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Short communication

New find of vulnerable species *Acorus calamus* L. (Acoraceae) and some other plant species in Northern Armenia

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Abstract. For the first time, a new native species of *Acorus calamus* L. (Acoraceae) is reported for the Lori floristic region in the northern part of the Republic of Armenia. Thickets of sweet flag were discovered in 2020–2021 at four lakes of the Lori Lakes system (Stepanavan-2, Novoseltsevo-1, Novoseltsevo-2, and Saratovka). Previously, this species was known only from the Yerevan floristic region of Armenia. Also, during the work on the Lori lakes, several rare species of Armenian flora were registered: *Nymphaea alba* L., *Carex bohemian* Schreb., *Iris sibirica* L., *Utricularia intermedia* Hayne, and *Nymphoides peltatum* (S.G. Gmel.) Kuntze.

Keywords: sweet flag, Lori lakes, coastal vegetation, Red List, South Caucasus

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Краткое сообщение

Новая находка уязвимого вида *Acorus calamus* L. (Acoraceae) и некоторых других видов растений в Северной Армении

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Аннотация. Впервые для Лорийского флористического района в северной части Республики Армения приводится новый аборигенный вид *Acorus calamus* L. из семейства Acoraceae (Аирные). Заросли аира болотного были обнаружены в 2020–2021 гг. на четырех озерах Лорийской озерной системы: Степанаван-2, Новосельцево-1, Новосельцево-2 и Саратовка. Ранее этот вид был известен только из Ереванского флористического района Армении. Также в ходе работ на Лорийских озерах были встречены несколько других редких видов армянской флоры (*Nymphaea alba* L., *Carex bohémica* Schreb., *Iris sibirica* L., *Utricularia intermedia* Hayne, *Nymphoides peltatum* (S.G. Gmel.) Kuntze).

Ключевые слова: аир болотный, Лорийские озера, прибрежная растительность, Красная книга, Южный Кавказ

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Introduction

In Armenia, *Acorus calamus* was found for the first time by A. Bush and A. Grossheim in 1925 in the vicinity of Parakar settlement, near Yerevan city; this collection is now stored in the Herbarium of A. Takhtajyan Institute of Botany of the National Academy of Sciences of the Republic of Armenia (ERE). Later, *A. calamus* was collected and then stored in ERE near Arevshat village (1948), near Etchmiadzin town (1984), near Tsaghkunk village (1994 and 1995), near Mkhchyan village (1996); also, some specimens were sampled in the Botanical Garden of the Institute of Botany of the NAS RA (1996) in the Section of Living Flora of Armenia (Tamanyan, 2001). All these sampling sites locate within the Yerevan floristic region of Armenia (Barseghyan, 1981; Tamanyan, 2001).

The Lori Lakes (Fig. 1), official name "Lori Plateau Lakes" or "Լոռու հարթավայրի լճեր", are known for the finds of a large number of vulnerable, protected and endemic plants (Tumanyan, 2011). The lakes are considered a key botanical territory (Important Plant Area), meeting the criteria of Aii, Aiv and Cii (Asatryan and Fayvush, 2013), which means that one or more vulnerable plant species (at a regional scale), and/or endemic potentially vulnerable plant species, and regionally vulnerable habitats or vegetation types are found in this area. In accordance with the principles of the Emerald Network of Areas of Special Conservation Interest under Bern Convention, the Lori Lakes location (Lori Lakes) is now assigned as a potential Area of Special Conservation Importance (status of Emerald Network Candidate site) (Fayvush et al., 2016; Updated list..., 2024).

The Lori Lakes system comprises about 30 mesotrophic lakes and wetlands (Fig. 2). These fragile ecosystems are of high regional conservation importance for Armenia and the entire South Caucasus due to the insular nature of the distribution of peatlands and lake systems among the mountainous terrain. The need to create a protected area at the Lori Plateau has been repeatedly emphasized (Fayvush and Aleksanyan, 2016; Fayvush et al., 2011; Freyhof et al., 2015; Tumanyan, 2014). Status of protected area ensures the conservation of freshwater ecosystems, but no legislative decisions have been taken so far. During our studies in 2020–2021, new data were obtained on the representation of threatened flora and fauna species at the Lori Plateau. In this regard, further actions are needed to update this information in the Ministry of Environment of the Republic of Armenia and in the Emerald Network Committee.

