

## New distribution areas of some vascular plants for the flora of Azerbaijan

Naiba P. Mehdiyeva<sup>1</sup>

Nigar Mursal

*Institute of Botany, Ministry of Science and Education of the  
Republic of Azerbaijan, Badamdar 40, Baku, AZ1004,  
Azerbaijan*

**Abstract:** Information is provided on new habitats for 44 taxa, based on the results of field studies from 2008 to 2023, supplementing data on individual botanical and geographical regions of Azerbaijan. For 20 species, new places of distribution were identified in the botanical-geographical region of the Greater Caucasus (GC) Guba part, 16 species were found in the eastern GC and two species in the western GC, four species – in the Samur-Devechi lowland, one species each – in Gobustan, Absheron, Lankaran and Caspian lowlands. Some taxa were identified both in the Guba and eastern part of GC. Among these plants six are endemics of the Caucasus (*Aquilegia olympica*, *Galanthus alpinus* var. *alpinus*, *Hedera pastuchovii*, *Senecio pojarkovae*, *Tulipa undulatifolia* var. *undulatifolia* (*T. eichleri* Regel), *Ziziphora clinopodioides* subsp. *clinopodioides* (*Z. serpyllacea* M. Bieb.)), two endemics of Azerbaijan (*Iris schischkinii*, *Rosa azerbaijandshana*), five rare and endangered taxa (*Aquilegia olympica*, *Ophrys sphegodes* subsp. *mammosa*, *Ophrys oestriifera*, *Rosa azerbaijandshana*, *Tulipa schmidtii*). The data obtained expand scientific knowledge about endemic, rare and endangered species of the flora of Azerbaijan, included in the Red Books of the Republic of Azerbaijan (1989, 2013, 2023), are important for the development of measures to ensure their safety. This source of information is necessary for the compilation of the new edition of “Flora of Azerbaijan”. To a certain extent, this study also echoes other works and the brief results of the taxonomic composition study of the republic flora.

**Keywords:** *distribution, endemic, plant, rare, species, taxon*

### INTRODUCTION

Factors acting in varying intensities and at diverse scales determine the distributional range of a species [Gaston,

2003]. A species is now found where abiotic conditions are favourable, where an appropriate set of species ensures co-occurrence [Avisé, 2000; Soberón, Peterson, 2005]. The above mentioned factors interact dynamically in order to produce a complex object that represents the geographic distribution of species. The distribution of species is a complex expression of its ecology and evolutionary biology [Barve et al., 2011; Brown, 1995]. The study of distribution patterns can provide appropriate information for understanding the evolutionary history of a species [Richards et al., 2007] and it also has high potential to guide species management and conservation policies [Guisan, Thuiller, 2005].

The effectiveness of measures to ensure the protection and sustainable development of the biodiversity of a particular territory is determined by many factors, including the availability of reliable information about the species composition of the flora and the distribution areas of its specific elements. Like any living organism, formation of flora is in a continuous process, when, for various reasons, its taxonomic structure can change, some plant species may disappear and new plant species may appear. Therefore, in order to have an idea of the state of the flora of a particular territory in real time, work to study its species composition is usually carried out on a regular basis [Khapugin, Kuzmin, 2022].

The flora of Azerbaijan is quite rich and includes the vegetation of different botanical-geographical regions, from mountains, forests and steppes to deserts and swamps. According to the literature data of recent years, about 5000 species of vascular plants, including cultivated plants, can be found in the flora of Azerbaijan [Asgarov, 2016; Ibadullayeva, Huseynova, 2021; Salimov, 2023].

It should be noted that for the last 10-15 years, supplements to the flora of Azerbaijan have been published annually [Ibadullayeva et al., 2012; Ibadullayeva et al., 2014; Mehdiyeva, 2014; Huseynova, et al., 2014; Mehdiyeva, Geltman, 2015; Karimov, Murtazaliyev, 2016; Karimov et al., 2016; Mehdiyeva et al., 2017; Mirzayeva, 2017; Pimenov et al., 2018; Abbasov, 2019; Abdiyeva et al., 2020; Abdiyeva et al., 2021; Mirzayeva, Zernov, 2022], which are the result

<sup>1</sup>E-mail: naiba\_m@mail.ru

Received: 20.09.2023; Received in revised form 30.10.2023; Accepted: 28.11.2023

of active botanical studies.

Also as a result of research and taxonomic refinements, 97 taxa of ferns belonging to 17 families and 30 genera, 17 taxa of gymnosperms belonging to five families and 20 genera [Salimov et al., 2019] 948 taxa of monocots belonging to 27 families and 222 genera were found in the flora of Azerbaijan [Salimov et al., 2020].

## MATERIAL AND METHODS

The material that served as the basis of this article was collected by the authors during field research in 2008-2023 (Fig. 1) “Flora of Azerbaijan” [Flora..., 1950-1961], as well as herbarium specimens from the herbarium fund of the Institute of Botany, MSE (BAK), were used as the main information source. To clarify the taxonomic status of species, a checklist of vascular plants of Azerbaijan [Salimov et al., 2019, 2020] and the WFO database and IPNI database [IPNI, 2023] were used. “Red List of the Endemic Plants of the Caucasus” was used for determining endemic status of species [Ali-zade et al., 2014].

At the same time, the places where plants grow and especially the places where new species are found are provided with geographic coordinates. Distribution maps of the studied taxa were implemented in ArcGIS 10.5.1.

