

TAXONOMICAL AND CHOROLOGICAL NOTES 19 (195–199)

Andrea AKÁC¹, Krisztina BUCZKÓ², Balázs CSER¹, Edit FARKAS³,
László LÖKÖS², Csaba MOLNÁR⁴, Csilla STENGER-KOVÁCS^{5,6},
Péter SZÜCS⁷ and Nóra VARGA²

¹Government Office of Pest County, H-1052 Budapest, Városház utca 7, Hungary;
akcand@gmail.com, balazs.cser@gmail.com

²Hungarian National Museum Collection Centre, Budapest, Hungarian Natural History Museum,
Department of Botany, H-1431 Budapest, Pf. 137, Hungary; buczko.krisztina@nhmus.hu,
lokos.laszlo@nhmus.hu, varga.nora@nhmus.hu

³Institute of Ecology and Botany, Centre for Ecological Research,
H-2163 Vácrátót, Alkotmány u. 2–4, Hungary; farkas.edit@ecolres.hu

⁴H-3728 Gömörzölös, Kassai u. 34, Hungary; birkaporkolt@yahoo.co.uk

⁵Center for Natural Science, University of Pannonia, Research Group of Limnology,
H-8200 Veszprém, Egyetem u. 10, Hungary; stenger.kovacs@almos.uni-pannon.hu

⁶HUN-REN-PE Limnology Research Group, H-8200 Veszprém, Egyetem u. 10, Hungary

⁷Department of Botany and Plant Physiology, Eszterházy Károly Catholic University,
H-3300 Eger, Leányka út 6/D, Hungary; szucs.peter@uni-eszterhazy.hu

Akác, A., Buczko, K., Cser, B., Farkas, E., Lökös, L., Molnár, Cs., Stenger-Kovács, Cs., Szűcs, P. & Varga, N. (2024): Taxonomical and chorological notes 19 (195–199). – *Studia bot. hung.* 55(1): 169–180.

Abstract: Floristical records of five cryptogamic plants (algae, lichen-forming fungi, bryophytes and pteridophytes) are reported from Hungary, i.e. the fifth records of the rare lichen-species *Hypotrachyna revoluta* and *Parmelia submontana*, the fourth occurrences of the spreading alga *Surirella tientsinensis* and the very rare bryophyte *Sciuro-hypnum reflexum*, as well as a new Hungarian locality of the pteridophyte species *Polystichum ×bicknellii*.

Key words: algae, bryophytes, lichen-forming fungi, Hungary

INTRODUCTION

This paper is the 19th part of the series launched in *Studia botanica hungarica* focusing on the new chorological records, nomenclature, and taxonomy of plant species from algae to vascular plants and fungi (ASZALÓSNÉ BALOGH *et al.* 2021, BARINA *et al.* 2015, 2020, BAUER *et al.* 2023, CSIKY *et al.* 2017, DEME *et al.* 2019, FARKAS *et al.* 2022, KIRÁLY *et al.* 2019a, b, MATUS *et al.* 2018, MESTERHÁZY *et al.* 2017, PAPP *et al.* 2016, 2020, RIGÓ *et al.* 2023, SCHMIDT 2020, SCHMIDT *et al.* 2018, SÜVEGES *et al.* 2021, TAKÁCS *et al.* 2016).

The present part of the series provides new records of 5 species, among them 1 alga, 2 lichen-forming fungi, 1 bryophyte and 1 pteridophyte species. The fourth

Hungarian occurrence of the invasive alga species *Surirella tientsinensis* confirms the idea that the species is spreading. The fifth locality of the rare lichen-forming fungi *Hypotrachyna revoluta* and *Parmelia submontana* was registered in the Barcsi-ősbörökás nature reserve (S Hungary) where they grew together on the bark of the same *Betula pendula* trunk. The fourth occurrence of the very rare bryophyte species, *Sciuro-hypnum reflexum* is reported here from the forest “Nagyerdő” in Debrecen (NE Hungary). A new record of the pteridophyte *Polystichum × bicknellii* (from Kiskunfélegyháza) and its Hungarian distribution is also presented.

MATERIAL AND METHODS

The AlgaeBase (GUIRY and GUIRY 2024) was checked and followed for the nomenclature and taxonomy of Bacillariophyceae; CABI (2024) and MycoBank (ROBERT *et al.* 2018) for lichen-forming fungi, and the World flora online (WFO 2024) database for bryophytes and pteridophytes. Codes of the Central European Flora Mapping grid are in square brackets. Abbreviations of herbaria follow THIERS (2017).

Distribution maps were prepared by QGIS 3.36 (QGIS Development Team 2024) based on the Central European grid system of 5 km × 6 km units (BORHIDI 1984, NIKLFELD 1971).

NEW RECORDS WITH ANNOTATIONS

Algae, Bacillariophyta, Ochrophyta

(195) *Surirella tientsinensis* Skvortzov (Surirellaceae, Bacillariophyceae) (Fig. 1)

Hungary, Pest County, Visegrád Mts, Apát-kúti-patak, above Visegrád. Lat.: 47.77318094° N; Long.: 18.98446913° E; Alt.: ca 180 m a.s.l. Leg.: Akác, A., Cser, B., 03.08.2023, det.: Buczkó, K.