Materials and methods

The flora of the Lori Lakes was surveyed in September 2020 and May 2021 using the route method. The largest lakes with open water free from thickets of aquatic vegetation were studied. The plant species were identified using the multi-volume publication "Flora of Armenia" (Flora Armenii, 1954–2009). Individual specimens were herbarized for the collection of the A.L. Takhtajyan Institute of Botany of the National Academy of Sciences of the Republic of Armenia (ERE).

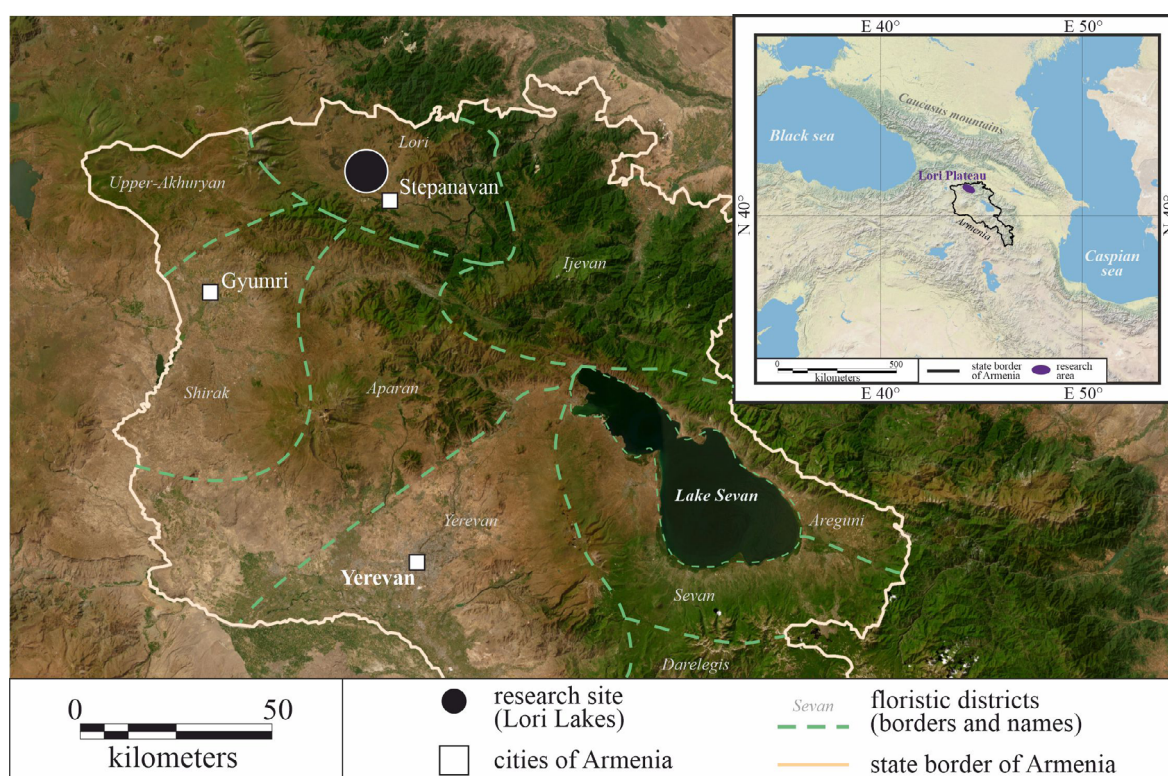


Fig. 1. The location of the research area in Armenia and within the Caucasus.

