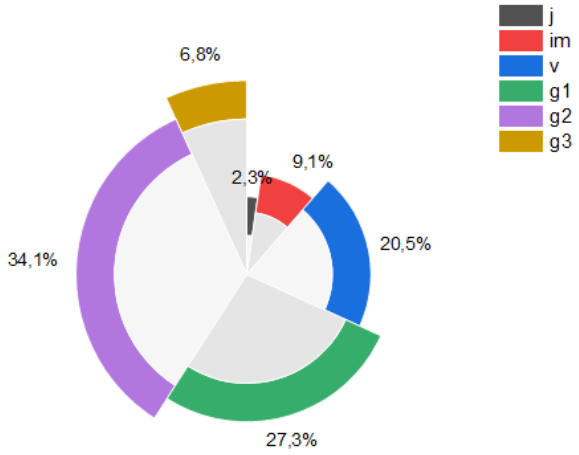
Ekologik mutanosibligiga ko’ra, *Mentha longifolia, Malva neglecta, Trifolium pratense, Polygonum aviculare, Lactuca serriola* turlari **evribiont** hamda *Vicia kokanica, Malacocarpus crithmifolius* turlari **stenobiont** xususiyatiga ega ekanligi qayd etildi.



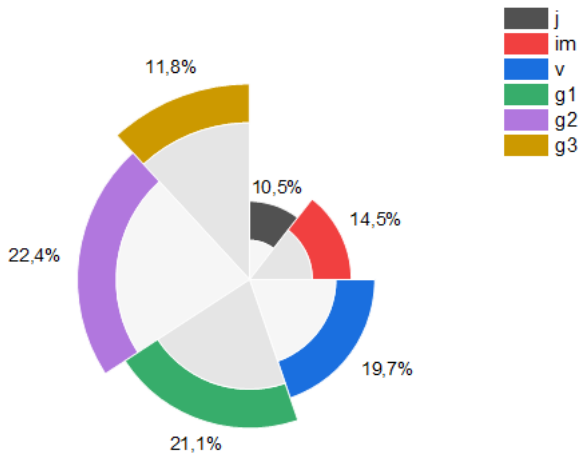


Inula grandis

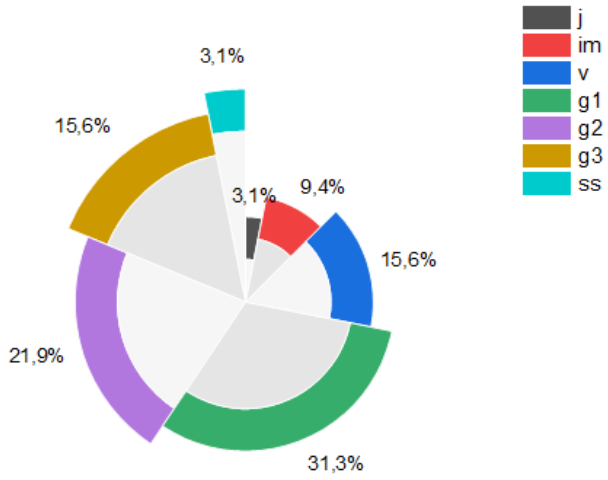
SP-1 Bobotog`



SP-2 Shalqon



SP-3 Xo`jamayxona

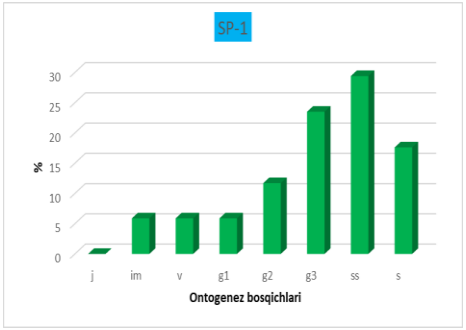


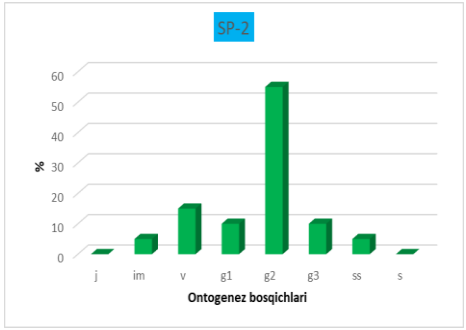
Fundamental tadqiqotlar sohasidagi asosiy natijalar:

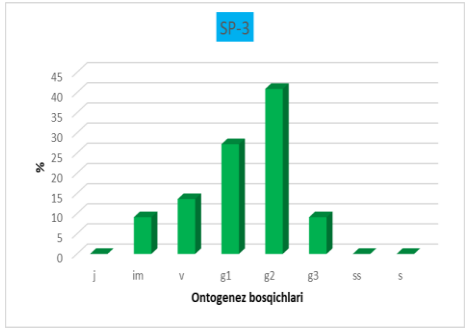
MO’YA lari daraxt va buta vakillarining 74 ta senopopulyatsiya ajratildi. Tadqiqotlarda deyarli barcha botanik-geografik rayonlari qamrab oldi.

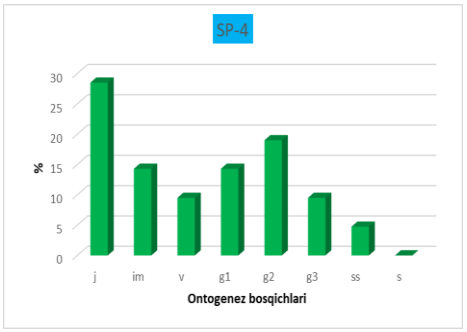
P. bucharica ning turli senopopulyatsiyalarida yosh tarkibi tahlil qilindi. Senopopulyatsiyalarning ontogenetik strukturasini aniqlashda tuplarning yosh bosqichi 8 ga bo‘lib (j, im, v, g_1, g_2, g_3, ss, s) o‘rganildi. Tadqiqotlar davomida *P. bucharica* senopopulyatsiyalari 3 xil tipga xos ekanligi aniqlandi (chap tomonlama 4; markazlashgan 2, 3, 5; o‘ng tomonlama 1).

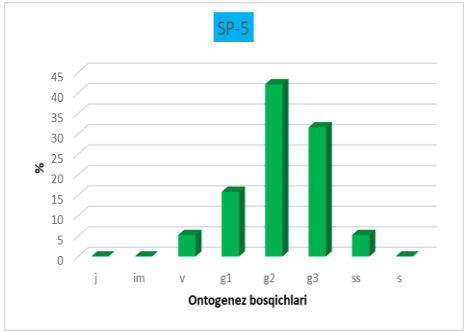
№	O‘simliklar nomi	Hayotiy shakli	Oila	Turlar mo‘lligi, %
1	*Juniperus seravschanica* Kom.	Daraxt	Cupressaceae	2
2	*Platanus orientalis* L.	Daraxt	Platanaceae	+
3	*Prunus bucharica* (Korsh.) Hand. - Mazz.	Daraxt	Rosaceae	7
4	*Sorbus persica* Hedl.	Daraxt	Rosaceae	3
5	*Acer platanoides* subsp. *turkestanicum* (Pax) P.C.de Jong	Daraxt	Sapindaceae	18
6	*Berberis integerrima* Bunge	Buta	Berberidaceae	3
7	*Lonicera nummulariifolia* Jaub. & Spach	Buta	Caprifoliaceae	+
8	*Ephedra intermedia* Schrenk & C.A. Mey.	Buta	Ephedraceae	+
9	*Prunus verrucosa* Franch	Buta	Rosaceae	+
10	*Allium verticillatum* Regel	Ko‘p yillik	Amaryllidaceae	+
11	*Ferula diversivittata* Regel & Schmalh.	Ko‘p yillik	Apiaceae	+
12	*Ferula dshizakensis* Korovin	Ko‘p yillik	Apiaceae	+
13	*Ferula kuhistanica* Korovin.	Ko‘p yillik	Apiaceae	8
14	*Polygonatum sewerzowii* Regel	Ko‘p yillik	Asparagaceae	2
15	*Eremurus olgae* Regel	Ko‘p yillik	Asphodelaceae	+
16	*Eremurus regelii* Vved.	Ko‘p yillik	Asphodelaceae	+
17	*Eremurus turkestanicus* Regel	Ko‘p yillik	Asphodelaceae	+
18	*Inula grandis* Schrenk ex Fisch. & C.A. Mey.	Ko‘p yillik	Asteraceae	6
19	*Crambe cordifolia* subsp. *kotschyana* (Boiss.) Jafri	Ko‘p yillik	Brassicaceae	+
20	*Megacarpaea gigantea* Regel	Ko‘p yillik	Brassicaceae	+
21	*Acanthophyllum pungens* (Bunge) Boiss.	Ko‘p yillik	Caryophyllaceae	+
22	*Pseudosedum fedtschenkoanum* Boriss.	Ko‘p yillik	Crassulaceae	+
23	*Astragalus alopecias* Pall.	Ko‘p yillik	Fabaceae	+
24	*Gentiana olivieri* Griseb.	Ko‘p yillik	Gentianaceae	+
25	*Hypericum scabrum* L.	Ko‘p yillik	Hypericaceae	+
26	*Iris kolpakowskiana* Regel	Ko‘p yillik	Iridaceae	+
27	*Iris magnifica* Vved.	Ko‘p yillik	Iridaceae	+
28	*Phlomis salicifolia* Regel	Ko‘p yillik	Lamiaceae	+
29	*Fritillaria olgae* Vved.	Ko‘p yillik	Liliaceae	2
30	*Tulipa fosteriana* W.Irving	Ko‘p yillik	Liliaceae	+
31	*Poa bulbosa* L.	Ko‘p yillik	Poaceae	+
32	*Rheum maximowiczii* Losinsk.	Ko‘p yillik	Polygonaceae	1
33	*Hemionitis persica* (Bory) Christenh.	Ko‘p yillik	Pteridaceae	+
34	*Arctium umbrosum* (Bunge) Kuntze	Ikki yillik	Asteraceae	+
35	*Parrya olgae* (Regel et Schmalh.) D.A. German et Al–Shehbaz	Ikki yillik	Brassicaceae	+
36	*Euphorbia falcata* L.	Bir yillik	Euphorbiaceae	+
37	*Ranunculus arvensis* L.	Bir yillik	Ranunculaceae	+
38	*Veronica biloba* Schreb. ex L.	Bir yillik	Plantaginaceae	+