Surirella tientsinensis Skvortzov, in Skvortzov 1927: 107, fig. 24 (emend. Liu) was found in the frame of biomonitoring of Nitrates Directive by Pest County Government Agency, labelled as No 979, and deposited in the Collection of Algae, Hungarian National Museum Public Collection Centre, Budapest – Hungarian Natural History Museum as HNHM-ALG-D-2024/51.

Cocconeis euglypta Ehrenberg and *C. euglyptoides* (Geitler) Lange-Bertalot were the dominant taxa in the sample, while *C. pediculus* Ehrenberg, *Gomphonema minutum* C. Agardh, *Nitzschia amphibia* Grunow, *N. paleaceae* Grunow, *Planothidium frequentissimum* Lange-Bertalot, *P. lanceolatum* (Brébisson ex Kützing) Lange-Bertalot, *Rhoicosphania abbreviata* (C. Agardh) Lange-Bertalot were sporadically detected. The relative abundance of *Surirella tientsinensis* was less than 1%.

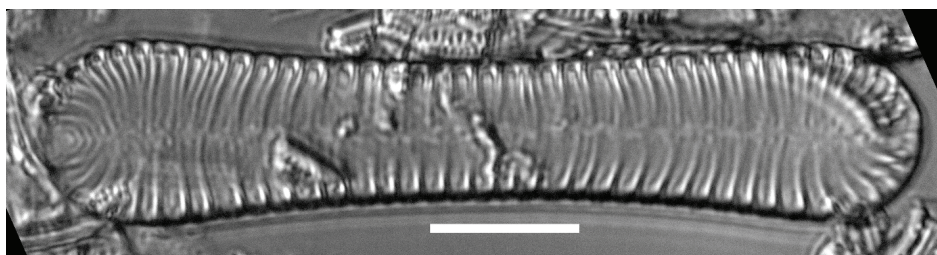


Fig. 1. *Surirella tientsinensis* from Apát-kúti-patak above Visegrád collected on 3 August, 2023. Light microscope. Scale bar is 10 mm.

Regarding the previous Hungarian data of the taxon, in 2021, *Surirella tientsinensis* appeared in the Danube, and in 2022 it was also found in the rivers Mureş and Tisza (BUCZKÓ *et al.* 2023). Due to its characteristic appearance, *Surirella tientsinensis* was plausibly new to the Carpathian region at that time. The taxon, described in 1927 by Skvortzov from Tientsin Province (Tianjin) in Northern China (SKVORTZOV 1927), was considered endemic to Asia by several authors. Later, its presence was detected in Arctic lakes. At the end of the 20th century, occurrence records were reported from Central Japan and from Ukraine. Overall, however, *Surirella tientsinensis* is still known as a rare species. Its appearance in Hungary and the fact that it was found in three rivers within two years, and the recent appearance in a brooklet indicate that the species is spreading. Although algae, including diatoms, are considered cosmopolitan, broadly distributed organisms, it is clear that the patterns of communities and the biogeography of species are definite and well defined. The study of invasive species in rapidly changing living spaces is justified and necessary.

K. Buczkó, A. Akác, B. Cser, Cs. Stenger-Kovács

Lichen-forming fungi

(196) *Hypotrachyna revoluta* (Flörke) Hale (Parmeliaceae, Lecanorales) (Fig. 2)

Hungary, Somogy County, Duna–Drava National Park, Darány, Barcsi-ősbörökás, Nagy-berek, eastern part of “Totyogó”, on bark (*Quercus*). Alt.: ca 130 m a.s.l. Coll.: Lőkös, L., 12.06.1996 [BP 98144] [0071.1]. – Hungary, Somogy County, Duna–Drava National Park, Darány, Barcsi-ősbörökás, Nagy-berek, on bark (*Betula*). Lat.: 45.993194° N; Long.: 17.554225° E; Alt.: ca 130 m a.s.l. Coll.: Lőkös, L. (GPS 951), 11.08.2022 [BP 98145] [0071.1].

Hypotrachyna revoluta is one of the small size foliose lichen species of the family Parmeliaceae (0.5–1.5 cm in diam., in Hungarian specimens, Fig. 2). It is rather inconspicuous, easy to be overlooked in the field. Although it has characteristic, often revolute lobe formation and farinose, pustulate soralia at the end zone of lobes, it can be recognised among the grey epiphytic lichen thalli by

trained eyes only. No apothecia are present in the Hungarian specimens. Thalli contain mainly atranorin and gyrophoric acid (with K⁺ yellow (thallus) and C⁺ red (medulla) spot reactions).

It is widely distributed on bark, usually in montane forests in natural habitats, however relatively rare. Formerly it was regarded as an oceanic-suboceanic species (ALMBORN 1942, DEGELIUS 1937), but later occurrence records from different habitats have changed this view (FRITZ and HULTENGREN 1998, VONDRÁK and LIŠKA 2010). First it had been reported mainly from *Alnus*, but then it was recorded also from a wide range of host tree species: *Abies*, *Acer platanoides*, *Alnus glutinosa*, *Betula*, *Corylus avellana*, *Fagus sylvatica*, *Fraxinus excelsior*, *Picea abies*, *Pinus sylvestris*, *Prunus domestica*, *Prunus padus*, *Quercus*, *Salix*, *Sorbus aucuparia*, *Tilia* (FRITZ and HULTENGREN 1998, VONDRÁK and LIŠKA 2010).