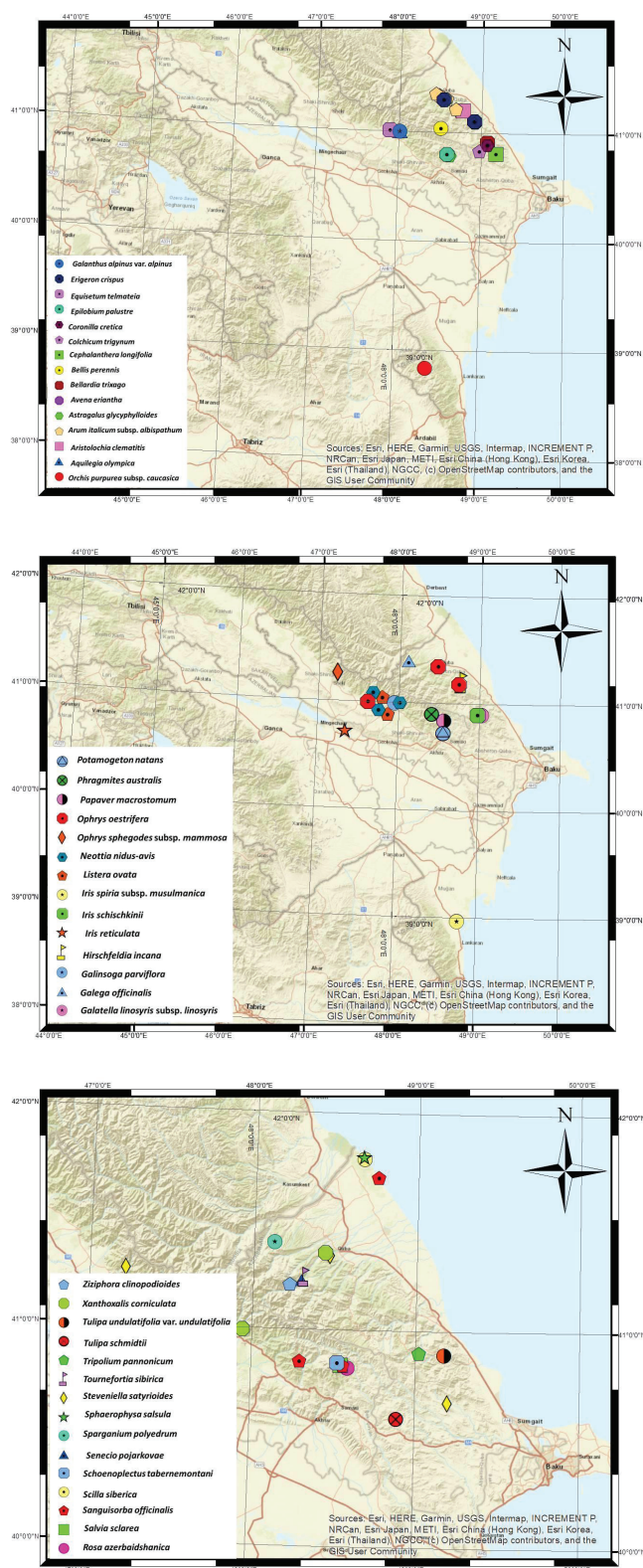
## RESULTS AND DISCUSSION

The conducted research made it possible to identify new localities for 44 taxa (Fig. 2).

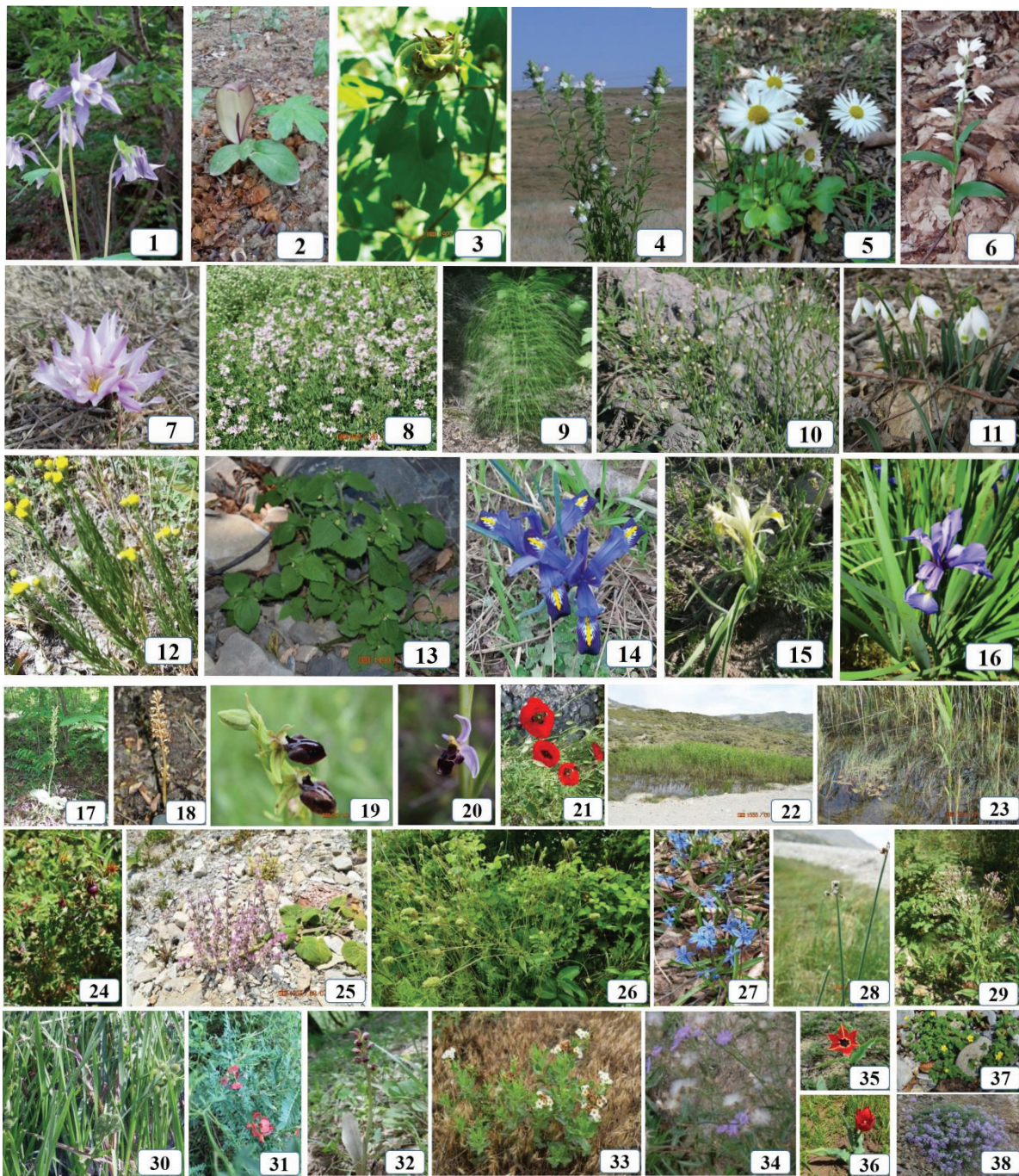
*Aquilegia olympica* Boiss. (Ranunculaceae Juss.). Greater Caucasus eastern (GC east) - Ismayilli district (subalpine belt, forest area of the Ismayilli branch of the Shahdag National Park, N 40°59'43.7" E 048°00'31.6" 1404 m a.s.l., 06.07.2022) [Mehdiyeva et al., 2023];

*Aristolochia clematitis* L. (Aristolochiaceae Juss.) – Greater Caucasus Guba part (GC Guba) - Shabran district (forest area, near to the village of Zeyva, N 41°12'07.7" E 048°46'05.5" 539 m a.s.l., 05.04.2018, N.P.Mehdiyeva);