P. bucharica ishtirokidagi aralash o‘tli – butali – daraxtzor jamoasi









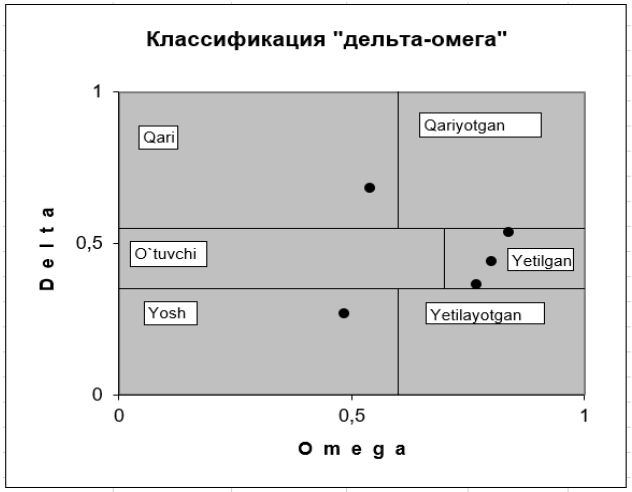
Fundamental tadqiqotlar sohasidagi asosiy natijalar:

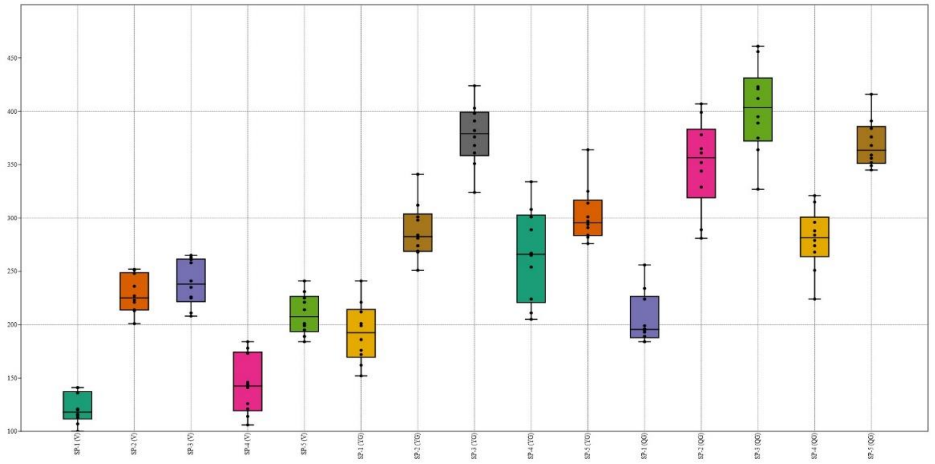
P. bucharica senopopulyatsiyalarda umumiy tuplar soni 17 tadan 22 tagacha bo‘lishi kuzatildi. 1 m^2 maydonda tuplar zichligi 0,2-0,36 ta, ularning ekologik zichligi esa 1-1,29 tani tashkil etdi. Senopopulyatsiyaning tiklanish indeksi 0,06-1,22 atrofida bo‘lishi kuzatildi. Qarish indeksi esa 0-0,89 gacha bo‘lishi qayd etildi. Sp-3 da subsenil va senil tuplarning yo‘qligi sababli, qarish indeksi 0 qiymatga ega.

P. bucharica senopopulyatsiyalarning demografik ko‘rsatgichlari

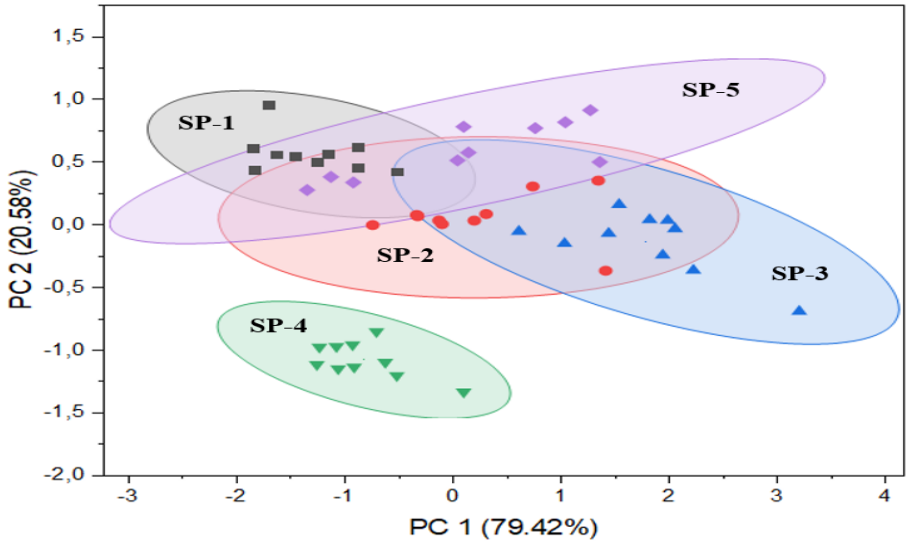
SP	Demografik ko‘rsatgichlar					SP tiplari
	I_t	I_q	Tuplar zichligi, dona ($1m^2$)	R_{ekol} ($1m^2$)	Umumiy tuplar soni, dona	
1	0,28	0,89	0,24	1	17	Qari
2	0,26	0,05	0,2	1,25	20	Yetilgan
3	0,29	0	0,36	1,29	22	Yetilgan
4	1,22	0,05	0,28	1	21	Yosh
5	0,06	0,05	0,29	1,14	19	Yetilgan

P. bucharica senopopulyatsiyalari tipi





P. bucharica ning uchta populyatsiyasidan olingan uch xil bosqichdagi (V-virginil, YG-yosh generativ va QG- qari generativ) o‘simliklarning balandlik ko‘rsatkichlari.

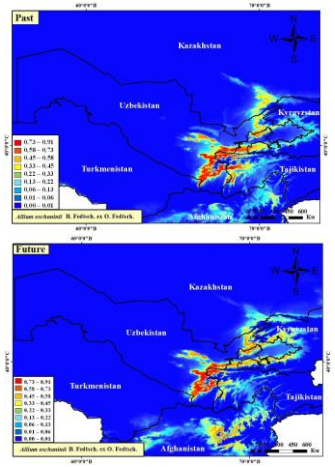


Vegetativ organlar ko‘rsatkichlariga ko‘ra, *P. bucharica* ning 5 ta populyatsiyasini PCA (Principle Component Analysis) sxemasi bo‘yicha tahlili.

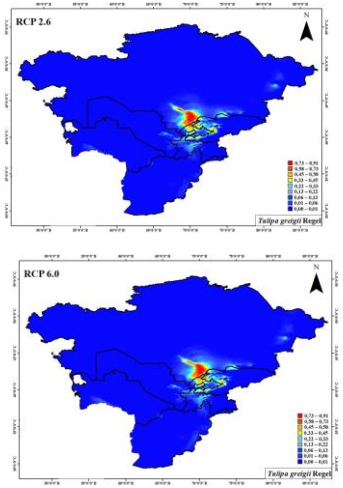
Fundamental tadqiqotlar sohasidagi asosiy natijalar:

Turlarning tarixiy va zamonaviy areallarini shakllanish xususiyatlarini bioiqlimiy modellashtirish

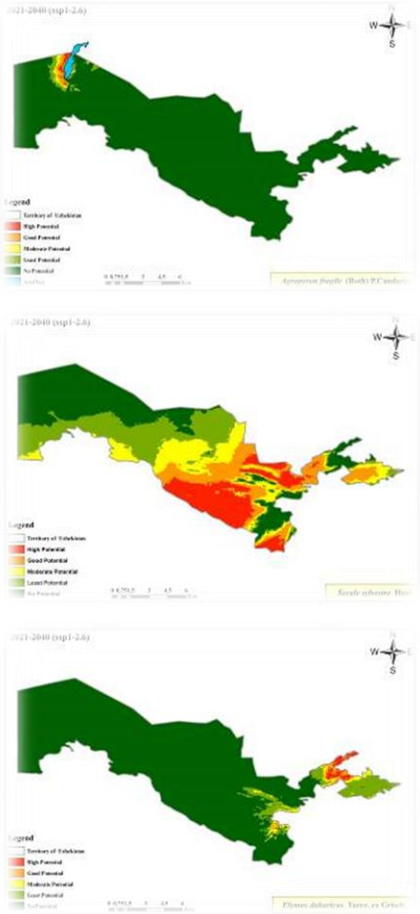
Allium L.



