



THE IMPACT OF ACADEMIC EXCHANGE PROGRAMS ON RESEARCH AND COLLECTION DEVELOPMENT IN THE HNHM BRYOPHYTE COLLECTION

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Abstract: The paper summarises the results of the author's twenty-eight trips, carried out with the help of exchange programs and thematic research programs between academies. The Bryophyte Collection of the Hungarian Natural History Museum (HNHM) was enriched with about 2,500 Asian and nearly 4,000 Balkan bryophyte specimens. Conference participations of the early trips were important in shaping scientific careers and building relationships between colleagues, and also profoundly influenced the development of the HNHM Bryophyte Collection. Several foreign colleagues visited the HNHM within the framework of exchange programs and carried out taxonomic revisions, which also increased the value of the collection. The 27 published articles and 22 conference abstracts also prove the success of the trips and the inter-academic scientific programs.

Key words: bryophyte specimens, collecting trips, international relations, joint research

INTRODUCTION

The Hungarian Natural History Museum participated in inter-academic exchange programs and thematic research programs primarily as expedition opportunities to collect scientific material serving as the basis for scientific work. Thanks to the support of the Hungarian Academy of Sciences, these collecting trips yielded a huge amount of zoological and botanical material deposited in the collections of the Museum (MÉSZÁROS & ZOMBORI 1995, MAHUNKA *et al.* 2002, PAPP *et al.* 2002a, PAPP 2013, CSORBA *et al.* 2004, 2006). The author has been working for the Hungarian Natural History Museum since 1989, immediately after graduating from university and then became the curator of the Bryophyte Collection in 1990. Her professional career was intertwined with the Bryophyte Collection, and the research conducted in the collection is practically the imprint of her scientific career. In this paper, she summarizes

the importance of exchange programs between academies, which directly or indirectly influenced the development of the Bryophyte Collection of HNHM (Herbarium BP).

MATERIAL AND METHODS

The author's trips, which will be presented in detail, can be found in Tab. 1.

Table 1. The author's trips are listed in chronological order with the hosts and projects.

Year	Host academy	Host institute	Project
1990	Ukrainian Academy of Sciences	Institute of Botany of UAS	visit the Institute of Botany of UAS, Kyiv
1991	Armenian Academy of Sciences	Institute of Botany of AAS	collecting trip in Armenia
1993	Spanish National Research Council (CSIC)	Autonomous University of Barcelona; Complutense University of Madrid; University of León	The role of bryophytes as bioindicators of water quality in running water
1994	National Academy of Sciences of the Democratic People's Republic of Korea		collecting trip in North Korea
1994	Bulgarian Academy of Sciences	Institute of Botany of BAS	The role of bryophytes as bioindicators of water quality in running water
1995	Bulgarian Academy of Sciences	Institute of Botany of BAS	The role of bryophytes as bioindicators of water quality in running water
1996	Bulgarian Academy of Sciences	Institute of Botany of BAS	The role of bryophytes as bioindicators of water quality in running water
1997	Chinese Academy of Sciences	Institute of Botany of CAS	Conference of the International Association of Bryologists, Beijing and a collecting trip
1997	Vietnam Academy of Science and Technology	Institute of Ecology and Biological Resources	visit the Institute in Hanoi and a collecting trip

Year	Host academy	Host institute	Project
1998	Norwegian Academy of Science	Norwegian University of Science and Technology	3rd Conference of the European Committee for the Conservation of Bryophytes
1999	Chinese Academy of Sciences	Institute of Botany of CAS; Shenyang University	collecting trip in China
2002	Indian National Science Academy	National Botanical Research Institute (NBRI), Lucknow	Conference of the International Association of Bryologists
2002	Korean Academy of Science and Technology	Kangwon National University, Chuncheon	First KAST/HAS Bilateral Symposium on Biodiversity Research in the Korean Peninsula
2005	Korean Academy of Science and Technology	Sunchon National University	collecting trip in South Korea
2005	Chinese Academy of Sciences	Nanjing Normal University	International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday and a collecting trip
2006	Bulgarian Academy of Sciences	Institute of Botany of BAS	4 th Balkan Botanical Congress, Sofia and a collecting trip
2006	Chinese Academy of Sciences	Institute of Botany of CAS	collecting trip in China
2007	Korean Academy of Science and Technology	Sunchon National University	collecting trip in South Korea
2007	Bulgarian Academy of Sciences	Institute of Botany of BAS	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species
2008	Bulgarian Academy of Sciences	Institute of Botany of BAS	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species
2009	Bulgarian Academy of Sciences	Institute of Botany of BAS	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species

Year	Host academy	Host institute	Project
2009	Serbian Academy of Sciences and Arts	Faculty of Biology, University of Belgrade	5th Balkan Botanical Congress, Belgrade
2010	Serbian Academy of Sciences and Arts	Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species
2011	Serbian Academy of Sciences and Arts	Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species
2012	Serbian Academy of Sciences and Arts	Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species
2013 two trips	Serbian Academy of Sciences and Arts	Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade	Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species
2019	Bulgarian Academy of Sciences	Institute of Biodiversity and Ecosystem Research of BAS	Metallophilic cryptogams - a little-known but high conservation value group