*Arum italicum* subsp. *albispatham* (Steven ex Ledeb.) Prime (= *Arum albispatham* Stev. in Ledeb.) (Araceae Juss.) GC Guba - Guba district (vicinity of the villages of Chichi and Sabatlar, along the ditches, N 41°13'01.10" E 048°38'48.82" 660 m a.s.l., 10.05.2009; in the village of Nugadi-2, N 41°18'08.9" E 048°34'4" 589 m a.s.l., 04.05.2018, N.P.Mehdiyeva); (forest in the vicinity of the village of Ispig, N 41°20'29.9" E 048°28'31.1" 721 m a.s.l.; forest area between



**Figure 1.** New locations of the studied species. Species are indicated in colors on the map.



**Figure 2.** Photos of investigated species: 1. *Aquilegia olympica*, 2. *Arum italicum* subsp. *albispathum*, 3. *Astragalus glycyphylloides*, 4. *Bellardia trixago*, 5. *Bellis perennis*, 6. *Cephalanthera longifolia*, 7. *Colchicum trigynum*, 8. *Coronilla cretica*, 9. *Equisetum telmateia*, 10. *Erigeron crispus*, 11. *Galanthus alpinus* var. *alpinus*, 12. *Galatella linosyris* subsp. *linosyris*, 13. *Galinsoga parviflora*, 14. *Iris reticulata*, 15. *Iris schischkinii*, 16. *Iris spirea* subsp. *musulmanica*, 17. *Listera ovata*, 18. *Neottia nidus-avis*, 19. *Ophrys sphegodes* subsp. *mammosa*, 20. *Ophrys oestrifera*, 21. *Papaver macrostomum*, 22. *Phragmites australis*, 23. *Potamogeton natans*, 24. *Rosa azerbaijani*, 25. *Salvia sclarea*, 26. *Sanguisorba officinalis*, 27. *Scilla siberica*, 28. *Schoenoplectus tabernemontani*, 29. *Senecio pojarkovae*, 30. *Sparganium polyedrum*, 31. *Sphaerophysa salsula*, 32. *Steniella satyrioides*, 33. *Tournefortia sibirica*, 34. *Tripolium pannonicum*, 35. *Tulipa schmidtii*, 36. *Tulipa undulatifolia* var. *undulatifolia*, 37. *Xanthoxalis corniculata*, 38. *Ziziphora clinopodioides* subsp. *clinopodioides*.

the villages of Alij and Kupchal, N 41°21'10.9" E 048°26'07.3" 787 m a.s.l. 24.05.2019, N.Mursal);

*Astragalus glycyphylloides* D.C. (Fabaceae Juss.) – GC east – Shamakhi district (forest between the village of Pirculu and the village of Archiman, N 40°47'18.0" E 048°36'58.3" 1315 m a.s.l., 07.16.2021, N.P.Mehdiyeva);

*Avena eriantha* Durieu (= *Avena pilosa* M. Bieb.) (Poaceae Barnhart). Caspian coastal lowland (Casp. coast. lowl.) - Siyazan district (Galaalty forest, N 41°06'04.1" E 048°54'56.0" 709 m a.s.l. 04.20.2018, N.P.Mehdiyeva);

*Bellardia trixago* (L.) All. (Orobanchaceae Vent.) – GC Guba - Khizi districts (vicinity of the village of Khizi, weedy places, N 40°54'43.75" E 049°04'21.93" 692 m a.s.l., 06.02.2016, N.P.Mehdiyeva);

*Bellis perennis* L. (Asteraceae Bercht. & J.Presl) – Greater Caucasus western (GC west) - Oghuz district (forest in the direction of the Khal-Khal recreation area N 41°02'09.7" E 048°30'16.6" 542 m a.s.l., 05.06.2023, N.P.Mehdiyeva);

*Cephalanthera longifolia* (L.) Fritsch (Orchidaceae Juss.) – GC Guba - Khizi districts (forest in the vicinity of the village of Gizilgazma, forest edges, N 41°53'53.1" E 049°01'15.8" 902 m a.s.l., 05.07.2017, N.P.Mehdiyeva);

*Colchicum trigynum* (Adams) Stearn (= *Merendera trigyna* (Steven ex Adam) Stapf (Colchicaceae DC.)) – GC Guba - Khizi districts (vicinity of the village of Yarimca, grassy mountain slopes, N 40°50'4.2" E 048°58'31.7" 1345 m a.s.l., 03.12.2017, N.Mursal);

*Coronilla cretica* L. (Fabaceae Juss.) GC Guba - Khizi districts (forest in the vicinity of the village of Gizilgazma, N 40°53'33.4" E 049°04'27.9" 778 m a.s.l., 03.18.2017, N.P.Mehdiyeva);

*Epilobium palustre* L. (Onagraceae Juss.) – GC east – Shamakhi district (forest area between the village of Pirculu and Damirchi, N 40°48'09.1" E 048°34'56.8" 1426 m a.s.l., 07.09.2020, N.P.Mehdiyeva);

*Equisetum telmateia* Ehrh. (= *Equisetum majus* Garsault) (Equisetaceae Michx. ex DC.) – GC east - Gabala district (forest area near the Khanlar recreation area, N 41°00'41.14" E 047°53'09.54" 1003 m a.s.l., 07.07.2016, N.P.Mehdiyeva);

*Erigeron crispus* Purr. (Asteraceae Bercht. & J.Presl) – GC Guba – Guba district (forest area, in the vicinity of the village of Alij, next to the Balbulag recreation area, N 41°17'57.6" E 048°31'51.9" 671 m a.s.l., 07.20.2014); Siyazan district (Galaalty forest area, N 41°06'16.6.1" E 048°54'35.6" 696 m a.s.l., 07.24.2014, N.P.Mehdiyeva).

*Galanthus alpinus* var. *alpinus* (= *Galanthus caucasicus* (Baker) Grossh.) (Amaryllidaceae J.St.-Hill.) – GC east - Ismayilli district (subalpine belt, forest area of the Ismayilli branch of the Shahdag National Park, surroundings of the waterfall, N 40°59'53.3" E 048°00'24.1" 1462 m a.s.l., 06.07.2022, N.Mursal);

*Galatella linosyris* subsp. *linosyris* (= *Linosyris vulgaris* Cass. ex Less.) (Asteraceae Bercht. & J.Presl) – GC Guba - Khizi districts (forest in the vicinity of the village of Gizilgazma, N 40°53'53.1" E 049°01'15.8" 902 m a.s.l., 08.12.2017, N.P.Mehdiyeva);

*Galega officinalis* L. (Fabaceae Juss.) – GC Guba - Gusar district (wet subalpine meadows between the villages of Gidzhan and Sudur, N 41°23'18.9" E 048°06'08.5" 1767 m a.s.l., 07.13.2012, N.P.Mehdiyeva);

*Galinsoga parviflora* Cav. (Asteraceae Bercht. & J. Presl) – GC east - Gabala district (vicinity of the village of Vandam, forest on the territory of the Duma tourist zone, N 40°59'28.45" E 047°56'32.33" 1126 m a.s.l., 08.15.2007); GC west – Zagatala district (Car village, in the forest, N 41°40'40.6" E 046°42'02.8" 1009 m a.s.l., 19.07.2019); Lankaran – in beach areas, N 38°44'54.14" E 048°51'59.87" -26 m b.s.l., 17.09.2020, N.P.Mehdiyeva).

