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NEW PTERIDOPHYTA OF THE NORTH-EASTERN PART OF THE LESSER CAUCASUS

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НОВЫЕ ВИДЫ ПАПОРОТНИКОВ СЕВЕРО-ВОСТОЧНОЙ ЧАСТИ МАЛОГО КАВКАЗА

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Abstract. The article provides information about new Pteridophyta in the North-Eastern part of the Lesser Caucasus. As a result of the development of literature and personal field research materials, Pteridophyta of the North-Eastern part of the Lesser Caucasus are characterized by 3 divisions, 5 classes, 13 families and 39 species of 20 genera. Among these species are *Polypodium interjectum* Shivas., *Polystichum illyricum* (Borb.), *Cystopteris anthriscifolia* Fomin., one species variety *Polystichum aculatum var. aristatum,* one new ecotype *Adiantum capillus-veneris* L., was identified as new for the studied area.

Аннотация. В статье приводятся сведения о новых видах папоротников из северо-восточной части Малого Кавказа. На основании литературных данных и данных собственных исследований папоротники северо-восточной части Малого Кавказа отнесены к 3 отделам, 5 классам, 13 семействами и 39 видам 20 родов. Установлено, что виды *Polypodium interjectum* Shivas., *Polystichum illyricum* (Borb.), *Cystopteris anthriscifolia* Fomin., вариация *Polystichum aculatum var. aristatum,* экотип *Adiantum capillus-veneris* L., являются новыми для территории исследования.

Keywords: new species, herbarium materials, new ecotype, species diversity.

Ключевые слова: новые виды, гербарные материалы, новый экотип, видовое разнообразие.

Introduction

The north-eastern part of the Lesser Caucasus (within Azerbaijan) is one of the richest regions of the Caucasus in terms of biodiversity. There are most types of plants found in Azerbaijan. A number of prominent scientists have conducted research on the formation of flora in the region. According to research, there are more than 12 000 species of ferns (Filicophytina, Polypodiophyta) in the world, especially in the tropical forests of mountainous areas. Paleobotanical studies show that this is a small part of the once widespread Pteridophyta.

The extinction of many large groups of Pteridophyta is associated with climatic, tectonic, and floristic changes in the past geological periods (especially cataclysms in the Devonian, Carboniferous, and Jurassic geological periods). In addition, the main reasons are the expansion of flowering plants, the poor tolerance of ferns to environmental factors compared to flowering plants, and the weak barrier mechanism during the fertilization of germ cells (in natural hybridization).

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Material and methodology

Basic researches in the study of ferns in the North-Eastern part of the Lesser Caucasus were carried out systematically and consistently by months and seasons of 2015–2020, taking into account the relief of the area, soil and vegetation. Taking into account the width of the area, the richness of vegetation and the diversity of ferns spreading zones, the main advantage in conducting field researches was given to the route method. Zonal distribution and botanical–geographical features of the area vegetation were taken into account during the selection of routes. During the study, a herbarium sample was collected and identified during regular expeditions covering the entire North-Eastern part of the Lesser Caucasus (Ganja, Gazakh, Tovuz, Gadabay, Dashkasan, Goy-Gol and Shamkir).

In the designation of the studied ferns, Flora of the Caucasus, Flora of Azerbaijan, A. M. Askerov's Ferns of the Caucasus, A. I. Shmakov's Key of Russian ferns and other works were used [1–9].

Discussion of the research and results

As a result of the development of literature and personal field research materials, the Pteridophyta of the north-eastern part of the Lesser Caucasus is characterized by 3 divisions, 5 classes, 13 families, and 39 species of 20 genera [2].

As a result of the analysis of the collected herbarium and descriptor data, *Polypodium interjectum* Shivas, *Polystichum illyricum* Hahne, *Cystopteris anthriscifolia* Fomin., 1 species variety *Polystichum aristatum* (G. Forst.) C. Presl., 1 new ecotype *Adiantum capillus-veneris* L., were identified as new for the studied area.

Table.

