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Anasferns Section in the Nakhchivan Autonomous Republic Flora, Their Systematic Composition and Spreading Zones

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Abstract

The article deals with plants of the ferns section that spread in the territory of Nakhichevan Autonomous Republic. It provides information about their systematic composition and spreading zones. There has been noted that 15 species, 11 genus and 6 families are included into the ferns section of the territory. One family, 3 genus and 4 new species out of them have been included into the Nakhichevan Autonomous Republic flora.

Keywords: ferns, familia, genus, species, *Polypodiaceae*, *Aspleniaceae*

1. Introduction

Nakhchivan Autonomous Republic lays in the south-west of the Lesser Caucasus. Zangezur and Dereleyez ranges of the Lesser Caucasus cover the most part of the Autonomous Republic. The ranges extend to the Araz River valley and form the middle and low mountainous terrain branches in the present relief.

The territory of Nakhichevan Autonomous Republic has a rich flora and variety of vegetation. In the first place it is due to the natural conditions of the area and due to the extremely complex geological and geomorphologic structure. In the formation of vegetation the anthropogenic factors have greater role than physical factors. Due to the dry and continental climate of the Autonomous Republic and its verticality and horizontality sharply differs the territory from other regions of Azerbaijan. The territory that covers the border of several botanical - geographical regions includes into the Caucasian, Central Asian and Iranian migration flora. As shown in the biological fiction there have been found 2963 species of higher plants in the territory, which are concentrated in 880 genus and 168 families [3]. Some of these plants are spread over the large areas and formed macrozonality and others spread over small areas and form microcenoses.

Material and Methods

During the floristic expeditions to different zones of the Nakhchivan Autonomous Republic in 2011-2014, the collected plants were studied and made herbarium. At the result of rich and systematic review of the herbarium materials the new families, genus and species were found in the pterido flora of the NAR. The herbariums of all species were included into the ANSA Nakhchivan Department Herbarium Fund and ANSA Botanical Institute Herbarium Fund.

On determining the plants that included into the ferns section there have been used the following fictions: "Flora of Azerbaijan" [7], "Living Plants" [8], A.M. Askerov "Ferns Caucasus" [1], Askerov A.M. "Pteridophyta of Azerbaijan" [2]. On determining the last systematic composition through the lens there have been used the following fiction: Botanical researcher Alan R. Smith - the University of Berkeley, 2006, in addition to the morphological results, a new classification based on molecular studies [11]. On studying the biological and ecological characteristics of the area we used the following fiction: T.H Talibov, A.Sh. Ibrahimov "Taxonomic spectrum of the Nakhichevan Autonomous Republic flora", 2008.

The actuality of the issue: Ferns are one of the most ancient groups of the higher plants and their beginning goes back to the Devon geological period (300 million years BC). More than 12000 species of ferns belonging to 300 genus spread around the world, more and more of their diversity and life forms (biomorfs) cover the areas of tropical countries.

During the floristic expeditions to various regions of the Nakhichevan Autonomous Republic (2011-2013 years) at the result of compiling and determination of systematic review of the rich

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herbarium materials, there have been studied thoroughly the ferns families, genus and species (Polypodiophyta) that spread in the Nakhichevan Autonomous Republic territory. Studying of these plants is very important not only for the NAR, but it is also very important for the researches of florogenetical relations of the whole Caucasus.

The ferns systematics in the flora is mainly determined due to the signs of the Sporophyte generation and the gametophyte generation was almost not taken into account, was very controversial and was changed many times before.

On classification of ferns, some schemes were proposed by outstanding botanists at various times. But their classification hardly confirmed with each other. The modern researchers based on morphological features and accepted the proposed classification.

Botanical researcher of the Berkeley University Alan R. Smith and others, in addition to the morphological results, stated the new classification based on molecular research in 2006. Due to this classification the ferns are divided into 4 classes: *Psilotopsida*; *Equisetopsida*; *Marattiopsida*; *Polypodiopsida* [9].

The ferns known to us have been included into the last class. Finally, the above proposed classification by Petra Korall and others, the changes made in the Cyatheaceae family, the new classification in 2007, as the class, series and the families related to them, all the phylogenetic relations were taken into account.

