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The Taxonomic Analysis of the *Astragalus* Species (*Fabaceae* Lind l.) in Flora of Azerbaijan

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Abstract. *The article provides information on the taxonomic composition of species belonging to the genus* Astragalus *(Fabaceae Lindl.) in the flora of Azerbaijan. Based on literature data and our own field studies, for the first time, 143 species belonging to the subgenera* Astragalus *and* Cercidothrix *have been identified in the flora of Azerbaijan. The conducted research has shown that the subgenus* Astragalus *is represented by 80 species within 27 sections, while the subgenus* Cercidothrix *comprises 63 species within 12 sections. Additionally, for the first time, the distribution of species belonging to the subgenera* Astragalus *and* Cercidothrix *across sections has been investigated. It has been determined that the sections* Incani *– 17 species,* Onobrychoidei *– 10,* Malacothrix *– 10,* Caprini *– 9,* Rhacophorus *– 8,* Dissitiflori *– 6,* Ornithopodium *– 5,* Hypoglottidei *– 5,* Adiaspastus *– 5,* Hololeuce *– 4,* Alopecuroidei *– 4, and* Aegacantha *– 4 species, while several other sections are represented by 1–3 species. Based on the analysis of botanical-geographical regions, it has been established that 84 species of the genus* Astragalus *are distributed in the Nakhchivan Autonomous Republic, 56 species in the Greater Caucasus, 45 in the Lesser Caucasus, 31 in the Lankaran region, and 15 in the Kura-Araz lowland. Furthermore, characteristic species for each botanical-geographical region are also indicated in the article.*

Keywords: *taxonomic analysis, subgenus, Astragalus, Cercidothrix, characteristic species*

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Azərbaycan florasında Astragalus növlərinin (Fabaceae Lindl.) taksonomik təhlili

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Xülasə. *Məqalədə Azərbaycan florasında Astragalus (Fabaceae Lindl.) cinsinə aid növlərin taksonomik tərkibi haqqında məlumat verilmişdir. Ədəbiyyat məlumatlarına və şəxsi çöl tədqiqatlarına əsasən tərəfimizdən ilk dəfə olaraq Azərbaycan florasında Astragalus və Cercidothrix yarımcinslərinə aid 143 növünə rast gəlinir. Aparılan tədqiqatlar zamanı məlum olmuşdur ki, Astragalus yarımcinsi 27 seksiya üzrə 80, Cercidothrix yarımcinsi isə 12 seksiya üzrə 63 növlə təmsil olunur.*

Həmçinin, ilk dəfə olaraq tərəfimizdən Astragalus və Cercidothrix yarımcinslərinə daxil olan növlərin seksiyalar üzrə paylanması tədqiq olunmuşdur. Məlum olmuşdur ki, Incani – *17,* Onobrychoidei – *10,* Malacothrix – *10,* Caprini – *9,* Rhacophorus – *8,* Dissitiflori – *6,* Ornithopodium – *5,* Hypoglottidei – *5,* Adiaspastus – *5,* Hololeuce – *4,* Alopecuroidei – *4,* Aegacantha – *4, bir sıra seksiyalar isə 1–3 növlə təmsil olunur. Botaniki-coğrafi rayonların təhlili əsasında müəyyən edilmişdir ki, Astragalus cinsinə aid növlərin 84-ü Naxçıvan Muxtar Respublikası ərazisində, 56-ı Böyük Qafqaz, 45-i Kiçik Qafqaz, 31-i Lənkəran bölgəsində, 15-i isə Kür-Araz ovalığında yayılmışdır. Həmçinin, məqalədə hər bir botaniki-coğrafi rayon üçün xarakterik növlər qeyd olunmuşdur.*

Açar sözlər: *taksonomik təhlil, yarımcins, Astragalus, Cercidothrix, xarakterik növlər*

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Introduction

The genus *Astragalus* is the largest among the genera of flowering plants. According to expert estimates by D. Podlech & Sh. Zarre (2013), *Astragalus* includes at least 2850 species (500 in America; 2350 in the Old World). Within the boundaries of the former USSR, there are 988 species of this genus (Cherepanov, 1995) and 235 in the Caucasus (Sytin, 2009). The data are somewhat outdated, as new species are described every year, and new localities are noted in different regions. The flora of Azerbaijan differs from the flora regions of the world with its rich vegetation and variety, and also attracts the attention of world researchers. The regional distribution, taxonomic composition, bioecological characteristics, etc. of higher plants in the flora of the republic such information can be found in the works of our research scientists. However, the data on the number of *Astragalus* species and their distribution in different regions of Azerbaijan are completely insufficient, with the exception of the territory of Nakhchivan MR (Ganbarov & Ibrahimov, 2015 a; 2015 b; Ganbarov et al., 2015; Ganbarov et al., 2023). A relatively new, but very brief summary of the flora of A.M. Askerov (2016) regarding the genus *Astragalus* does not contain new data.