In Hungary it was published at first from the Hortobágy National Park (VERSEGHY 1982), and two years later from the Bükk Mts (ASZTALOS *et al.* 1984), from *Quercus* in both localities. Unfortunately, voucher specimens are not available for these literature records. Göran Thor found a further locality at the “Barcsi-ösborókás” in southern Hungary in 1987 (THOR 1988), confirming it by a voucher specimen in the Swedish Museum of Natural History, Stockholm (S)



Fig. 2. *Hypotrachyna revoluta* growing on the bark of *Betula pendula* in the Barcsi-ösborókás Nature Reserve in Hungary.

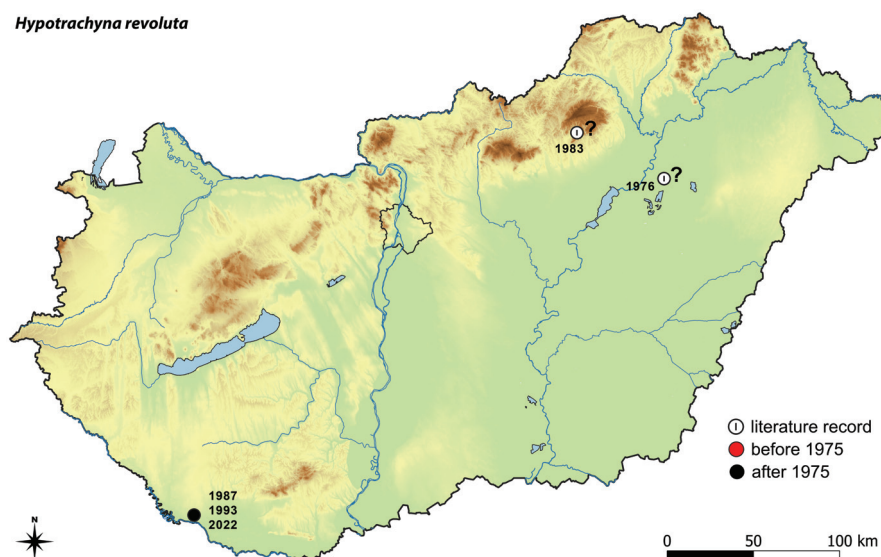
Hypotrachyna revoluta

Fig. 3. Known occurrences of *Hypotrachyna revoluta* in Hungary.

[“Hungary, Somogy prov., Barcs area, Barcsi ősbörökás (10 km ENE of Barcs). Alt. c. 150 m. *Carex elongatum*-*Alnus glutinosa* fen, on *Alnus glutinosa*. Leg.: Göran Thor (7287), 02.06.1987, (S L65781)”].

In addition to an older record from the Barcsi-ősbörökás (1996), another recent occurrence was recognised from the same area (Fig. 3). Thalli of *Hypotrachyna revoluta* grew together with *Parmelia submontana* on the bark of *Betula pendula*. This finding confirms that the population still exists in the Barcsi-ősbörökás (since 1987).

E. Farkas, L. Lőkös, N. Varga

(197) *Parmelia submontana* Hale (Parmeliaceae, Lecanorales)

Hungary, Somogy County, Duna–Drava National Park, Darány, Barcsi-ősbörökás, Nagyberek, on bark (*Betula*). Lat.: 45.993194° N; Long.: 17.554225° E; Alt.: ca 130 m a.s.l. Coll.: Lőkös, L. (GPS 951), 11.08.2022 [BP 98146] [0071.1].

All the Hungarian locality records (2 new and 2 old) of the Mediterranean–Southern European montane lichen species, *Parmelia submontana* have already been reported recently (PAPP *et al.* 2020), discussing also the diagnostic features of the species. These specimens were collected from *Fagus sylvatica*, *Fraxinus ornus*, and *Quercus petraea* in montane habitats, however a fifth specimen was found on the bark of *Betula pendula* in a lowland habitat (! at 130 m a.s.l.) in southern Hungary, where it grew together with *Hypotrachyna revoluta* (Fig. 4). Although the old Osztra-tető (Bükk Mts) record (being revised as *Parmelina tiliacea* in EGR) was

