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STUDY OF SPECIES OF *Campanula* L. SUBGENUS FOUND IN KARABAKH AND ZANGEZUR FLORA

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ИЗУЧЕНИЕ ВИДОВ ПОДРОДА *Campanula* L., НАЙДЕННЫХ ВО ФЛОРЕ КАРАБАХА И ЗАНГЕЗУРА

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Abstract. Karabakh and Zangezur are the south-eastern end of the Lesser Caucasus, and they are distinguished by their climate and landscape diversity with a rich in vegetation. Analysis of literature and herbarium specimens collected in this region is an invaluable source for a comprehensive assessment of the state of the ecosystems of Karabakh and Zangezur over the past 30 years. This is the purpose of the study of the genus *Campanula* which is widespread in the northern hemisphere and is of special importance for the flora of the Caucasus. According to literature, 110 species of this genus are found in the Caucasus, and 46 — in Azerbaijan. The history of the study of the genus, its geographical distribution, as well as the taxa found in the flora of Karabakh and Zangezur were compared, and the herbarium data stored in the BAK were analyzed. It was found that the subgenus *Campanula* L., which is the richest of the subgenus in terms of the number of species of the genus, includes 11 sections. And 18 taxa belonging to 7 sections are found in the flora of Azerbaijan, 11 taxa of which are found in the flora of Karabakh and Zangezur. During the examination of herbarium specimens of the genus *Campanula* L. stored in the BAK, it was found that 20 herbarium specimens belonging to 5 species were collected from Karabakh region.

Аннотация. Карабах и Зангезур, отличающиеся разнообразием климата и ландшафта и являющиеся юго-восточной оконечностью Малого Кавказа, богаты растительностью. Анализ литературы и гербарных образцов, собранной в этом регионе, является бесценным источником для всесторонней оценки состояния экосистем Карабаха и Зангезура за последние 30 лет. Это и является целью изучения рода *Campanula*, широко распространенного в северном полушарии и имеющего особое значение для флоры Кавказа. Согласно литературным данным, 110 видов этого рода встречаются на Кавказе, а 46 — в Азербайджане. Проведено сравнение истории изучения рода, его географического распространения, а также таксонов, обнаруженных во флоре Карабаха и Зангезура, и проанализированы гербарные данные, хранящиеся в гербарном фонде БАК. Было установлено, что подрод *Campanula* L., являющийся самым богатым по числу видов рода, включает в себе 11 секций, из которых во флоре Азербайджана встречаются 18 таксонов, относящихся к 7 секциям. 11 таксонов из 18 обнаружены во флоре Карабаха и Зангезура. Вместе с тем, при осмотре гербарных образцов подрода *Campanula* в гербарном фонде (БАК)

Т. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

Института ботаники выявлен 21 гербарный экземпляр, принадлежащий к 5 видам, собранным в Карабахской зоне.

Keywords: Campanula, herbarium, Lesser Caucasus, species.

Ключевые слова: колокольчик, гербарий, Малый Кавказ, виды.

Campanula L. (Bellflower) is the largest genus of the Campanulaceae family which comprises more than 400 species (https://kurl.ru/yScie). Representatives of the genus are perennial, rarely annual herbs that can be found in various habitats, including subalpine and alpine belts of mountains, forests, meadows, partly deserts and steppes. The genus *Campanula* is widespread mainly in the northern hemisphere, and this genus is of special importance for the flora of the Caucasus. So, many endemic species of the genus are found here. According to literature data, 110 species of the genus are found in the Caucasus and 46 in Azerbaijan [3]. In "Synopsis of the flora of the Caucasus" [12] authors noted that *Campanula* genus includes 11 subgenera and among these subgenus *Campanula* L. is the richest in the number of species. From 18 taxa of this subgenus which indicated for the flora of Azerbaijan 11 taxa are found in the flora of Karabakh and Zangezur [13].

According to the botanical-geographical division of Azerbaijan, the territories of Karabakh and Eastern Zangezur mainly cover the central and southern part of the Lesser Caucasus. It is bordered by Armenia by covering the borders of the administrative regions of Lachin, Gubadli and Zangilan from the southwest, the Murovdagh ridge from the northwest, Injachay from the north, the Karabakh plain from the northeast, the Mil plain from the east, the Karabakh ridge from the west; from the south it extends to the state border with Iran with the territories included in Jabrayil, Zangilan and Fuzuli administrative regions according to its geographical position.