Methods

The data on the most significant floristic reports for the flora of Azerbaijan are critically summarized: Flora of the Caucasus and Analysis of the flora of the Caucasus (Grossheim, 1936, 1952), Flora of USSR (1946), Flora of Azerbaijan (1954), Vegetation of Azerbaijan (Prilipko, 1970), *Astragalus* of Eastern Europe and the Caucasus (Sytin, 2009). These data are supplemented by new ones, which were established by the authors of the article over the past ten years of floristic research. Field studies were carried out based on the route-stationary method. During expeditions covering various physical-geographical and floristic regions of Azerbaijan, species of the *Astragalus* genus were discovered in natural conditions, samples were collected, and geographical coordinates of each locality were recorded using GPS. Based on the collected materials, the spreading area of each species within Azerbaijan was determined and systematized by regions.

Plant samples were processed according to standard herbarium methods: samples were dried, mounted on herbarium sheets, and stored in appropriate scientific funds. These materials were used as the main basis for subsequent comparative and taxonomic analyses.

Species identification was carried out based on a complex approach - by integrating morphological and molecular-genetic methods. During morphological analysis, the external structure of vegetative and generative organs of plants were studied in detail. Leaf, stem, and root structures were measured, and diagnostic features of flowers and seeds were determined. The results obtained were compared with existing taxonomic keys, classical floristic works, and herbarium funds of the Institute of Botany.

For each species, the region where it occurs within Azerbaijan was established. Thus, the analysis of the regularities of representatives of the genus *Astragalus*, which was first considered by A.A.Grosgeim in 1936, has been reperformed on the basis of updated data. During the research, phenological observations were made and the taxonomic composition was compiled by section, taking into account the areas where the studied species are distributed (Novruzova et al., 2024). All data obtained as a result of the research were systematized, processed using comparative and analytical methods, and summarized based on modern floristic-taxonomic principles.

Results and Discussion

Based on literature data and field studies, 143 species belonging to two subgenera of the *Astragalus* genus of the *Fabaceae* family are distributed in the flora of Azerbaijan. Below the taxonomic composition of those species by section is given (Ganbarov, 2021; Ganbarov et al., 2024). List of sections, subsections, species of the genus *Astragalus* L. (*Fabaceae*) in Azerbaijan. Below are the sections in bold with a number (section numbering is continuous throughout the list); further, for each section, numbered views are given with the indication of the authors (the numbering of views is continuous throughout the list); the most common synonyms are given in parentheses with an indication of the authors); If chromosome numbers are established for species, they are given after the species name (Ganbarov et al., 2023).

Genus: *Astragalus* L. 1753, Sp. Pl.: 24, 755, id. 1754, Gen. Pl. ed. 5: 335.

Lectotypus: *A. christianus* L. (Rydberg, 1905, in Bull. Torrey Bot. Club 32)

1. Subgen. *Astragalus*

Sect. 1. *Astragalus* *(A. sect. Christiani* DC*, A. sect. Christiana* Bunge*, A. sect. Christianopsis* Gontsch**.)** 1. *A. caraganae* Hohen. (*A. nachitschevanicus* Rzazade) 2n = 16.

Sect. 2. ***Galegiformes*** **DC:** 2. *A. galegiformis* L. 2n = 16.

Sect. 3. ***Komaroviella*** **Gontsch.:** 3. *A. alpinus* L. 2n = 16, 32;

Sect. 4. *Oroboidei* A. Gray (sect. *Orobella* Gontsch.): 4. *A. brachytropis* (DC.) C.A. Mey. (*A. norvegkus* Grauer var. *brachytropis* (Steven) Hashimov) 2n = 16, 24.

Sect. 5. *Hypoglottidei* DC. (sect. *Euhypoglottis* Bunge): 5. *A. cicer.*L. 2n = 32, 48, 64; 6. *A. oreades* C.A. Mey.; 7. *A. saganlugensis* Trautv.; 8. *A. supinus* Bunge; 9. *A. klopotovskii* Sosn. (=*A vavilovii* Fedorov et Tamamsch.).

Sect. 6. *Glycyphyllos* Bunge: 10. *A. fraxinifollius* DC; 11. *A. glycyphylloides* DC. 2n = 16; 12. *A. glycyphyllos* L. 2n = 16

Sect. 7. *Erionotus* Bunge: 13. *A dasyanthus* Pall.