PROPORTION OF PTERIDOPHYTA IN THE NORTH-EASTERN PART OF THE LESSER CAUCASUS BY NUMBER OF FAMILIES, GENERA AND SPECIES

№	Families	Genera		Species	
		Number	According to the total number of genera by %	Number	According to the total number of species by %
1	*Huperziaceae* Rothm	1	5	1	2,56
2	*Selanigellaceae* Vilk.	1	5	1	2,56
3	*Equisetaceae* Rich. ex DC.	1	5	5	2,56
4	*Botrychiaceae* Nakai	1	5	1	2,56
5	*Sinopteridaceae* Koidz	2	10	3	10,25
6	*Adiantaceae* Newm.	1	5	1	2,56
7	*Polypodiacea* Ebercht. et J. Presl	1	5	1	2,56
8	*Dennstaedtiaceae* Pichi Sermolli	1	5	1	2,56
9	*Aspleniaceae* Newm.	3	15	7	17,94
10	*Thelypteridaceae* Pie, Serm.	2	10	2	5,12
11	*Dryopteridaceae* R.-C. Ching.	2	10	10	25,64
12	*Woodsiaceae* (Diels) Herter.	1	5	2	5,12
13	*Athyriaceae* Ching (*Athyriaceae* Alston, nom. Illeg.)	3	15	4	10,25
Total:		*20*	*100*	*39*	*100*

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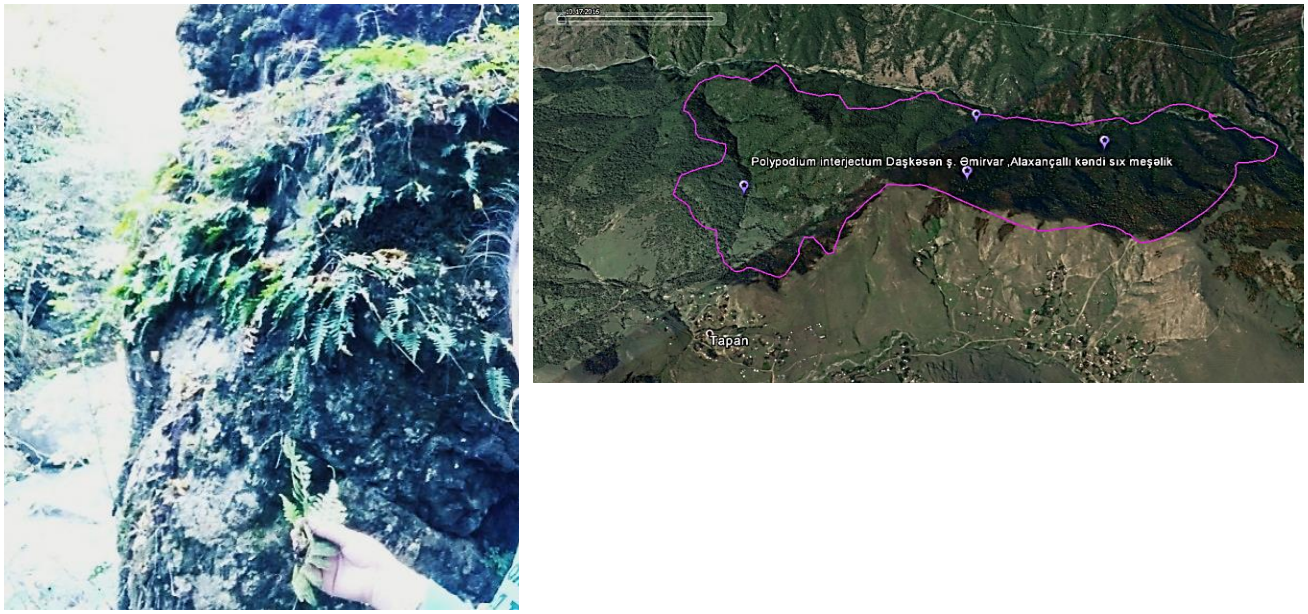

Figure 1. *Polypodium interjectum* Shivas.

