Uzbekistan vascular plant novelties 1993 through 2023

Obidjon Turdiboev[1,2*], *Rabiga* Esemuratova[3], *Gulayim* Serekeeva[3], *Ibragim* Yusupov[2], and *Akbar* Akhmedov[4]

[1]Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan, 100125, Tashkent, Uzbekistan
[2]Kokand State Pedagogical Institute, 150700, Kokand, Uzbekistan
[3]Karakalpak State University, 230112, Nukus, Republic of Karakalpakstan, Uzbekistan
[4]Samarkand State University, 140104, Samarkand, Uzbekistan

Abstract. This study aimed to determine the number of taxa that will be discovered in Uzbekistan from 1993 to 2023. As a result of the analysis of various scientific journals, monographs, and flora books from 1993 to 2023, it was found that 114 new vascular plant taxa were described for Uzbekistan during this period: 1 new genus, 80 new species, 28 new combinations, 2 new subspecies, 4 new names, and 1 new variety. The process of discovering new vascular plants in Uzbekistan will continue in coming years. In the process of preparing a new national flora of Uzbekistan, it is very important to study the composition of the national flora and conduct taxonomic research. Major work is being carried out in this regard, especially over the next 10 years. Sometimes, newly discovered taxa by scientists are cited in local scientific journals or monographs. This creates difficulties in disclosing these taxa to the global scientific community. From these results, it can be concluded that if newly discovered taxa are regularly included in scientific databases (such as IPNI), it will be easier for the world community to determine the floristic composition of individual countries or specific geographical regions.

1 Introduction

In recent years, researchers have been collecting information on plants, which are the basis of all biodiversity on Earth, at the global level. This allows for a clear picture of the remaining knowledge gaps at the global or regional level, the so-called ‘darkspots’ of biodiversity [1]. I. Ondo et al. (2023) identified 30 global biodiversity dark spots, including six Asian countries, where many plants are scientifically uncharacterized and whose geographic distribution is poorly documented. Uzbekistan is among these countries [7]. A project to create the flora of Uzbekistan was announced in 2016. It was noted that this project was an important step in the creation of the second edition of the flora of Uzbekistan after it was published in 1941–1961 and was an important step in the study of flora [10].

* Corresponding author: turdiboyev.obidjon@mail.ru

Uzbekistan is divided into 12 regions and one autonomous republic (the Karakalpakstan Republic). Currently, a list of territorial cadastres is being compiled for each region of the Republic of Uzbekistan. Cadastral lists of 6 regions have already been compiled (Table 1).
Over the past decade, significant projects have been implemented to prepare the second edition of the 'Flora of Uzbekistan' [10]. Currently, five volumes of the 'Flora of Uzbekistan' have been published. Based on modern nomenclature rules, a list of 20 families, 184 genera, and 820 species and subspecies was compiled [9].
Recent studies have focused on the distribution of the genera *Hedysarum, Molucella, Tulipa, Eremurus, Salvia* in the flora of Uzbekistan and Central Asia [4-6, 12-14].

Table 1. Cadastral list of regions of Uzbekistan.

Regions (year)	Family	Genus	Species	Family
Jizzakh (2015)	115	645	1986	115
Samarkand (2018)	95	573	1687	95
Kashkadarya (2019)	97	613	2022	97
Navoi (2019)	90	534	1561	90
Bukhara (2020)	67	240	765	67

2 Materials and methods

Data were obtained from the International Plant Name Index (IPNI) on December 31, 2023. This includes statistical information on newly published vascular plant species from 1993 to 2023, including new names, combinations, species, subsp and varieties. Species and local monographs published in some local journals (e.g., Doklady Akademii Nauk Respubliki Uzbekistan, Journal of Biology of Uzbekistan) may not be included in the IPNI database. Therefore, only new taxa published in the IPNI database until December 31, 2023, were included in this study. Additionally, the synopses of some recently published genera, such as *Hedysarum, Parrya, Plocama, Primula, Tulipa, Eremurus, Salvia, Hedysarum* and *Gagea*, as well as taxa from the new Flora of Uzbekistan (1-6 volumes, 2017–2023), which include new species, combinations and variations, are also included.