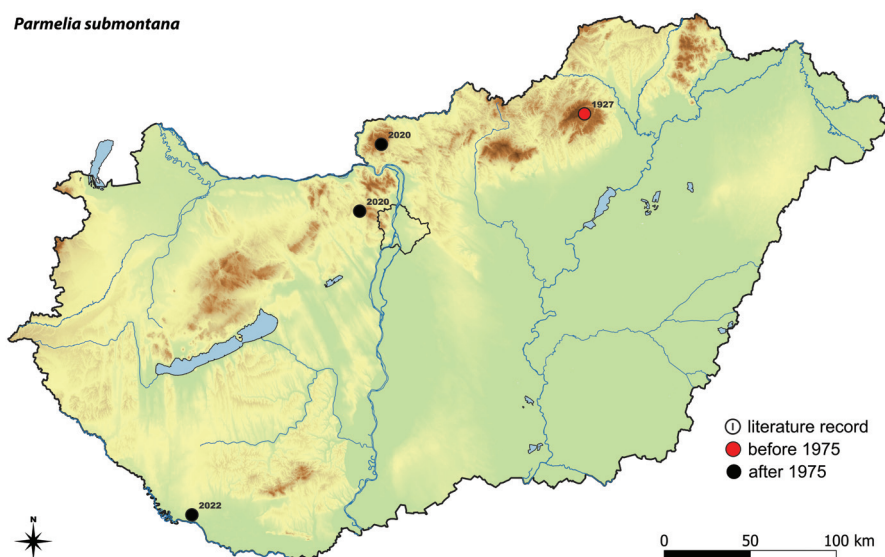
Parmelia submontana

Fig. 4. Distribution of *Parmelia submontana* in Hungary.

mistakenly published (see PAPP *et al.* 2020), the new occurrence also suggests that *P. submontana* is spreading in Hungary, probably due to global climate changes.

E. Farkas, L. Lőkös, N. Varga

Bryophytes

(198) *Sciuro-hypnum reflexum* (Starke) Ignatov et Huttunen (Brachytheciaceae, Hypnales) (syn: *Brachythecium reflexum* (Starke) Schimp.)

Hungary, Hajdú-Bihar County, Debrecen city, Nagyerdő, *Quercus* forest, on bark of old *Q. robur* (diameter: 50 cm), with *Metzgeria furcata*. Lat.: 47.5875105° N, Long.: 21.6471402° E, Alt.: ca 153 m a.s.l., leg. and det: P. Szűcs, 15.09.2023 [EGR]; conf. P. Erzberger, [8495.2].

The “Nagyerdő” forest is situated on the edge of Debrecen city in NE Hungary. The bryophyte flora of this old *Quercus* forest is well known, firstly Lajos Felföldy published several bryophyte data from the territory (FELFÖLDY 1941) and most recently Sándor Orbán investigated the forest stand, and published some new bryophyte records from the area (ORBÁN 2012).

BOROS (1968) and ORBÁN and VAJDA (1983) mentioned this moss only from the Zemplén Mts, Börzsöny Mts, Visegrád Mts, and Bakonyalja geographical regions, but BOROS’s handbook (1953) mentioned the data of *Sciuro-hypnum reflexum* from Debrecen as doubtful.

Three recent localities are known from Hungary based on the Hungarian Bryophyte Mapping Project (P. Erzberger, pers. comm.): Zemplén Mts, Regéc,

Nagy-Péter-Ménkö, andesite rock, 2004, leg. B. Papp (BP BR 174880) [7594.3]; Kőszeg Hills, Hármaspatak Valley, 2016, leg. P. Erzberger, K. Baráth, A. Mesterházy [8664.2]; Vendvidék, Szentgotthárd, Zsida Creek, 2014, leg. Cs. Németh, P. Erzberger (B-Erzberger 18622) [9063.4].

Sciuro-hypnum reflexum is very rare in Hungary (ERZBERGER 2021), the occurrence reported here is the fourth in the country.

P. Szűcs

Pteridophytes

(199) *Polystichum* × *bicknellii* Hahne (Dryopteridaceae, Polypodiales) (Figs 5–6) (*P. aculeatum* (L.) Roth × *P. setiferum* (Forsskal) Woyнар)

Hungary, Kiskunfélegyháza, railway station, 46.7059° N, 19.8355° E [9285.3]; leg.: Cs. Molnár; det. Cs. Molnár, J. Csiky (based on photo), 03.01.2023 [HNHM-TRA 00027633].

The specimen of this special shield-fern was found on a half-metre-high brick wall of the railway loading docks at the Kiskunfélegyháza railway station in January 2023. It has intermediate features between *Polystichum aculeatum* and *P. setiferum*. In the case of *P. setiferum* the stem is strongly fimbriated, the pinnales are distinctly separated, pedunculated, their plate does not extend onto the peduncle (not decurrent), and the lower pinnae are almost as long as the middle ones. On the other hand, *P. aculeatum* has darker-coloured, rigid and winter-resistant leaves (I observed the plant in the middle of winter), and the pinnae are at an acute angle to the rachis. According to János Csiky: “It is evident that the angle formed by the primary veins of the basal pairs of pinnales along the rachis is a distinctive feature of *P. setiferum*. However, the leaf blades are narrower and the aristate tips are relatively longer on the teeth than in the case of *P. setiferum*”. Unfortunately, sori are not present on the leaves of our specimen. The lack of sori may be due to the too young age of the specimen, or to the relatively high level of drought, which is common in urban habitats. Without spores the identification could be carried out only by the morphological features of the leaves.