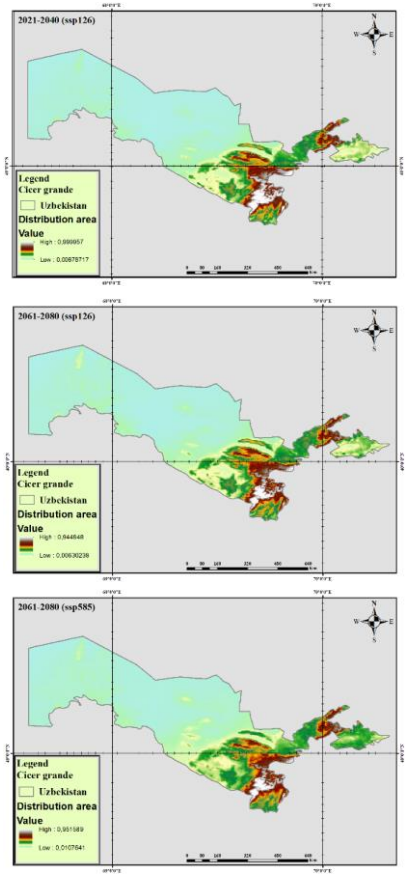
Tulipa L.



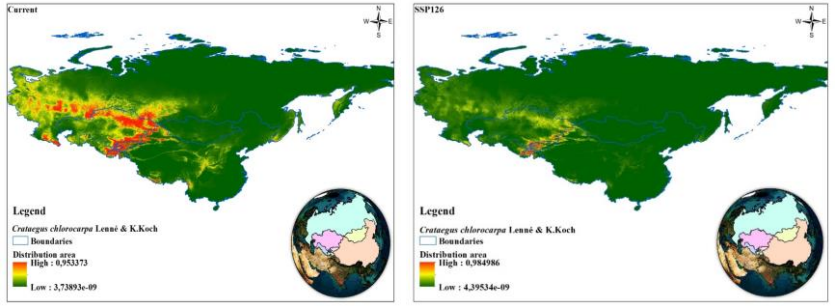
Poaceae



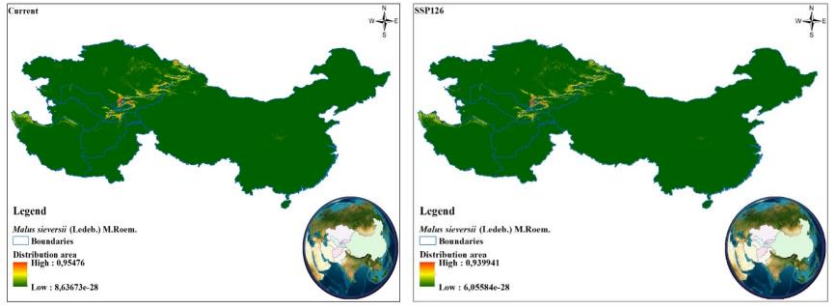
Cicer grande



Crataegus chlorocarpa



Malus domestica



Davr	Bioiqlimiy yashash joylarining yaroqlilik indeksi				
	0.80 – 1.00	0.60 – 0.79	0.50 – 0.59	0.30- 0.49	<0.30
Xozirgi davr	82816.11	41084.85	154880.61	418745.48	14721750.79
2041-2060 ssp126	4130.71	144550.36	84292.12	361071.99	14788063.28
2041-2060 ssp585	42038.87	82722.87	147182.60	401962.68	14745372.43
2081-2100 ssp126	78292.82	37102.72	322943.57	133161.61	14847778.34
2081-2100 ssp585	37372.58	74539.62	399669.98	134972.14	14772723.71

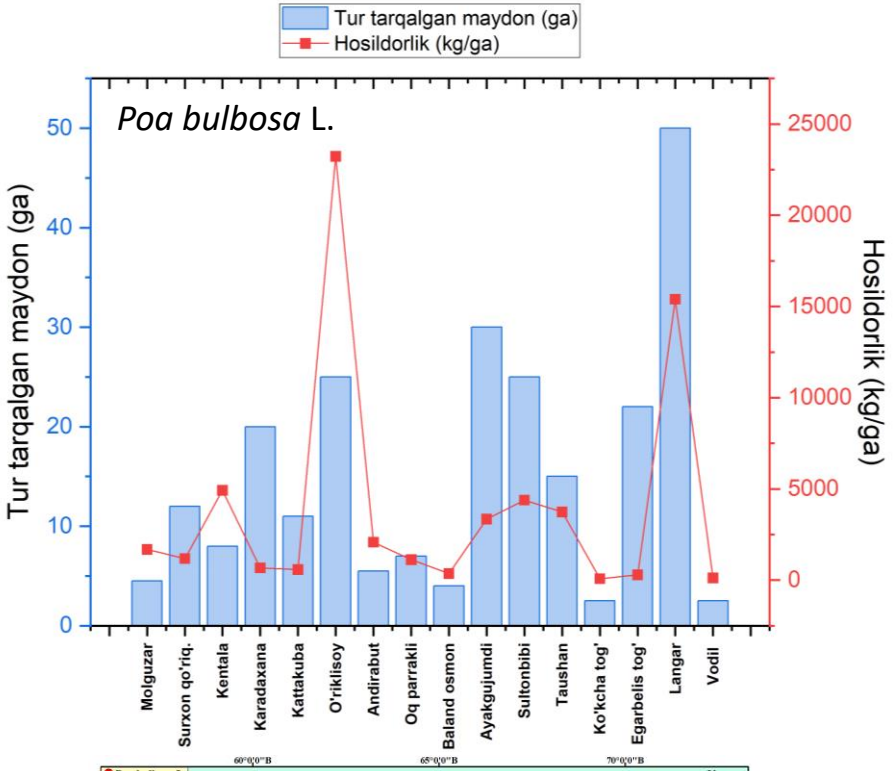
Zhang et al., 2023. **Potentially suitable distribution areas of *Populus euphratica* and *Tamarix chinensis* by MaxEnt and random forest model in the lower reaches of the Heihe River, China.** Environmental Monitoring and Assessment (CiteScore 4.7)

Anand et al., 2020. **Predicting the current and future potential spatial distribution of endangered *Rucervus eldii eldii* (Sangai) using MaxEnt model.** Environmental Monitoring and Assessment (CiteScore 4.7)

Amaliy tadqiqotlar sohasidagi asosiy natijalar:

Poaceae oilasi

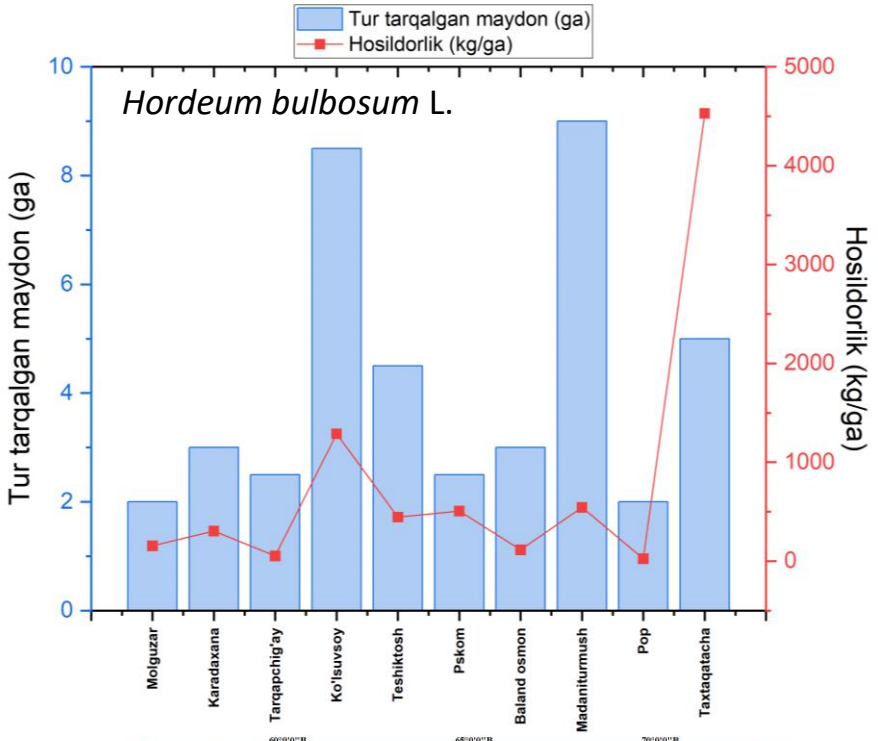
Turlarning tabiiy xom-ashyo resurslarini baholash