RESULTS AND DISCUSSION

First trips

The story begins in 1990, when the author travelled to Lapland, the Kola Peninsula, with Miklós Rajczy, a bryologist working at the museum, for the 7th Meeting of the Central and East European Bryological Working Group. This was the author's first foreign conference, which is a starting point in the life of any researcher, and of course had a great impact on her work. In addition to numerous foreign colleagues, she also met with bryologists from Eger, Hungary, who

said that they were able to attend the conference through an exchange program between the Hungarian and Russian academies; this covered their travel and stay. The author was very interested in this opportunity, and right at the conference, she and Miklós Rajczy began planning their trip for next year, which was a collecting trip to Armenia. The plan seemed even more feasible, because the Armenian bryologist, Vrez Manakyan, was also present at the conference, and he approved the plan and assured them of his willingness to receive them. But first, still in the same year, in September 1990, the author visited with Miklós Rajczy and Éva Ács (algologist at that time at the HNHM) the Institute of Botany in Kyiv (Ukraine) through an inter-academic exchange program. Here she was able to gain insight into the taxonomic work of Vitalij Virchenko, bryologist, who was working at that time on the *Bryum erythrocarpum* complex (rhizoid gemmae bearing *Bryum* species). She also had the opportunity to become familiar with the herbarium work processes and management of another institute. Then, in June 1991, a two-week collecting trip to Armenia was realised through an exchange program between academies. Despite the political problems, shortage of gasoline and curfew at that time, the Armenian colleagues at the Institute of Botany of the Armenian Academy of Sciences did everything to make this trip a success and took them to many interesting places in Armenia, where they conducted joint collections (Fig. 1, 2). The collecting trip included the following localities: Marmarik Artavan (Marmarik River Valley), Lake Sevan, the area around Garni Temple, the area around Geghard Monastery, the Yeranos Mts near Dvin, and the 4090 m high Mt. Aragats. A total of 125 samples of bryophytes were collected.



Fig. 1. With Vrez Manakyan in the Yeranos Mts (Armenia) in June 1991.



Fig. 2. Miklós Rajczy and Vrez Manakyan in Mt. Aragats (Armenia) in June 1991.

As a continuation of the author's PhD thesis "Bioindication of karst water level changes in a mountainous area of Hungary", defended in 1993, which still dealt with streamside higher plant vegetation, she began investigating the role of bryophytes as bioindicators of water quality in running water; in streams of Hungarian mountains, in the Danube, and in the Szigetköz branch system of the Danube. To expand on this topic, in the autumn of 1993, through an exchange program between the Hungarian Academy of Sciences and the Spanish National Research Council (CSIC), she spent a month in Spain, establishing contacts with bryologists of the Autonomous University of Barcelona, the Complutense University of Madrid, and the hydrobiology research group of the University of León. The good relationships developed with Spanish bryologists accompanied the author throughout her career and also influenced the Bryophyte Collection, e.g. through herbarium loans, materials from the Bryophyte Collection of the HNHM help Spanish researchers in numerous taxonomic works, such as the Flora Briofítica Iberica series (BRUGUÉS & GUERRA 2015, GUERRA *et al.* 2006, 2010, 2014, 2018). In 2005, the author was invited to give a lecture at the 20th meeting of the Spanish Society of Bryology (Sociedad Española de Briología) in the Canary Islands, La Gomera island, Garajonay National Park, famous for its laurel forests (*laurisilva*) rich in bryophytes. The meeting also included several field trips, during which the bryophyte specimens collected enriched the Bryophyte Collection of the HNHM, including species that were not yet in the collection. The investigation on the bioindication role of bryophytes in running waters was successfully extended to Bulgaria within the framework of a thematic research program between academies from 1994 to 1996. In 1994, the author and Anna Ganeva, the bryologist at the Institute of Botany of the Bulgarian Academy of Sciences, conducted field trips and collections in the streams of the Vitosha, Rila,

Pirin, and Rhodope Mts. Then, the following year, the Iskur River was selected, and the bryophyte vegetation of the upper reaches, the Beli and Cerni Iskur and their tributaries in the Rila and Vitosha Mts, and then the lower reaches flowing through the Stara Planina Mts, were examined. In 1996, Miklós Rajczy and Lilyana Yurukova (ecologist at the Botanical Institute of the Bulgarian Academy of Sciences) joined them, and the team explored the bryophyte vegetation of the lower reaches of the Iskur River and followed the river further until it joins the Danube. The results of this research were presented at the 1st Balkan Botanical Congress in Thessaloniki, Greece, in 1997 (PAPP *et al.* 1997) and published in a paper (PAPP *et al.* 2006a), according to which the main results are the following: Eighty-four bryophyte species were found. Three species were recorded for the first time in Bulgaria (Fig. 3). Based on the bryophyte vegetation, two large groups could be distinguished: 1) the upper reaches of Iskur River and its tributaries taking their source from the Vitosha and Stara Planina Mts, and 2) the lower sections of Iskur River. The bryophyte assemblages of the source area at Lakatnik and the sites situated in the upper course of Iskur River in the Rila Mts were very different from those of the other sampling sites. Furthermore, from this 3-year project, 378 specimens were added to the Bryophyte Collection of the HHNM.

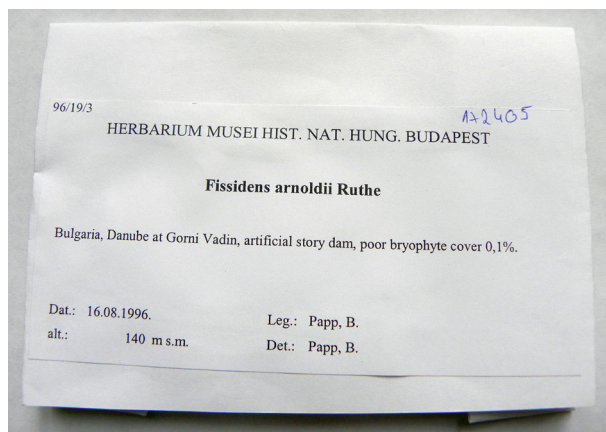


Fig. 3. Voucher specimen of *Fissidens arnoldii* R. Ruthe, a moss recorded for the first time in Bulgaria.

Asian trips

In 1994, a series of East Asian bryological collecting trips began. Within the framework of exchange programs between the Hungarian Academy of Sciences and the National Academy of Sciences of the Democratic People's Republic of

Korea, eleven scientists of the Botanical Department of the HNHM made five collecting trips to North Korea between 1987 and 1994. A wide range of experts visited the country, and almost all groups of plants were examined and collected during the field trips. The author participated in the last expedition with Krisztina Buczkó, algologist, László Lőkös, lichenologist, Miklós Rajczy, bryologist, and Tibor Szerdahelyi, pteridologist, during which they visited the following sites: the surroundings of Mangjongdae, Mt. Taesong, Mt. Ryongak, and spent a week in the Myohyang Mts (Fig. 4). A total of approximately 800 samples of bryophytes were collected, of which more than 300 specimens were later fully processed and inventoried to the Bryophyte Collection of the HNHM (Fig. 5). Besides the collecting trips, the delegation visited the Botanical Institute and the Botanical Garden of the Academy of Sciences of DPRK, and the author met with Hoang Ho Dzun, bryologist, and saw some materials deposited in the herbarium of the institute.