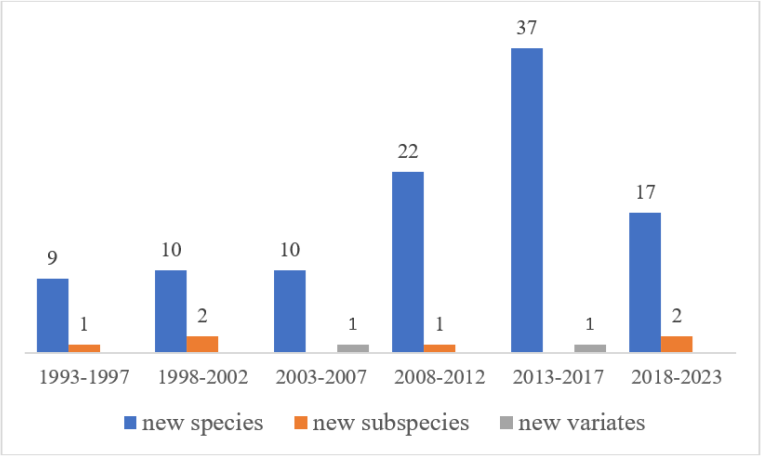

Fig. 1. Number of Uzbekistan vascular plants described as new to science from 1993 through 2023.

3 Results and Discussion

From 1993 through 2023, 114 new taxa of vascular lants were described from Uzbekistan, including 1 new genus, 80 new species, 28 new combinations, 2 new subspecies, 4 new names and 1 new variate. The newly established endemic genus *Kuramosciadium* Pimenov, Kljuykov & Tojibaev, is based on the new species *Kuramosciadium corydalifolium* Pimenov, Kljuykov & Tojibaev [8]. Recently, a new rare and endemic *Parrya tojibaevii* D. A. German & Madaminov was described from Uzbekistan. Because of its limited range, this recently discovered species is considered to be Critically Endangered [2]. Some species (*Dipcadi turkestanicum* Vved. (1941) are disappearing from the flora of Uzbekistan [14].
The remaining newly recorded genera were based on previously published species in existing genera. Over the past 31 years, the number of newly recorded species has varied from year to year, with an average of 4–5 per year (Figure 1). The data show that despite increased attention paid to biodiversity hotspots, a large number of undescribed species in Uzbekistan await discovery. Further investigations are needed.
Consequently, a preliminary list of 114 taxa belonging to 20 families and 40 genera was created. When extracting the taxa recorded from Uzbekistan, attention was paid to the following: The type or lectotype of the taxon was recorded from the region. The lectotype, which was later selected from the syntypes, was documented from Uzbekistan.
The new species are from about 20% of the families and 6% of the genera recognized for Uzbekistan. Statistics on the number of newly described vascular plants indicate that the majority are from the large families Amaryllidaceae (25 species), Apiaceae and Iridaceae (11 spp. each.), Asteraceae, Liliaceae and Fabaceae (11 spp. each) and the large genera *Allium* (25 spp.), *Iris* (11 spp.), *Elwendia* (7 spp.), *Astragalus* (6 spp.), *Plocama* and *Tulipa* (5 spp. each). The families and genera with the most new species of vascular plants in Uzbekistan are shown in Table 2.

Table 2. The top 6 families and genera from which new species of vascular plants from Uzbekistan were described from 1993 through 2023

Family	**Number of Genera**	**Number of Species**	**Genus**	**Number of Species**
Amaryllidaceae	1	25	*Allium*	25
Apiaceae	5	11	*Iris*	11
Iridaceae	1	11	*Elwendia*	7
Asteraceae	5	9	*Astragalus*	6
Fabaceae	4	9	*Plocama*	5
Liliaceae	3	9	*Tulipa*	5

During the past period, the newly discovered species for science were mainly published in the fundamental works ‘Flora of Uzbekistan’ and ‘Conspectus Florae Asiae Mediae’ and in the world's most prestigious scientific journals (Stapfia, Taxon, Phytotaxa etc.) published in the last decade (Table 3). Every year, Uzbek researchers have published new taxa (e.g., *Elwendia bucharica* Kljuykov & Lyskov (2018), *Elwendia ugamica* Kljuykov & Lyskov

(2018), *Hedysarum sunhangii* Juram. & Tojibaev (2021), *Aulacospermum multicaule* Pimenov & Tojibaev (2023)) in the Phytotaxa journal.

A few new species, published in the first decade, have been published in national journals. For example, *Scutellaria kuramensis* M. N. Abdull. & I. I. Malzev (1994) was published in 1994 in Doklady Akademii Nauk Respubliki Uzbekistan but was not included in the IPNI database until 2022 (via Register a plant name) [3]. *S. kuramensis* M. N. Abdull & I. I. Malzev described from Uzbekistan (Holotype. Tian Shan, Kurama range, east side, upper reaches of the rivers, 3300 m., 20 August 1991, I.I. Maltzev s.n. (TASH)). This information is largely unknown to the scientific community. Based on these studies, this species was included in the IPNI database.

To date, more than 200 taxa have been included in the IPNI database by the first author and this process is ongoing.