It is covering the borders of the administrative regions of Azerbaijan (Lachin, Gubadlin and Zangilan from the southwest) which borders with Armenia, the Murovdag ridge (from the northwest), Injachay (from the north), the Karabakh plain (from the northeast), the Mil plain (from the east), the Karabakh ridge (from the west); from the south it extends to the state border with Iran with territories that are geographically included in the Jabrayil, Zangilan and Fuzuli administrative regions of Azerbaijan.

Western Zangezur, which is a part of the ancient historical Zangezur district of Azerbaijan, covers Gafan (at present Sunik province or marzi), Gorus (at present Sunik province or marzi), Garakilsa (at present Sunik province or Sisian included in marzin), Mehri (at present Sunik province or Megri included in marzin) administrative regions of Armenia and it borders with Azerbaijan by covering the borders of Zangezur ridge (from the west) and southwest (Ordubad, Julfa and Shahbuz districts of Nakhchivan MR), Kalbajar (from the northeast), Lachin, Gubadli (from the east) and Zangilan (from the southeast) administrative regions and from the south it borders with Iran, extending to the Araz River (Figure 1).

The study of the flora of Karabakh and Zangezur is closely related to various expeditions to the region for the purpose of studying the flora and nature of the Caucasus in general. According to the herbarium specimens collected from the territory of Karabakh and Zangezur stored in different collections and also literature data it is clear that the first botanist to visit this region was A. I. Shovic (1829), later R. F. Hohenacker, F. A. Buze, G. I. Radde, Y. S. Medvedev, V. I. Lipsky, A. A. Lomakin, B. B. Grinevechki and others has traveled [2].

Т. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

Plant samples collected by G. I. Radde in 1890 and by A. A. Lomakin in 1895 mainly belongs to Zangezur, Shusha and Khojavand, and a relatively small number belongs to Jabrayil region and Nakhchivan. Q. I. Radde also visited some mountains around Goycha Lake [9].

Figure 1. The map of Karabakh and Zangezur territories

Plant samples collected from these areas: *Symphyandra armena* (Steven) A. DC. — in Shusha and Zangezur cliffs (by Lomakin and Radde); *Symphyandra zangezura* Lipsky — mainly in the upper forest zone in the southern part of Zangezur (for example Khustup mountain) (by Lomakin); *Campanula sibirica* L. — on the rocks in Shusha, Ballica, Gorus, Zabukh, etc. (by Lomakin and Radde); *Campanula latifolia* L. — Kharar village in the forest (by Lomakin); *Campanula rapunculoides* L. — in Ustupi village (by Radde); *Campanula bononiensis* L. — in Kharar, Shurnukhu and Bichenak villages, in the forest (by Lomakin); *Campanula glomerata* L. — in Shusha (by Lomakin); *Campanula bayerniana* Rupr. — among the stones (by Lomakin) in Parichingil [9].

After 1917, in addition to floristic studies also geobotanical studies were carried out to study the vegetation of forests and grasslands in Karabakh and Zangezur. During the study of mountain xerophytes of the southern part of the Lesser Caucasus 899 species included in this group were recorded during the expeditions organized to: in 1928-1929 along the southern and western shores of Lake Goycha by T. Heydeman, O. M. Zedelmeyer, N. I. Kuznesov, A. A. Grossheim and others, in 1930, Karabakh (Shusha), in 1931, the highlands of Kalbajar, as well as Lachin mountains (up to the village of Minkend), in 1935 to Khojavand region, Ziyarat mountain and surrounding peaks. 10 species of these, belonged to the Campanulaceae family. These species were found on rocks and grouped as *Campanuletum* and *Symphyandretum* phytocenosis [8].

Plant samples were collected during an expedition organized to the western slope of the Zangezur range, as well as its southern and high-mountainous part (between Kapicic mountain in the north and Shikhyurdu mountains in the south) in 1933. Scientists Y. Isayev, Ch. Gurvich, N. L. Antonov, A. Grossheim participated in the collection and determination of these samples. Among these samples also were plant species belonging to the *Campanula* L. genus and they were grouped as follows: on rocks in subalpine zone (3-4 km to north-east from Urmus) — *Symphyandra*

T. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

zangezura Lipsky (in rock crevices, stony — rocky slopes); *S. armena* (Steven) A. DC. (Urmus — Mazra, in rock cracks); also, *S. zangezura* Lipsky and *Campanula glomerata* L. in semi-open phytocenoses in Thymeto-Festucetum and Tragacanth astragal phytocenosis [7].

In the IV volume of "Flora of the Caucasus" it was mentioned that 15 species of the subgenus *Campanula* are distributed in the Caucasus and 8 in Zangezur [6].