Fig. 4. The team in the Myohyang Mts (North Korea) in September 1994. From left to right: László Lőkös, North Korean guide, Krisztina Buczkó, Miklós Rajczy, North Korean interpreter, Tibor Szerdahelyi.

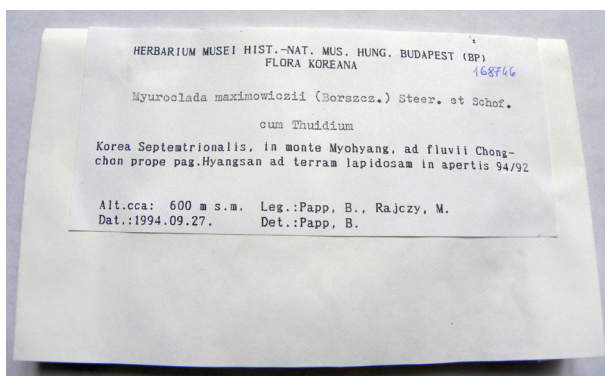


Fig. 5. Specimen of an Asian moss species, *Myuroclada maximowiczii* (G.G. Borshch.) Steere & W.B. Schofield collected in the Myohyang Mts (North Korea).

A few years later, South Korean colleagues became interested in the materials collected in North Korea, and in 2002, as part of the scientific exchange program between the Korean Academy of Science and Technology and the Hungarian Academy of Sciences, a symposium was organized at Kangwon National University in Chuncheon, where the author participated as a botanical expert together with zoologists of the HNHM. For the symposium, a summary of expeditions and research conducted in North Korea by the scientists of the Botanical Department of the HMHM was published (PAPP *et al.* 2002a).

After the symposium, the South Korean colleagues organized a 2-week tour for the Hungarian colleagues, during which they gave lectures at universities in the southern part of the country and had the opportunity for smaller collections. Later, in 2005 and 2007, the author made two more collecting trips to South Korea through exchange programs between academies together with her lichenologist colleague, László Lőkös. Their host was Jae-Seoun Hur at Suncheon National University. They managed to collect in several nature reserves of the southern part of South Korea (e.g. Mt. Jogye and Mt. Nanbongsan at Suncheon city, Mt. Cheon-gwansan at Gwansan city, Mt. Baegasan at Hwasun city, Mt. Taebek at Taebek city, Mt. Juwang National Park at Cheongsong city, Jirisan National Park between Gurye and Hamyang, etc.), and even they visited the iconic Jeju Island (Fig. 6, 7, 8). In total, more than 800 samples of bryophytes were collected in South Korea, and a paper on the bryophyte flora of Mt. Taebek was published (PAPP 2008). During their visit in 2007, they also participated in the Symposium of the Lichen Bioresources Center of Suncheon University, where they gave a presentation entitled „Biodiversity research on lichens and bryophytes in North Korea” (LŐKÖS & PAPP 2007).



Fig. 6. With László Lőkös at a peak of Mt. Taebek (South Korea), in October 2005.



Fig. 7. On the ferry to Jeju Island (South Korea) in October 2005. To the left side of Beáta Papp is Jae-Seoun Hur.



Fig. 8. In the Yeomiji Botanical Garden in Jeju Island (South Korea), with a famous Korean painter on the right side of Beáta Papp in October 2005.

Another part of the East Asian trips led to China, which began in 1997, when the author was able to attend the IAB (International Association of Bryologists) conference held in Beijing through the exchange program between the Hungarian Academy of Sciences and the Chinese Academy of Sciences (Fig. 9). At this major international world conference, she reported on her studies of bryophyte vegetation in running water (PAPP & RAJCZY 1997), but was inspired by lectures given by foreign colleagues and conversations with them. A milestone in her career was reached, with her interest turning to rare, endan-

gered bryophyte species and their protection, which further defined her research and influenced the development of the Bryophyte Collection of the HNHM, e.g. establishment of a herbarium database of rare and threatened species and digitalization of the field diaries of Ádám Boros. After the conference, she participated in a conference excursion led by Professor Cao Tong, a Chinese bryologist, to the Changbai Mts at the border between China and North Korea (Fig. 10).



Fig. 9. With Trần Ninh, a Vietnamese bryologist at the Great Wall in the IAB (International Association of Bryologists) conference in Beijing in 1997.



Fig. 10. Conference excursion in the Changbai Mts (China) in June 1997.
Left side Professor Cao Tong.



Fig. 11. In front of the Ecological Institute in Mt. Lingshan (China) in June 1999. On the left side, Professor Wu Pengcheng.



Fig. 12. In front of the directorate of the Baishilazi National Park (China) in June 1999. To the right of Beáta Papp are László Lőkös and Professor Cao Tong.

During this conference, she also managed to establish good relations with Chinese colleagues, and later, further trips took place, also through exchange programs between academies. She participated with László Lőkös, lichenologist, in two collecting trips. In 1999, their host were Wu Pengcheng at the Institute of Botany of the Chinese Academy of Sciences in Beijing and Cao Tong at Shenyang University. They had the opportunity to collect on Mt. Lingshan near Beijing (Fig. 11), in Baishilazi Nature Reserve (Fig. 12), and in the Yiwulü Mts in Manchuria. In 2006, they visited the Wulingshan Nature Reserve with Professor Wu Pengcheng and again Mt. Lingshan near Beijing.



Fig. 13. With Chinese colleagues at the International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday in Nanjing (China) in October 2005. To the right side of Beáta Papp is Professor Cao Tong.



Fig. 14. With Professor Wu Pengcheng in the Herbarium of the Nanjing Botanical Garden (China) in October 2005.