The locality was discovered by Győző Haszonits, who found there *Polystichum aculeatum*, *Dryopteris filix-mas*, and *Asplenium trichomanes* specimens in 2019 (DEME *et al.* 2019, HASZONITS *et al.* 2021). Visiting the same locality again on 19 May 2023 I also found *Thelypteris palustris* in addition to the above-mentioned three species, but the *Polystichum* × *bicknellii* specimen has already disappeared, presumably dried out. *Asplenium trichomanes* was identified as subsp. *quadrivalens* based on the work of CSIKY *et al.* (2023).

Several *Polystichum* specimens deposited in the Pteridological Collection of the Botanical Department, Hungarian Natural History Museum [BP] were revised by L. Somlyay as *Polystichum* “cf.” × *bicknellii*, since his revisions were based

on morphological features only, without checking the spores. One specimen was collected at the border of Fejér and Tolna counties near Vajta and Kistápé (S. Jávorka and B. Zólyomi 1939, originally named as *P. setiferum*, revid.: L. Somlyay 2023). More specimens from the Bakony Mts: Bakonybél (Á. Boros 1937, orig. *P. lobatum*, rev. *P. setiferum* N. Bauer 2020, rev. L. Somlyay 2023), Farkasgyepű (L. Vajda 1950, orig. *P. setiferum*, rev. L. Somlyay 2023), Bakonykoppány (G. Fekete 1959, orig. *P. setiferum*, revid. L. Somlyay 2023), Fenyőfő (G. Vida 1951, orig. *P. Braunii* and *P. setiferum* revid. L. Somlyay 2023), Fenyőfő (J. Papp 1951, without name, revid. L. Somlyay 2023), and Várpalota (Á. Károlyi 1954, orig. *P. setiferum*, revid. L. Somlyay 2023). The taxon was also collected in Gellénháza (Á. Károlyi 1955, orig. *P. setiferum*, revid. L. Somlyay 2023), Maróc (Á. Károlyi 1958, orig. *P. setiferum*, revid. L. Somlyay 2023), Sopron (G. Király & I. Pintér 2022, orig. *P. setiferum*, revid. L. Somlyay 2023), Őrtilos (Á. Károlyi 1956, orig. *P. setiferum*, revid. L. Somlyay 2023), Zákány (Á. Károlyi & S. Jávorka 1947, orig. *P. setiferum*, revid. L. Somlyay 2023), Edde (A. O. Horvát 1953, orig. *P. setiferum*, revid. L. Somlyay 2023), Mánfa (Á. Boros 1946, *P. setiferum*, revid. L. Somlyay 2023), Orfű (Á. Boros 1940, *P. setiferum*, revid. L. Somlyay 2023), and Orfű (Z. Kárpáti 1952, *P. setiferum*, revid. L. Somlyay 2023). The specimen collected by Z. Kárpáti in Gödöllő in 1943 (orig. *P. setiferum*) seems to be also *P. ×bicknellii*.

In the Rezső Soó Herbarium, University of Debrecen [DE], a specimen from the “Ebgondolta” forest in Kisalföld (Hüvös-Récsi A. & Sramkó G., 2002) is deposited under this name, but its duplicate specimen in BP was revised to *P. aculeatum* by J. Csiky (2022). In my opinion, the specimen in BP also shows the morphological features of *P. ×bicknellii*.

Additional literature records from the Mecsek Mts (PINTÉR 1995, BÁTORI *et al.* 2012), the Bakony Mts (PINTÉR 1995) and the Kisalföld (SEREGÉLYES 1986) suggest that it might be more common in Hungary.

According to Flora Europaea “The hybrid ... is found with the parents in many places in W. & C. Europe” (VALENTINE 1993). Since it is difficult to identify, they are rarely collected and published (and their correct identification is also uncertain – some specimens of *P. aculeatum* and *P. setiferum* in the examined herbaria are probably *P. ×bicknellii*). There is probably a series of introgressions between the two parent species.

Of the two parent species, *P. aculeatum* can be found on this locality, and although it is rare in the Great Hungarian Plain, only sporadic occurrences are known (DEME *et al.* 2019). *P. setiferum* is much rarer, with only 2 previous records known from the Danube–Tisza Interfluve. The first one was found by Csaba Tölgyesi in an old well, near Orgovány, in 2015 (ARADI *et al.* 2017). Based on Csaba Tölgyesi’s data (in litt.) I visited the well on 27–28.04.2023, but I could not



Fig. 5. Leaves of *Polystichum x bicknellii* (Kiskunfélegyháza railway station, Hungary).



Fig. 6. Underside of the leaf of *Polystichum x bicknellii* (Kiskunfélegyháza railway station, Hungary).

find the fern in it. It has probably dried out, too. The second specimen was found by Attila Rigó in Csepel (Budapest) in 2022 (RIGÓ *et al.* 2023).

Cs. Molnár

* * *

Acknowledgements – Csaba Molnár is grateful to Norbert Bauer [BP] and Attila Takács [DE], curators of the herbaria for their help with access of BP and DE specimens, to János Csiky for his help in identifying the specimen, as well as to Csaba Tölgyesi and Attila Rigó who guided him to the exact localities of *P. setiferum* they found. Csilla Stenger-Kovács thanks for support of the NKFIH 137950 (Complex study of diatom diversity with special emphasis on rarity and invasion) grant.