Sect. 8. *Caprini* DC. (sect. *Myobroma* Bunge): 14. *A, fabaceus* Bieb. (*A. tumidus* Bieb. nom. illeg. поп Willd. 1794); 15. *A. angustiflorus* C Koch 2n= 16; 16. *A. schemachensis* Karjagin; 17. *A.*

bakuensis Bunge; 18. *A. pinetorum* Boiss. (*A. declinatus* Willd., *A. declinatus* Willd. var. *subglaber* Freyn et Boram., *A. declinatus* Willd. var. *suprahirsutus* Freyn, *A. talyschensis* Bunge) 2n = 16; 19; *A. polyphyllus* Bunge; 20. *A. aegobromus* Boiss. et Hohen. (*A. torrentum* Bunge) 2n = 16; 21.*A. kirpicznikovii* Grossh. 2n=16; 22. *A. pseudoutriger* Grossh. 2n=16.

Sect. 9. *Macrosemium* Bunge: 23. *A. paradoxus* Bunge.

Sect. 10. *Alopecuroidei* DC. (sect *Alopecias* Bunge): 24. *A. megalotropis* C.A. Mey.; 25. *A. macrocephalus* Willd. (*A. finitimus* Bunge, *A. sphaerocephalus* Manden., *A. oloricus* Manden., *A. sphaerocephalus* Manden., *A. johannis* Rzazade) 2n = 16; 26. *A. echinops* Boiss. (*A. regelii* Trautv.); -27. *A. alopecurus* Pall. (*A. maximus* Willd.) 2n = 16;

Sect. 11. ***Melacothrix* Bunge:** 28. *A. podocarpus* C.A. Mey.; 29. A. *macrostachys* DC; 30.*A. eugenii* Grossh 31. *A. elegans* Bunge; 32. *A. kabristanicus* Grossh.; 33. *A. mollis* M. Bieb. *(A. eriocarpus* M. Bieb., *A longibracteatus* Sommier et Levier) 2n = 16; 34. *A. takhtadzhjanii* Grossh. 2n= 16; 35. *A. rzaevii* Grossh.; 36. *A. neoalbanicus* Podlech (*A. albanicus* Grossh.); 37. *A. aznabjurtkus* Grossh.; 38. *A. macrourus* Fisch. et C.A. Mey. (*A. schachbusensis* Rzazade).

Sect. 12. ***Grammocalyx* Bunge:** 39. *A. lineatus* Lara. (*A. sphaerocalyx* Ledeb., *A. grammocalyx* Boiss, et Hohen., *A. gezeldarensis* Grossh.) 2n = 48.

Sect. 13. *Anthylloidei* DC. (sect. *Halicacabus* Bunge): 40. *A. mesites* Boiss. et Buhse; 41. *A. karakuschensis* Gontsch.

Sect. 14. *Macrophyllium* Boiss.: 42. *A. cephalotes* Banks et Sol. (*A. sommieri* Freyn); 43. *A. karjaginii* (Boriss.) Boriss. (*A. barba-caprina* Al. Fed., Fed. et Rzazade); 44. *A. oleaefolius* DC. (*A. lagowskii* Trautv., *A. oleaefolius* subvar. *alexandrii* Sirj.).

Sect. 15. *Aegacantha* Bunge (sect. *Acanthophace* Bunge**):** 45. *A. sahendi* Fisch.; 46. *A. beckerianus* Trautv.; 47. *A. sangesuricus* Boriss.; 48. *A. euoplus* Trautv.

Sect 16. *Adiaspastus* Bunge (sect. *Tragacantha* W.D.J. Koch, nomen illegit., non sect. *Tragacantha* DC. 1825): 49. *A. aureus* Willd. (*A. pseudotragacantha* Pall., *A. sivasicus* Bunge, *A. macropodius* Fisch.; *A. flavirubens* Al. Fed., Fed. et Rzazade) 2n = 16, 32; 50. *A. caucasicus* Pall.; 51. *A. caspicus* M. Bieb. (*A. theodorovianus* Al. Fed. et Rzazade); 52. *A. vedicus* Takht. (*A. karabaghensis* subsp. *vedicus* (Takht.) Takht., *A. polyanthus* subsp. *vedicus* (Takht.) Zarre); 53. *A. karabaghensis* Bunge (*A. araxinus* Lipsky).