In 2005, the author was invited to give a lecture at the International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday, at Nanjing (PAPP *et al.* 2005a, 2010). This symposium was a great opportunity to meet again with many Chinese bryologists (Fig. 13, 14) and many experts on Asian bryophyte flora from other countries, like Michael Ignatov from Russia (Fig. 15) and Timo Koponen from Finland.



Fig. 15. With Dolgor Tubanova (Institute of General and Experimental Biology, Ulan-Ude) and Michael Ignatov (Lomonosov Moscow State University) at the International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday in Nanjing (China) in October 2005.



Fig. 16. Conference excursion in the Tian Tang Zhai National Park in Anhui Province (China) in October 2005. To the left side of Beáta Papp is Professor Wu Pengcheng.

After the symposium, she participated in the conference excursion to the Tian Tang Zhai National Park in Anhui Province (Fig. 16). During Chinese trips, in total, more than 600 samples of bryophytes were collected.

Among the Asian trips, a 2-week trip to Vietnam in 1997 with Krisztina Buczkó, algologist, should also be mentioned, which was organized with the help of the exchange program between the Vietnam Academy of Science and Technology and the Hungarian Academy of Sciences.



Fig. 17. With Krisztina Buczkó in the Hoang-Liem Mts (Vietnam) in 1997.

They were guests of the Institute of Ecology and Biological Resources in Hanoi and visited the Hoang-Liem Mts in Lao Cai Province with Professor Mai, where they made small collections (about 130 samples of bryophytes) (Fig. 17). They also met with Trần Ninh, a bryologist at the Department of Botany at the University of Hanoi, who graduated in Hungary at Eszterházy Károly Teacher Training College in Eger, supervised by Professor Tamás Pócs.

The author's participation in the IAB (International Association of Bryologists) conference held in the National Botanical Research Institute (NBRI), Lucknow, India, in 2002 can also be considered one of her Asian trips, which was realized through the exchange program between the Indian National Science Academy and the Hungarian Academy of Sciences. Here she was able to meet again with the world's leading bryologists and gave a lecture on the monitoring of bryophyte species included in the Bern Convention (PAPP *et al.* 2002b). This lecture was a presentation of the methods of the then-initiated Hungarian National Biodiversity Monitoring System. This topic has already been linked to the research of rare and endangered bryophyte species and the topic of bryophyte conservation. The methods and protocols of the Hungarian National Biodiversity Monitoring System later received great international attention, and as a result, further studies were published about them (PAPP *et al.* 2005b, VANDERPOORTEN *et al.* 2010).

Trips and cooperations related to bryophyte conservation

In 1998, through the exchange programme between the Norwegian Academy of Science and Letters and the Hungarian Academy of Sciences, she managed to participate in the 3rd ECCB (European Committee for the Conservation of Bryophytes) meeting held in Trondheim, Norway.



Fig. 18. With Bulgarian and Turkish bryologists in the 4th Balkan Botanical Congress, Sofia. From left to right: Rayna Natcheva (Bulgaria), Gökhan Abay (Turkey), Beáta Papp, Güray Uyar (Turkey), Anna Ganeva (Bulgaria).

Participation in this conference was already in line with her recently started activities in the field of bryophyte protection, and the lecture she gave was about threatened bryophyte species and their habitats (PAPP & RAJCZY 1998). From then on, her career was permanently intertwined with the ECCB. In 2004, she had been invited to the Board of the ECCB, then, served as the chair of the ECCB from 2012 to 2016 and as the vice-chair since 2016. Her activities in the field of bryophyte conservation also had a great impact on the development of the Bryophyte Collection of the HNHM, e.g. she enriched it with more than 12000 specimens collected in Hungary, among them voucher specimens of the populations of rare and threatened species. The specimens were collected during fieldworks, aimed to confirm existing populations and search for new populations of rarities by visiting special habitats and habitats rich in bryophytes. It must be mentioned here that recent specimens are very important and provide a solid basis for the red-listing process of threatened species. Later, her research on rare and endangered bryophyte species and the topic of bryophyte conservation was extended to the Balkans, which was among the bryologically less-explored regions in Europe (SABOVLJEVIĆ *et al.* 2001). In line with this theme, Bulgarian trips started again through inter-academic exchange programs. In 2006, the author, accompanied by László Lőkös, lichenologist and Zoltán Barina and Dániel Pifkó, higher plant specialists, participated in the 4th Balkan Botanical Congress held in Sofia (Fig. 18). She gave a lecture on the results of her collecting trips conducted in Serbia from 2000 (PAPP *et al.*

2006b), which was later published in the Proceedings of the Congress (PAPP *et al.* 2009). After the congress, they made a short field trip to the Western Stara Planina Mts with Bulgarian colleagues, Anna Ganeva and Rayna Natcheva, bryologists, and Siikia Nikolova, lichenologist. Bryological results were published in *Phytologia Balcanica* (PAPP *et al.* 2008). During the field trip a total of 252 species (48 liverworts and 204 mosses) were recorded. Three species were new to Bulgaria and 46 were new to the floristic regions of the Western Balkan Range and the West Forebalkan. Twenty-five of the species were red listed in Bulgaria. In addition, the 2006 collecting trip enriched the Bryophyte Collection of the HNHM with more than 400 specimens.



Fig. 19. The team in the Palace and Botanical Gardens of Balchik (Northern Black Sea Coast, Bulgaria) in April 2007. From left to right: László Lőkös, Rayna Natcheva, Jae-Seoun Hur, Anna Ganeva.



Fig. 20. With Daniela Ivanova and László Lőkös in the Strandzha Mts (Bulgaria) on the celebration of Nestinarka folk tradition in Bulgari village in June 2009.