*Hirschfeldia incana* (L.) Lagr.-Foss. (Brassicaceae Burnett) – GC Guba - Shabran district (the edge of the forest before reaching the village of Zeyva, N 41°12'07.7" E 048°46'05.5" 539 m a.s.l., 05.04.2018, N.P.Mehdiyeva);

*Iris reticulata* M. Bieb. (Iridaceae Juss.) – GC east - Shamakhi district (24th km of the Shamakhi-Ismailli highway, forest, N 40°43'17.3" E 047°20'47.5" 830 m a.s.l., 06.05.2022, N.Mursal);

*Iris schischkinii* Grossh. – GC Guba - Khizi district (grassy mountain slopes along the road towards the village of Bakhlyshly, N 40°53'42.00" E 048°58'23.27" 837 m a.s.l., 05.01.2015, N.P.Mehdiyeva);

*Iris spiria* subsp. *musulmanica* (Fomin) Takht. (= *Iris musulmanica* Fomin) – Lankaran lowland (Lank. lowl.) - Lankaran district (wet and saline areas along *Quercus castaneifolia* plantings, Lankaran - Masalli highway, N 38°57'59.1" E 048°46'40.7" -20 m b.s.l., 06.07.2009, N.P.Mehdiyeva; 07.14.2021, N.Mursal);

*Listera ovata* (L.) R.Br. (Orchidaceae Juss.) – GC east. - Gabala district (forest of the Gabala natural reserve, in the village of Yengidzha, N 40°53'06.2" E 047°51'26.9" 497 m a.s.l., 05.06.2022, N.P.Mehdiyeva; vicinity of the village of Gamarvand, N 41°02'27.2" E 047°47'14.4" 1033 m a.s.l., 06.06.2022, N.Mursal);

*Neottia nidus-avis* (L.) (Rich.) (Orchidaceae Juss.) – GC east - Gabala district (forest of the Gabala natural reserve, vicinity of the village of Yengidzha, N 40°53'06.2" E 047°51'26.9" 497 m a.s.l., 06.05.2022; vicinity of the village of Gamarvand, N 41°02'27.2" E 047°47'14.4" 1033 m a.s.l., 06.06.2022); Ismayilli district (subalpine belt, forest area of the Ismayilli branch of the Shahdag National Park, surroundings of the waterfall, N 40°59'43.7" E 048°00'31.6" 1404 m a.s.l., 06.07.2022, N.P.Mehdiyeva, N.Mursal).

*Ophrys sphegodes* subsp. *mammosa* (Desf.) Soó ex E. Nelson (= *Ophrys caucasica* Woronow) (Orchidaceae Juss.) – GC west - Sheki district (Gelersen-Gorersen forest, N 41°15'36.6" E 047°13'38.5" 1155 m a.s.l., 05.05.2023, N.Mursal) [Ibadullayeva et al., 2023];

*Ophrys oestrifera* M. Bieb. – GC Guba – Shabran district (dry grassy slopes, before reaching the village of Zeyva, N 41°10'41.8" E 48°44'03.3" 603 m a.s.l., N 41°10'42.5" E 48°44'01.8" 593 m a.s.l. 07.22.2018); Guba district (forest area in the vicinity of the village of Ispig, N 41°20'25.1" E 048°28'00.6" 861 m a.s.l., 05.15.2019); GC east – Ismayilli district (forest area of the Ismayilli branch of the Shahdag National Park, N 40°55'46.9" E 048°04'14.0" 762 m a.s.l. 07.06.2022) [Mehdiyeva et al., 2023];

*Orchis purpurea* subsp. *caucasica* – Lankaran Mountain (Lank. Mount.), Lerik district (vicinity of the village of Durgan, forest dominated by the trees *Quercus iberica* M. Bieb. and *Fraxinus excelsior* L., by the shrubs *Rubus ibericus* Juz., *Mespilus germanica* L. and *Crataegus kyrtostyla* Fingerh., *Ilex hyrcana* Pojark. was noted sporadically, the herbaceous layer was mostly represented by *Viola alba* Besser, *Primula heterochroma* Stapf and *Fragaria vesca* L., the least represented are *Platanthera chlorantha* (Custer) Rchb., *Dactylorhiza romana* subsp. *georgica* (Klinge) Soó ex Renz & Taubenheim and *Limodorum abortivum* (L.) Sw., (N 38°50'17.54" E 048°23'22.83" 904 m a.s.l., 25.04.2021, B.R.Kerimli, N.P. Mehdiyeva) (Fig. 3);

*Papaver macrostomum* Boiss. et A.Huet (Papaveraceae Juss.) – GC east - Shamakhi district (mountain meadows between the village of Damirchi and the village of Lahij, N 40°50'11.2" E 048°33'22.1" 1533 m a.s.l., 07.09.2020, N.P.Mehdiyeva);

*Phragmites australis* (Cav.) Trin. ex Steud. (= *Phragmites communis* (L.) Trinius) (Poaceae Barnhart) – GC Guba - Guba district (vicinity of the village of Ispig, N 41°20'25.1" E 048°28'00.6" 861 m a.s.l., 08.15.2019); GC east - Shamakhi district (reservoirs in the meadows along the Damirchi



**Figure 3.** *Orchis purpurea* subsp. *caucasica* (Regel) B. Baumann, H. Baumann, R. Lorenz & Ruedi Peter- new taxa for Azerbaijan flora.

highway, N 40°50'13.9" E 048°32'33.0" 1593 m a.s.l.; N 40°50'50.6" E 048°31'18.1" 1769 m a.s.l., 07.09.2020, N.P.Mehdiyeva);

*Potamogeton natans* L. (Potamogetonaceae Bercht. & J. Presl.) – GC east – Shamakhi district (reservoirs in the meadows along the Damirchi - Lahij highway, N 40°50'13.9" E 048°32'33.0" 1593 m a.s.l.; N 40°50'50.6" E 048°31'18.1" 1769 m a.s.l., 07.09.2020, N.P.Mehdiyeva);

*Rosa azerbaijandica* Novopokr. & Rzazade (Rosaceae Juss.) - GC east - Shamakhi district (meadows and shrubs along the Pirgulu-Damirchi highway, N 40°49'29.4" E 048°34'22.2" 1576 m a.s.l.; N 40°49'31.4"