Sect. 17. *Rhacophorus* Bunge (sect. *Stenonychium* Bunge; sect. *Microthrix* Sirj.): 54. *A. denudatus* Steven (*A. marschallianus* Fisch.) 2n = 32; 55. *A. meyeri* Boiss.; 56. *A. compactus* Lam. (*A. strictifolius* Boiss., *A. strictifolius* var. *kutepovii* Sirj., *A. insidiosus* (Boriss.) Boriss.); 57. *A. microcephalus* Willd. (*A. pycnophyllus* Steven, *A. andreji* Al. Fed., Fed. et Rzazade, *A. terekensis* Al. Fed., Fed. et Rzazade, *A. carthlicus* Al. Fed., Fed. et Rzazade, *A. gudrathii* Al. Fed., Fed. et Rzazade, *A. atenicus* Ivanisch.). 58. *A. stenonychioides* Podlech, 59. *A. alexeenkoana* Podlech. 60. *A. jucundus* Al. Theod., Fed. & Rzazade; 61. *A. alexeenkoana* Podlech

Sect. 18. *Hymenostegis* Bunge: 62. *A. lagopoides* Lara. (*A. lagurus* Willd.); 63. *A. uraniolimneus* Boiss. 64. *A. persicus* Fisch. & C.A. Mey. ex Bunge

Sect. 19. *Campylanthus* Bunge (sect. *Tricholobus* Bunge): 65. *A. hohenackeri* Boiss.

Sect. 20. *Ankylotus* Bunge: 66. *A. commixtus* Bunge; 67. *A. camptaceras* Bunge 2n = 16.

Sect. 21. *Annotates* DC. (sect. *Harpilobus* Bunge); 68. *A. campylorhynchus* Fisch. et C.A. Mey.; 69. *A. crenatus* Schult. (*A. corrugatus* Bertol.); 70. *A reticulatus* M.Bieb.;

Sect. 22. *Cycloglottis* Bunge: 71. *A. contortuplicatus* L. 2n = 16.

Sect. 23. *Aulacolobus* Bunge: 72. *A. guttatus* Banks et Sol.; 73. *A. onobrychis* L. (*A. striatellus* Pall. ex M. Bieb.) 2n =16.

Sect. 24. *Bucerates* Bunge: 74. *A. hamosus* L**.**

Sect. 25. ***Oxyglottis* Bunge:** 75. *A. oxyglottis* M. Bieb. 2n = 16; 76. *A. ammophilus* Kar. & Kir. 77. *A.psiloglottis* Steven 2n=16

Sect. 26. ***Sesamei* DC:** 78. *A. asterias* Hohen. (*A. cruciatus* Link.) 2n = 16; 79. *A. tribuloides* Delile 2n = 14, 16;

Sect. 27. *Magalocystis* Bunge. 80. *A. szovitsii* Fisch. & C.A. Mey.

2. Subgen. *Cercidothrix* Bunge 1868, Mem. Acad. Sci. Petersb. (Sci. Phys. Math.), ser. 7, 11, 16: 94. Lectotypus: A. incanus L.

Sect. 28. *Uliginosi* Gray (*Euodmus*** Bunge): 81. *A. falcatus* Lam. 2n = 16; 82. *A. odoratus* Lam. 2n = 14, 16.

Sect. 29. *Incani* DC. (sect *Proselius* Bunge**):** 83. *A. monspessulanus* L. 2n = 16; 84. *A. somcheticus* K. Koch (*A. polygala* Pall.) 2n = 16; 85. *A. buschiorum* Galushko *(A. alexandrii* Charadze) 2n = 16; 86. *A. achundovii* Grossh.; 87. *A. orduhadensis* Grossh.; 88. *A. montis-aquillae* Grossh.; 89. *A. sanguinolentus* M. Bieb.; 90. *A. brachycarpus* M. Bieb. 2n = 16; 91. *A. robustus* Bunge (*A. subrobustus* Boriss.) 2n = 32; 92. *A. cuscutae* Bunge; 93. *A. longicuspis* Bunge; 94. *A. prilipkoanus* Grossh.; 95.*A. refractus* CA. Mey.; 96. *A. kazbeki* Charadze 2n = 16; 97. *A. rostratus* C.A. Mey.; 98. *A. zangelanus* Grossh.; 99. *A. latifollus* Lam. (*A. candolleanus* Boiss., *A. choicus* Bunge, *A. heteromorphus* Boriss., *A. fedorovii* Takht., *A. sukaczevii* Derv. et Jelenevsky) 2n = 16;

Sect. 30. *Euhypoglottis* Bunge: 100. *A. brachypetalus* Traurv. 101. *A. kubensis* Grossh.