Polypodium interjectum Shivas 1961, Journ. Linn. Soc., Bot. 58:29; Valentine, 1964, Fl. Europ. 1:23; A. Beaver. 1974, Fl. European part of the USSR, 1:96; A. Askerov 1977, Bot. journal. 62: 1029.; Kudryashova 2003, Consp. Fl. Kavk. 1: 156. — P. vulgare subsp. prionoides (Aschers.) Rothm. 1929, Mitt. Thür. Bot. Ver., N. F., 38: 106. — *P. vulgare f. prionoides* Aschers. 1896, in Aschers. u. Graebn. Syn. Mitteleurop. Fl. 1:94. — *P. vulgare f. attenuatum* Milde, 1867, Phil. Eur. Atl.: 92; Rzazade 1950, Fl. From. 1:40. — *P. serratum* auct. non South.: Fomin 1934, Fl. USSR, 1: 89 pp. — Intermediate sweet root is a mesophilous forest plant, 20–40 cm tall, spore-forming in July-August, perennial, often found in epiphytic forms. Cover the roots with brown scales. The leaves are oblong-lanceolate, the segments are serrated along the edge. Vascularization is 2–3 layers dichotomous branching. The soruses are oval or elliptical and uncovered. Sporangia ring cells number is 10–20. The spores are leguminous shaped. 2n = 222.

Polypodium interjectum we collected during the first expedition in the Lesser Caucasus on June 24, 2015, from Goygol area, Amirvar village of Dashkesan region and Asrik forest area of Tovuz region (N40°47,462′; E 45°35,636; h 1209 m). It is a new species for the area flora. It is a mesophyte, lithophilic plant of the Euro–Mediterranean area type.

Cystopteris anthriscifolia Fomin 1911, Mater. Fl. Caucasus. 1, 1:15; Fomin 1913, Pterid. Fl. Kavk.: 15. — C. fragilis (L.) Bernh. 1805, Journ. Bot. (Götting.) 1, 2:27, pp.; Kudryashova 2003, Consp. Fl. Kavk. 1: 162. — *C. filix-fragilis* var. anthriscifolia Luerss. Farnpfl. 457, f. 156; Isaev 1950, Fl. From. 1:19. Sivriyarpag q. is a perennial, mesophytic plant, 20–40 cm tall, spore-bearing in July-August, spread in forests and rock crevices. The sorus is arranged in rows on both sides of the veins. The surface of the spores (perisporis) is wrinkled. 2n = 168.

Cystopteris anthriscifolia was collected near the Amirvan village of Dashkesan region, from the Asrik forest of Tovuz region, near the Bayan village of Ganja–Dashkesan highway and around the Khoshbulag and included into the flora as a new species.

Polystichum illyricum (Borb.) Hahne 1904, Allg. Bot. Zeitschr. 10: 103; A. Askerov 1977, Bot. journal. 62: 1027; A. Askerov 2001, Ferns of the Caucasus: 120; Kudryashova 2003, Consp. Fl. Caucasus. 1: 164; A. Asgarov 2016, Azerbaijan. flora: 59. — Aspidium illyricum Borb. 1891, Oest. Zeit. 41: 354. — Illyrian c.

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Figure 2. *Cystopteris anthriscifolia* Fomin in Kusn. & al.Fl.

Is 20–60 cm high and is a transitional species between *P. aculeatum* and *P. lonchitis*, a species of natural hybrid origin. Vails are lanceolate, 30–50 cm long and 4–9 cm wide. The stems are covered with short, grayish, lanceolate scales. The segments are sickle-shaped, the lower ones are triangular, the veins on the leaf are single fork shaped. The sores are located at the tip or middle of the veins. Spores are immature and often sterile. 2n = 123 The sprouting period is July–September.