In multivolume of "Flora of the USSR"150 species of the *Campanula* genus and 7 species of the *Symphyandra* genus was studied by A. Fyodorov. 18 of them belonging to the *Campanula* subgenus and 3 species of the *Symphyandra* A. DC. genus was noted to be distributed in Karabakh and Zangezur [4].

The taxonomy of the *Campanula* L. species found in Azerbaijan flora was studied by A. Fyodorov in the multivolume "Flora of Azerbaijan" [3].

He gave description and distribution of 19 species of *Campanula* subgenus in Volume VIII. It is mentioned that 16 species distributed in Karabakh and Zangezur belong to the *Campanula* subgenus, and 3 species belong to the *Symphyandra* A. DC. genus [3].

Later the *Campanula* L. genus was not taxonomically revised as an independent genus but was studied floristic and geobotanically in the vegetation composition of the determined area [14, 15].

In June 1985, A. D. Mikheev described a new species of *Campanula* L. from the broadleaf forest on the right bank of the Tartar River in northern Karabakh — *Campanula karabaghensis* Mikheev [10].

Caucasian species of the genus *Campanula* L. have been studied by many researchers But, Azerbaijani bellflower species have not been studied from a morpho-systematic point of view. Only A. Nasirova investigated *Campanula* species distributed in Nakhchivan [11].

Since 2018, studies have been started in order to clarify the phylogenetic relationships and to carry out a systematic review of species belonging to the *Campanula* L. subgenus found in the flora of Azerbaijan. There are given the analysis of data (history of the study of genus, geographical distribution, including herbarium specimens in the BAK herbarium fund, etc.) and morphological descriptions of species of *Campanula* L. subgenus distributed in the flora of Karabakh and Zangezur [14, 15].

Materials and Methods

In this study, various floras [3, 4, 6, 8] and other literary materials [9, 11, 13] were analyzed from taxonomic and nomenclature points of view (Table 1).

Table 1

CLASSIFICATION OF *CAMPANULA* L. SUBGENUS DISTRIBUTED IN KARABAKH AND ZANGEZUR FLORA

Flora of Caucasus [6]	*Flora of USSR* [4]	*Flora of Azerbaijan* [3]	*Flora of Armenia* [2]	*Synopsis of the flora of the Caucasus* [1]
	Campanula L. *Medium* DC.			
	Involucratae (Fom.) Fed.		*Involucratae* (Fomin.) Char.	*Involucratae* (Fomin.) Charadze
C. glomerata v. *cervicarioides* A. DC.	*C. glomerata* L.		*C. glomerata* subsp. *glomerata*	*C. glomerata* subsp. *glomerata*
				C. glomerata subsp. *oblongifolia* (K. Koch.) Fed.

Т. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

Flora of Caucasus [6]	*Flora of USSR* [4]	*Flora of Azerbaijan* [3]	*Flora of Armenia* [2]	*Synopsis of the flora of the Caucasus* [1]
	C. oblongifolia (C. Koch) Charadze	C. *oblongifolia* (K. Koch.) Charadze	*C. glomerata* subsp. *oblongifolia* (K. Koch.) Fed.	*C. glomerata* subsp. *caucasica* (Trautv.) Ogan.
	C. trautvetteri Grossh.	*C. trautvetteri* A. Grossh.	*C. glomerata* subsp. *caucasica* (Trautv.) Ogan.	
	Eucodon (A. DC.) Fed.		*Campanula*	*Campanula*
C. latifolia L.	*C. latifolia* L.	*C. latifolia* L.	*C. latifolia* L.	*C. latifolia* L.
	C. bononiensis L.	*C. bononiensis* L.	*C. bononiensis* L.	*C. bononiensis* L.
C. rapunculoides L.	*C. rapunculoides* L.	*C. rapunculoides* L.		*C. rapunculoides* L.
	C. grossheimii Charadze	*C. grossheimii* Charadze		
	Triloculares Boiss.			
			Sibiricae (Fomin.) Char	*Sibiricae* (Fomin) Charadze
	C. caucasica M. B.	*C. caucasica* M. B.		*C. caucasica* Bieb.
	C. sibirica L.		*C. sibirica* L.	*C. sibirica* subsp. *hohenackeri* (Fisch. & Mey.) Damboldt
C. hohenackeri Fisch. & Mey.	*C. hohenackeri* Fisch. et Mey.	*C. hohenackeri* Fisch. & Mey.		
	C. schelkownikowii Grossh.	*C. schelkownikowii* Grossh.		
	Cordifoliae (Fom.) Fed.		*Cordifolia* (Fomin.) Char.	*Cordifolia* (Fomin.) Char.
	C. alliariifolia Willd.	*C. alliariifolia* Willd.	*C. alliariifolia* Willd.	*C. alliariifolia* Willd.
	C. sclerotricha Boiss.	*C. sclerotricha* Boiss.		
	Oreocodon Fed.		*Oreocodon* (Fed.) Ogan.	*Oreocodon* (Fed.) Ogan.
	C. radula Fisch.	*C. radula* Fisch. ex Fenzl.	*C. coriacea* P. H. Davis	*C. coriacea* P. H. Davis
	Symphyandriformes (Fom.) Fed.		*Symphyandriformes* (Fomin.) Char.	*Symphyandriformes* (Fomin) Charadze
C. bayerniana Rupr.	*C. bayerniana* Rupr.	*C. bayerniana* Rupr.	*C. bayerniana* Rupr.	*C. bayerniana* Rupr.
	C. choziatowskyi Fom.	*C. choziatowskyi* Fom.		
	C. takhtadzhiani Fed.	*C. takhtadzhianii* Fed.		
	C. elegantissima Grossh.	*C. elegantissima* A. Grossh.		
	Symphyandra A.	Symphyandra A.		