Összefoglaló: A sorozat legújabb részében 5 kriptogám fajról, köztük 1 alga-, 2 zuzmó-, 1 moha- és 1 páfrányfajról közlünk új hazai adatokat. A *Surirella tientsinensis* inváziós algafaj negyedik magyarországi előfordulása megerősíti a faj további terjedését. A *Hypotrachyna revoluta* és a *Parmelia submontana* ritka zuzmófajok ötödik lelőhelyét a Barcsi-ösborókás természetvédelmi területen (Dél-Magyarország) sikerült megtalálni, ahol egymás mellett nőttek ugyanannak a nyírfának a törzsén. A nagyon ritka *Sciuro-hypnum reflexum* mohafaj negyedik előfordulását jelezzük a debreceni Nagyerdőből (Északkelet-Magyarország). A *Polystichum ×bicknellii* páfrányfaj új kiskunfélegyházi adatát és magyarországi elterjedését is ismertetjük.

REFERENCES

- ALMBORN, O. (1948): Distribution and ecology of some South Scandinavian lichens. – *Bot. Not.* **1948**(Suppl. 1(2)): 1–254.
- ARADI, E., ERDŐS, L., CSEH, V., TÖLGYESI, Cs. and BÁTORI, Z. (2017): Adatok Magyarország flórájához és vegetációjához II. – *Kitaibelia* **22**(1): 104–113.
<https://doi.org/10.17542/kit.22.104>
- ASZALÓSNÉ BALOGH, R., BUCZKÓ, K., ERZBERGER, P., FREYTAG, Cs., HOMM, TH., LÓKÖS, L., MATUS, G., NAGY, Z., PAPP, B. and FARKAS, E. (2021): Taxonomical and chorological notes 15 (153–163). – *Studia bot. hung.* **52**(2): 165–184. <https://doi.org/10.17110/studbot.2021.52.2.165>
- ASZTALOS, Z., GÁL, S. and KISZELYNÉ, V. A. (1984): Adatok Csákpilis zuzmóflórájához. – *Egri Tanárk. Főisk. Évk.* **17**: 733–739.
- BARINA, Z., BENEDEK, L., BOROS, L., DIMA, B., FOLCZ, Á., KIRÁLY, G., KOSZKA, A., MALATINSZKY, Á., PAPP, D., PIFKÓ, D. and PAPP, V. (2015): Taxonomical and chorological notes 1 (1–19). – *Studia bot. hung.* **46**(2): 205–221. <https://doi.org/10.17110/studbot.2015.46.2.205>
- BARINA, Z., MOLNÁR, Cs., SOMOGYI, G., SZEDERJESI, T., PIFKÓ, D., RIGÓ, A., MÁRTONFFY, A., VIRÓK, V. and DUDÁŠ, M. (2020): Taxonomical and chorological notes 11 (112–125). – *Studia bot. hung.* **51**(1): 67–76. <https://doi.org/10.17110/StudBot.2020.51.1.67>
- BÁTORI, Z., KOVÁCS, D., WIRTH, T., KÖRMÖCZI, L. and CSIKY, J. (2012): A mecseki dolinák és a környező területek flórájának kapcsolata. – *Kitaibelia* **17**(1): 11.
- BAUER, N., RÉDEI, T., BARABÁS, S., LOCSMÁNDI, Cs., MESTERHÁZY, A., MÉSZÁROS, A., MOLNÁR, Cs., VAJNA, F. and TAKÁCS, A. (2023): Taxonomical and chorological notes 18 (184–194). – *Studia bot. hung.* **54**(2): 205–224. <https://doi.org/10.17110/StudBot.2023.54.2.205>
- BORHIDI, A. (1984): Role of mapping the flora of Europe in nature conservation. – *Norrlinia* **2**: 87–98.
- BOROS, Á. (1953): *Magyarország mohái*. – Akadémiai Kiadó, Budapest, 360 pp.
- BOROS, Á. (1968): *Bryogeographie und Bryoflora Ungarns*. – Akadémiai Kiadó, Budapest, 466 pp.