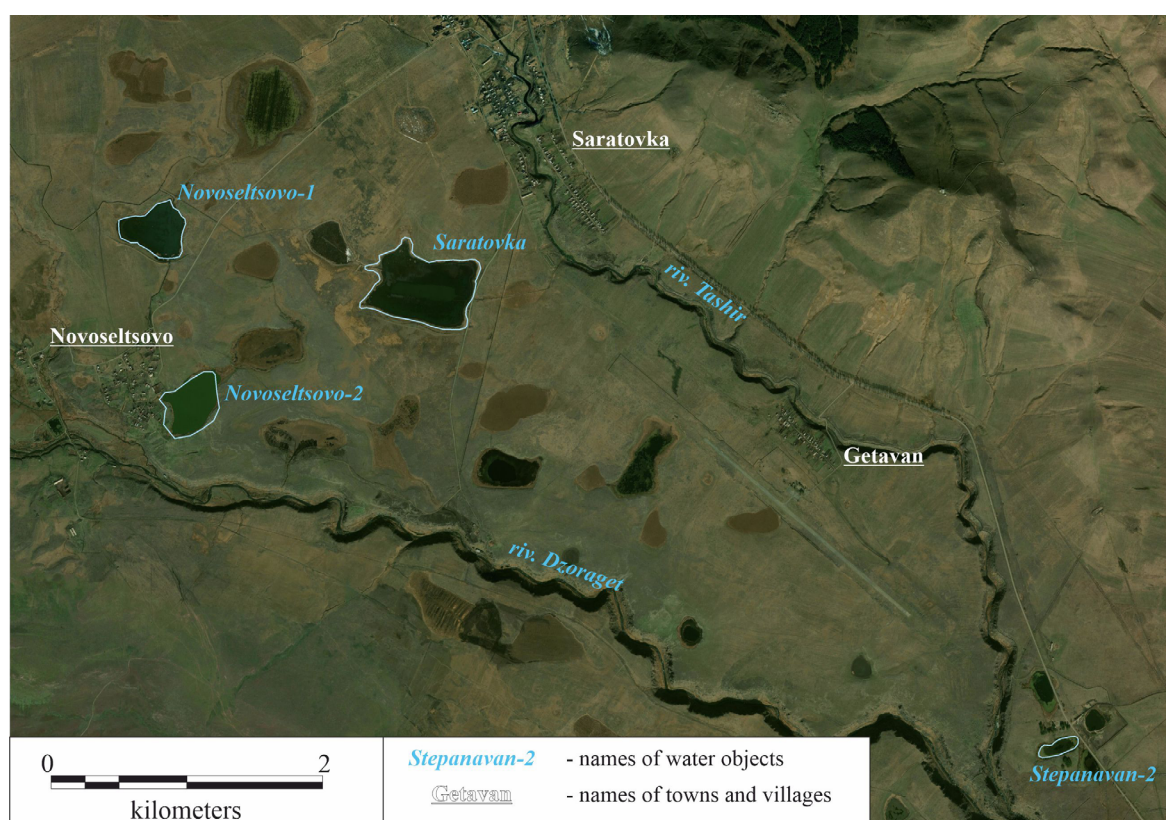


Fig. 2. Schematic map of the Lori Plateau.

Results and discussion

On September 12, 2020, a fairly large clump of *Acorus calamus*, covering about 7 m², was discovered during field studies at the northern shore of Lake Stepanavan-2 (Fig. 3); this species was growing together with that of the genera *Juncus*, *Sparganium*, *Carex*, *Ranunculus*, etc. On the same day, sweet flag was found on the eastern shores of lakes Novoseltsovo-1 and Novoseltsovo-2, near the Novoseltsovo village. In addition, on September 19, 2020, the species was found at the northeastern shore of Lake Saratovka (also known as Torfyanik and Rybkhoz), near the Saratovka village. At these sites, the thicket area was about 2-3 m² at each one. The sampling was repeated on May 22, 2021, on the shore of Lake Stepanavan-2.

Acorus calamus L. finds with reference to ERE herbarium sheets

1) Armenia, Lori Lakes, environs of Stepanavan city, shores of Lake Stepanavan-2, N 41°02'04" E 44°21'36", September 12, 2020, leg. I. Gabrielyan, V. Digalova, A. Ostashov, det. I. Gabrielyan (ERE 200136);

2) Armenia, Lori Lakes, near the village Saratovka, Lake Saratovka-1, N 41°03'56" E 44°18'27", September 19, 2020, leg., det. I. Gabrielyan (ERE 200135);

3) Armenia, Lori Lakes, in vicinity of Novoseltsovo village, Lake Novoseltsovo-1, N 41°04'01" E 044°16'52", September 12, 2020, leg. I. Gabrielyan, V. Ananyan, I. Stepanyan, det. I. Gabrielyan (ERE 200133);