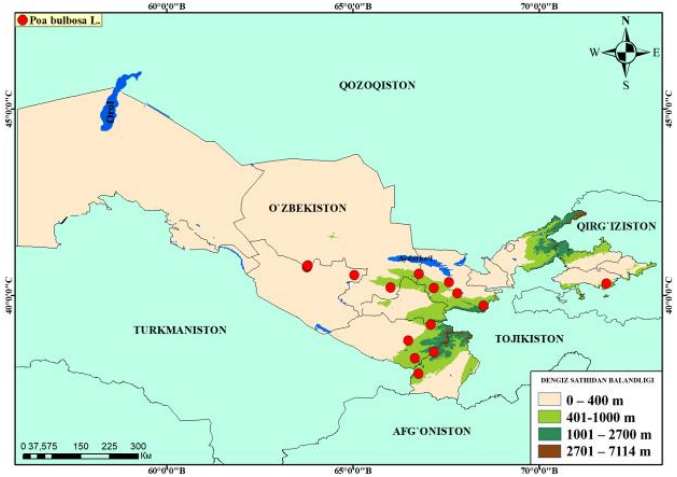


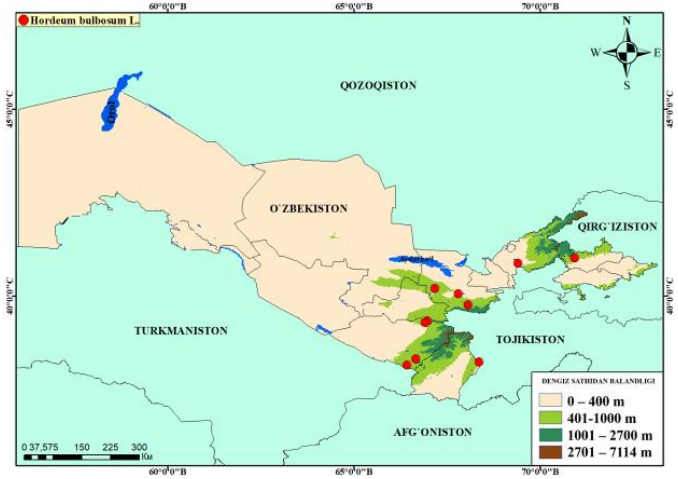










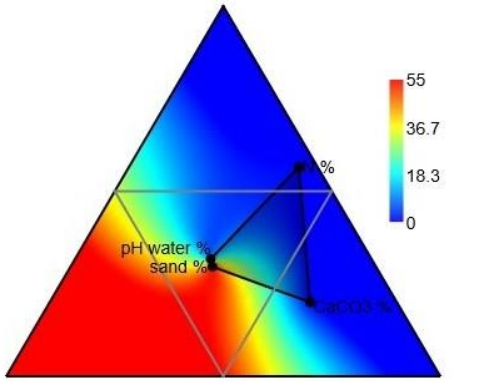


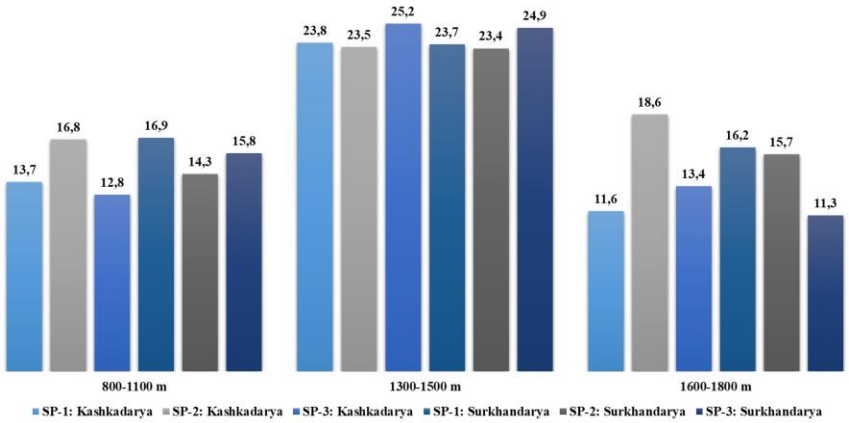
Amaliy tadqiqotlar sohasidagi asosiy natijalar:

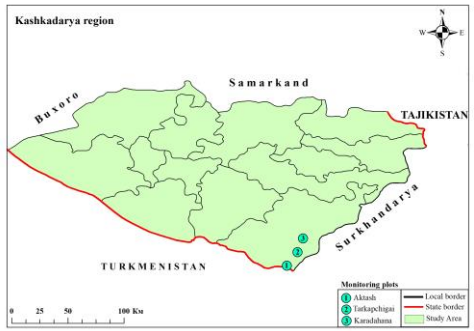




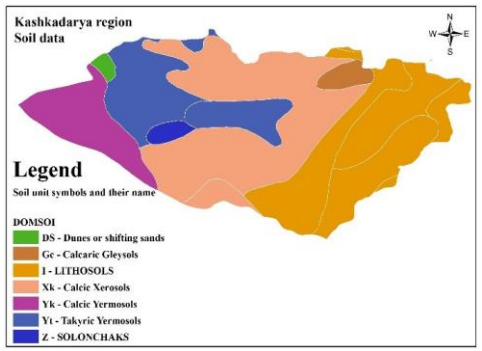
Kvota tarkibiga kiritilgan turlar

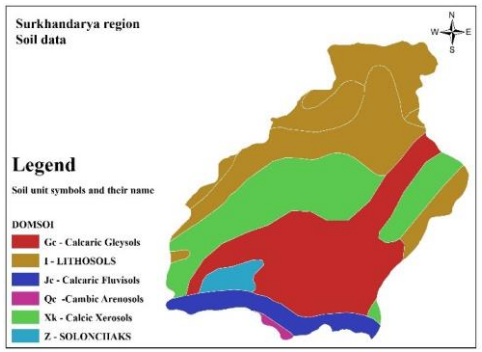






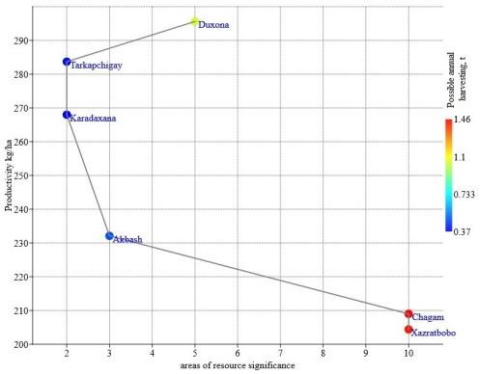


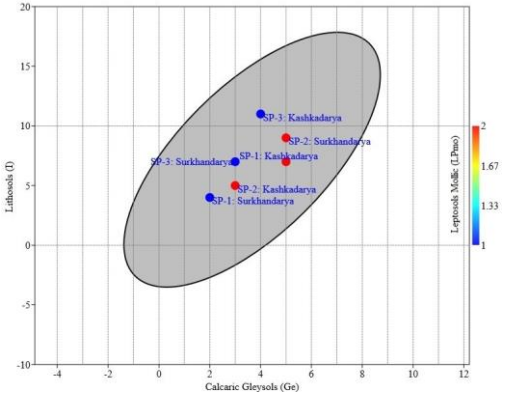


















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RESEARCH ARTICLE

Resources of *Inula grandis* Schrenk ex Fisch. & C.A. Mey. in South Uzbekistan

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Mahmudov AV, Abduraimov OS, Allamurotov AL, Maxmudov V, Mavlanov B J, Mamatkasimov OT. Resources of *Inula grandis* Schrenk ex Fisch. & C.A. Mey. in South Uzbekistan. Plant Science Today. 2024; 11(3): 719-727. https://doi.org/10.14719/pst.3392

Abstract

The article describes the resources of underground phytomass *Inula grandis* in the southern part of Uzbekistan. The soil type of the studied areas refers to mountain-crushed (Lithosols) soils. The optimum location for soil types and altitude above sea level is mountainous-crushed soils at altitudes of 1300-1500 m altitudes above sea level. The phytocoenotic optimum is distributed among the herb-shrub-juniper community. The yield of underground phytomass in the Kashkadarya region averages 261.2 kg/ha and in the Surkhandarya region, 236.3 kg/ha. The volume of possible annual harvesting in the Kashkadarya region is 1.24 tons from 7.0 ha of resource areas. These indicators were recorded in the Surkhandarya region: 3.92 tons from 25.0 ha of areas of resource significance.

Keywords

Inula grandis; Southern Uzbekistan; resources; biological and operational reserves; possible annual harvest volume

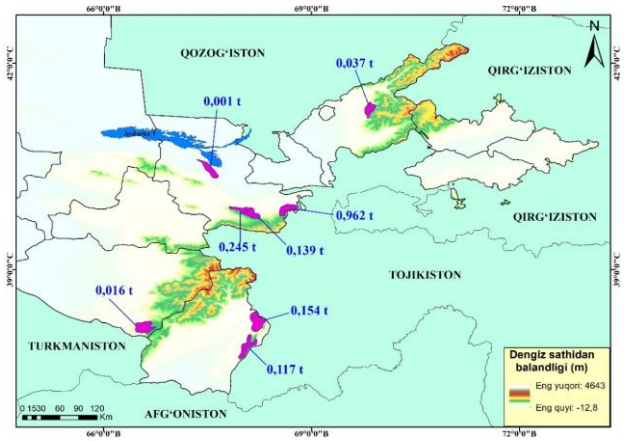
Introduction

The genus *Inula* L. includes about 77 species distributed in Europe, Asia and Africa. Species of this genus are mainly perennial, rarely biennial and annual plants (1). Species of the genus *Inula* L. (elecampane) are bushy perennial herbs belonging to the family Asteraceae. There are 9 species found in Uzbekistan: *Inula helenium*, *I. grandis*, *I. salicina*, *I. glauca*, *I. caspica*, *I. britannica*, *I. macrolepis*, *I. rhizocephala* and *I. multicaulis* (2). However, according to the latest results of scientists, 3 species of *Pentanema salicinum* (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort., *Pentanema caspicum* (F.K.Blum ex Ledeb.) G.V.Boiko, Korniy. & Mosyakin and *Pentanema britannica* (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort. are separated into a separate genus *Pentanema* Cass. (3). The most medicinal species are *Inula helenium*, *I. grandis*, *I. rhizocephala* (4). In addition, *Inula helenium* is a wild relative of cultivated plants too (5, 6). According to the results of pasture digression in the steppes of the Inner Tien Shan, *Inula grandis* is an indicator of degradation (7). *Inula grandis* is the main participant in plant communities of honey importance in south Uzbekistan since the projective cover of plants averages 30 % (8).