E 048°34'16.7" 1586 m a.s.l., 07.16.2021) [Mehdiyeva, Abdiyeva, 2023];

*Salvia sclarea* L. (Lamiaceae Martinov) – GC east – Shamakhi district (grassy mountain slopes along the Damirchi-Lahij highway, N 40°50'13.9" E 048°32'33.0" 1593 m a.s.l., 07.09.2020, N.P.Mehdiyeva);

*Sanguisorba officinalis* L. (Rosaceae Juss.) – Sam.-Dav. lowl. – Khachmaz district (vicinity of the village of Mugtadyr, seashore, N 41°42'12.6" E 048°45'06.0" - 31 m b.s.l., 07.25.2008, Nabran, seashore, -33 m b.s.l., 05.20.2017); GC east – Shamakhi district (meadows between the village of Damirchi and the village of Lahij, N 40°50'11.2" E 048°33'22.1" 1533 m a.s.l., 07.09.2020); Ismayilli district (Ismayilli state reserve, open forest on the river bank, N 40°55'46.9" E 048°04'14.0" 762 m a.s.l., 06.07.2022); GC Guba – Gusar district (Shahdag, subalpine meadow, N 41°18'15.0" E 048°07'30.2" 1792 m a.s.l., 07.07.2022); Guba district (vicinity of the village of Ispig, N 41°20'25.1" E 048°28'00.6" 862 m a.s.l., 05.10.2019; in the village of Susay, edge of the forest, N 41°18'36.52.0" E 048°17'35.22" 1231 m a.s.l., 06.27.2023, N.P.Mehdiyeva).

*Scilla siberica* Haw. (Asparagaceae Juss.) – Sam.-Dav. lowl. – Khachmaz district (forest on the territory of the Dostlug tourist base, N 41°47'20.0" E 048°39'48.4" -3 m b.s.l., 10.16.2021, N.P.Mehdiyeva);

*Schoenoplectus tabernemontani* (C.C. Gmel.) Palla (Cyperaceae Juss.) – GC east – Shamakhi district (reservoirs in the meadows along the Damirchi-Lahich highway, N 40°50'50.6" E 048°31'18.1" 1769 m a.s.l., 07.09.2020, N.P.Mehdiyeva);

*Senecio pojarkovae* (Boiss.) Schischk. (Asteraceae Bercht. & J.Presl) – GC Guba – Guba district (in the village of Girizdehne, forest area, not reaching the valley 500-600 m, N 41°13'29.7" E 048°17'36.6" 1392 m a.s.l., 08.05.2016, N.P.Mehdiyeva);

*Sparganium polyedrum* Asch. & Graebn. (Typhaceae Juss.) – GC Guba - Gusar district (vicinity of the village of Gidzhan, reservoir, N 41°23'53.74" E 048°07'21.00" 1525 m a.s.l., 08.19.2014);

*Sphaerophysa salsula* (Pall.) DC. (Fabaceae Juss.) – Sam.-Dav. lowl. - Khachmaz district (vicinity of the village of Nabran, coastal strip of the sea, N 41°47'49.7" E 048°39'29.2" -28 m b.s.l., 07.11.2018, N.P.Mehdiyeva);

*Steniella satyrioides* (Stev) Schlecht. (Orchidaceae Juss.) – GC Guba - Guba district (forest in the vicinity of the village of Ispig, N 41°20'25.1" E 048°28'00.6" 861 m a.s.l., 05.15.2019; Khizi district, forest in the vicinity of Gizilgazma, N 40°50'11.2" E 048°33'22.1" 1533 m a.s.l., 05.15.2020, N.P.Mehdiyeva); GC west

(Sheki district, Shambaghi forests, N 41°15'30.6" E 047°13'05.4" 1117 m a.s.l., Gelersen-Gorersen, N 41°15'36.6" E 047°13'38.5" 1155 m a.s.l., 05.05.2023, N.Mursal);

*Tournefortia sibirica* L. (Boraginaceae Juss.) – GC Guba - Guba district (forest area in the vicinity of the village of Girizdehne, side of the road, N 41°14'27.6" E 048°18'37.9" 1213 m a.s.l., 05.15.2019, N.P.Mehdiyeva);

*Tripolium pannonicum* (Jacq.) Dobrocz. (= *Tripolium vulgare* (L.) Nees ab Es.) (Asteraceae Bercht. & J.Presl). – GC Guba - Khizi district (forest area in the vicinity of the village of Gizilgazma, N 40°53'53.7" E 049°01'15.5" 822 m a.s.l., 09.14.2017, N.P.Mehdiyeva);

*Tulipa schmidtii* Fomin (Liliaceae Juss.) – Gobustan (Gob.) - Gobustan district (cereal pantation in the vicinity of the village of Bakla-Nabur, N 40°35'43.6" E 048°52'81.1" 943 m a.s.l., 05.15.2019, N.Mursal) [Talibov, Garakhani, 2023];

*Tulipa undulatifolia* var. *undulatifolia* (*Tulipa eichleri* Regel) (Liliaceae Juss.) – Casp. Coast. lowl. - Khizi district (grassy mountain slopes along the Tikhlichay river in the village of Gilazi, Khizi, N 40°53'24.1" E 049°10'22.4" 943 m a.s.l., 05.15.2019, N.P.Mehdiyeva);

*Xanthoxalis corniculata* (L.) Small (= *Oxalis corniculata* L.) (Oxalidaceae R.Br.) – GC east - Ismayilli district (vicinity of the village of Lahich, in shady, damp places, 07.28.2006); Gabala district (vicinity of the village of Vandam, forest on the territory of the Duyma tourist zone, N 40°59'28.45" E 047°56'32.33" 1126 m a.s.l., 08.15.2007); GC Guba – Guba district (forest area in the vicinity of the village of Kupchal, N 41°21'10.9" E 048°26'05.8" 797 m a.s.l., 05.24.2019); Absheron (Absh.) - Baku (Shafayat Mehdiyev St., 28-36, weeds in the courtyards, N 40°22'38.2" E 040°49'03.5" 158 m a.s.l., 08.15.2023, N.P.Mehdiyeva);

*Ziziphora clinopodioides* subsp. *clinopodioides* (= *Ziziphora serpyllacea* M. Bieb.) (Lamiaceae Martinov) – GC Guba – Guba district (grassy mountain slopes after the village of Dzhek, N 41°12'14.2" E 048°13'17.7" 2033 m a.s.l., 06.15.2013, N.P.Mehdiyeva).