4) Armenia, Lori Lakes, near the village Saratovka, shores of Lake Saratovka-1, N 41°03'56" E 044°18'27", September 19, 2020, leg. I. Gabrielyan, D. Sadokov, det. I. Gabrielyan (ERE 200134);

5) Armenia, Lori Lakes, environs of Stepanavan city, shores of the Lake Stepanavan-2, N 41°02'24" E 044°21'36", May 22, 2021, leg., det. I. Gabrielyan (ERE 200130);

6) Armenia, Lori Lakes, environs of Stepanavan city, shores of the Lake Stepanavan-2, N 41°02'24" E 44°21'19", May 22, 2021, leg., det. I. Gabrielyan (ERE 200131, ERE 200132).

General distribution of the species: Caucasus (Fore-Caucasus; Western, Eastern and Southern Transcaucasia), Europe, Asia (Siberia; North, Southwest and East Asia), and North America (Tsvelev, 2006).

Acorus calamus is a new species for the Lori floristic region of the Republic of Armenia. Previously, it was registered in Armenia only in Yerevan floristic region (Tamanyan, 2001). Sweet flag is included into the Red List of Plants of Armenia (Tamanyan et al., 2010), under the category of "endangered" (EN). New finds of sweet flag in the Lori Lakes are of great importance for improving the measures to protect this species and its habitats in Armenia.

During field studies at the lakes of the Lori Plateau in 2020–2021, other rare and vulnerable plant species were found in addition to *A. calamus*; the most important finds are listed below.

Nymphaea alba L., white water lily, Red List of Plants of Armenia, EN status (Tamanyan et al., 2010), is a species that has had a significant impact on the tourist popularity of the Lori Lakes due to its widespread distribution in these water bodies. *N. alba* has been found at the Lori Lakes since 1920 (Vitek et al., 2013). In addition, individual finds are known from the Lake Arpi basin and the Aparan floristic region. As of 2023, the white water lily forms dense thickets at the lakes Chisty Liman, Konsky Liman and Urasar; it is also found sporadically at other Lori Plateau wetlands (Fig. 4).

Thickets of Bohemian sedge *Carex bohemica* Schreb., Red List of Plants of Armenia, EN status (Tamanyan et al., 2010), were found on the shores of the lakes Long Liman, Chisty Liman and Boloto Sedmoe in 2020. Previously, this sedge species was found in Armenia only at the Lori Plateau in 1962, at the lakes Long Liman and Chisty Liman (Barsegyan, 1981), and in 1991 at the Tsolaki peat bog (Egorova, 2006).



Fig. 3. Sweet flag (*Acorus calamus*), found on the shore of Lake Stepanavan-2: **A** – thicket, **B** – inflorescence, **C** – leaves.



Fig. 4. Specimens of white water lily (*Nymphaea alba*) at Lake Dlinny Liman.

Iris sibirica L., Siberian iris, was noted in May 2021 at the Lake Novoseltsevo-1 (western part of the Lori Plateau). Siberian iris is listed in the Red List of Armenia (VU) (Tamanyan et al., 2010) and in the IUCN Red List (NT) (Khela, 2013). Previously, *I. sibirica* was found in 2018 in the center of the Lori Plateau, between the lakes Saratovka and Chisty Liman (according to publicly available data from GBIF)¹.

Utricularia intermedia Hayne, flatleaf bladderwort, was registered in September 2020 in Lake Konsky Liman (central part of the Lori Plateau), long after the previous finds by A.M. Barseghyan in 1967 in Lake Long Liman of the Lori floristic province (Barseghyan, 1981; Tumanyan, 2014). *U. intermedia* is included in the Red List of Plants of Armenia (EN) (Tamanyan et al., 2010).

Nymphoides peltata (S.G.Gmel.) Kuntze, yellow floating heart, is known only from the Lori floristic region. The latest finds date back to 2011–2012 (Tumanyan, 2014). In 2020–2021, we have found this species again on lakes Stepanavan-1 and Boloto Sedmoe.