Sect. 31. *Onobrychoidei* DC. (sect. *Onohychium* Bunge**):** 102. *A. onobrychis* L. (*A. hybridus* S.G. Gmelin, *A. borysthenicus* Klok., *A. troitzkii* Grossh., *A. pseudoonobrychis* auct. non Andrz.; non Grossh.) 2n = 16, 32, 64; 103. *A. bungeanus* Boiss. (*A. perembelicns* Grossh., *A. borissovae* Grossh., *A. kukurttavicus* Prokh.) 2n = 16, 56; 104. *A. sevangensis* Gross. (*A. leonidae* Manden.) 2n = 32; 105. *A. arguricus* Bunge (*A. kozlovskyi* Grossh.) 2n = 16, 32; 106. *A. cancellatus* Bunge (*A. pseudocancellatus* Grossh., *A. darriensis* Grossh., *A. perrarus* Boriss.) 2n = 16, 32; 107. *A. kadshorensis* Bunge; 108. *A. captiosus* Boriss. (*A. interpositus* Boriss., *A. ketzkhovelii* Kharadze, *A. klukhoricus* Sosn.) 2n = 16+2B, 16; 109. *A. shagalensis* Grossh.; 110. *A. goktschaicus* Grossh. (*A. onobrychis* subsp. *goktschaicus* Ponert; *A. atrocarpus* Chamberlain et Mathews; *A. kosmaljanicus* Rzazade) 2n = 40; 111. *A. conspicuus* Boriss. (*A. aduncus* auct. non Willd.) 2n = 16; 112. *A. hajastanus* Grossh. 2n = 16. 33

Sect. 32. *Hololeuce* Bunge: 113. *A. dzhebrailicus* Grossh.; 114. *A. zuvanlicus* Grossh. 115. *A. incertus* Ledeb. 2n= 16, 32; 116. *A. onobrychioides* M. Bieb. (*A. cephalotes* Pall. *A. canescens* DC, *A. subcaulescens* auct. non Royle, non Ledeb., *A. ruprechtii* Bunge, *A. owerinii* Bunge) 2n = 32; 117. *A. elbrusensis* Boiss.118. *A. schuschensis***.** 119. *A. gjunaicus* Grossh.

Sect. 33. ***Ornithopodium* Bunge** 120. *A. ornithopodioides* Lam. (*A. stevenianus* var. *multijugus* Trautv., *A. multijugus* (Trautv.) Grossh., *A. bylowae* Jelenevsky); *A.glochideus* Borris.; 121. *A.*

stevenianus DC. (*A. junceus* Ledeb., *A. davuricus* K. Koch, *A. conrathii* Freyn, *A. virgeus* Boriss., *A. stevenianus* var. *stevenianus* Chamberlain) 2n = 32; 122. *A. kochianus* Sosn.; 123. *A. lunatus* Pall.; 124. *A. shelkovnikovii* Grossh.

Sect. 34. *Synochreati* DC: 125. *A. resupinatus* Bieb. (*A. fragrans* Willd.) 126. *A. levieri* Sommier. et Levier.

Sect. 35. *Dissitiflori* DC. (sect. *Vesicarii* DC, sect. *Xiphidium* Bunge, sect. *Cystodes* Bunge); 127. *A. viridis* Bunge; 128. *A. cornutus* Pall., 129. *A. commits* Pall. (*A. vimineus* Pall.; *A. odessanus* Besser, *A. lussiae* Rzazade) 2n = 48; 130. *A. xiphidium* Bunge (*A. husseinovii* Rzazade, *A. marasiensis* Rzazade); 131. *A. haesitabundus* Lipsky; 132. *A. argyroides* Beck. ex Stapf (*A. novus* Grossh.); 133. *A. sachokianus* Grossh. 134. *A.subulatus* Bieb.

Sect. 36. *Cystium* Bunge (sect. *Paracystium* Gontsch.): 135. *A. biebersteinii* Bunge;

Sect. 37. *Trachycercis* Bunge: 136. *A. humilis* M. Bieb. (*A. humilis* var. *subsericea* Trautv. *A. kikodzeanus* Sosn., *A. theodorii* Grossh., *A. humilis* subsp. *theodori* (Grossh.) Hashimov, *A. vanensis* Sosn., *A. teberdensis* Grossh.) 2n = 64; 137. *A. badamliensis* Chalilov 138. *A. erivanensis* Bornm. et Woronov (*A. pseudohumiiis* Grossh.; *A. chalilovii* Grossh.) 139. *A. barnassari* Grossh.

Sect. 38. *Laguropsis* Bunge: 140. *A. calycinus* M. Bieb. 2n = 16.

Sect. 39. *Ammodendron* Bunge 141. *A. karakugensis* Bunge 2n = 16; 142. *A. hyrcanus* Pall. 2n = 16, 143. *A. igniarius* Pop

Taking into account, the distribution ratio of species belonging to the *Astragalus* genus is given in the table below (Table 1.)