Looking at the new distribution areas of some of the above-mentioned taxa, it can be seen that there is a significant difference between their habitats. So, according to the «Flora of Azerbaijan», although some species are indicated for lowlands and coastal areas, we found them in high mountain areas, in the forest (for example, *Erigeron crispus*, *Tournefortia sibirica*, *Galinsoga parviflora*, *Potamogeton natans*, *Sparganium polyedrum*, *Tulipa schmidtii* etc.). There were also taxa that, although they were recorded in highland areas,

were found by us in coastal areas, below sea level (for example, *Sanguisorba officinalis*, *Phragmites australis*, *Scilla siberica* etc.) [Flora of Azerbaijan, 1950-1961]. In our opinion, the arrival of these taxa in these areas could be through birds, wind, as well as through building materials (mainly sand).

As studies have shown, among the above mentioned plants there are six endemics of the Caucasus (*Aquilegia olympica*, *Galanthus alpinus* var. *alpinus*, *Hedera pastuchovii*, *Senecio pojarkovae*, *Tulipa undulatifolia* var. *undulatifolia* (*T. eichleri* Regel), *Ziziphora clinopodioides* subsp. *clinopodioides* (*Z. serpyllacea* M. Bieb.)) [Musayev, 2005; Safarov, 1979], two endemics of Azerbaijan (*Iris schischkinii*, *Rosa azerbaijdshanic*) [Ali-zade et al., 2014; Askerov, 2011; Asgarova, 2016] and five rare and endangered taxa (*Aquilegia olympica*, *Ophrys sphegodes* subsp. *mammosa*, *Ophrys oestriifera*, *Rosa azerbaijdshanic*, *Tulipa schmidtii*) [Red Book, 2023].

As a result of the research, data was obtained on new localities of 44 taxa. The presented array of information, complementing the flora of Azerbaijan, is extremely important material for work on the re-edition of “Flora of Azerbaijan”.

The obtained data are a definite contribution to the study of endemics, as well as rare and endangered species. These expand scientific knowledge about the modern distribution of species and are important for taking measures to ensure their conservation.

## REFERENCE

- Abbasov N.K. (2019) *Scorzonera gorovanica* (Asteraceae), a new species to the flora of Nakhchivan Autonomous Republic. *Botanical Journal*, 5: 815-818. [Аббасов Н.К. (2019) *Scorzonera gorovanica* (Asteraceae) – новый вид для флоры Нахичеванской Автономной Республики. *Ботанический журнал*, 5: 815-818] DOI: 10.1134/S0006813619050028
- Abdiyeva R.T., Asadova K.K., Mehdiyeva N.P. and Alizade V.M. (2021) *Amaranthus spinosus* (Amaranthaceae) is a new species for the flora of Azerbaijan. *Botanical Journal*, 9: 917-919 [Абдыева Р.Т., Асадова К.К.; Мехтиева Н.П., Али-Заде В.М. (2021) *Amaranthus spinosus* (Amaranthaceae) – новый вид для флоры Азербайджана. *Ботанический журнал*, 9: 917-919] DOI: 10.31857/S0006813621090027
- Abdiyeva R.T., Mehdiyeva N.P., Alizade V.M. (2020) *Oenothera odorata* (Onagraceae), a new alien species for the flora of Azerbaijan. *Botanical Journal*, 7: 717-720. [Абдыева Р.Т., Мехтиева Н.П., Али-Заде В.М. (2020) *Oenothera odorata* (Onagraceae) – новый заносный вид для флоры Азербайджана. *Ботанический журнал*, 7: 717-720] DOI: 10.31857/S0006813620070029
- Ali-zade V., Hajiev V., Kerimov V., Musayev S., Abdiyeva R., Farzaliyev V. (2014) Endemic plants of Azerbaijan. In: Red List of the Endemic plants of the Caucasus. p. 67-108. Eds. J. Solomon, T. Shulkina, G. Schatz. USA, Missouri Botanical Garden Press., Saint Louis; 451p.
- Askerov A.M. (2011) Endemic Flora of Azerbaijan. *Proceedings of ANAS (biological sciences)*, 6: 99-105. [Аскеров А.М. (2011) Эндемики флоры Азербайджана. *Известия НАНА (биологические науки)*, 6: 99-105.]
- Askerov A.M. (2016) The plant world of Azerbaijan. TEAS press, 444 p. [Əsgərov A.M. (2016) Azərbaycanın bitki aləmi. Ali bitkilər – Embryophyta. TEAS Press Nəşriyyat evi, 444 s.]
- Avise J.C. (2000) Phylogeography: the history and formation of species. Harvard University Press, Cambridge.
- Barve N., Barve V., Jiménez-Valverde A. et al (2011) The crucial role of the accessibility area in ecological niche modeling and species distribution modeling. *Ecol. Model.*, 222: 1810–1819.
- Brown J.H. (1995) Macroecology. Chicago: The Chicago University Press.
- Flora of Azerbaijan 1950–1961: in 8 volumes / Ed. I. I. Karyagin. Baku: Publishing House of the Academy of Sciences of the Azerbaijan SSR. [Флора Азербайджана. 1950–1961. Баку: Изд.АН Азерб. ССР, 1950-1961, т. I-VIII].
- Gaston K.J. (2003) The structure and dynamics of geographic ranges. Oxford University Press, Oxford.
- Guisan A., Thuiller W. (2005) Predicting species distribution: offering more than simple habitat models. *Ecol. Lett.*, 8: 993–1009.
- Huseynova A.Y., Garakhani P.K., Mehdiyeva N.P. (2014) A new species of the genus *Centaurea* (Asteraceae) from Azerbaijan. *Botanical Journal*, 99(3): 350-352. [Гусейнова А.Ю., Гарахани П.Х., Мехтиева Н.П. (2014) Новый вид рода *Centaurea* (Asteraceae) из Азербайджана. *Ботанический журнал*, 99(3): 350-352.]
- Ibadullayeva S.J., Alekperov R.A., Gasimov H.Z. (2014) *Thymus hyemalis* (Lamiaceae), A new species to the flora of Azerbaijan Republic. *Botanical Journal*, 7:

- 825-827. [Ибадуллаева С.Дж., Алекперов Р.А., Гасымов Г.З. (2014) *Thymus hyemalis* (Lamiaceae) – новый вид для флоры Азербайджана. *Ботанический журнал*, 7: 825-827.]
- Ibadullayeva S.J., Huseynova I.M. (2021) An Overview of the Plant Diversity of Azerbaijan. In: Öztürk M., Altay V., Efe R. (eds). Biodiversity, Conservation and Sustainability in Asia. Springer, Cham. [https://doi.org/10.1007/978-3-030-59928-7\\_17](https://doi.org/10.1007/978-3-030-59928-7_17).
- Ibadullayeva S., Karimov V., Mursal N. (2023) *Ophrys caucasica* Woronow - p. 98 in: Red Book of the Republic of Azerbaijan. Flora. Third edition. Turkiye: “Imak” Printing house.
- Ibadullayeva S.J., Seyidov M.M., Gasimov H.Z. (2012) *Viscum album* (Viscaceae), A new species to the flora of Nakhchivan Autonomous Republic. *Botanical Journal*, 97(10): 1368-1369. [Ибадуллаева С.Дж., Сеидов М.М., Гасымова Г.З. (2012) *Viscum album* (Viscaceae) – новый вид для флоры Нахичеванской АР. *Ботанический журнал*, 97(10): 1368-1369.]
- International Plant Names Index. (2023) Published on the Internet <http://www.ipni.org>, The Royal Botanic Gardens, Kew, Harvard University Herbaria & Libraries and Australian National Herbarium. [Retrieved 25 July 2023].
- Karimov V., Yusifov E., Murtazaliyev R. (2016) Vascular plant species new to the flora of the Caucasus from Azerbaijan. *Botanical Journal*, 101(5): 592-595. [Каримов В.Н., Юсифов Э., Муртазалиев Р.А. (2016) Новые для флоры Кавказа виды сосудистых растений из Азербайджана. *Ботанический журнал*, 101(5): 592-595.] DOI: 10.1134/S0006813616050082
- Karimov V.N., Murtazaliyev R.A. (2016) Finding of *Allium grande* (Alliaceae) in Azerbaijan. *Botanical Journal*, 1: 108-111. [Каримов В.Н., Муртазалиев Р.А. (2016) К нахождению *Allium grande* (Alliaceae) в Азербайджане. *Ботанический журнал*, 1: 108-111.] DOI: 10.1134/S0006813616010087
- Khapugin A.A., Kuzmin I.V. (2022) Data for distribution of vascular plants (Tracheophytes of Urban Forests and Floodplains in Tyumen City (Western Siberia). *Data*, 7(12): 180. <https://dx.doi.org/10.3390/data7120180>
- Mehdiyeva N.P. (2014) Addition to flora of Azerbaijan. *Proceedings of the Institute of Botany of ANAS*, 34: 37-140. [Мехтиева Н.П. (2014) Дополнение к флоре Азербайджана. *AMEA Botanika İnstitutunun elmi əsərləri*, 34: 37-140.]
- Mehdiyeva N.P., Abdiyeva R.T., Mursal N. (2023) *Aquilegia olympica* Boiss. Pp. 134 in: Red Book of the Republic of Azerbaijan. Flora. Third edition. Turkiye: “Imak” Printing house.
- Mehdiyeva N.P., Abdiyeva R.T. (2023) *Rosa azerbaijdzhanica* Novopokr. & Rzazade, p. 235 in: Red Book of the Republic of Azerbaijan. Flora. Third edition. Turkiye: “Imak” Printing house.
- Mehdiyeva N.P., Dadashova A.G., Ali-zade V.M. (2017) *Phalacrolooma annuum* (Asteraceae), a new species to the flora of Azerbaijan. *Botanical Journal*, 5: 689-692. [Мехтиева Н.П.; Дадашова А.Г.; Али-Заде В.М. *Phalacrolooma annuum* (Asteraceae) - новый вид для флоры Азербайджана. *Ботанический журнал*, 5: 689-692.] DOI: 10.1134/S0006813617050106
- Mehdiyeva N.P., Geltman D.V. (2015) *Acalypha australis* (Euphorbiaceae), a new alien species in Azerbaijan. *Botanical Journal*, 4: 403-406. [Мехтиева Н.П., Гельтман Д.В. (2015) *Acalypha australis* (Euphorbiaceae) - новый чужеродный вид для флоры Азербайджана. *Ботанический журнал*, 4: 403-406.] DOI: 10.1134/S0006813615040092
- Mehdiyeva N.P., Mursal N. (2023) *Ophrys oestriifera* M. Bieb. p. 99 in: Red Book of the Republic of Azerbaijan. Flora. Third edition. Turkiye: “Imak” Printing house.
- Mirzayeva Sh.N., Zernov A.S. (2022) *Allium neapolitanum* (Amaryllidaceae), a new alien species to the flora of the Caucasus. *Botanical Journal*, 6: 594-598. [Мирзоева Ш.Н., Зернов А.С. (2022) *Allium neapolitanum* (Amaryllidaceae) – новый чужеродный вид для флоры Кавказа. *Ботанический журнал*, 6: 594-598.] DOI: 10.31857/S0006813622060072
- Mirzayeva Sh.N., Zernov A.S. (2017) The new plants of Absheron peninsula. *Proceedings of the Institute of Botany, ANAS*, 37: 75-80.
- Musaev S.G. (2005) Inventory of the endemic flora of Azerbaijan. *News of the ANAS. Ser. biol. Sci.*, 1(2): 125-131. [Мусаев С.Г. (2005) Инвентаризация эндемы флоры Азербайджана. *Известия НАН Азербайджана. Серия биол. науки*, 1(2): 125-131.]
- Pimenov M.G., Nabieva F.Kh., Degtyarova G.V., Samigullin T.Kh., Ibadullaeva S.J., Ibragimov A.Sh., Zulfugarova P.V. (2018) *Helosciadium nodiflorum* is a new genus and species of *Umbelliferae* for the flora of Azerbaijan and the entire Caucasus. *Botanical Journal*, 103,4: 516-527. [Пименов М.Г., Набиева Ф.Х., Дегтярова Г.В., Самигуллин