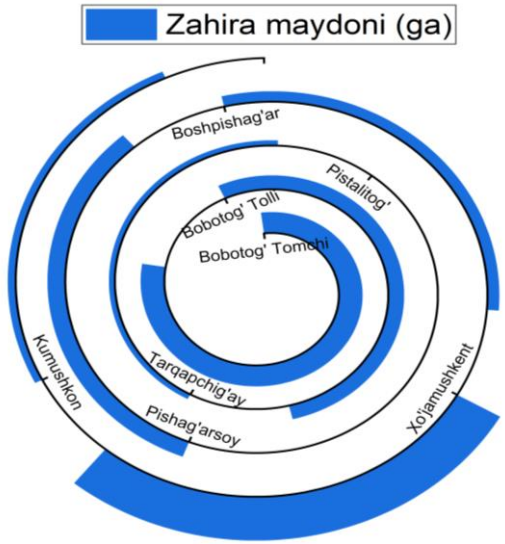
There has also been research on the species in Central Asia. On the territory of Kazakhstan, *Inula grandis* is widely distributed along the steppe and rocky slopes of low mountains from Tarbagatai to the Western Tien Shan. There are thickets of resource significance in the Zailii and Djhungar

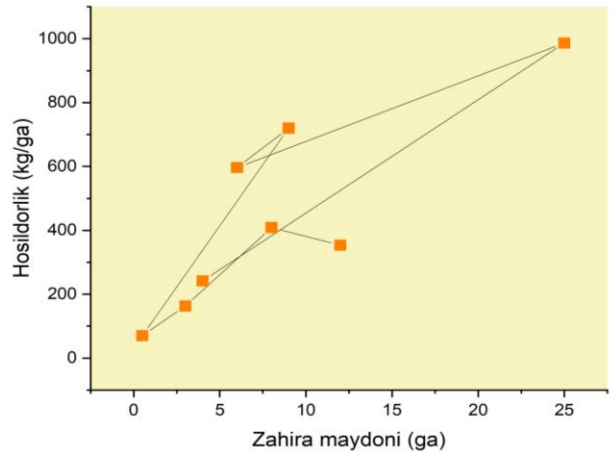
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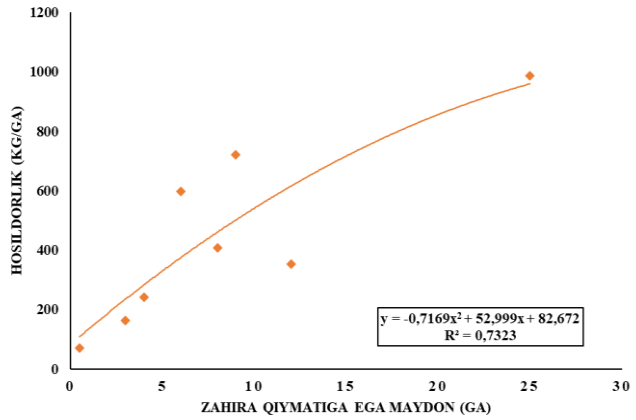
Kvota tarkibiga kiritilgan turlar



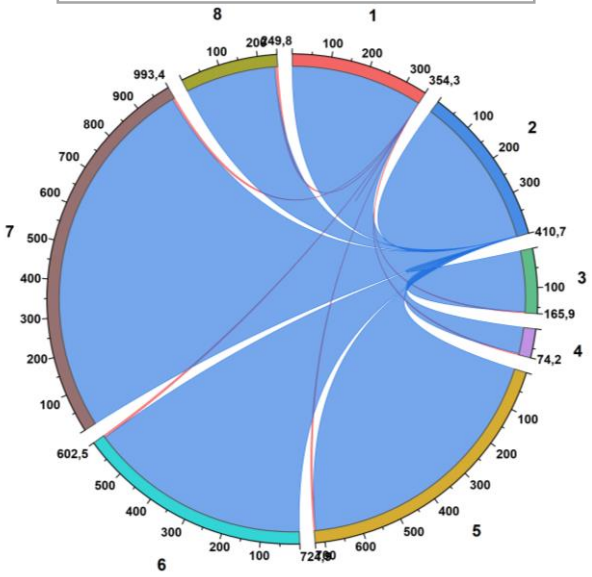


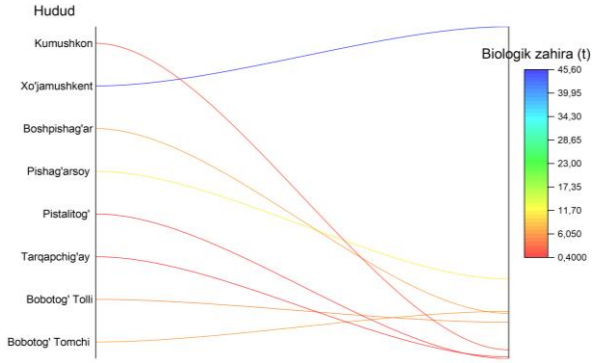


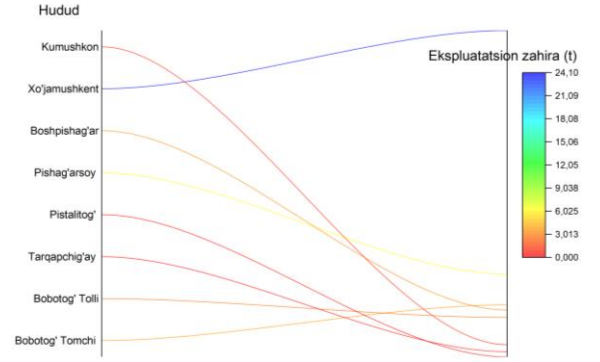


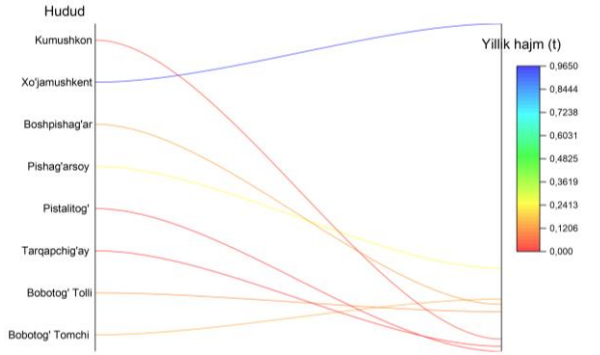


Hosildorlik kg/ga













O‘zbekiston Respublikasi “Qizil kitobi” ga kiritilgan MO‘YoA vakillari (2019)

№	Tur nomi	Oilasi	Maqomi (QK, 2019)	XTMQI (IUCN)	Tuplar soni		Ex situ sharoitida muhofazasi	Ho‘jalikdagi ahamiyati
					QK, 2019 y	2019-2024 yy		
1	*Allium giganteum* Regel	Amaryllidaceae	3	-	Umumiy tuplarining soni aniqlanmagan	1500 ta	+	O, M
2	*Allium praemixtum* Vved.	Amaryllidaceae	1	DD	1000	4-5 ming ta	+	O
3	*Allium pskemense* B.Fedtsch.	Amaryllidaceae	2	DD	60-100 ming	90 ming	+	O, M
4	*Diospyros lotus* L.	Ebenaceae	2	LC	Umumiy soni aniqlanmagan	35 ta	+	O
5	*Cicer grande* (Popov) Korotkova	Fabaceae	1	-	Umumiy soni aniqlanmagan	240 ta	-	Y
6	*Ribes malvifolium* Pojark.	Grossulariaceae	3	CR	Umumiy soni aniqlanmagan	900 ta	-	O
7	*Tulipa fosteriana* W.Irving	Liliaceae	2	VU	Umumiy soni aniqlanmagan	100 ming	+	M
8	*Tulipa greigi* Regel	Liliaceae	3	LC	Toshkent viloyati hududida 100 000 tupga yaqin o‘sadi	24 ming	+	M
9	*Tulipa kaufmanniana* Regel	Liliaceae	3	NT	Umumiy soni aniqlanmagan	100 ming	+	M
10	*Tulipa tubergeniana* Hoog	Liliaceae	3	NT	Umumiy soni aniqlanmagan	10 ming	+	M
11	*Punica granatum* L.	Lythraceae	3	LC	Umumiy soni aniqlanmagan	53	+	O, D
12	*Ficus carica* L.	Moraceae	2	LC	Umumiy soni aniqlanmagan	130	+	O, D
13	*Malacocarpus crithmifolius* (Retz.) Fisch. & C.A.Mey.	Nitrariaceae	2	DD	Umumiy soni 200 ta atrofida	250 ta	-	D
14	*Ziziphus jujuba* Mill.	Rhamnaceae	2	LC	Umumiy soni aniqlanmagan	60 ta	+	O, D
15	*Vitis vinifera* L.	Vitaceae	3	LC	Umumiy soni aniqlanmagan	450 ta	+	O

Izoh: XTMQI (IUCN) – Xalqaro tabiatni muhofaza qilish ittifoqi, QK – Qizil kitob; O – ozuqabop, M – manzarali, Y – Yem-xashak, D – Dorivor.