Table 1
Distribution of species in the subgenera Astragalus and Cercidothrix

	Subgenera *Astragalus*	
S/№	**Section**	**Number of species**
1	*Astragalus*	1
2	*Galegiformes*	1
3	*Komaroviella*	1
4	*Oroboidei*	1
5	*Hypoglottidei*	5
6	*Glycyphyllos*	3
7	*Erionotus*	1
8	*Caprini*	9
9	*Macrosemium*	1
10	*Alopecuroidei*	4
11	*Melacothrix*	11
12	*Grammocalyx*	1
13	*Anthylloidei*	2
14	*Macrophyllium*	3
15	*Aegacantha*	4
16	*Adiaspastus*	5
17	*Rhacophorus*	8
18	*Hymenostegis*	3
19	*Campylanthus*	1

20	*Ankylotus*	2
21	*Annulares*	3
22	*Cycloglottis*	1
23	*Aulacolobus*	2
24	*Bucerates*	1
25	*Oxyglottis*	3
26	*Sesamei*	2
27	*Magalocystis*	1
Total	**27**	**80**
	Subgenera *Cercidothrix*	
1	*Uliginosi*	2
2	*İncani*	17
3	*Euhypoglottis*	2
4	*Onobrychoiei*	11
5	*Hololeuce*	7
6	*Ornithopodium*	5
7	*Synochreati*	2
8	*Dissitiflori*	8
9	*Cystium*	1
10	*Trachycercis*	4
11	*Laguropsis*	1
12	*Ammodendron*	3
Total	**12**	**63**

As can be seen from the table, subgenus *Astragalus* is dominantly represented by 80 species in 27 sections. In this section, *Malacothrix* 10, *Caprini* 9, *Rhacophorus* 8, *Hypoglottidei* and *Adiaspastus* 5, *Alopecuroidei* and *Aegacantha* are represented by 4 species, *Glycyphyllos*, *Hymenostegis*, *Annulares*, *Oxyglottis* sections by 3 each, and the rest by 1-2 species. The subgenus *Cercidothrix* includes 63 species in 12 sections, and in this section *Incani* 17, *Onobrychoidei* 10, *Dissitiflori* 6, *Ornithopodium* 5, *Hololeuce* 4, and the remaining sections are represented by 1-3 species. In the flora of Azerbaijan, it is important to study the distribution of species belonging to the genus Astragalus in botanical-geographical regions. Ganbarov D.Ş. in his doctoral dissertation on "Preservation of phytocenological, eco-biological characteristics and gene pool of *Astracantha* and *Astragalus* (*Fabaceae* Lindl.) species distributed in Nakhchivan Autonomous Republic", since the studied species were comprehensively studied, we will continue our further research with other botanical-geographical ones. we consider it expedient to conduct by regions. Therefore, when determining the distribution of the researched species in the flora of the republic, 4 different botanical-geographical regions were taken and a comparative analysis of those regions was studied. The table below shows the distribution of species belonging to the genus *Astragalus* by botanical-geographical regions (Table 2.).

Table 2

The Comparative analysis of species belonging to Astragalus genus by botanical-geographical regions

№	Species	Greater Caucasus	Lesser Caucasus	Kura-Araz Lowland	Lankaran (Talish region)	Nakhchivan AR
1.	*A. caraganae*				+	+
2.	*A. galegiformis*	+		+		
3.	*A. alpinus*	+				+
4.	*A. brachytropis*	+				
5.	*A cicer*	+	+			+
6.	*A. oreades*	+				
7.	*A. saganlugensis*		+			+
8.	*A. supinus*	+				
9.	*A. fraxinifolius*					+
10.	*A. glycyphyttoides*	+	+		+	+
11.	*A. glycyphyllos*	+				+
12.	*A dasyanthus*					+
13.	*A, fabaceus*	+		+		+
14.	*A. angustiflorus*					+
15.	*A. bakuensis*	+				
16.	*A. pinetorum*				+	+
17.	*A. declinatus*	+	+			
18.	*A. polyphyllus*	+				+
19.	*A. aegobromus*					+
20.	*A. torrentum*					+
21.	*A. kirpicznikovii*		+			
22.	*A.pseudoutriger*	+		+	+	
23.	*A. paradoxus*					+
24.	*A. megalotropis*				+	
25.	*A. macrocephalus*	+				+
26.	*A. echinops*					+
27.	*A. alopecurus*		+		+	
28.	*A. podocarpus*				+	
29.	*A. macrostachys*		+			+
30.	*A. eugenii*	+				
31.	*A. elegans*				+	
32.	*A. kabristanicus*	+				
33.	*A. mollis*		+	+		+
34.	*A. takhtadzhjanii*					+
35.	*A. rzaevii*		+			
36.	*A. neoalbanicus*	+				
37.	*A. aznabjurticus*					+
38.	*A. macrourus*				+	+
39.	*A. lineatus*					+
40.	*A. mesites*		+			+
41.	*A. karakuschensis*					+
42.	*A. karjaginii*					+
43.	*A. oleifolius*					+
44.	*A. sahendi*				+	
45.	*A. beckerianus*	+				
46.	*A. zangesuricus*		+			