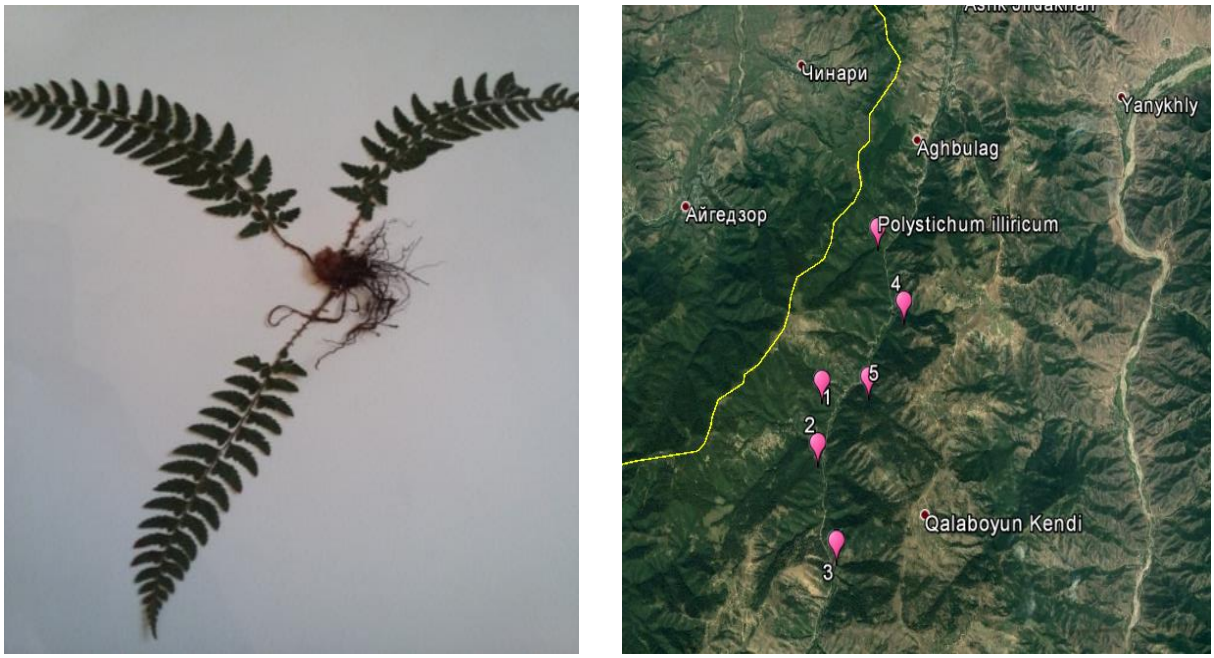

Figure 3. *Polystichum Illyricum.*

Polystichum illyricum was collected from Dashkasan and Tovuz regions during the research.

Adiantum capillus-veneris L. 1753, Sp. Pl.: 1096; Fomin 1913, Pterid. Fl. Caucasus.: 155; Grossg. 1939, Fl. Caucasus, Ed. 2, 1:34, tab. 3; Isaev 1950, Fl. From. 1:38; Takht. 1954, Fl. Arm. 1:27, fig. 9; Dmitry. 1960, Opred. true. Aj.: 19; Ear. 1961, Rast. Kolkh.: 140; Doluh., Mikel. 1971, Fl. Georgia., Publishing house. 2, 1:34; A. Bobr. 1974, Fl. European part of the USSR, 1:94; A.

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Asker. 1977. Bot. journal. 62, 7: 1024; Galushko 1978, Fl. Northern Caucasus. 1:31, figure. 3; Ear. 1980, Fl. Abkh., Publishing house. 2, 1:28, tab. 2. — Venus hair adiant.

The height of the plant is 30 cm, the rhizome is covered with an elongated, narrow black cover. Vaya is an ovoid, usually dark green, soft herbaceous plant. The boards are elongated and wide, alternately arranged, with double or triple feathery sections. The axis is thin, dark brown or dark red with a bright color and is bare. The last row of segments is on a thin woolen stalk and the sides are rounded. The upper edges are serrated. Spores are located transversely at the end of the wings. The soruses are elongated. Spores grow in June-August. It is a moist-lithophilic, mesophytic plant associated with tropical flora of cosmopolitan geographical type. Diploid, 2n = 60.

Figure 4. *Adiantum capillus–veneris.*

Adiantum capillus–veneris was collected twice by us for the first time from the research area in 06.09.2015, a new Alchagboylu–Ganja ecotype of this species was discovered in the vicinity of Amirvar village of Dashkesan region and in the area around the waterfall, among the rocks, together with moss plant (N40°30,594′; E 46°20,494′; h 1086 m). It was collected on 18.04.2018 from a cave, which is an ancient settlement in Dashsalahli village of Aghdam region. It is given by us as a new ecotype for the area flora. This specimen differs from typical Venus hair adiant specimens by its small size and is found in relatively arid habitats.

Figure 5. *P. aculeatum.*

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The *Polystichum aculeatum* var. aristatum (Christ) A. Askerov 1983, Not. sist. georg. (Tbilisi.), 39: 6; A. Asgarov 2016 Azerbaijan. Flora: 60. — *Aspidium lobatum.* aristatum Christ 1891, Schweiz Bot Ges. 1:85. It is a perennial, mesophytic plant, 25–100 cm tall, spore-bearing in July-September, found in shady forests up to the middle mountain range.