Flora of Caucasus [6]	*Flora of USSR* [4]	*Flora of Azerbaijan* [3]	*Flora of Armenia* [2]	*Synopsis of the flora of the Caucasus* [1]
	DC.	DC.		
	Otocalyx A. DC.			
	S. armena (Stev.) A. DC.	*S. armena* (Stev.) A. DC.	*C. armena* Steven.	*C. armena* Steven.
	S. daralaghezica Grossh.	*S. daralaghezica* A. Grossh.		
	Parageranion Fed.			
S. zangezura Lipsky	*S. zangezura* Lipsky	*S. zangezura* Lipsky	*C. zangezura* (Lipsky) Kolak & Serdyuk.	*C. zangezura* (Lipsky) Kolak & Serdyuk.

As a result of the comparative analysis of the taxonomic composition of the *Campanula* subgenus found in the flora of two neighboring areas, Jaccard's similarity index was determined [7] and dendrogram of cluster analysis was drawn by UPGMA method (Unweighted Pair Group Method with Arithmetic mean) [8].

1:1300000 scale thematic map of the studied area was prepared using ArcGIS 10.8 software (Figure 1). Also, the herbarium specimens of the *Campanula* L. genus stored in the BAK herbarium fund [1] of the Institute of Botany and digitized in the virtual herbarium database [5] were revised. Among the herbarium specimens stored in the herbarium fund, specimens belonging to the subgenus *Campanula* species collected from Karabakh and Zangezur territories were analyzed, the area where they were collected, the date of collection, as well as the researchers who collected and identified them, etc. listed in the form of a table (Table 2).

Because those areas were occupied for a long time, no expedition was organized there, and no new herbarium specimens were collected (https://kurl.ru/yScie).

Table 2

HERBARIUM SPECIMENS COLLECTED FROM KARABAKH AND ZANGEZUR

Species	*Determiner*	*Collector*	*Date*	*Distribution*	*Region*
C. armena Stev. (*Symphyandra armena* DC.)	C. Gurvitsh	C. Gurvitsh	14.06.1936	Karabakh, opp. Schuscha, in declivibus graminosis	Shusha
C. armena Stev. (*Symphyandra armena* DC.)	A. A. Grossheim	A. Chadarin	22.08.1932	Karabakh, distr. Gadrut, pr. Chuzabirt, in pratis subalpinis	Khojavand
C. armena Stev. (*Symphyandra armena* DC.)	A. A. Grossheim	Y. Isaev	13.08.1936	Kurdistan, distr. Lachin, prope p. Sarysh Sogly, in lapidosis	Lachin
C. armena Stev. (*Symphyandra armena* DC.)	C. Gurvitsh	C. Gurvitsh	08.08.1934	Kalbajar, ad thermas Isti su, inter p. Shurotan et trajectum Shurotan, in lapidosis	Kalbajar
C. armena Stev. (*Symphyandra armena* DC.)	T. Heideman	M. Ragimov, T. Heideman	28.06.1937	Karabach, Vank dizak, pr. Pag. Dommi. Ad rupes	Khojavand
C. armena Stev. (*Symphyandra armena* DC.)	Y. Isaev	Y. Isaev	10.06.1935	distr. Dzhebrail, prope p. Dolanlar, inm - te Kyzyl - kaja - dag, 1850 m. In	Jabrayil