Experimental Part

According to the fiction there is a class, 2 series, 4 families within the 7 species representing 10 genus of ferns [3]. There was versions that there were the *Ophioglossaceae* R.Br. *Botrychium* Sw. family, which included into the *Botrychium Lunaria* (L.) Swartz's Schrad, Jorun in the - Gapichig mountain, Nakhchivan Autonomous Republic. Also there was a version that Fortnight has been found, but at the result of our research there has not been found such a kind during an expedition to the area. It was included into the taxonomic list according to the information taken from fictions. Black *Asplenium adiantum - nigrum* L. was collected near the village of Tivi, Ordubad Region, *Adiantum capillus - veneris* L. was collected near the villages of Kotam, Kilit, the same region [4]. At the result of the studied ferns herbarium materials collected in the Nakhichevan Autonomous Republic territory that included into Polypodiophyta, a new family that has not been researched in the territory yet- (*Polypodiaceae* Bercht. et J. Presl), 3 new genus (*Athyrium*, *Notholaena*, *Polypodium*) and 4 new species (*Athyrium distentifolium*, *Polystichum aculeatum*, *Notholaena marantae*, *Polypodium vulgare*) have been found [6].

Thus, as a result of researches carried out in the territory of the Nakhchivan Autonomous Republic, there has been fully defined the systematic composition of the Pteridoflora and has been known that there is a class, two series, 6 families and 11 genus of ferns including into 15 species that spread in the area. Ferns systematic spreading in the area is as following:

Kingdom: *Plantae*

Phylum: *Pteridophyta*

Classis: *Pteridopsida*

Ordo: *Polypodiales*

1. Familia: *Polypodiaceae* Bercht. et J. Presl

1. Genus: *Polypodium* L.

1(1) *Polypodium vulgare* L.

2. Familia: *Pteridaceae* Reichenb.

1. Genus: *Cheilanthes* Sw.

2(1) *Cheilanthes persica* (Bory) Mett.

3(2) *Cheilanthes pteridioides* (Reichard) C.Chr.

2. Genus: *Notholaena* R. Br.

4(1) *Notholaena marantae* (L.) Br.

3. Genus: *Adiantum* L.

5(1) *Adiantum capillus - veneris* L.

3. Familia: *Aspleniaceae* Newm.

1. Genus: *Asplenium* L.

6(1) *Asplenium adiantum - nigrum* L.

7(2) *Asplenium septentrionale* (L.) Hoffm.

8(3) *Asplenium trichomanes* L.

2. Genus: *Ceterach* DC.

9(1) *Ceterach officinarum* Willd.

4. Familia: *Woodsiaceae*

1. Genus: *Athyrium* Roth.

10(1) *Athyrium distentifolium* Tausch ex Opiz [*A. alpestre* (Hoppe) Clairv.]

2. Genus: *Cystopteris* Bernh.

11(1) *Cystopteris fragilis* (L.) Bernh.

5. Familia: *Dryopteridaceae* R.- C.Ching (*Aspidaceae* Mett. ex. Frank.)

1. Genus: *Dryopteris* Adans.

12(1) *Dryopteris filix - mas* (L.) Schott.

2. Genus: *Polystichum* Roth, emend. Schott.

13(1) *Polystichum lonchitis* (L.) Roth.

14(2) *Polystichum aculeatum* (L.) Roth [*P. lobatum* (Huds.) Bast.]

Classis: *Psilotopsida*

Ordo: *Ophioglossales*

6. Familia: *Ophioglossaceae* R.Br.

Polypodiaceae Bercht. et J Presl family – There have spread 63 genus of ferns including into 1500 species in the world. They grow mainly in tropical areas and rainforests. One species *Polypodium* L. spread in the Caucasus and in Azerbaijan.

Polypodium L. grow on the trees of the Talish forests (epiphyte shape), in the grass cover of the forests, broad-leaved forests, drought-loving forms grow in the rock fissures. It is a medical herb and has got hybrid origin types and forms. There have been spread 6 species in the former USSR, 4 in the Caucasus and 2 in Azerbaijan. The species recorded in the Nakhchivan Autonomous Republic is only *Polypodium vulgare* L.

Polypodium vulgare L.-General distribution zones: North America, Eurasia, Crimea, the Caucasus, north-western and southern Africa, West Siberia, Asia and the whole Europe.

Distribution zones in Nakhchivan Autonomous Republic: Kotam - Kilit villages of Ordubad region at the foot of the Soyug Mountain, in the forest-bushy area [5, 6, 11].

Pteridaceae Reichenb family spread 50 species which included 950 genus around the globe. 3 genus have spread in the Caucasus and Azerbaijan 2 genus- *Cheilantes* Sw. and *Adiantum* L. were known in the Nakhichevan Autonomous Republic territory. But as a result of the expeditions in 2011, the families of the other sorts were found *Notholaena* in the Nakhchivan Autonomous Republic flora and included as a new sort.