¹ Natural History Museum, Vienna (2025). Natural History Museum, Vienna – Herbarium W. Occurrence dataset <https://doi.org/10.15468/5sl7sh> accessed via GBIF.org on 2023-07-17. <https://www.gbif.org/occurrence/2611619777>.

References

- Asatryan, A., Fayvush, G., 2013. Important Plant Areas representing the rare and threatened habitat types of Armenia. The Rufford Foundation, Yerevan, Armenia, 78 p.
- Barsegian, A.M., 1981. Vodno-bolotnaia flora Armenii i ee analiz [Water-marsh vegetation of Armenia and its analysis]. *Flora, rastitel'nost' i rastitel'nye resursy Armianskoi SSR [Flora, vegetation and plant resources of the Armenian SSR]* 8, 53–120. (In Russian).
- Egorova, T.V., 2006. Rod *Carex* L. [Genus *Carex* L.] In: Takhtajyan, A.L. (ed.), *Konspekt flory Kavkaza. T. 2 [Caucasian flora conspectus. Vol. 2]*. St. Petersburg University Press, St. Petersburg, Russia, 214–244. (In Russian).
- Fayvush, G.M., Aleksanyan, A.S., 2016. Mestoobitaniya Armenii [Habitats of Armenia]. Zangak-97, Yerevan, Armenia, 358 p. (In Russian).
- Fayvush, G.M., Baloyan, S.A., Vardanyan, Zh.H., Kalashyan, S.Yu., Tamanyan, K.G., 2011. K voprosu usovershenstvovaniia seti osobo okhraniaemykh prirodnykh territorii Armenii [On improvement of the network of specially protected nature areas in Armenia]. *Takhtajania* 1, 185–189. (In Russian).
- Fayvush, G., Arakelyan, M., Aghababyan, K., Aleksanyan, A., Aslanyan, A. et al., 2016. The “Emerald” Network in the Republic of Armenia. Van Aryan, Yerevan, Armenia, 57 p.
- Flora Armenii. T. 1 [Flora of Armenia. Vol. 1], 1954. Takhajyan, A.L. (ed.). Yerevan, Armenia, 292 p. (In Russian).
- Freyhof, J., Khorozyan, I., Fayvush, G., 2015. Freshwater ecosystems and biodiversity: Atlas of Freshwater Key Biodiversity Areas in Armenia. WWF-Armenia, Yerevan, Armenia, 38 p.
- Khela, S., 2013. *Iris sibirica* (Europe assessment). The IUCN Red List of Threatened Species 2013, e.T203236A2762502. Web page. URL: <https://www.iucnredlist.org/species/203236/2762502> (accessed: 21.02.2025).
- Tamanian, K.G., 2001. Semeistvo Airovye [Family Acoraceae]. In: Takhtajyan, A.L. (ed.), *Flora Artmenii. Tom 10. Monocotyledones (krome Poaceae) [Flora of Armenia. Vol. 10. Monocotyledones (except Poaceae)]*. A.R.G. Gantner Verlag KG, Ruggel, Liechtenstein, 574–576. (In Russian).
- Tamanyan, K., Fayvush, G., Nanagyulyan, S., Danielyan, T., 2010. The Red Book of plants of the Republic of Armenia. Higher plants and fungi. Zangak-97, Yerevan, Armenia, 598 p. (In Armenian).
- Tsvelev, N.N., 2006. Airovye [Acoraceae]. In: Takhtajan, A.L. (ed.), *Konspekt Flory Kavkaza. T. 2 [Caucasian flora conspectus. Vol. 2]*. St. Petersburg University Press, St. Petersburg, Russia, 714–715. (In Russian).
- Tumanyan, A., 2011. O vide *Salvinia natans* (Salviniaceae) v Armenii [About the species *Salvinia natans* (Salviniaceae) in Armenia]. *Takhtajania* 1, 189–190. (In Russian).
- Tumanyan, A., 2014. Rare plant species of the Lori plateau lakes. *Biological Journal of Armenia* 1 (66), 46–53. (In Armenian).
- Updated list of officially nominated candidate Emerald Network sites (December 2024), 2024. *Standing Committee 44th meeting, Convention on the Conservation of European Wildlife and Natural Habitats, Strasbourg, 6 December 2024*. No. T-PVS/PA(2024)18, 16 p.
- Vitek, E., Fayvush, G., Oganessian, M., Tamanyan, K., Ter-Voskanyan, H., Margaryan, K., Tumanyan, A., 2013. *Nymphaea alba* (Nymphaeaceae) in Armenia. *Rostaniha* 14 (1), 43–47. <https://doi.org/10.22092/botany.2013.101315>