Species	*Determiner*	*Collector*	*Date*	*Distribution*	*Region*
				fissuris rupium	
C. armena Stev. (*Symphyandra armena* DC.)	I. Karjagin	I. Karjagin	24.06.1933	Karabach, meridionalis pr. p. Zamzur (V. Varvan). In lapidosis ca 1400 mt	Khojavand
C. armena Stev. (*Symphyandra armena* DC.)	T. Heideman	T. Heideman Y. Isaev	24.07.1931	Kurdistan, in monte Kilossa?, ad rupes	Kalbajar
C. armena Stev. (*Symphyandra armena* DC.)	A.A. Grossheim	Y. Isaev	09.08.1936	distr. Latshin, prope p. Kara - keshish, in fissuris rupium	Lachin
C. armena Stev. (*Symphyandra armena* DC.)	T. Heideman	T. Heideman	20.08.1935	distr. Vank dizak, prope p. Dommi, in silva	Khojavand
C. armena Stev. (*Symphyandra armena* DC.)	T. Heideman	T. Heideman	27.08.1935	distr. Vank dizak, in monte Ziarat	Khojavand
C. armena stev. (*Symphyandra armena* DC	A. A. Grossheim	A. Kolakovsky	21.06.1929	Karabakh, prope oppidum Shusha	Shusha
C. bayerniana Rupr.	T. Heideman	T. Heideman Y. Isaev	15.08.1931	Kalbajar, p. Lacum Alagel	Kalbajar
C. bononiensis L.	T. Heideman	T. Heideman	10.08.1935	Vank Dizak, prope p. Gadrut. In horto	Khojavand
C. glomerata L.	T. Heideman	T. Heideman Y. Isaev	08.08.1931	Kurdistan, in declivitate fl. Isti - su. In pratis subalpinis	Kalbajar
C. latifolia L.	T. Heideman	T. Heideman. M. Ragimov	28.06.1937	Karabach. distr. Vank Dizak. pr. pag. Dommi. in silva	Kalbajar
C. latifolia L.	Ts. Gurvich	Ts. Gurvich	30.07.1934	Kəlbəcər. Aşaği Isti su. otlu yamaclarda	Kalbajar
C. rapunculoides L.	C. Gurvitsh	C. Gurvitsh	21.07.1934	Kalbajar, ad thermas Isti su, inf.in lapidosis herbosis	Kalbajar
C. rapunculoides L.	I. Karjagin	I. Karjagin, A. Chadarin	24.06.1932	Qarabağ, Vank Dizak. Sur və Tax Kəndləri arasinda Daşli yamaclarda	Khojavand
C. rapunculoides L.	Y. Isayev	Y. Isayev	18.06.1935	Jabrail, prope p. Dolanlar. In arvis derelictis	Jabrayil

Results and Discussions

As a result of analysis of literature materials, floras and synopses about the *Campanula* L. genus, as well as revision of herbarium specimens stored in the BAK herbarium fund and digitized in the virtual herbarium databases, taxonomic analysis based on nomenclature changes made as a result of research conducted in recent decades, to the taxa of the subgenus *Campanula* found in the flora of Karabakh and Zangezur belongs: *Campanula latifolia* L., *Campanula rapunculoides* L., *Campanula bononiensis* L., *Campanula caucasica* M. Bieb., *Campanula armena* Steven, *Campanula zangezura* (Lipsky) Kolak. & Serdyuk., *Campanula bayerniana* Rupr., *Campanula coriacea* P. H. Davis., *Campanula glomerata* L., *Campanula glomerata* subsp. *caucasica* (Trautv.) Ogan., *Campanula glomerata* subsp. *oblongifolia* (C. Koch.) Fed., *Campanula sibirica* subsp. *hohenackeri* (Fisch. et C. A. Mey.) Damboldt.

It was determined that 11 taxa, including 8 species and 3 subspecies, are distributed in each of the territories of Karabakh and Zangezur, and were analyzed their similarities with representatives of the *Campanula* subgenus found in flora of Nakhchivan in Table 3.

Т. 9. №11. 2023
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Table 3

COMPARISON OF THE SUBGENUS *CAMPANULA* FOUND IN THE FLORA OF NAKHCHIVAN, KARABAKH AND ZANGEZUR

Name of taxa	*Nakhchivan*	*Western Zangezur*	*Eastern Zangezur*	*Karabakh*
Campanula glomerata	+	+	+	+
subsp. *oblongifolia*			+	+
subsp. *caucasica*		+	+	+
Campanula latifolia	+	+	+	+
Campanula rapunculoides	+	+	+	+
Campanula bononiensis	+	+	+	+
Campanula sclerotricha	+			
Campanula armena	+	+	+	+
Campanula zangezura	+	+		
Campanula bayerniana	+	+	+	+
Campanula coriacea	+	+		
Campanula caucasica			+	+
Campanula sibirica subsp. *hohenackeri*		+	+	+
Campanula alliariifolia			+	
Campanula karabaghensis				+