Genus: 130 species of the *Cheilanthes* Sw genus spread over the world as well as in America and Africa's drought zones, in the Mediterranean islands, in Asia and Australia and the Pacific islands mountainous areas. 4 species spread in the former USSR and 2 in the Caucasus Azerbaijan and NAR.

Cheilanthes pteridioides (Reich.) C. Chr.-Total distribution zones: Southern Europe, Southern and Western Iran, Minor Asia, the Caucasus, the Himalayas.

Distribution zones in Azerbaijan: the Great Caucasus, Nakhichevan and Absheron peninsula ^[10].

Spreading zones in the Nakhichevan Autonomous Republic: mountainous areas of low and middle ends of Ordubad region mountains.

Cheilanthes persica (Bory) Mett. ex. Kuhn - spreading zones: Southern Europe, Southern-Eastern Asia, Asia Minor, Crimea, the Caucasus and the Himalayas .

Spreading zones in Azerbaijan: The type was found for the first time by A.A. Qrossheym in the Zuvand territory, also spread in the Lesser Caucasus, the Nakhichevan Autonomous Republic, in the Talysh zone.

Spreading zones in Nakhchivan Autonom Republic: Around the Kilit, Kotam Pazmari villages the Ordubad region, near the Sherur region around the Ardij mountain (Eyvazkhan).

60-70 species of the *Notholaena* R. Br sort are known and mainly spread in the hot and drought areas of the Earth. Only one species is known in the Caucasus and Azerbaijan.

Notholaena marantae (L.) Desv. - Total spreading zones: the Atlantic, Mediterranean, the Caucasus, the Himalayas, East Africa, Europe and the Crimea.

Spreading zones in Azerbaijan the Great Caucasus, Minor Caucasus, Talysh zone, spread to the Nakhichevan Autonomous Republic.

Nakhchivan Autonom Republic spreading zones: In 2011, near the village of Bilav, Gilanchay Ordubad region and noted as a new species for the Autonomous Republic flora ^[6].

About 200 species of *Adiantum* L.-mainly spread in the tropical regions of the globe. The rich number of the species spread zone can be considered tropical and subtropical South America. Also a number of species have spread in Eastern and Southern Asia, South Africa. 2 species spread on the territory of the former USSR and one in the Caucasus, including Azerbaijan and the Nakhichevan Autonomous Republic.

Total spreading zones of the *Adiantum capillus - veneris* L. species: North America, South-East Europe, the Crimea, the Caucasus, Central Asia, the Himalayas, Sri Lanka, Polynesia, Australia, and Africa.

Spreading zones in Azerbaijan: Absheron and Lankaran regions, Ganja and Nakhchivan Autonomous Republic in the mountainous areas of low and medium, wet rocks.

Spreading zones in the Nakhchivan Autonom Republic: The Araz river bank near the Kotam and Kilit villages Ordubad region, in the Baramy and Ul valley, near the Abragunus village of Julfa region.

Aspleniaceae Mett. ex Frank family – there are about 700 species of the family on Earth, which included in 10 genus. 4 species are in Russia, 3 in the Caucasus and Azerbaijan and 2 species are found in the Nakhichevan Autonomous Republic.

700 species of the *Asplenium* L. have spread on the Earth. Lots of species are found in the tropical zones, 30 species and 11 subspecies in Europe, 9 species in the Caucasus, 5 in Azerbaijan, and 3 species are found in the Nakhichevan Autonomous Republic.

Total spreading zones of the *Asplenium septentrionale* (L.) Hoffm species: Europe, Scandinavia, the Himalayas, North America, Western Siberia, Central Asia, Asia Minor, Africa, the Caucasus. Spreading zones in Azerbaijan: the western part of the Greater Caucasus, the Lesser Caucasus, the mountainous areas of the NAR and Lankaran.

Spreading zones in Nakhchivan Autonom Republic: In the forest and bushy areas near the Nurgud Nasirvaz villages of Ordubad.

Total spreading zones of the *Asplenium trichomanes* L. species: Europe, Eurasia, North and South America, Africa, Australia, the Crimea, Central Asia, the Caucasus.

Spreading zones in Azerbaijan: the Great Caucasus, Gobustan, Absheron, Lesser Caucasus, the mountainous and lowland areas of Lankaran, Nakhchivan.

Spreading zones in the Nakhchivan Autonom Republic: Near the village of Abragunus Julfa region, Berdik Mountain, Arajic and Demirli mountains, near the village of Pazmari Ordubad region, Deveboynu, Nabatdag, Gapichig, Garangush, Soyug mountains and the Batabat reservation of the Shakhbuz region.

Asplenium adiantum-nigrum L. - spreading zones are Central Europe, Eurasia, Africa, Crimea, Central Asia, the Caucasus.