Список литературы

- Барсегян, А.М., 1981. Водно-болотная флора Армении и ее анализ. *Флора, растительность и растительные ресурсы Армянской ССР* 8, 53–120.
- Егорова, Т.В., 2006. Род *Carex* L. В: Тахтаджян, А.Л. (ред.), *Конспект флоры Кавказа. Т. 2.* Издательство Санкт-Петербургского Университета, Санкт-Петербург, Россия, 214–244.
- Таманян, К.Г., 2001. Семейство Acoraceae, Аирные, խնկեղեգազգիներ. В: Тахтаджян, А.Л. (ред.), *Флора Армении. Т. 10. Monocotyledones (исключая Poaceae)*. A.R.G. Gantner Verlag KG, Руггелль, Лихтенштейн, 574–576.
- Туманян А., 2011. О виде *Salvinia natans* (Salviniaceae) в Армении. *Тахтаджания* 1, 189–190.
- Файвуш, Г.М., Алексанян, А.С., 2016. Местобитания Армении. Зангак-97, Ереван, Армения, 358 с.
- Файвуш, Г.М., Балоян, С.А., Варданян, Ж.А., Калашян, М.Ю., Таманян, К.Г., 2011. К вопросу усовершенствования сети особо охраняемых природных территорий Армении. *Тахтаджания* 1, 185–189.
- Флора Армении. Т. 1, 1954. Тахтаджян, А.Л. (ред.). Ереван, АрмССР, 292 с.
- Цвелёв, Н.Н., 2006. Acoraceae С.А. Agardh – Аиrowые. В: Тахтаджян, А.Л. (ред.), *Конспект флоры Кавказа. Т. 2.* Издательство Санкт-Петербургского Университета, Санкт-Петербург, Россия, 714–715.
- Asatryan, A., Fayvush, G., 2013. Important Plant Areas representing the rare and threatened habitat types of Armenia. The Rufford Foundation, Yerevan, Armenia, 78 p.
- Fayvush, G., Arakelyan, M., Aghababayan, K., Aleksanyan, A., Aslanyan, A. et al., 2016. The “Emerald” Network in the Republic of Armenia. Van Aryan, Yerevan, Armenia, 57 p.
- Freyhof, J., Khorozyan, I., Fayvush, G., 2015. Freshwater ecosystems and biodiversity: Atlas of Freshwater Key Biodiversity Areas in Armenia. WWF-Armenia, Yerevan, Armenia, 38 p.
- Khela, S., 2013. *Iris sibirica* (Europe assessment). The IUCN Red List of Threatened Species 2013, e.T203236A2762502. Интернет-ресурс. URL: <https://www.iucnredlist.org/species/203236/2762502> (дата обращения: 21.02.2025).
- Tamanyan, K., Fayvush, G., Nanagyulyan, S., Danielyan, T., 2010. The Red Book of plants of the Republic of Armenia. Higher plants and fungi. Zangak-97, Yerevan, Armenia, 598 p. (In Armenian).
- Tumanyan, A., 2014. Rare plant species of the Lori plateau lakes. *Biological Journal of Armenia* 1 (66), 46–53. (In Armenian).
- Updated list of officially nominated candidate Emerald Network sites (December 2024), 2024. *Standing Committee 44th meeting, Convention on the Conservation of European Wildlife and Natural Habitats, Strasbourg, 6 December 2024.* No. T-PVS/PA(2024)18, 16 p.
- Vitek, E., Fayvush, G., Oganessian, M., Tamanyan, K., Ter-Voskanyan, H., Margaryan, K., Tumanyan, A., 2013. *Nymphaea alba* (Nymphaeaceae) in Armenia. *Rostaniha* 14 (1), 43–47. <https://doi.org/10.22092/botany.2013.101315>