The taxonomic composition of the *Campanula* subgenus found in flora of Karabakh and Zangezur was comparatively analyzed using Jaccard's similarity coefficient. The results of the preliminary studies showed that 6 species (*C. glomerata* L., *C. latifolia* L., *C. rapunculoides* L., *C. bononiensis* L., *C. armena* Stev., *C. bayerniana* Rupr.) belonging to this genus are common for a flora of Nakhchivan, western and eastern Zangezur and Karabakh. This is approximately 40% of the total number of species distributed in these territories. In order to compare the similarity of *Campanula* L. species distributed in these territories, a similarity index was determined using the Jaccard similarity coefficient method (Figure 2).

During the examination of the herbarium materials stored in the Herbarium Fund (BAK) of the Institute of Botany of the Ministry of Science and Education of Azerbaijan Republic among the herbarium specimens of the species *C. armena* Steven (=*Symphyandra armena* (Steven) A. DC.), *C. bayerniana* Rupr., *C. bononiensis* L., *C. glomerata* L., *C. rapunculoides* L., *C. latifolia* L. were also found herbarium specimens collected from Karabakh and Eastern Zangezur territories. Materials belonging to the *C. armena* Steven species were collected from Khojavand, Kalbajar, Jabrayil, Lachin, Shusha regions, only one herbarium specimen belonging to *C. bayerniana* Rupr. were collected from Kalbajar region, herbarium specimens of *C. bononiensis* L. were collected from Kalbajar and Khojavand districts, one herbarium specimen of *C. glomerata* L. species were collected from Kalbajar district, herbarium materials of *C. rapunculoides* L. species from Khojavand, Kalbajar, Jabrayil districts and herbarium specimens belonging to *C. latifolia* L. were collected from Khojavand and Kalbajar regions. Scientists such as T. Heydeman, A. Grossheim, Y. Isayev, M. Rahimov, J. Gurvich, A. Kolakovskiy, A. Khadarin played a great role in the collection and identification of these materials (especially T. Heydeman). The visits of these scientists to the Karabakh region coincided with the years 1929-1937.

During the revision of the herbarium materials stored in the Herbarium fund of the Botanical Institute of MSE AR (BAK), it was determined that herbarium materials of the following species were collected from the territory of Karabakh and East Zangezur:

Т. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

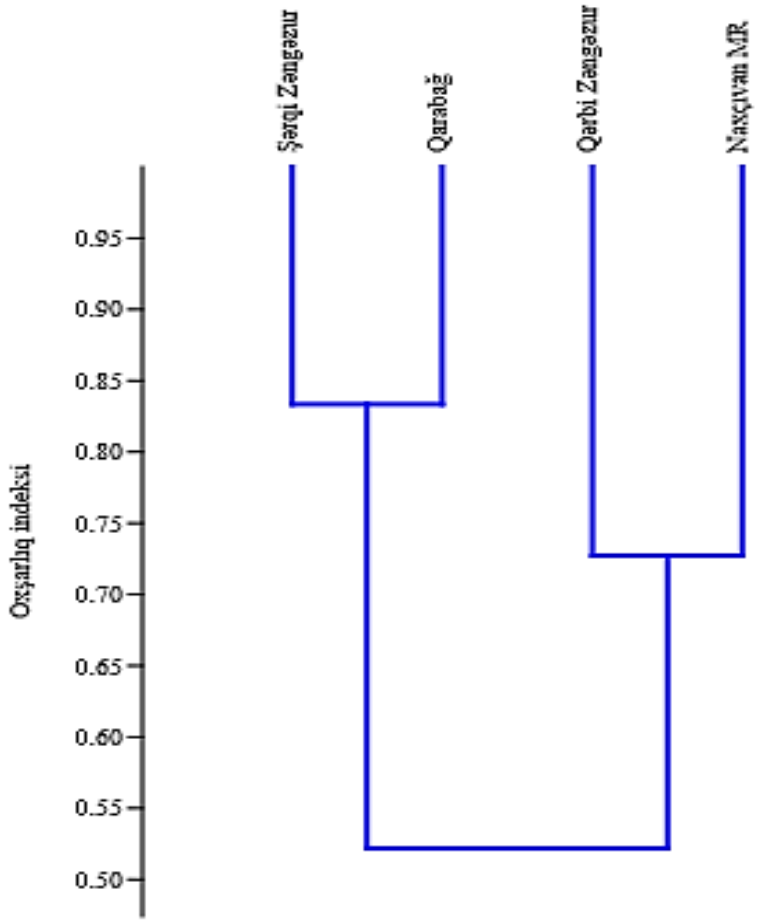

Figure 2. Dendrogram of cluster analysis using the UPGMA method and Jaccard similarity index of data on the taxonomic composition of the subgenus Campanula found in flora of Karabakh and Zangezur

C. armena Steven, in Mem. Soc. Imp. Naturalistes Moscou 3:256. 1812 — Armenian bellflower [3].

Homotypic synonym: *Symphyandra armena* (Steven) A. DC.