The spreading zones in Azerbaijan: the east and west parts of the Greater Caucasus, the Smaller Caucasus, in the mountainous and lowland areas of Lankaran and Nakhchivan.

The spreading zones in Nakhchivan Autonom Republic: the Bichanak village of the Shahbuz region, in Ordubad region near the villages of Tivi and Kilit, Sharur and Sadarak regions around the Ardıcdag and Validagh mountains.

Ceterach Willd. - 4 species are found over mountainous areas of Eurasia and Africa, one species in the Caucasus and Azerbaijan including Nakhchivan Autonomous Republic - *Ceterach officinarum* Willd.

Ceterach officinarum Willd - spreading zones are Central and Southern Europe, the Himalayas, the Crimea, Central Asia, South-West Asia, North Africa, the Caucasus.

The spreading zones in Azerbaijan: the Greater Caucasus, Minor Caucasus, Absheron Peninsula, mountainous areas of Lankaran and Nakhchivan.

The spreading zones in Nakhchivan Autonom Republic: Duzdag territory, Kotam and Kilit villages of the Ordubad Gapijig and cold mountain area, near the village of Ordubad region, Turkish village of the Shahbuz region, around Mount Berdik the Julfa region, around Validagh, Garagush and Xanbulagi territories of Sharur and Sadarak regions.

Woodsiaceae Herter family including 15 genus and 700 species spread on the Earth, 3 species out of them found in Azerbaijan and 2 in the Nakhchivan Autonomous Republic.

Athyrium Roth - the majority of diversity of species found in Asia (China, Japan, India). Fewer species are found in the United States and in Africa, Australia. None of the species is found in Australia.

Athyrium distentifolium Opiz ex Tausch - spreading zones: Central Europe, Scandinavia, the Caucasus, the Urals, Siberia, north-east and south-west Asia, North America, Greenland and Island.

The spreading zones in Azerbaijan: the Greater Caucasus, Minor Caucasus, the Nakhichevan Autonomous Republic.

The spreading zones in the Nakhichevan Autonomous Republic: In 2012 found in the Sarkhanbichen area in the Shakhbuz region forest. This is a new species for the Nakhichevan Autonomous Republic flora ^[6].

Cystopteris Bernh – mainly spread in the mountainous areas of the Earth, a small species consisting of 15 species. Usually small shaped plant and found in stony-rocky areas. In the former USSR found 6 species, in the Caucasus and one in Azerbaijan, including the Nakhichevan Autonomous Republic.

Cystopteris fragilis (L.) Bernh. - Total spreading zones: Scandinavia, Europe, Western and Eastern Siberia, Central Asia, the Far East, the Caucasus.

The spreading zones in Azerbaijan: Almost all areas of the republic.

The spreading zones of the Nakhichevan Autonomous Republic: in the Khazinadara and Paradash areas near the village of Arafsa Julfa region, in the Kola forest, around the Berdik and Ilanlidagh mountains, near the village of Kilit of the Ordubad region and the Kuku village of the Shakhbuz region, in the rocky areas of Zorbulaq Batabat reservation.

Dryopteridaceae R. - C. Ching family – There are nearly 45 families including about 1700 species in the world. 2 species are found in the Caucasus, Azerbaijan, as well as in the territory of the Nakhichevan Autonomous Republic.

Polystichum Roth - species spread in the warm zones of the world, especially in tropical areas. Despite the fact that many species are typical alpine ferns, more diversity is found in south-east Asia and rarely found in the snowy areas. 6 species are found in the Caucasus, 5 in Azerbaijan and 2 species are found in the Nakhchivan Autonom Republic.

Polystichum lonchitis (L.) Roth - spreading zones are Central and Southern Europe, North America, the Crimea, Western and Eastern Siberia, the Far East, Central Asia, the Caucasus.

The spreading zones in the Caucasus: the Greater Caucasus, the Minor Caucasus, the Nakhichevan Autonomous Republic.

The spreading zones in Nakhchivan Autonom Republic: near the Lakatagh village of the Julfa region, around the Abrugunus and Arafsa villages the area called Khazinadara, also the same region.

Polystichum aculeatum (L.) Roth-spreading zones: of South Palearctica, Europe, South-West Asia, Central Asia, the Crimea, the Caucasus and Central Asia. The spreading zones in Azerbaijan: the Apsheron Peninsula, the eastern and western parts of the Greater Caucasus, the Smaller Caucasus, the Lankaran lowland, the Nakhichevan Autonomous Republic.