47.	*A. euoplus*		+			+
48.	*A. aureus*	+	+		+	+
49.	*A. caucasicus*	+				
50.	*A. caspicus*	+			+	
51.	*A. vedicus*					+
52.	*A. karabaghensis*		+			+
53.	*A. denudatus*	+				
54.	*A. meyeri*		+		+	+
55.	*A. compactus*				+	+
56.	*A. microcephalus*	+	+		+	+
57.	*A. stenonychioides*					+
58.	*A. alexeenkoana*					+
59.	*A. jucundus*		+		+	+
60.	*A. lagopoides*					+
61.	*A. uraniolimneus*		+			+
62.	*A. persicus*				+	+
63.	*A. hohenackeri*				+	
64.	*A. commixtus*	+				+
65.	*A. camptoceras*					+
66.	*A.campylorrhynchus*					+
67.	*A. crenatus*	+		+		+
68.	*A reticulatus*			+		+
69.	*A. contortuplicatus*			+		+
70.	*A. guttatus*	+				+
71.	*A.onobrychis*	+		+		+
72.	*A.hamosus*	+	+			+
73.	*A. oxyglottis*	+		+		
74.	*A. ammophilus*	+				+
75.	*A. asterias*	+		+		+
76.	*A. tribuloides*	+		+		+
77.	*A. szovitsii*					+
78.	*A. falcatus*	+	+			+
79.	*A. odoratus*				+	+
80.	*A. monspessulamus*	+				
81.	*A. somcheticus*		+			
82.	*A. buschiorum*	+				
83.	*A. alexandrii*	+				+
84.	*A. achundovii*					+
85.	*A. ordubadensis*		+			+
86.	*A. montis-aquillae*					+
87.	*A. sanguinolentus*	+	+			
88.	*A. brachycarpus*	+		+		
89.	*A. robustus*				+	+
90.	*A. cuscutae*	+				
91.	*A. longicuspis*					+
92.	*A.prilipkoanus*		+			+
93.	*.A. refractus*				+	
94.	*A. kazbeki*	+	+			
95.	*A. rostratus*		+		+	
96.	*A. zangelanus*		+			
97.	*A. latifolius*					+

98.	*A. sukaczevii*		+			
99.	*A. brachypetalus*		+			
100.	*A. kubensis*	+				
101.	*A. bungeanus*	+	+			+
102.	*A. sevangensis*		+			+
103.	*A. arguricus*		+			+
104.	*A. canceltatus*		+			+
105.	*A.kadshorensis*		+			
106.	*A. captiosus*	+				
107.	*A. shagalensis*		+			
108.	*A. goktschaicus*		+		+	+
109.	*A. conspicuus*					+
110.	*A. hajastanus*		+			+
111.	*A. dzhebrailicus*		+			
112.	*A. zuvanticu*				+	
113.	*A. incertus*	+	+			+
114.	*A. onobtychioides*	+				+
115.	*A. elbrusensis*				+	
116.	*A. schuschensis*		+			
117.	*A. gjunaicus*		+			
118.	*A. ornithopodioides*				+	
119.	*A.glochideus*				+	
120.	*A. stevenianus*	+		+		+
121.	*A. kochianus*		+	+		+
122.	*A. lunatus*	+				+
123.	*A. shelkovnikovii*					+
124.	*A.resupinatus*		+		+	+
125.	*A levieri*	+				
126.	*A. viridis*					+
127.	*A. cornutus*					
128.	*A. xiphidium*	+			+	
129.	*A. haesitabundus*	+				
130.	*A. argyroides*					+
131.	*A. sachokianus*	+				
132.	*A.subulatus*		+		+	
133.	*A. biebersteinii*	+				
134.	*A. humilis*	+				
135.	*A. badamliensis*					+
136.	*A. erivanensis*					+
137.	*A. chalilovii*					+
138.	*A.barnassari*				+	
139.	*A. calycinus*		+			+
140.	A.*schernchensis*	+				
141.	*A. hyrcanus*	+				
142.	*A. igniarius*	+		+		
143.	*A. cephalotes*					+
	Total:	**56**	**45**	**15**	**31**	**84**

As seen from Table 2, there are species that are considered characteristic of only one botanical-geographical region, and there are also species that are found in other botanical-geographical regions (Figure 1.).