From 2007 to 2009, a thematic research programme between the Bulgarian and Hungarian Academies started, entitled “Investigations of cryptogram flora (bryophytes, lichens) and biodiversity in Bulgaria and Hungary, especially in the habitats of rare species”. The project aimed to explore the lichen and bryophyte flora of less-researched areas. In 2007, the author visited the northern part of the Bulgarian Black Sea Coast with a large team consisting of Anna Ganeva and Rayna Natcheva, bryologists, Siika Nikolova, lichenologist, László Lőkös, and his South Korean lichenologist colleague, Jae-Seoun Hur (Fig. 19). Then, in 2008, they continued their work with László Lőkös, Rayna Natcheva, and Siika Nikolova in the southern part of the Black Sea Coast. In 2009, they collected in the Strandzha Mts with László Lőkös and Daniela Ivanova, a Bulgarian pteridologist (Fig. 20). Bryological results were published in three papers (PAPP *et al.* 2011, 2012a, 2018). As a summary, in the Black Sea Coast, 153 species were recorded. Five species were new to the bryophyte flora of Bulgaria, and 116 species were new to the Black Sea Coast floristic region. Eighteen species were red-listed at the national level, and 10 species were European red-list candidates (PAPP *et al.* 2018). In the Strandzha Mts, 206 species were found, among them 13 species and one subspecies were new to the country. Eighty-nine mosses and 20 liverworts were reported for the first time for the Strandzha Mts. Twenty-four species were red-listed in Bulgaria (PAPP *et al.* 2011). The surveys highlighted the importance of the studied regions for conservation of the bryophyte diversity in Bulgaria.



Fig. 21. The team in the Eastern Rhodopi Mts near Chernichevo village (Bulgaria) in June 2019. From left to right: Nóra Varga, Beáta Papp, László Lőkös, Veselin Shivarov, Galin Gospodinov.



Fig. 22. Bryologists from the Balkans in the 5th Balkan Botanical Congress in Belgrade, in 2009. From left to right: Evdoxia Tsakiri (Greece), Snežana Dragičević (Montenegro), Marko Sabovljević (Serbia), Beáta Papp.

Furthermore, due to this 3-year project, more than 1200 Bulgarian specimens have been added to the Bryophyte Collection of the HNHM. Then, after a break, in 2019, a 3-year research project started between the Bulgarian and Hungarian Academies, led by lichenologist Edit Farkas (Institute of Ecology and Botany, Ecological Research Centre of the Hungarian Academy of Sciences) on the Hungarian side, to explore the lichen and bryophyte vegetation of special habitats entitled “Metallophilic cryptogams - a little-known but high conservation value group”. In addition to the author, other participants were László Lőkös, Nóra Varga, and Veselin Shivarov, lichenologists, and Rayna Natcheva and Galin Gospodinov, bryologists. In 2019, they visited metalliferous areas of the Eastern Rhodopi Mts (Fig. 21). The bryological results were presented at a conference (PAPP *et al.* 2021) and published in two papers (ELLIS *et al.* 2024, PAPP *et al.* 2026). As a summary 183 bryophyte taxa (one hornwort, 33 liverworts, and 149 mosses) were recorded. Nine taxa (two liverworts and 7 mosses) have been reported for the first time from Bulgaria. Two species were included in the European bryophyte red list. Twenty-seven species (6 liverworts and 21 mosses) have conservation importance based on recent knowledge of their distribution and threats affecting them in Bulgaria and the neighbouring countries. Due to this collecting trip, approximately 450 specimens enriched the Bryophyte Collection of the HNHM. Unfortunately, the Covid19 pandemic that broke out in the meantime interrupted this project, and we were unable to organize further collecting trips in 2020 and 2021.



Fig. 23. With Erzsébet Szurdoki on the peak of Mt Čemernik near Lake Vlasina (Serbia), in June 2011.

Among the trips related to the bryophyte conservation in the Balkans, the Serbian collecting trips are very important. From 2000, a series of field-works have been conducted in the country in cooperation with Serbian colleagues (PAPP 2013, PAPP *et al.* 2006b, 2019). At the same time, a database of the bryophyte specimens collected in the Balkans was established in the Bryophyte Collection of the HNHM. In 2009, through the exchange program between the Serbian Academy of Sciences and Arts and the Hungarian Academy of Science, the author, accompanied by Zoltán Barina and Dániel Pifkó, higher plant specialists, participated in the 5th Balkan Botanical Congress held in Belgrade, where she gave a lecture on the historical specimens from the Balkans deposited at the Bryophyte Collection of the HNHM (PAPP & SABOVLJEVIĆ 2009). At the same congress, the results of their research conducted in Montenegro were also presented (DRAGIĆEVIĆ *et al.* 2009). This conference provided a great opportunity to meet with numerous colleagues from the Balkans (Fig. 22).

Then, from 2010, a 3-year thematic research program started between the Serbian Academy of Sciences and Arts and the Hungarian Academy of Sciences, entitled “Investigations on cryptogam flora (bryophytes, lichens) and biodiversity in Serbia and Hungary, especially in the habitats of rare species”. Within the framework of this program, the author participated with Erzsébet Szurdoki, bryologist, and László Lőkös, lichenologist, in the 10th Symposium on the Flora of Southeastern Serbia and Neighbouring Regions held at Lake Vlasina, where she presented her results on the bryophyte flora of a mountain area of Serbia (PAPP & ERZBERGER 2010). After the conference, they made collections in the surroundings of the lake, and continued this work in 2011, too (Fig. 23).

The bryological results were published in several papers (ELLIS *et al.* 2012a, 2012b, PAPP *et al.* 2012b, 2013a). As a summary, 216 bryophyte taxa (38 liverworts and 178 mosses) were collected during these field trips at Lake Vlasina. Four species were found for the first time in Serbia (Fig. 24), and six species were red-listed in Europe (PAPP *et al.* 2012b). Furthermore, the Bryophyte Collection of the HNHM was enriched with 745 Serbian specimens. In the last year of this 3-year project, the Hungarian team, together with Marko Sabovljević (Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade) visited the Pešter plateau in Southern Serbia. This was also a fruitful collecting trip, as evidenced by four published papers (ELLIS *et al.* 2014, PAPP *et al.* 2014a, 2014b, 2014c). The results were as follows: 211 bryophytes (37 liverworts and 174 mosses) were collected. Five species were new additions to the bryophyte flora of Serbia. Four species were red-listed in Europe. An additional 19 taxa were regarded as rare in the Balkans. Due to the trip to the Pešter plateau, 442 specimens were added to the Bryophyte Collection of the HNHM (PAPP *et al.* 2014c).