- BUCZKÓ, K., ÁCS, É., B-BÉRES, V., KOVÁCS, T. and STENGER-KOVÁCS, C. (2023): The first sign of *Surirella tientsinensis* (Surirellaceae, Bacillariophyceae) spreading in the Carpathian region. – *Studia bot. hung.* **54**(2): 105–112. <https://doi.org/10.17110/studbot.2023.54.2.105>
- CABI (2021): *The Index Fungorum*. – <http://www.indexfungorum.org> (accessed 5 May 2021).
- CSIKY, J., WIRTH, T. and TAMÁS, J. (2023): Az *Asplenium trichomanes* alakkör (Aspleniaceae) hazai taxonómiai sokféleségéről, és a subsp. *hastatum* magyarországi elterjedéséről. – *Bot. Közlem.* **110**(1): 61–80. <https://doi.org/10.17716/BotKozlem.2023.110.1.61>
- CSIKY, J., KOVÁTS, D., DEME, J., TAKÁCS, A., ÓVÁRI, M., MOLNÁR, V. A., MALATINSZKY, Á., NAGY, J. and BARINA, Z. (2017): Taxonomical and chorological notes 4 (38–58). – *Studia bot. hung.* **48**(1): 133–144. <https://doi.org/10.17110/studbot.2017.48.1.133>
- DEGELIUS, G. (1937): Nytt fynd av *Parmelia revoluta* Flk. [New record of *Parmelia revoluta* Flk.]. – *Bot. Not.* **1937**: 499–500.
- DEME, J., PALLA, B., HASZONITS, GY., CSIKY, J., BARÁTH, K., KOVÁCS, D., ZURDO JORDA, A., ERZBERGER, P., WOLF, M., PAPP, V. and SCHMIDT, D. (2019): Taxonomical and chorological notes 9 (94–98). – *Studia bot. hung.* **50**(2): 379–389. <https://doi.org/10.17110/StudBot.2019.50.2.379>
- ERZBERGER, P. (2021): Keys for identification of bryophytes occurring in Hungary. – *Acta Biol. Plant. Agriensis* **9**(2): 3–260. <https://doi.org/10.21406/abpa.2021.9.2.3>
- FARKAS, E., A. BALOGH, R., BAUER, N., LÖKÖS, L., MATUS, G., MOLNÁR, CS., PAPP, B., PIFKÓ, D. & VARGA, N. (2022): Taxonomical and chorological notes 16 (164–177). – *Studia bot. hung.* **53**(1): 249–266. <https://doi.org/10.17110/studbot.2022.53.2.249>
- FELFÖLDY, L. (1941): A debreceni Nagyerdő epiphyta vegetációja. – *Acta Geobot. Hung.* **4**: 35–73.
- FRITZ, Ö. and HULTENGREN, S. (1998): Örlav, *Hypotrachyna revoluta*, funnen på ett stort antal nya lokaler i sydvästra Sverige. (The lichen *Hypotrachyna revoluta* found on a large number of new localities in southwestern Sweden). – *Svensk Bot. Tidskr.* **92**: 139–146.
- GUIRY, M. D. and GUIRY, G. M. (2024): *AlgaeBase*. World-wide electronic publication, National University of Ireland, Galway. – <https://www.algaebase.org>; searched on 12 June 2024
- HASZONITS, GY., MOLNÁR, CS., SONKOLY, J., TÓTHMÉRÉSZ, B., TÖRÖK, P., TÓTH, E., GNOTEK, P., NAGY, J., KORDA, M., ÁDÁM, SZ., MALATINSZKY, Á., RIEZING, N., JÓNA, Z. and SÉLLEI, D. (2021): Pótlások Magyarország edényes növényfajainak elterjedési atlaszához XIII. – *Kitaibelia* **26**(1): 85–88. <https://doi.org/10.17542/kit.26.85>
- KIRÁLY, G., BARÁTH, K., BAUER, N., ERZBERGER, P., PAPP, B., SZÜCS, P., VERES, SZ. and BARINA, Z. (2019a): Taxonomical and chorological notes 8 (85–93). – *Studia bot. hung.* **50**(1): 241–252. <https://doi.org/10.17110/StudBot.2019.50.1.241>
- KIRÁLY, G., HOHLA, M., SÜVEGES, K., HÁBENCZYUS, A. A., BARINA, Z., KIRÁLY, A., LUKÁCS, B. A., TÜRKE, I. J. and TAKÁCS, A. (2019b): Taxonomical and chorological notes 10 (98–110). – *Studia bot. hung.* **50**(2): 391–407. <https://doi.org/10.17110/StudBot.2019.50.2.391>
- MATUS, G., CSIKY, J., BAUER, N., BARÁTH, K., VASUTA, G., BARABÁS, A., HRICSOVINI, D., TAKÁCS, A., ANTAL, K., BUDAI, J., ERZBERGER, P., MOLNÁR, P. and BARINA, Z. (2018): Taxonomical and chorological notes 7 (75–84). – *Studia bot. hung.* **49**(2): 83–94. <https://doi.org/10.17110/studbot.2018.49.2.83>
- MESTERHÁZY, A., MATUS, G., KIRÁLY, G., SZÜCS, P., TÖRÖK, P., VALKÓ, O., PELLER, G., PAPP, V. G., VIRÓK, V., NEMCSOK, Z., RIGÓ, A., HOHLA, M. and BARINA, Z. (2017): Taxonomical and chorological notes 5 (59–70). – *Studia bot. hung.* **48**(1): 263–275. <https://doi.org/10.17110/studbot.2017.48.2.263>
- NIKL FELD, H. (1971): Bericht über die Kartierung der Flora Mitteleuropas. – *Taxon* **20**: 545–571. <https://doi.org/10.2307/1218258>
- ORBÁN, S. (2012): Adatok a debreceni Nagyerdő mohafldrájához. – *Calandrella* **15**: 73–75.
- ORBÁN, S. and VAJDA L. (1983): *Magyarország mohafldrájának kézikönyve*. – Akadémiai Kiadó, Budapest, 518 pp.