Amaliy tadqiqotlar sohasidagi asosiy natijalar:

Madaniy o‘simliklar yovvoyi ajdodlarining tirik kolleksiya maydoni

Toshkent botanika bog‘i







Qizilqum cho‘l stansiyasi

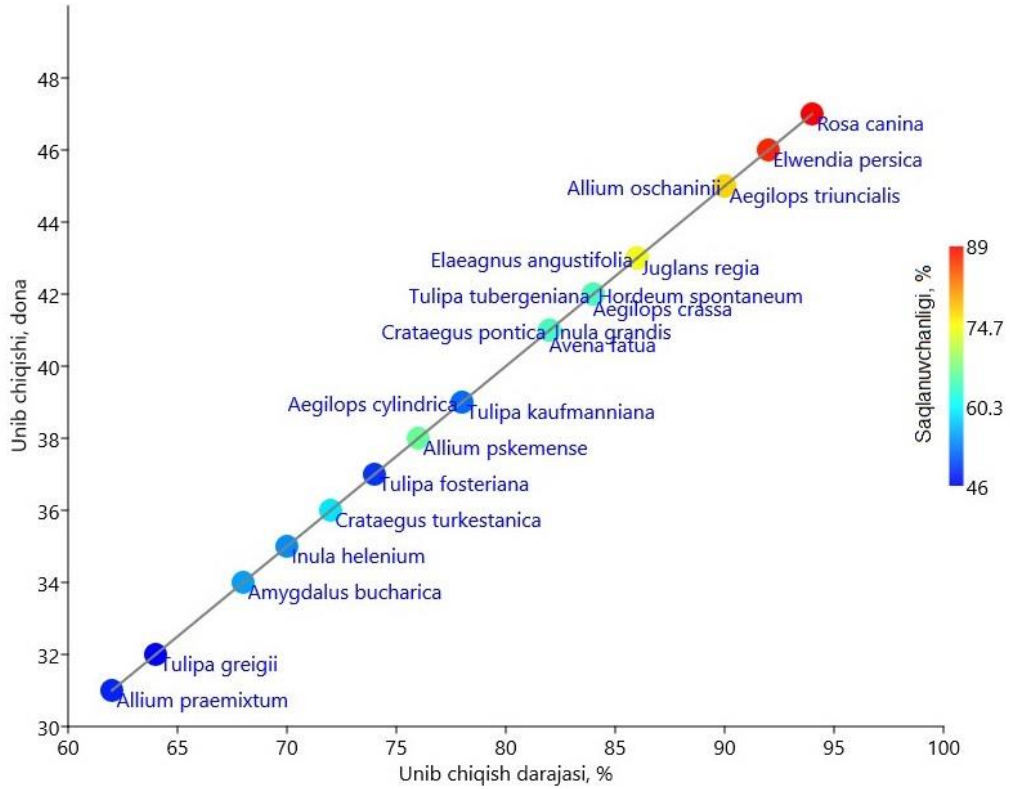






Toshkent Botanika bog‘i va Qizilqum cho‘l stansiyasida MO‘YA larining kolleksiyasi 21 turdagi yangi vakillari bilan boyitildi.

Turlarning urug‘ unuvchanligi va nihollarning saqlanuvchanlik ko‘rsatkichlariga ko‘ra, eng yuqori ko‘rsatkichlar *Rosa canina* (94/89%), *Elwendia persica* (92/87%) va eng quyi ko‘rsatkichlar *Allium praemixtum* (62/48%), *Tulipa greigii* (64/46%) turlarida qayd etildi.



Amaliy tadqiqotlar sohasidagi asosiy natijalar:

“Yashil makon” umummilliy loyihasi doirasida amalga oshirilgan tadbirlar

Buxoro viloyati Peshku tumanining olis “Jongeldi” MFY 24-

2022 y.	2024 y.
	
	
	

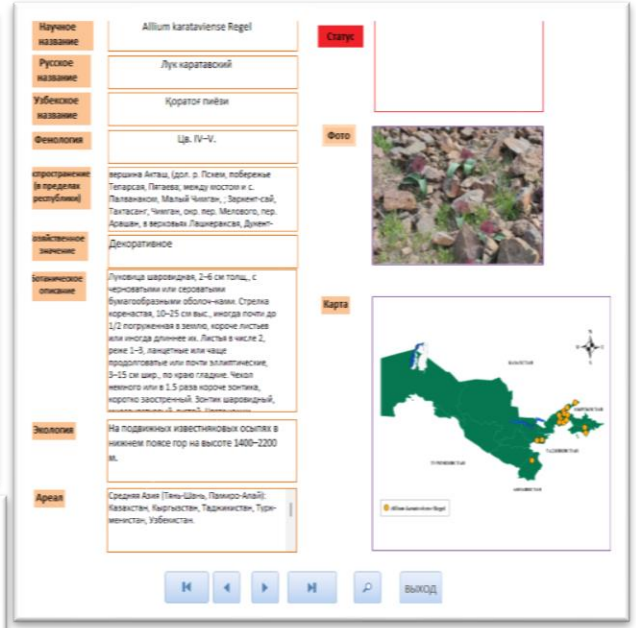
Qizilqum cho‘l stansiyasi

2022 y.	2024 y.
	
	
	

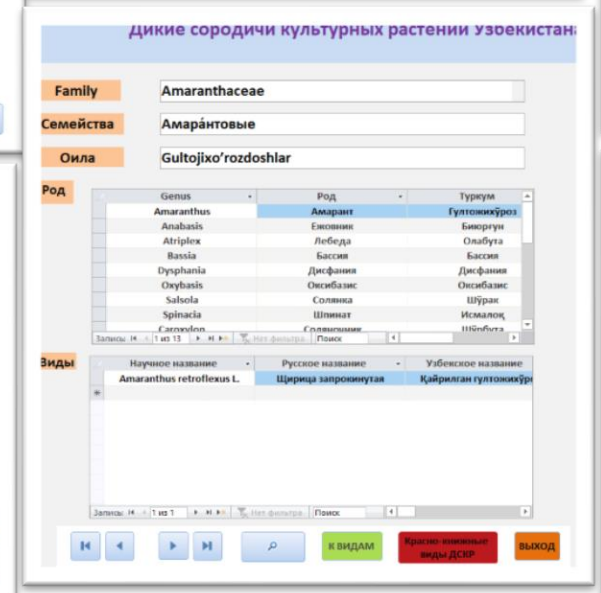
O‘zbekiston florasida tarqalgan madaniy o‘simliklar yovvoyi ajdodlarinining ma’lumotlar bazasi (MO’YA-UZ)

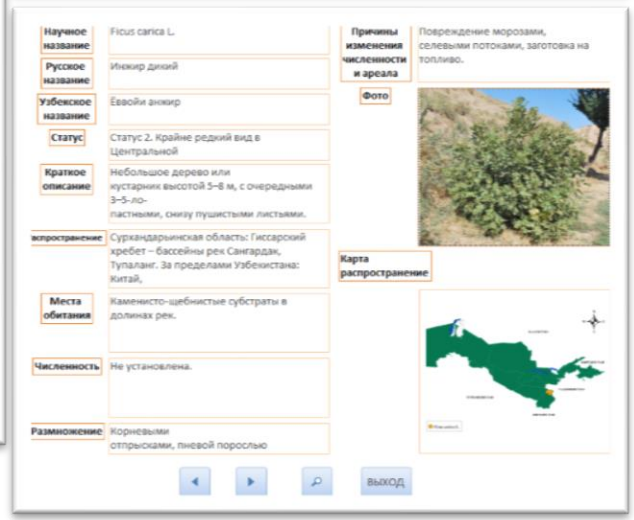












МАЪЛУМОТЛАР БАЗАСИНИНГ РАСМИЙ РЎЙХАТДАН ЎТКАЗИЛГАНЛИГИ ТЎҒРИСИДАГИ

ГУВОҲНОМА

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ АДЛИЯ ВАЗИРЛИГИ

№ BGU 1338

Ushbu guvohnoma O‘zbekiston Respublikasining «Elektron hisoblash mashinalari uchun yaratilgan dasturlar va ma‘lumotlar bazalarining huquqiy himoyasi to‘g‘risida»gi Qonuniga asosan quyidagi ma‘lumotlar bazasiga berildi:

Дикие сородичи культурных растений Узбекистана

(Маълумотлар базасининг номи)

Талабнома келиб тушган сана: **01.03.2024** (210) Талабнома рақами: **BGU 20240081**

Ҳуқуқ эгаси(лари): **O`ZBEKISTON RESPUBLIKASI FANLAR AKADEMIYASI BOTANIKA INSTITUTI, UZ**

Маълумотлар базаси муаллиф(лари): **ABDURAIMOV OZODBEK SULTANKULOVICH, UZ; SHOMURODOV XABIBULLO FAYZULLOYEVICH, UZ; MAXMUDOV AZIZBEK VALIJONOVICH, UZ; SARIBAYEVA SHAXNOZA USANOVNA, UZ; ALLAMUROTOV AKMAL LOLA O‘G‘LI, UZ; MAVLANOV BEKZOD JURABEKOVICH, UZ; MAMATQOSIMOV ODILBEK TO‘RAYEVICH, UZ**

O‘zbekiston Respublikasining Ma‘lumotlar bazasi davlat reestrida 01.04.2024 y. ro‘yxatdan o‘tkazilgan.

XULOSA:

1. O‘zbekiston florasida madaniy o‘simliklar yovvoyi ajdodlarining 28 oilaning 119 turkumga mansub 224 turi uchrashi qayd etildi. Flora tarkibida yetakchi oilalar spektrida Poaceae, Fabaceae, Amaranthaceae, Rosaceae va Amaryllidaceae vakillari yetakchilik qiladi. *Poa*, *Allium*, *Vicia*, *Rumex*, *Lathyrus*, *Aegilops*, *Hordeum* va *Prunus* turkumi vakillari yuqori xilma-xillikni tashkil qiladi.

2. Madaniy o‘simliklar yovvoyi ajdodlarining 51 turi daraxt va butalar hamda 173 tur o‘tsimon hayotiy shakliga ega ekanligi qayd etildi. Qayd etilgan turlar xo‘jalik ahamiyatiga ko‘ra: oziq-ovqat; vitaminli; yem-xashak; dorivor; texnik; asal-shirali; manzarali, bo‘yoqbop, zaharli, efir-moyli guruhlarga ajratildi. Unga ko‘ra ushbu turlarning ko‘pchiligidan Yem-xashak (144), Dorivor (87), Ozuqabop (79) sifatida foydalaniladi.