Heterotypic synonym: *Symphyandra daralaghezica* Grossh.

A perennial densely covered, sometimes almost bare plant. The rhizome is branched, grayish brown, from the upper part, wrapped with rather long, dry and grayish remnants of dead leaves and stalks of old stems. Stems are erect or decumbent, slender, creeping, branched from the top or middle, with single-flowered branches or 3-5-flowered shield-shaped branches, which in turn sometimes form a paniculate inflorescence.

The leaves are large and toothed, 2-4 cm in diameter; the lower leaves are long-stalked, heart-shaped - egg-shaped, the upper leaves are almost sessile and shortened. Flowers 2 cm. long, has a thin flower stalk. The teeth of the hairy grayish calyx are triangular, sharp, 4 times smaller than the corolla; Calyx appendages are very short and sharp. The corolla is white, velvety, bell-shaped, with short segments, the column is straight, the seeds are brown, elongated, sharp. Flowering: VI-VIII months, fruiting: (VII) VIII-IX months [3].

C. bayerniana Rupr., in Bull. Acad. Imp. Sci. Saint-Petersbourg — Bayern bellflower [3].

Heterotypic synonyms: *Campanula choziatowskyi* Fomin, *Campanula elegantissima* Grossh., *Campanula takhtadzhianii* Fed., *Campanula bayerniana subsp. choziatowskyi* (Fomin) Ogan.

A perennial, almost completely bare plant. The rhizome forms small, branched grasses. The stems are thin (1 mm. thick), bent, have a few flowers, height 15-20 cm. The leaves are leathery, long-stalked around the root and in the vegetative shoots, kidney-shaped or ovoid-heart-shaped, 1-2

Т. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

(2.5) cm in diameter, and have large, uneven hook-shaped curved teeth, and curly hairs on the edges. Stem leaves are few in number, ovoid — round or round, with large teeth and short petioles. The length of the flowers is 1.5-2 cm. The teeth of the calyx are triangular, long, sharpened, and have curly hairs on the edges. Calyx appendages are very short, and the stem has a round or conical base. The corolla is narrowly bell-shaped, blue, naked outside, bearded inside and 4-5 times longer than the calyx. The enlarged parts of the stamens are usually bearded inside. The column is not visible. Flowering and fruiting: VI-VII months.

C. bononiensis L., Sp. Pl.: 165. 1753 — Bolons bellflower [3].

Heterotypic synonym: *Campanula obliquifolia* Ten.

Perennial plant, the root is more or less dense. The stem is erect, up to 70 cm high, bumpy, with more or less soft covering, simple or lightly branched. The leaves are egg-shaped, sharpened, jagged on both sides, usually gray below (because of the cover), saw-toothed, with sharp teeth, dark green above. The leaves around the root are petiolate, the stem leaves are sessile, and the upper leaves embrace the stem. Flowers are small, 2-2.5 cm. long, bent, with a very short flower stalk, numerous and collected in a spike-like cluster. Sometimes the inflorescence is slightly branched. The calyx is naked or with a blunt-stubby cover, almost round, blackish, the teeth of the calyx are sharp, more or less bent, blunt-stubbed, narrow triangular-lanceolate and several times shorter than the corolla. The corolla is funnel-shaped, blue-purple, bare from below, bearded from the inside. Stamens are pubescent from the base and hairy. The column is equal to the length of corolla, slightly hairy at the beginning, with 3 stigmas. The capsule is bent, balloon-shaped, small. Flowering: VI-VII (VIII); fruiting: VII-VIII months.

C. rapunculoides L., Sp. Pl.: 165. 1753 — creeping bellflower [3].

Heterotypic synonyms: *Campanula cordifolia* K. Koch, *Campanula foliosa* Galushko, *Campanula grossheimii* Kharadze, *Campanula neglecta* Besser, *Campanula trachelioides* M. Bieb., *Campanula rapunculoides subsp. cordifolia* (K. Koch) Damboldt.