- PAPP, B., ERZBERGER, P., LÖKÖS, L., SZURDOKI, E., NÉMETH, Cs., BUCZKÓ, K., HÖHN, M., ASZALÓSNÉ BALOGH, R., BARÁTH, K., MATUS, G., PIFKÓ, D. and FARKAS, E. (2020): Taxonomical and chorological notes 12 (126–136). – *Studia bot. hung.* **51**(1): 77–98.
<https://doi.org/10.17110/StudBot.2020.51.1.77>
- PAPP, V., KIRÁLY, G., KOSCSÓ, J., MALATINSZKY, Á., NAGY, T., TAKÁCS, A. and DÍMA, B. (2016): Taxonomical and chorological notes 2 (20–27). – *Studia bot. hung.* **47**(1): 179–191.
<https://doi.org/10.17110/studbot.2016.47.1.179>
- PINTÉR, I. (1995): Progeny studies of the fern hybrid *Polystichum ×bicknellii* (Dryopteridaceae: Pteridophyta) – *The Fern Gazette* **15**(1): 25–40.
- QGIS Development Team (2024): *QGIS Version 3.36 Maidenhead*. – Geographic Information System. QGIS Association. Available at <https://QGIS.org>.
- RIGÓ, A., DÖME, B., DUDÁŠ, M., KARIKÁS, M., LÖKÖS, L., PIFKÓ, D., VARGA, N. and FARKAS, E. (2023): Taxonomical and chorological notes 17 (178–183). – *Studia bot. hung.* **54**(1): 93–104.
<https://doi.org/10.17110/StudBot.2023.54.1.93>
- RIGÓ, A., MALATINSZKY, Á. and BARINA, Z. (2023): Inventory of the urban flora of Budapest (Hungary) highlighting new and noteworthy floristic records. – *Biodiv. Data J.* **11**: e110450.
<https://doi.org/10.3897/BDJ.11.e110450>
- ROBERT, V., STALPERS, J. and STEGEHUIS, G. (2018): *MycoBank, the fungal website*. – <http://www.mycobank.org/DefaultPage.aspx> (accessed 5 May 2021).
- SCHMIDT, D. (2020): Taxonomical and chorological notes 13 (137). – *Studia bot. hung.* **51**(2): 87–90.
<https://doi.org/10.17110/StudBot.2020.51.2.87>
- SCHMIDT, D., CSIKY, J., MATUS, G., BALOGH, R., SZURDOKI, E., HÖHN, M., ÁBRÁN, P., BUCZKÓ, K. and LÖKÖS, L. (2018): Taxonomical and chorological notes 6 (71–74). – *Studia bot. hung.* **49**(1): 121–130. <https://doi.org/10.17110/studbot.2018.49.1.121>
- SEREGÉLYES, T. (1986): The establishment of ferns in planted pine forests in the vicinity of Tata, Hungary. – *Abstracta Bot.* **10**: 117–130.
- SKVORTZOV, B. V. (1927): Diatoms from Tientsin North China. – *J. Bot.* **65**(772): 102–109.
- SÜVEGES, K., TAKÁCS, A., TÓTH, K., TÖRÖK, P., VIKÁR, J. and MOLNÁR, Cs. (2021): Taxonomical and chorological notes 14 (138–152). – *Studia bot. hung.* **52**(1): 65–79.
<https://doi.org/10.17110/studbot.2021.52.1.65>
- TAKÁCS, A., BARÁTH, K., CSIKY, J., CSIKYNÉ, R. É., KIRÁLY, G., NAGY, T., PAPP, V., SCHMIDT, D., TAMÁSI, B. and BARINA, Z. (2016): Taxonomical and chorological notes 3 (28–37). – *Studia bot. hung.* **47**(2): 345–357. <https://doi.org/10.17110/studbot.2016.47.2.345>
- THIERS, B. M. (2017): *Index Herbariorum: A global directory of public herbaria and associated staff*. – New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> [accessed on 21 June 2021]
- THOR, G. (1988): Some lichens from Hungary. – *Graphis Scripta* **2**(2): 67–71.
- VALENTINE, D. H. (1993): *Polystichum* Roth. – In: TUTIN, T. G., BURGESS, N. A., CHATER, A. O., EDMONDSON, J. R., HEYWOOD, V. H., MOORE, D. M., VALENTINE, D. H., WALTERS, S. M. and WEBB, D. A. (eds): *Flora Europaea* 1, 2nd ed. Cambridge University Press, Cambridge, p. 27.
- VERSEGHY, K. P. (1982): *The lichen flora of the Hortobágy National Park*. – In: SZUJKÓ, J. (ed.): *The Flora of the Hortobágy National Park*. Akadémiai Kiadó, Budapest, pp. 91–95.
- VONDRÁK, J. and LIŠKA, J. (2010): Changes in distribution and substrate preferences of selected threatened lichens in the Czech Republic. – *Biologia*, Sect. Bot. **65**(4): 595–602.
<https://doi.org/10.2478/s11756-010-0061-3>
- WFO (2024): *The world flora online*. – Published on the Internet; <http://www.worldfloraonline.org>. [accessed in 2024].