3. 2021-2024 yillarda yuqori xo‘jalik va iqtisodiy ahamiyatga ega bo‘lgan geofit, boshoqli, dukkakli hamda daraxt va buta hayotiy shakliga ega bo‘lgan madaniy o‘simliklar yovvoyi ajdodlarining fitotsenotik tahlili amalga oshirildi. Mazkur turlar ishtirokida jami 200 dan ortiq senopopulyatsiya ajratildi.

4. O‘zbekistonning turli botanik-geografik rayonlaridan madaniy o‘simliklarning yovvoyi ajdodlari bo‘lgan *Tulipa* L. turkumining 4 turi (*Tulipa fosteriana* Irv., *T. greigii* Regel, *T.kaufmanniana* Regel, *T. tubergeniana* Hoog.) ishtirokida 28 ta hamda *Allium* L. turkumining 3 turi (*Allium pskemense* B.Fedtch., *A. oschanini* O.Fedtsch., *A.praemixtum* Vved.) ishtirokida 20 ta, jami 48 ta senopopulyatsiyalarning zamonaviy holati baholandi. Senopopulyatsiyalarning aksariyati yosh va yetilgan tipga xos ekanligi qayd etildi.

5. Madaniy o‘simliklar yovvoyi ajdodlari boshoqli (Poaceae) vakillarining 13 turkum (*Aegilops, Agropyron, Phalaris, Sacharum, Elymus, Secale, Bromus, Poa, Avena, Festuca, Lolium, Hordeum, Alopecurus*) 20 turi ishtirokida jami 99 ta senopopulyatsiyalarning zamonaviy holati baholandi. Turlar uchun xarakterli spektr chap tomonlama bo’lib, senopopulyatsiyalarning asosiy qismi normal holatda ekanligi qayd etildi.

6. Madaniy o‘simliklar yovvoyi ajdodlar dukkakli (Fabaceae) vakillarining 6 turi (*Cicer grande, Melilotus officinalis, Trifolium pratense, Trifolium repens, Vicia kokanica, Vicia tenuifolia*) ishtirokida jami 30 ta senopopulyatsiyalarning zamonaviy holati baholandi. Senopopulyatsiyalar asosan yosh va yetilgan tipga xos ekanligi aniqlandi.

7. Madaniy o‘simliklarning (daraxt va buta hayotiy shaklga ega turlar) O‘zbekiston florasidagi alohida xo‘jalik ahamiyatga ega yovvoyi ajdodlarining (8 oila, 14 turkumga mansub 19 tur) zamonaviy holati baholandi. Senopopulyatsiyalarning yosh holati va samaradorlik indeksiga ko‘ra, yosh (24,32%), yetilgan (35,13%), o‘tuvchi (17,56%), yetilayotgan (13,51%), qariyotgan (8,10%) va qari (1,35%) tipga xosligi qayd etildi.

8. Antropogen ta’sirning kamligi yoki deyarli yo‘qligi sababli *Elaeagnus angustifolia* ishtirokidagi fitotsenozlar daryo to‘qaylarida saqlanib qolgan. Fitotsenozlarda *Elaeagnus angustifolia* ni dominant yoki sodominant holatida uchrashi, turni o‘simlik qoplamidagi boshqa turlar bilan uzviy bog‘liqligi, shu ekologik muhitga yaxshi moslashganiligidan dalolat beradi. *Elaeagnus angustifolia* ning biometrik ko‘rsatkichlari o‘zgaruvchanlik koeffitsienti daryo o‘zanida suv oqimiing o‘zgarishi, iqlim omillari va antropogen ta’siri natijasida variabelligi kuzatilsada, senopopulyatsiyalarda barqaror holatda ekanligi aniqlandi. *Elaeagnus angustifolia* ning barcha senopopulyatsiyalarida generativ yo‘l bilan ko‘payishi turni fitotsenozda turg‘un holatda bo‘lishini ta’minlaydi. Senopopulyatsiyalarda vitalitet ko‘rsatkichi depressiv va gullab yashnayotgan tipiga xos ekanligi aniqlandi. Depressiv tipiga xos senopopulyatsiyalar iqlim keskin o‘zgarishi va antropogen omilining salbiy ta’siri natijasida shakllanadi.

9. Dastur rejalariga qo‘shimcha ravishda, 21.09.2016 yildagi O‘RQ-409-son “O‘simlik dunyosini muhofaza qilish va undan foydalanish to‘g‘risida” gi qonunga asosan, O‘zbekiston Respublikasi Fanlar akademiyasining xulosasi inobatga olingan holda O‘zbekiston Respublikasi Ekologiya, atrof-muhitni muhofaza qilish va iqlim o‘zgarishi tomonidan tasdiqlangan kvotalar ro‘yxatidagi *Althaea officinalis, Elwendia persica, Lactuca serriola, Malva neglecta, Mentha longifolia, Polygonum aviculare* turlari senopopulyatsiyalarining zamonaviy holati baholandi. Olingan natijalar o’simliklarni yillik yig’ib olish mumkin bo’lgan kvotalar tartibini belgilashda foydalaniladi.

10. Ontogenetik struktura va vitalitet ko‘rsatkichlari asosida 9 ta O‘zbekiston Respublikasi “Qizil kitobi” ga kiritilgan kamyob o‘simliklarning 51 ta senopopulyatsiyalarining strukturalari ochib berilgan va zamonaviy holati (optimal, pessimal, kritik) baholangan. Olingan natijalar O‘zbekiston Respublikasi “Qizil kitobi” ning navbatdagi nashrlarida foydalanish imkonini beradi.

11. Muhim iqtisodiy hamda xo‘jalik ahamiyatga ega bo‘lgan: Yem-xashak (*Poa bulbosa* L., *Hordeum bulbosum* L.), dorivor (*Cichorium intybus* L., *Inula grandis* Schrenk ex Fisch. & C.A.Mey, *Inula helenium* L.) hamda ozuqabop (*Crataegus chlorocarpa* Lenne & K.Koch., *Malus domestica* (Suckow) Borkh.) turlarning tabiiy resurs maydonlari aniqlangan hamda ulardan yillik foydalanish me’yorlari aniqlangan. Olingan natijalar turlarning yillik dinamikalarini tahlil qilish hamda ulardan tizimli foydalanish imkonini bergan.

12. Floramiz tarkibidagi kamyob hamda tarqalish areallari tor bo‘lgan *Tulipa greigii, T.kaufmanniana, T.fosteriana, T.tubergeniana, Allium pskemense, A.praemixtum, A. oschaninii, Agropyron fragile, Elymus dahuricus, Secale sylvestre, Cicer grande, Elwendia persica, Malacocarpus crithmifolius, Crataegus chlorocarpa, Malus domestica* turlari iqlim o‘zgarishining turli ssenariylari bo‘yicha potensial tarqalishi modellashtirildi. Olingan natijalar turlarning muhofaza choralarini ishlab chiqish hamda ularning doimiy monitoringini olib borishda foydalaniladi.

13. 2021-2024 yillar davomida Toshkent Botanika bog‘i kolleksiya maydoniga yuqorida qayd etilgan turlarning urug‘lari turli xil variantlar asosida olib kelib ekildi. Olingan natijalar muhim xo‘jalik ahamyaitiga ega bo‘lgan turlarni introduksiya qilish, ulardan urug‘ bankini yaratish hamda kelajakda ularni reintroduksiya qilish imkonini beradi. Bu kabi tadqiqotlarning asosiy maqsadi yaylovlarni tiklash hamda ulardan oqilona foydalanish borasidagi muammolarni bartaraf etishdagi muhim vazifalardan biri hisoblanadi.

14. 2021-2024 yillar davomida Dastur rejasiga qo‘shimcha sifatida Qizilqum cho‘l biologik stansiyasi kolleksiya maydoniga 20 dan ortiq madaniy o‘simliklar yovvoyi ajdodlarining O‘zbekistonning arid mintaqalarida keng tarqalgan turlari hamda muhim iqtisodiy ahamiyatga ega turlarning kolleksiya maydonlari yaratildi. Mazkur turlarning o’sish va rivojlanishi o‘rganish dinamikasi tizimli davom ettirilmoqda.

15. “Yashil makon” umummilliy dasturi asosida Buxoro viloyati Peshku tumani “Jongeldi” mahalla fuqarolar yig‘ini hududidagi 24-maktab hududiga 300 ga yaqin daraxt ko‘chatlari ekildi. Bunday keng ko‘lamli tashabbuslarning amalga oshirilishi natijasida respublikamizning olis hududlaridagi yashil maydonlar hududi kengaytirib boriladi.

16. Toshkent Botanika bog‘i va Qizilqum cho‘l stansiyasida tashkil etilgan kolleksiya maydonida turlarning fenologik kuzatuvlari amalga oshirildi. Tadqiqotlar davomida MO‘YA larining 21 turining urug‘ unuvchanligi va nihollarning saqlanuvchanlik ko‘rsatkichlari o‘rganildi. Eng yuqori ko‘rasatkich *Rosa canina* (94/89%) va eng quyi ko‘rsatkich *Allium praemixtum* (62/48%) turida qayd etildi.