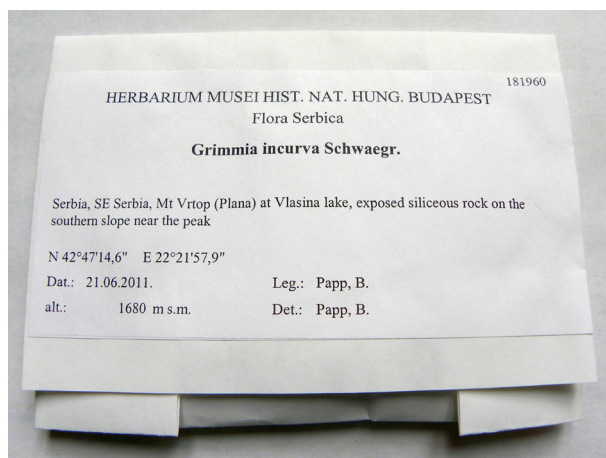


Fig. 24. Voucher specimen of *Grimmia incurva* Schwagr., a moss recorded for the first time in Serbia.

Then, as a continuation of the previous project, from 2013, another 3-year thematic research program started between the Serbian and Hungarian Academies with the same title and aims. Participants were the same, but it was led by a bryologist, Péter Ódor (Institute of Ecology and Botany, Ecological Research Centre of the Hungarian Academy of Sciences), on the Hungarian side, and the Serbian team was expanded with a young bryologist, Jovana Pantović. In April 2013, they visited the Ibar gorge (Fig. 25) and in June participated again in the 11th Symposium on the Flora of Southeastern Serbia and the Neighbouring

Regions held at Lake Vlasina, where the author gave a lecture on the bryophyte flora of Lake Vlasina (PAPP *et al.* 2013b). After the symposium, smaller collections were also made, during which a liverwort new to Serbia was found (PAPP *et al.* 2014b). The collecting trip to the Ibar gorge was also successful. The bryological results were published in three papers (ELLIS *et al.* 2015, PAPP *et al.* 2016a, 2016b). As a summary, 126 bryophyte taxa (12 liverworts and 114 mosses) were collected in the Ibar gorge and its surroundings. Four moss species were recorded for the first time in Serbia. Several rare species in Serbia and in the Balkans were found. One species was included in the Bern Convention and the European Union Habitats and Species Directives. The Ibar gorge maintains a unique bryophyte assemblage due to the serpentine bedrock and continental, Mediterranean climatic influence, which are the main characteristics of the region (PAPP *et al.* 2016b). From the collecting trips conducted in 2013, 262 specimens were added to the Bryophyte Collection of the HNHM. Later, the results of these two 3-year Hungarian-Serbian inter-academic projects were summarised and presented at numerous conferences (PAPP *et al.* 2015, 2016c, 2019).



Fig. 25. The team in the Ibar gorge (Serbia) in April 2013. From left to right: Marko Sabovljević, Erzsébet Szurdoki, Beáta Papp, Jovana Pantović, László Lőkös.

There was another theme related to the bryophyte conservation that participants kept in mind during their fieldwork in these projects, the *ex situ* conservation of nationally red-listed and internationally valuable bryophyte species. Species-specific biotechnological approaches in establishing axenic culture of selected red-listed, rare, nationally or internationally significant bryophyte species were performed. Various species were targeted in axenic cultivation, and axenic collection of the Bryophyte Biology Group at the Institute of Botany and

Botanical Garden, Faculty of Biology, University of Belgrade. Accession from the Bryophyte Collection of the HNHM, as well as adequate field collections during these projects were of the highest value for achievement of materials for reviving or establishing targeted *ex situ* bryophyte collection (SABOVLJEVIĆ *et al.* 2015). Hungarian fieldwork in the framework of Hungarian-Serbian inter-academic projects carried out with Marko Sabovljević, Aneta Sabovljević, and Jovana Pantović, contributed to the successes achieved in this research field, evidenced by several presentations in conferences (JADRANIN *et al.* 2023, PAPP *et al.* 2022, SABOVLJEVIĆ *et al.* 2013, 2015, 2016, VUJIČIĆ 2013a, 2013b) and joint publications (ČOSIĆ 2022, JADRANIN *et al.* 2024, 2025, SABOVLJEVIĆ *et al.* 2012a, 2012b, 2018).

SUMMARY

The author carried out twenty-eight trips with the help of exchange programs and thematic research programs between academies. Among them, the most important were the collecting trips, which contributed significantly to the development of the Bryophyte Collection of the HNHM. All recent (collected in the last 35 years) Asian material in the Bryophyte Collection, derived from inter-academic exchange projects, counts approximately 2500 samples of bryophytes. The recent Balkan collection is an important part of the Bryophyte Collection and reaches more than 27500 specimens, from which 76% (almost 21000 specimens) were collected in the last 35 years. More than one-sixth, 16.7%, of the recent collections is Bulgarian material (2547 specimens). All of them were collected during exchange programs and thematic research programs between the Bulgarian and Hungarian Academy of Sciences. More than a quarter, 25.5%, of the recent Balkan collection is Serbian material (5347 specimens), of which 27 % (1449 specimens) were collected during exchange programs and thematic research programs between the Serbian Academy of Sciences and Arts and the Hungarian Academy of Sciences. In addition to the collecting trips, which directly influenced the Bryophyte Collection of the HNHM by the acquisition of Asian and Balkan specimens, conference participations also contributed to the author's scientific career and indirectly influenced the collection. It should also be mentioned that many foreign colleagues visited the Bryophyte Collection of the HNHM within the framework of exchange programs between academies and carried out taxonomic revisions, which also increased the value of the collection. The 27 published articles and 22 conference abstracts also prove the success of the trips and, through them, the inter-academic exchange programs and thematic research programs.