P. aculeatum was collected by us from Asrik forest area of Tovuz region during the expedition to the research area on June 24, 2015. N40°47,462′; E 45°35,636′; h 1209 m.

Conclusion

1. As a result of the development of the research materials, *Pteridophyta* of the north-eastern part of the Lesser Caucasus are represented by 3 divisions, 5 classes, 13 families and 39 species of 20 genera. As a result of the analysis of the collected herbarium and descriptor data, there are 3 species *Polypodium interjectum* Shivas, *Polystichum illyricum* (Borb.), *Cystopteris anthriscifolia* Fomin., 1 species variety *Polystichum aculatum* var, which are new to the studied area aristatum., and 1 new ecotype (*Adiantum capillus-veneris* L.,) has been identified.

References

1. Askerov, A. M. (2001). Paporotniki Kavkaza. Baku. (in Russian).
2. Askerov, A. M., & Verdieva, L. N. (2016). The taxonomic composition of Pteridophyta in the northeastern part of the Lesser Caucasus. Baku, 58-65. (in Azerbaijani).
3. Flora Azerbaidzhana (1950-1961). Akad. nauk Azerbaidzh. SSR. In-t botaniki im. V. L. Komarova. Baku. (in Russian).
4. Grossgeim, A. A. (1936). Analiz flory Kavkaza. *Trudy Botanicheskogo instituta AN Azerb. SSR, issue 1*. Baku, 260. (in Russian).
5. Shmakov, A. И. (1999). Key for the ferns of Russia. Barnaul, 107. (in Russian)
6. Askerov, A. M. (1983). Redkie paporotniki Kavkaza i ikh okhrana. *Botanicheskii zhurnal, 68*(6), 836-841. (in Russian).
7. Novruzova, A. M. & Askerov, A. M. (1979). Sravnitel'no-anatomicheskii analiz Aspidievykh i Telipterisovykh paporotnikov Kavkaza. *Doklady AN AzSSR,* (4), 65. (in Russian).
8. Askerov, A. M. (1982). Dva novykh vida paporotnika dlya flory SSSR s Kavkaza. *Doklady AN AzSSR, 38*(9), 57-61. (in Russian).
9. Askerov, A. M., Akchai, U. About the status of certain species of Dryopteris Adans. s. str. in the flora of Azerbaijan. *Turczaninowia, 19*(1), 79-86. (in Russian). https://doi.org/10.14258/turczaninowia.19.1.10

Список литературы:

1. Аскеров А. М. Папоротники Кавказа. Баку: Элм, 2001.
2. Аскеров А. М., Вердиева Л. Н. Таксономический состав Pteridophyta в северо-восточной части Малого Кавказа. Баку, 2016. С. 58-65.
3. Флора Азербайджана. Акад. наук Азербайдж. ССР. Ин-т ботаники им. В. Л. Комарова. Баку: Изд-во Акад. наук АзССР, 1950-1961.
4. Гроссгейм А. А. Анализ флоры Кавказа. Труды Ботанического института АН Азерб. СССР, вып. 1. Баку, 1936. 260 с.
5. Шмаков А. И. (1999). Определитель папоротников России. Барнаул, 1999. 107 с.
6. Аскеров А. М. Редкие папоротники Кавказа и их охрана // Ботанический журнал. 1983. Т. 68. №6. С. 836-841.
7. Новрузова А. М. Аскеров А. М. Сравнительно-анатомический анализ Аспидиевых и Телиптерисовых папоротников Кавказа // Доклады АН АзССР. 1979. №4. С. 65.

Тип лицензии CC: Attribution 4.0 International (CC BY 4.0)

8. Аскеров А. М. Два новых вида папоротника для флоры СССР с Кавказа // Доклады АН АзССР. 1982. Т. 38. №9. С. 57-61.

9. Аскеров А. М., Акчай У. О видовом статусе некоторых щитовников (Dryopteris Adans. s. str.) флоры Азербайджана // Turczaninowia, Т. 19. №1. С. 79-86. https://doi.org/10.14258/turczaninowia.19.1.10

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