17. Ilk bor madaniy o‘simliklar yovvoyi ajdodlarining ma’lumotlar elektron bazasi yaratilgan. Mazkur ma’lumotlar bazasida madaniy o‘simliklar yovvoyi ajdodlarining ilmiy, o‘zbek va rus tillaridagi nomlanishi, respublika bo‘ylab tarqalishi, xo‘jalikdagi ahamiyati, botanik tavsifi, ekologiyasi, resurslarining zamonaviy holati va umumiy areallari bo‘yicha ma’lumotlar keltirilgan.

NASHR ETILGAN ILMIY ISHLAR


nature climate change

ARTICLES

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Phenological shifts of abiotic events, producers and consumers across a continent

Ongoing climate change can shift organism phenology in ways that vary depending on species, habitats and climate factors studied. To probe for large-scale patterns in associated phenological change, we use 70,709 observations from six decades of systematic monitoring across the former Union of Soviet Socialist Republics. Among 780 phenological events related to plants, birds, insects, amphibians and fungi, we find a mosaic of change, defying simple predictions of earlier springs, later autumns and stronger changes at higher latitudes and elevations. Site mean temperature emerged as a strong predictor of local phenology, but the magnitude and direction of change varied with trophic level and the relative timing of an event. Beyond temperature-associated variation, we uncover high variation among both sites and years, with some sites being characterized by disproportionately long seasons and others by short ones. Our findings emphasize concerns regarding ecosystem integrity and highlight the difficulty of predicting climate change outcomes.

Climate change is restructuring biodiversity across the globe[1]. Among key responses to spatial and seasonal changes in ambient temperature are changes in phenology[2,3]—that is, changes in season-related life cycle events. At mid to high latitudes in the Northern Hemisphere, spring events are generally occurring earlier, whereas autumn events are occurring later, mostly due to rising temperatures[4,5]. Overall, responses are expected to be faster and more pronounced the higher the latitude or elevation, that is, the lower the average temperatures[6].

Despite rough consensus regarding these general trends and expectations, there are substantial differences in the observed magnitude and direction of phenological responses to climate change among individual species[7–10], different taxonomic groups and trophic levels[11,12]. Where spring phenology in terrestrial areas has advanced by a global average of 2.3 to 2.8 days per decade[13,14], some studies have suggested changes as fast as 30 days per decade[15]. Higher rates of advance are possibly associated with lower trophic levels[11,12], perhaps reflecting not only different sensitivity to different drivers among trophic layers, but also varying responses in terms of physiological development[7]. Another factor that may accelerate phenological advance relates to the mean timing of an event within the season: spring-time events may be advancing at higher rates than autumn events[4,16]. On top of species-specific variation, there is also considerable site-specific variation in phenological advance[17,18]. Such variation among sites and populations may arise from a combination of factors, including changes in temperature and other climatic variables, population sizes, genetic differences, phenotypic plasticity and land use[19–21].

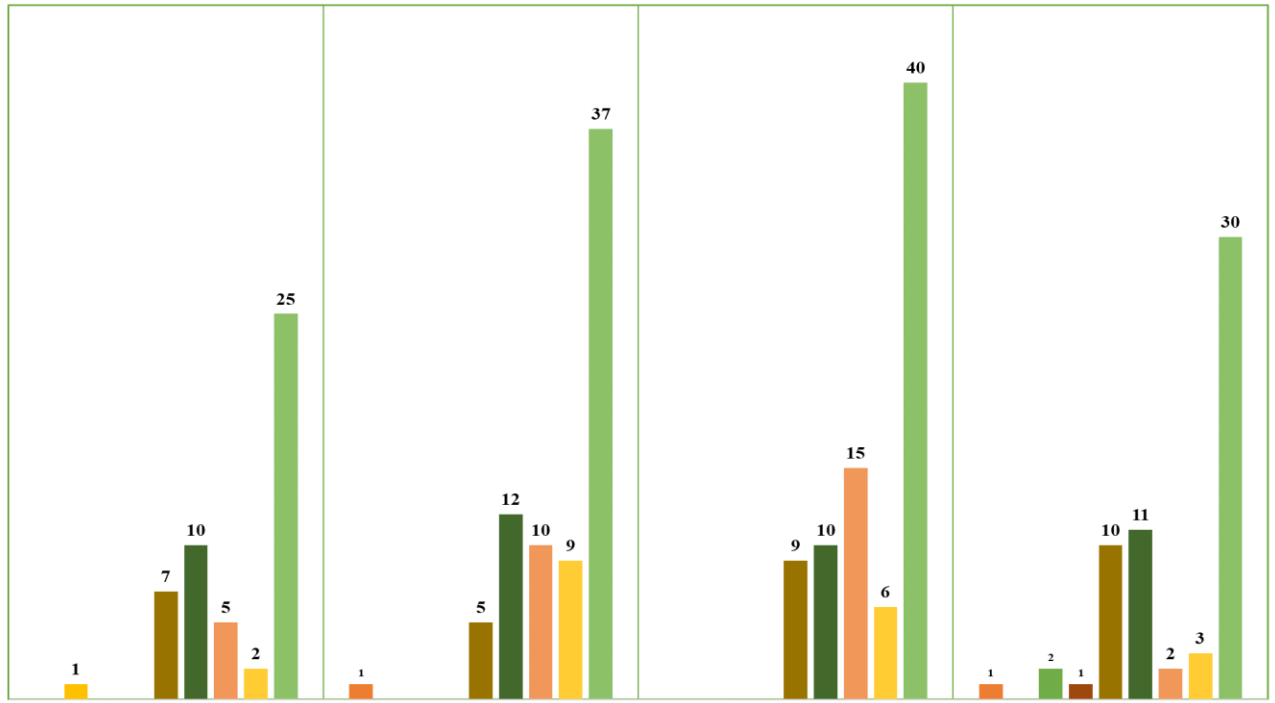
A general reason for variability in phenological responses is that patterns of climate change vary substantially across the globe. As the climate of different regions and biomes is changing in somewhat different ways[1], uniform responses to climate change are hardly to be expected. Regional variation in climate change concerns patterns in, for example, overall warming, precipitation and the seasonal distribution of change[1]. Thus, changes in phenology can be expected to track local changes in the timing of abiotic or climatically driven events, within the constraints set by the utilization of and sensitivity to cues of the regional species assemblage[22–24]. Such local and regional variation in drivers[25–27] and sensitivity towards them[22,28] can be reflected in spatiotemporal variation in phenological shifts[29–31,32]. Although the few studies analysing geographically extensive datasets on phenology have observed spatial variation in temporal trends of phenological responses (for example, refs. [11,33]) and their main abiotic drivers[7,10,34], the question remains whether patterns of change and response follow major environmental gradients in latitude, photoperiod or temperature[1,6,35].

Spatially extensive long-term data across northern Eurasia

Evaluating to what extent shifts in phenological events vary over space[7,36], with their annual timing[37] or with trophic level[11,12] requires consistently sampled, community-wide data that are both long-term and spatially extensive[11,12,33]. Such data may also give insights on whether local phenology is influenced by biotic interactions beyond abiotic cues[10,35]. Unfortunately, systematic community-wide datasets are still uncommon, hampering progress in understanding large-scale taxonomic and geographic patterns in phenological change[7]. The few existing exceptions (for example, refs. [11,12,33,38]) are built on sparse data and/or combining individual studies using variable methods. However, for such data, both noise and bias may affect the overall pattern detected. Regarding seasonality, most datasets come with a partial bias, as much more interest has been invested in spring- than in autumn-time events[39]. This is a problem, because where data are available, phenological events occurring during different times of the year have often been found to shift differently[40].

Here, we draw on a uniquely comprehensive, long-term database established using uniform protocols across northern Eurasia[36,37]. As this monitoring effort encompassed the timing of multiple seasonal events as characterizing both climatic variation and a wealth of taxa (plants, birds, insects, amphibians, reptiles and fungi; Fig. 1), it allows us to quantify large-scale patterns in phenological responses over six decades. Specifically, we ask: (1) Has the timing of different phenological events shifted similarly across this vast geographic range, measured in terms of the rate and direction (advance or delay) of change? (2) To what extent does variation in the rate and direction of change follow climate? Thus, geographic gradients, such as latitude, photoperiod, temperature or chilling degree days? (3) To what extent can variation in the rate and direction of change be linked to the relative seasonal timing of the event (early versus late), or to the species' trophic level? (4) To what extent does variation in the timing of different events covary locally in ways not attributable to overall patterns, suggesting an effect of biotic interactions

Roslin T. et al. 2021
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Differences in spatial versus temporal reaction norms for spring and autumn phenological events

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For species to stay temporally tuned to their environment, they use cues such as the accumulation of degree-days. The relationship between the timing of a phenological event in a population and its environmental cue can be described by a population-level reaction norm. Variation in reaction norms along environmental gradients may either intensify the environmental effects on timing (cogradient variation) or attenuate the effects (countergradient variation). To resolve spatial and seasonal variation in species' response, we use a unique dataset of 91 taxa and 178 phenological events observed across a network of 472 monitoring sites, spread across the nations of the former Soviet Union. We show that compared to local rates of advancement of phenological events with the advancement of temperature-related cues (i.e., variation within site over years), spatial variation in reaction norms tend to accentuate responses in spring (cogradient variation) and attenuate them in autumn (countergradient variation). As a result, among-population variation in the timing of a phenological event is greater in spring and less in autumn than if all populations followed the same reaction norm regardless of location. Despite such signs of local adaptation, overall phenotypic plasticity was not sufficient for phenological events to keep exact pace with their cues—the earlier the year, the more did the timing of the phenological event lag behind the timing of the cue. Overall, these patterns suggest that differences in the spatial versus temporal reaction norms will affect species' response to climate change in opposite ways in spring and autumn.

chilling | climate change | heating | phenology | plasticity

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