- T.X., Ибадуллаева С.Дж., Ибрагимов А.Ш., Зулфугарова П.В. *Helosciadium nodiflorum* – новые род и вид *Umbelliferae* для флоры Азербайджана и всего Кавказа. *Ботанический журнал*, 103(4): 516-527.]
- Red Book of the Republic of Azerbaijan. (1989) Baku: Ishig, 544 p. [Azərbaycan SSR-in Qırmızı Kitabı (1989) Nadir və nəsli kəsilməkdə olan heyvan və bitki növləri. Bakı: İşiq, 544 s.]
- Red Book of the Republic of Azerbaijan. (2013) Rare and endangered plant and fungi species. 2<sup>nd</sup> edition. Baku; 670 p. [Azərbaycan Respublikasının Qırmızı Kitabı. (2013) Nadir və nəsli kəsilməkdə olan bitki və göbələk növləri [Bakı: Şərqi-Qərb, 2-ci nəşr, 676 s.]
- Red Book of the Republic of Azerbaijan. (2023) Rare and endangered plant and fungi species. 3<sup>rd</sup> edition. Turkey, IMAK printing house, 512 p.
- Richards C.L., Carstens B.C., Lacey Knowles L. (2007) Distribution modelling and statistical phylogeography: an integrative framework for generating and testing alternative biogeographical hypotheses. *J. Biogeogr.*, 34:1833-1845.
- Safarov I.S. (1979) Subtropical forests of Talysh. Baku, 158 c. [Сафаров И.С. (1979) Субтропические леса талыша. Баку, 158 с.]
- Salimov R.A. (2023) Studying the flora of Azerbaijan in a changing environment: status, trends and challenges. *Journal of History of Science and Science of Science*, 6: 56-65. [Səlimov R.A. (2023) Dəyişən ətraf mühitdə Azərbaycan florasının öyrənilməsi: vəziyyəti, meyllər və çağırışlar. *Elm tarixi və Elmşünaslıq beynəlxalq elmi-nəzəri jurnal*, 6: 56-65.] DOI <https://doi.org/10.59849/2788-9831.2023.6.56>
- Salimov R.A., Garakhani P.Kh., Aliyeva Z.S. (2019) Vascular plants of Azerbaijan: a nomenclatural checklist of nonflowering plants. CBS Polygraphic Production. 64 p.
- Salimov R.A., Karimov V.N., Garakhani P.Kh., Aliyeva Z.S. (2020) Vascular plants of Azerbaijan: a nomenclatural checklist of monocotyledons. CBS Polygraphic Production. 175 p.
- Soberón J., Peterson A.T. (2005) Interpretation of models of fundamental ecological niches and species' distributional areas. *Biodivers. inform.*, 2:1–10.
- Talibov T.G, Garakhani P.Kh. (2023) *Tulipa schmidtii* Fomin. p. 53, In: Red Book of the Republic of Azerbaijan. Flora. Third edition. Turkiye: “Imak” Printing house.
- WFO (2023) World Flora Online. Published on the Internet; <http://www.worldfloraonline.org>. Accessed on: 21 Sep 2023.

### Azərbaycan florası üçün bəzi borulu bitkilərin yeni yayılma yerləri

**Naibə P. Mehdiyeva**

**Nigar Mürsəl**

*Botanika İnstitutu, Azərbaycan Respublikası Elm və Təhsil Nazirliyi, Badamdar şossesi 40, Bakı, AZ1004, Azərbaycan*

2008-2023-cü illərdə Azərbaycanın ayrı-ayrı botaniki-coğrafi rayonları üzrə aparılmış çöl tədqiqatlarının nəticələri əsasında 44 takson üçün yeni yayılma yerləri haqqında məlumat verilir. 20 növün Böyük Qafqazın (BQ) Quba hissəsi, 16 növün BQ şərq hissəsi, iki növün BQ qərbi hissəsi, dörd növün Samur-Dəvəçi ovalığı, Qobustan, Abşeron, Lənkəran və Xəzəryanı ovalıq botaniki-coğrafi rayonlarının hər biri üçün isə bir növün yeni yayılma yerləri aşkar edilmişdir. Bəzi növlər həm BQ Quba və BQ şərq hissə üçün müəyyən edilmişdir. Növlərin arasında altı Qafqaz endemiki (*Aquilegia olympica*, *Galanthus alpinus* var. *alpinus*, *Hedera pastuchovii*, *Senecio pojarkovae*, *Tulipa undulatifolia* var. *undulatifolia* (*T. eichleri* Regel), *Ziziphora clinopodioides* subsp. *clinopodioides* (*Z. serpyllacea* M. Bieb.)), 2 Azərbaycan endemiki (*Iris schischkinii*, *Rosa azerbaijandica*), beş nadir və itmə təhlükəsində olan takson (*Aquilegia olympica*, *Ophrys sphegodes* subsp. *mammosa*, *Ophrys oestriifera*, *Rosa azerbaijandica*, *Tulipa schmidtii*) vardır. Əldə edilmiş məlumatlar Azərbaycan Respublikasının Qırmızı Kitablarına (1989, 2013, 2023) daxil edilmiş Azərbaycan florasının endemik, nadir və nəsli kəsilməkdə olan növləri haqqında elmi əsaslandırılmış bilikləri genişləndirir, onların təhlükəsizliyini təmin etmək məqsədilə tədbirlərin işlənilməsi üçün mühüm əhəmiyyət kəsb edir, “Azərbaycan florası”nın yeni nəşri üzərində işləmək üçün zəruri olan mühüm məlumat mənbəyidir. Hazırkı məqalə müəyyən dərəcədə respublika florasının taksonomik tərkibinin tədqiqinə dair son illərdə aparılan tədqiqatların qısa nəticələrindən də bəhs edir.

**Açar sözlər:** yayılma, endemik, bitki, nadir, növ, takson

## Новые места произрастания некоторых сосудистых растений во флоре Азербайджана

Найба П. Мехтиева

Нигяр Мурсал

Институт ботаники, Министерства Науки и Образования  
Азербайджанской Республики, Бадамдарское шоссе 40,  
Баку, AZ1004, Азербайджан

Приводятся сведения о новых местах произрастания для 44-х таксонов, основанные на результатах полевых исследований 2008-2023 гг., дополняющие данные по отдельным ботанико-географическим районам Азербайджана. Для 20 видов выявлены новые места произрастания в ботанико-географическом районе Большой Кавказ (БК) кубинский, 16 видов обнаружены на БК восточном и два вида – БК западном, четыре вида – на Самур-Дивичинской низменности, по один виду – в Кобустане, на Апшероне, Ленкоранской и Прикаспийской низменностях. Некоторые таксоны были выявлены как на БК кубинск., так и на БК восточ. Среди указанных растений шесть эндемиков Кавказа (*Aquilegia olympica*, *Galanthus alpinus* var. *alpinus*, *Hedera pastuchovii*, *Senecio pojarkovae*,

*Tulipa undulatifolia* var. *undulatifolia* (*T. eichleri* Regel), *Ziziphora clinopodioides* subsp. *clinopodioides* (*Z. serpyllacea* M. Bieb.)), два эндемика Азербайджана (*Iris schischkinii*, *Rosa azerbaijandica*) и пять редких и исчезающих таксонов (*Aquilegia olympica*, *Ophrys sphegodes* subsp. *mammosa*, *Ophrys oestriifera*, *Rosa azerbaijandica*, *Tulipa schmidtii*). Полученные данные расширяют научно обоснованные знания об эндемиках, редких и исчезающих видах флоры Азербайджана, включенных в Красные книги Азербайджанской Республики (1989, 2013, 2023), имеют важное значение для разработки мер по обеспечению их сохранности и являются важным источником информации, необходимой для работы над переизданием «Флоры Азербайджана». В определенной мере настоящее исследование перекликается и с другими работами по исследованию таксономического состава флоры республики, проведенными в последние годы, краткие результаты которых обсуждены в настоящей статье.

**Ключевые слова:** распространение, эндемик, растение, редкие, виды, таксон