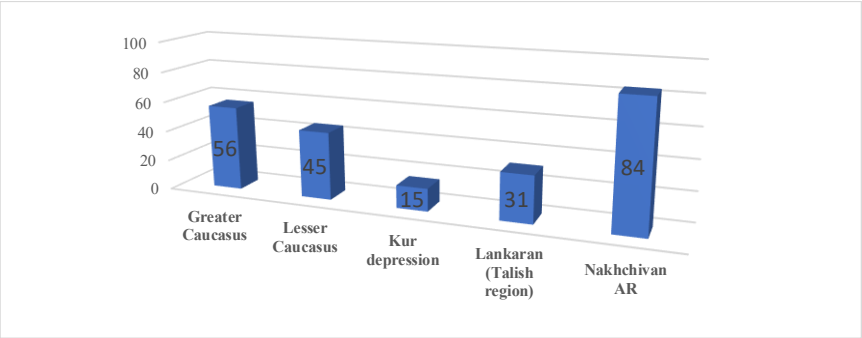

Figure 1
The percentage distribution of species belonging to the genus Astragalus across the regions of Azerbaijan

There are 84 species of the genus *Astragalus* in the flora of the Nakhchivan Autonomous Republic, which makes up 58.74% of the total flora. In the mentioned region, *A. cephalotes, A. paradoxus, A. aznabjurticus, A. karakuschensis, A. shelkovnikovii* A. *viridis*, *A. argyroides, A. longicuspis, A. latifolius* etc. such species are found only in this area. It was found out from the conducted researches that 56 species of the genus *Astragalus* are distributed in the flora of the Greater Caucasus and make up 39.16% of the total flora. In the mentioned region, *A. brachytropis, A. supinus, A. bakuensis, A. eugenii, A. neoalbanicus, A. monspessulamus, A. buschiorum, A. cuscutae, A. kubensis, A. haesitabundus, A. sachokianus, A. humilis , A. hyrcanus*, etc. such species are found only in this area. 31 species of the genus *Astragalus* are distributed in Lankaran (Talysh region), which makes up 21.67% of the total flora. For this region, only A. *megalotropis, A. podocarpus, A. elegans, A. sahendi, A. hohenackeri, A. refractus, A. zuvanticu, A. elbrusensis, A. barnassari*, etc. types are found. It should also be noted that the flora of this region is more similar to the flora of Nakhchivan MR.

15 species of the genus *Astragalus* are found in the flora of the Kura basin and are represented by 10.48% of the studied flora. Only *A. reticulatus* is considered a characteristic species for this area. Another 14 species are also found in the regions mentioned above. In the flora of the Lesser Caucasus, 45 species of the genus *Astragalus* are found, which is 31.46% of the studied flora *A. kirpicznikovii, A. rzaevii, A. brachypetalus, A. bungeanus* and *A. sukaczevii* are considered characteristic species for this area. According to the literature sources, *Astragalus ordubadensis* has been reported from the Ordubad district of the Nakhchivan Autonomous Republic and the Lesser Caucasus region. However, no photographs of this species have been found in any of the published literature (floras). This species was recorded by us for the first time on 13 July 2024 in the phrygana vegetation of the village of Khoshbulag in the Dashkasan district. Herbarium specimens of the species were collected and deposited in the Herbarium collection of the Department of Biology at Nakhchivan State University (Figure 2.).

Figure 2
Astragalus ordubadensis

Thus, the above-mentioned does not fully reflect the distribution of species belonging to the genus *Astragalus* in botanical-geographical regions. In our future studies, it is considered appropriate to conduct complex studies, taking into account the distribution of the studied species in different regions.

Conclusion

1. Furthermore, for the first time, we have investigated the sectional distribution of species belonging to the subgenera *Astragalus* and *Cercidothrix*. The study revealed that these subgenera are represented by various sections, with the highest species counts found in *Incani* (17), *Onobrychoidei* (10), and *Malacothrix* (10), followed by *Caprini* (9), *Rhacophorus* (8), *Dissitiflori* (6), *Ornithopodium* (5), *Hypoglottidei* (5), *Adiaspastus* (5), *Hololeuce* (4), *Alopecuroidei* (4), and *Aegacantha* (4), while several other sections are represented by 1–3 species each.
2. According to the results of the conducted research, *Fabaceae* Lindl in the flora of Azerbaijan. 143 species belonging to two subgenera of the genus *Astragalus* are distributed. It was found that subgenus *Astragalus* is represented by 80 species in 27 sections, and subgenus Cercidothrix is represented by 63 species in 12 sections.
3. Based on the analysis of botanical-geographical regions, it was determined that 84 species of the genus *Astragalus* are found in Nakhchivan MR, 56 species in the Greater Caucasus, 45 in the Lesser Caucasus, 31 in Lankaran (Talish region), and 15 in the Kura plain. Also, characteristic species found in each botanical-geographic region were studied.

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