Table 3. The top 10 journals/monographs in which new species of vascular plants of Uzbekistan were published from 1993 through 2023

Journals or monographs	Number of new taxa
Stapfia	15
Taxon	14
Phytotaxa	9
Opred. Rast. Sred. Azii	8
Linzer Biol. Beitr.	7
Bot. Zhurn. (Moscow & Leningrad)	6
Uzbeksk. Biol. Zhurn.	6
Turczaninowia	4
Fl. Uzbekist. [A.N.Sennikov]	4

These taxa include new species, subspecies, and combinations published in 1927–2023, related to the flora of Central Asia. Recently, Uzbekistan scientists integrated national flora and global biodiversity databases into this study. It enables multiple colleagues to use it equally at the same time

Acknowledgements

This study was supported by the “Taxonomic revision of polymorphic plant families of the flora of Uzbekistan” (FZ-20200929321) "Grid mapping of the flora of Uzbekistan" from 2021 to 2025, and in the framework of scientific programs of the National Herbarium of Uzbekistan (TASH).

References

1. A. Antonelli, R. Govaerts, E. Nic Lughadha, R. E. Onstein, R. J. Smith & A. Zizka. Why plant diversity and distribution matter. New Phytologist **240,** (2023). https://doi.org/10.1111/nph.19282
2. D. A. German, F. M. Madaminov & N. Y. Beshko, A new, highly endangered and restricted-range species of *Parrya* sect. *Pseudoclausia*, comb. nov. (Brassicaceae) from Western Tian Shan, Uzbekistan. Phytotaxa **633**(2), (2024). https://doi.org/10.11646/phytotaxa.633.2.5
3. IPNI, International Plant Names Index. (2024).
4. I. Juramurodov, D. Makhmudjanov, P. L. Liu, Z. Yusupov, E. Nikitina, T. Deng, K. Tojibaev & H. Sun, Phylogenetic relationships and biogeography in *Hedysarum* (Hedysareae, Fabaceae) with a focus on Central Asian taxa. Taxon **72**(6), (2023). https://doi.org/10.1002/tax.13105
5. B. S. Khabibullaev, K. F. Shomurodov & B. A. Adilov, Impact of long-term climate change on *Moluccella bucharica* (B. Fedtsch.) Ryding population decline in Uzbekistan. Plant Science Today **9**(2), (2022). https://doi.org/10.14719/pst.1464
6. D. Makhmudjanov, I. Juramurodov, M. Kurbonalieva, Z. Yusupov, D. Dekhkonov, T. Deng, K. Tojibaev & H. Sun, Genus *Eremurus* (Asphodelaceae) in the flora of Uzbekistan. Plant Divers. Cen. As, **2,** (2022).
7. I. Ondo, K. Dhanjal-Adams, S. Pironon, D. Silvestro, V. Deklerck, O. Grace, A. Monro, N. Nicolson, B. Walker & A. Antonelli, Plant diversity darkspots for global collection priorities. bioRxiv. (2023). https://doi.org/10.1101/2023.09.12.557387
8. M. G. Pimenov, K. Tojibaev, E. V. Kljuykov & G. V. Degtjareva, *Kuramosciadium* (Umbelliferae): A new genus from the Uzbekistanian part of the western Tian Shan Mountains. Systematic Botany **36**(2), (2011). https://doi.org/10.1600/036364411X569679
9. A. N. Sennikov (Ed.) Flora of Uzbekistan, Vol. 1-6. (2017-2023).
10. A. N. Sennikov, K. S. Tojibaev, F. O. Khassanov & N. Y. Beshko, The flora of Uzbekistan project. Phytotaxa **282**(2), (2016). https://doi.org/10.11646/phytotaxa.282.2.2
11. K. S. Tojibaev, N. Y. Beshko, O. T. Turginov, D. F. Lyskov, U. A. Ukrainskaja & E. V. Kljuykov, An annotated checklist of the endemic Apiaceae of Uzbekistan. Phytotaxa **455**(2), 2020). https://doi.org/10.11646/phytotaxa.455.2.2
12. K. Tojibaev, D. Dekhkonov, I. Ergashov, H. Sun, T. Deng & Z. Yusupov, The synopsis of the genus *Tulipa* (Liliaceae) in Uzbekistan. Phytotaxa **573**(2), (2022). https://doi.org/10.11646/phytotaxa.573.2.2
13. K. Tojibaev, F. Khassanov, O. Turginov, F. Akbarov, S. Pulatov O. & Turdiboev, Endemic plant species richness of Surkhondaryo province, Uzbekistan. Plant Divers. Cen. As, **1**, (2022). http://doi.org/10.54981/PCDA/vol1_iss1/a4
14. O. A. Turdiboev, A. A. Shormanova, M. B. Sheludyakova, F. Akbarov, B. T. Drew & F. Celep, Synopsis of the Central Asian *Salvia* species with identification key. Phytotaxa **543**(1) (2022). https://doi.org/10.11646/phytotaxa.543.1.1