* * *

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Összefoglaló: A tanulmány a szerző huszonnyolc tanulmányi- és gyűjtőútját mutatja be, melyeket akadémiák közötti csereprogramok és tematikus kutatási programok segítségével bonyolított le. A gyűjtőutak eredményeként az MNMKK MTM Mohagyűjteménye mintegy 2500 ázsiai mohamintával, valamint közel 4000 bulgáriai és szerbiai mohapéldánnyal gyarapodott. A korai utak konferencia részvételei fontosak voltak a szerző pályafutásának alakításában és számos külföldi kollégával való kapcsolatépítésében. E kapcsolatok közül sok végigkíserte a szerzőt pályafutása során, és hatott a Mohagyűjtemény fejlődésére is. Ezen kívül számos külföldi kolléga látogatta meg az MNMKK MTM Mohagyűjteményt akadémiák közötti csereprogramok keretében, és végzett taxonómiai revíziós munkát, ami szintén növelte a gyűjtemény értékét. A 27 publikált cikk és a 22 konferencia kivonat is bizonyítja az utak, és ezeken keresztül az akadémiai csereprogramok és a tematikus kutatási programok sikerét.

REFERENCES

- BRUGUÉS, M. & GUERRA, J. (2015): *Flora Briofítica Ibérica. Vol. II.* – Universidad de Murcia, Sociedad Española de Briología, 355 pp.
- ĆOSIĆ, M.V., SABOVLJEVIĆ, M.S., PAPP, B., GIBA, Z. S., ŠINŽAR-SEKULIĆ, J. B., SABOVLJEVIĆ, A. D. & VUJIĆIĆ, M. M. (2022): Micropropagation of rare bryo-halophyte *Hennediella heimii* – *Botanica Serbica* **46**(2): 187–195. DOI: <https://doi.org/10.2298/BOTSERB2202187C>
- CSORBA, G., KUN, A. & RONKAY, L. (2004): Zoological collectings by the Hungarian Natural History Museum in Korea 144. A report on the collectings of the twenty-first and twenty-second expeditions. – *Folia entomologica hungarica* **65**: 153–158.
- CSORBA, G., KORSÓS, Z. & KUN, A. (2006): Zoological collectings by the Hungarian Natural History Museum in Korea 145. A report on the collectings of the twenty-third, twenty-fourth and twenty-fifth expeditions – *Folia entomologica hungarica* **67**: 5–9.
- DRAGIĆEVIĆ, S., PAPP, B. & ERZBERGER, P. (2009): Distribution of the moss *Buxbaumia viridis* (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. in Montenegro on 5th Balkan Botanical Congress, Belgrade, Serbia, September 07–11, 2009, Book of Abstracts: 84.
- ELLIS, L. T., BEDNAREK-UCHYRA, H., CYKOWSKA, B., UCHYRA, R., GARCIA, C., SÉRGIO, C., LEBOUVIER, M., MANOLAKI, P., GIANNOURIS, E., KADIS, C., MARKOVA, I., PAPP, B., SZURDOKI, E., PERALTA, D.F., PLÁŠEK, RISTOW, R., SABOVLJEVIĆ, M., SIM-SIM, M., SMITH, V.R., TSAKIRI, E., VÁÑA, J., VIRCHENKO, V.M. & BARSUKOV, O.O. (2012a): New national and regional bryophyte records, 30. – *Journal of Bryology* **34**(1): 45–51.
- ELLIS, L.T., BEDNAREK-UCHYRA, H., UCHYRA, R., CYKOWSKA, B., DULIN, M.V., EZER, T., KARA, T., FLORES, J.R., SUÁREZ, G. M. GARCIA, C., MARTINS, A., SÉRGIO, C., GARILLETI, R., KIRMACI, M., AGCAGIL, E., KURBATOVA, L.E., LEBOUVIER, M., PAPP, B., SZURDOKI, E., PHILIPPOV, D.A., PLÁŠEK, V., PÓCS, T., SABOVLJEVIĆ, M., SAWICKI, J., SIM-SIM, M., SZŰCS, P., BIDLÓ, A., VÁÑA, J., VIGALONDO, B., LARA, F., DRAPER, I., VIRCHENKO, V.M. & WOLSKI, G.J. (2012b): New national and regional bryophyte records, 33. – *Journal of Bryology* **34**(4): 281–291.