The spreading zones in Nakhchivan Autonom Republic: in 2012, found near the village of Julfa region Ermammad Piri Abrugunus Dağdağan, in the hawthorn and juniper bushy area- collected as a new kind for the territory.

Dryopteris Adans. - Fern -in the territory of the former USSR found 24 species, 13 species in the Caucasus, and only one in the Nakhichevan Autonomous Republic.

Dryopteris filix-mas (L.) Schott - the spreading zones: Greenland, Scandinavia, Mexico, the Mediterranean, Eurasia, the Caucasus, North America, Island, Western and Eastern Siberia, the Kola Peninsula, Central Asia.

The spreading zones in Azerbaijan: forest and mountainous areas of the Greater and Lesser Caucasus, Lankaran mountainous and lowland areas, mountainous areas of the Nakhichevan Autonomous Republic.

The spreading zones in Nakhchivan Autonom Republic: Shahbuz Batabat forest area, in the skirts of Araji Mont near the village of Arafsa of Julfa region, in the Khazinadere area, Kola forest, from Dumandagh Mountain, Talalar, Palidli, UpperJalilli and Soyug Mountain territories.

Two species of the *Botrychiaceae* Nakai family are found in Azerbaijan and the Nakhichevan Autonomous Republic.

There are about 40 species in the composition of the *Botrychium* Sw. family and mainly found in cold and warm zones. 15 species are found in America, 8 in the former Soviet Union, 2, in the Caucasus and one in Azerbaijan including the Nakhchivan Autonomous Republic. *Botrychium Lunaria* (L.) Sw. - spread in Europe, Western and Northern Asia, Australia, New Zealand, Siberia, the Crimea, in the Himalayas, North and South America, Caucasus.

The spreading zones in Azerbaijan: the Greater Caucasus, the eastern part of the Lesser Caucasus, the mountainous areas of Lankaran, Nakhchivan Autonomous Republic.

The spreading zones in the Nakhichevan Autonomous Republic: According to the fiction collected in the territory of Ordubad Gapichig mount. The area has repeatedly researched by the expeditions of this kind, but there was not found any and according to the fiction materials are included into the list.



Ceterach officinarum Willd.



Cystopteris fragilis (L.) Bernh.



Athyrium distentifolium Tausch ex Opiz



Adiantum capillus – veneris L.

References

1. Askerov A.M. Ferns of Caucasus. Baku: Science, 2001, 244 p. (Written in Russian)
2. Askerov A.M. 1977. Pteridophyta of Azerbaijan. Bot. j., 1977, №7, c. 1022-1030 (Written in Russian)
3. Talibov T., Ibragimov A.Sh. The taxonomic spectrum of the flora of Nakhchivan Autonomous Republic of Nakhchivan: Ajami, 2008, 365 p (Written in Azerbaijan).
4. Talibov T.H. About the new family Adiantaceae flora of Nakhichevan Autonomous Republic (Azerbaijan). Botanical Magazine. Saint - Petersburg, 2001, v. 86, № 6, p. 171-172 (Written in Russian)
5. Talibov T., Novruzov E.S. Species of the departing families Aspleniaceae Newm. and Pteridaceae Reichenb. common in Nakhchivan Autonomous Republic // Herald of Innovative University of Eurasia, 2014, №1, ISSN 1729-536X, p. 148-150 (Written in Russian)
6. T.H. Talibov, E.S. Novruzov A.M. Askerov new families, genera and species of the flora of Nakhchivan Autonomous Republic of Azerbaijan // Proceedings of National Academy of Sciences, Baku: Elm, 2014, Volume 69, number 2, pp. 102-106 (Written in Azerbaijan)
7. Flora of Azerbaijan. Baku: Publishing house. Azerb. SSR, 1950, Volume I, p. 15-45 (Written in Russian)
8. Life of plants. Volume 4, Moscow: Education, 1978 s.148-254 (Written in Russian)
9. Alan R. Smith, Kathleen M. Pryer, Eric Schuettpelz, Petra Korall, Harald Schneider, Paul G. Wolf. A classification for extant ferns. TAXONIMY, 55(33), Avqust, 2006, p.705-731
10. Askarov A.M. Forest Ferns of the Caucasus, Its Systematic and Eco-Geographical Analysis., International Caucasian Forestry Symposium. Artvin-Turkey, 2013, p.258-264
11. Talibov T.H., Novruzova E.S. *Polypodiaceae* Bercht. et Presl as a new familia in the flora of Nakhchivan. Publishing house Education and Science s.r.o. http://www.rusnauka.com/21_SEN_2014/Biologia/4_175_021.doc.htmSection: Sistematic and Geography of higher plants.