It is a perennial plant. The root is dense, branched, sometimes with long aerial roots. Stem 30-100 cm. high, simple, straight, slightly ribbed, glabrous or usually covered with stiff and short hairs. Leaves around the root and lower stem leaves long-stalked, cordate-ovate or oblong-cordate-ovate; leaves located in the middle of the blunt stem, blunt-based, and those located in the upper part are lanceolate, sessile and unevenly sharp teeth. Inflorescence is long, brush-shaped, one-sided. Flowers about 2-2.5 cm. in length, short-stalked, bent, blue-purple, solitary. The calyx is inverted conical, hairy, and has linear-lanceolate bent teeth, much smaller than the corolla. There are no calyx appendages. The corolla is funnel-shaped or bell-shaped, slightly ciliated on the edges and divided into egg-shaped sharp slices up to 1/3. The column sometimes protrudes slightly above the corolla. The capsule opens from the base. Flowering: VI-VIII months, fruiting: VII-IX months.

C. glomerata L., s. I., Sp. Pl.: 166. 1753 — clustered bellflower [4].

Synonyms: *Campanula cervicarioides* Schult., *Campanula elliptica* Schult., *Campanula oblongifolioides* Galushko, *Campanula speciosa* Hornem., *Campanula symphytifolia* (Albov) Kolak., *Campanula trautvetteri* Fed., *Campanula glomerata* subsp. *caucasica* (Trautv.) Ogan., *Campanula glomerata* subsp. *cervicarioides* (Schult.) Arcang., *Campanula glomerata* subsp. *elliptica* (Kit. ex Schult.) Kirschl., *Campanula glomerata* subsp. *hispida* (Witasek) Hayek, *Campanula glomerata* subsp. *oblongifolia* (K. Koch) Fed., (www.emplantbase.org).

A perennial plant has a dense, woody root. The stem is erect, from 20 cm to 1.3 m in height. Basal leaves are long-stalked, ovate-lanceolate or ovate, 6-15 × 2-7 cm, heart-shaped at the base, toothed at the edges and the apex is sharpened. The base of the stem leaves is elliptic, narrowly egg-shaped, 4-10 × 0.7-4 cm., rounded or wedge-shaped or truncated at the base, the edges are toothed, the apex is sharpened. The lower leaves are long-stalked, the upper ones are sessile, narrow and

Т. 9. №11. 2023
https://doi.org/10.33619/2414-2948/96

small. Flowers are sessile, clustered in a panicle, sometimes with additional, simple sessile panicles located in the axils of the lower and middle leaves. The central flower that blooms first is small. The parts of the calyx are square or linear-triangular. The corolla is purple, blue-purple or blue (rarely white), tubular-bell-shaped, 1.5-2.5 cm. The capsule is hemispherical or obovate-conical, about 4.5 mm. The seeds are oblong, compressed, 1-1.5 mm in size. Flowering: VII-VIII-IX months, Fruiting: IX-X months.

C. latifolia L., Sp. Pl.: 165. 1753 — Giant bellflower [3].

Heterotypic synonym: *Campanula megrelica* Manden. et Kuth.

A perennial plant. The root is fibrous, milky and juicy. Stem straight, simple, glabrous or sparsely hairy, height is 1 m. or more. Leaves are bare, sometimes blunt, 7-12 cm in length, 3 cm. in width, it is light in color from the lower part, the edges of the leaf are unevenly double-serrated. Leaves around the stem are ovate-oblong, with long teeth compared to the leaves of the stem; lower stem leaves short-stalked, ovate, acuminate; upper leaves are sessile, relatively narrow and almost completely marginate. The flowers are large, pedunculate, located singly in axils of upper leaves; erect, narrow, forms spike inflorescence. The calyx is completely naked, pear-shaped, large, blackish, with long, sharpened teeth, usually serrated at the edges; noticeably shorter than the large corolla (up to 6 cm long). The corolla is blue, or sometimes almost white, funnel-shaped, with long soft hairs inside. Stamens widened at the base, bearded; the column is slightly shorter than the corolla, with 3 (sometimes 2) stigmas. The capsule is egg-shaped and opens with 3 holes. The seeds are egg-shaped, light yellow in color. Flowering: VI-VII months, Fruiting: VII-VIII months.

Taking into account that most of the collected herbarium specimens belong to the years 1931-1937, it is appropriate to re-collect new herbarium specimens from those areas and it is necessary to study them. Also, the nomenclature changes made as a result of the research conducted in the last decades show that it is important to revise both taxonomically and molecularly the species of the *Campanula* L. subgenus of the *Campanula* L. genus found in the flora of Azerbaijan. For this reason, within the framework of our ongoing research in the near future, it is planned to organize expeditions to the administrative regions included in the Karabakh and Eastern Zangezur and to study of their flora.

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