- ELLIS, L.T., ALEFFI, M., ASTHANA, A.K., SRIVASTAVA, A., BAKALIN, V.A., BATAN, N., ÖZDEMİR, T., BEDNAREK-UCHYRA, H., BOROVICHEV, E.A., BRUGUÉS, M., CANO, M.J., CHOI, S.S., DE BEER, D., ECKSTEIN, J., ERZBERGER, P., FEDOSOV, V.E., GANEVA, A., NATCHEVA, R., GARCIA, C.A., SÉRGIO, C., GARILLETI, R., ALBERTOS, B., PUCHE, F., GÜCEL, S., HIGUCHI, M., HUGONNOT, V., HYLANDER, K., KIRMACI, M., ASLAN, G., KOPONEN, T., LARA, F., MAZIMPAKA, V., VAN MELICK, H., MÜLLER, F., ÖZENOGLU KIREMIT, H., PAPP, B., SZURDOKI, E., PLÁŠEK, V., ČÍHAL, L., VAND DER PLUIJM, A., POPONESSI, S., MARIOTTI, M.G., REYNIERS, J., SABOVljević, M., SAWICKI, J., SMITH, V.R., STEBEL, A., ȘTEFĂNUȚ, S., SUN, B.-Y., VÁÑA, J. & VENANZONI, R. (2014): New national and regional bryophyte records, 40. – *Journal of Bryology* 36(3): 223–244.
- ELLIS, L.T., ALEGRO, A., ŠEGOTA, V., BAKALIN, V.A., BARONE, R., BOROVICHEV, E.A., HUGONNOT, V., LEBOUVIER, M., NOBIS, M., NOWAK, A., OCHYRA, R., PAPP, B., SZURDOKI, E., PIWOWARCZYK, R., PLÁŠEK, V., ČÍHAL, L., REN, Z.-J., SABOVljević, M.S., SÉRGIO, C., GARCIA, C.A., MELO, I., SAWICKI, J., STEBEL, A., ȘTEFĂNUȚ, S., ION, R., MANOLE, A., TZIORTZIS, I., XIONG, Y. & ZHAO Z.-T. (2015): New national and regional bryophyte records, 44. – *Journal of Bryology* 37(3): 228–241.
- ELLIS, L.T., ADJIE, B., ALVAREZ, D.J., ARDILES, V., ASTHANA, A.K., ATWOOD, J.J., BAKALIN, V.A., BEDNAREK-UCHYRA, H., BOIKO, M., BUDKE, J.M., CEDRÉS-PERDOMO, R.D., CERRATO, M.D., CSIKY, J., ESPINOZA-PIETO, B., GABRIEL, R., GEY, S., GIL, L., GRAULICH, A., HYLANDER, K., KIEBACHER, T., KONSTANTINOVA, N. A., KUČERA, J., KUNEV, G., LARRAÍN, J., LÖNNELL, N., MACIEL-SILVA, A.S., MAMONTOV, YU. S., MATTOS, G.H.R., MIR-ROSSELLÓ, P.M., NADHIFAH, A., NATCHEVA, R., O'LEARY, SEAN V., OLIVEIRA, M.F., OPISSO, J., PAPP, B., PEÑALOZA-BOJACÁ, G.F., POLAINO-MARTÍN, C., RAWAT, K.K., RIBAS-SERRA, A., ROSADZIŃSKI, S., SAHU, V., SIPOS, A., STANIASZEK-KIK, M., STARZOMSKI, B. M., SUÁREZ, G.M., TUCKER, D.B.L., VERMA, A. & ZAGORODNIUK, N. (2024): New national and regional bryophyte records, 77 – *Journal of Bryology*, <https://doi.org/10.1080/03736668.7.2024.2388418>
- GANEVA, A., PAPP, B. & NATCHEVA, R. (2008): Contribution to the bryophyte flora of the NW Bulgaria. – *Phytologica Balcanica* 14(3): 327–333.
- GUERRA, J., CANO, M.J. & ROS, R.M. (2006): *Flora Briofítica Ibérica. Vol. III.* – Universidad de Murcia, Sociedad Española de Briología, 305 pp.
- GUERRA, J., CANO, M.J. & ROS, R.M. (2010): *Flora Briofítica Ibérica. Vol. IV.* – Universidad de Murcia, Sociedad Española de Briología, 317 pp.
- GUERRA, J., CANO, M.J. & BRUGUÉS, M. (2014): *Flora Briofítica Ibérica. Vol. V.* – Universidad de Murcia, Sociedad Española de Briología, 264 pp.
- GUERRA, J., CANO, M.J. & BRUGUÉS, M. (2018): *Flora Briofítica Ibérica. Vol. VI.* – Universidad de Murcia, Sociedad Española de Briología, 463 pp.
- JADRANIN, B.Z., PAPP, B., BOŽOVIĆ, Đ.P., ČOSIĆ, M.V., SABOVljević, A.D., VUJIČIĆ, M.M. & SABOVljević, M. S. (2023): Influence of plant growth regulators on multiplication of rare and threatened moss *Drepanocladus lycopodioides* (Amblystegiaceae) in *in vitro* conditions (Növényi növekedés szabályozók hatása a ritka és veszélyeztetett *Drepanocladus lycopodioides* (Amblystegiaceae) lombosmoha szaporodására *in vitro* körülmények között). – *Acta Biol. Plantarum Agriensis* 11(2): 29.
- JADRANIN, B.Z., COSIĆ, M.V., BOZOVIĆ, Đ.P., VUJIČIĆ, M.M., PAPP, B., SABOVljević, A.D. & SABOVljević, M.S. (2024): Novel Insights into the Conservation Physiology and Ex situ Conservation of the Threatened and Rare Semi-Aquatic Moss *Drepanocladus lycopodioides* (Amblystegiaceae). – *Phyton-International Journal of Experimental Botany* 93(11): 3039–3054. <https://doi.org/10.32604/phyton.2024.058469>

- JADRANIN, B.Z., ČOSIĆ, M.V., VUJIČIĆ, M.M., BOŽOVIĆ, Đ.P., PAPP, B., SABOVLJEVIĆ, A.D., & SABOVLJEVIĆ, M.S. (2025): Towards ex situ conservation of the moss *Campyliadelphus elodes* (Amblystegiaceae, Bryophyta) – *Comprehensive Plant Biology* **49**(1): 49–60. <https://doi.org/10.2298/CPB2501049J>
- LÖKKÖS, L. & PAPP, B. (2007): Biodiversity research on lichens and bryophytes in North Korea – 2007 International Symposium of Lichen Bioresources Center, Sunchon University, October 18, 2007, p. 73–91.
- MAHUNKA, S., ZOMBORI, L. & CSORBA, G. (2002): Zoological researches of the Hungarian Natural History Museum in the Korean Peninsula. – Proceedings of the First KAST/HAS Bilateral Symposium on Biodiversity Research in the Korean Peninsula. The Korean Academy of Science and Technology, Seoul, pp. 58–61.
- MÉSZÁROS, F. & ZOMBORI, L. (1995): Zoological collectings by the Hungarian Natural History Museum in Korea 130. A report on the collectings of the twentieth expedition. – *Folia entomologica hungarica* **56**: 109–111.
- PAPP, B. (2008): Contribution to the bryophyte flora of Mt Taebaek, South Korea – *Studia bot. hung.* **39**: 89–100.
- PAPP, B. (2013): The Balkan collection in the Bryophyte Herbarium of the Hungarian Natural History Museum – *Field Bryology* **110**: 60–62.
- PAPP, B. & RAJCZY, M. (1997): Investigations on the condition of bryophyte vegetation of montane streams in Hungary. – IAB Symposium on 2000's Bryology, Abstracts, Beijing, China, 26–30 May 1997, p. 39.
- PAPP, B. & RAJCZY, M. (1998): Bryophytes of saline-alkaline areas of the Danube-Tisza Interfluvium, Hungary. – The 3rd European Conference on the Conservation of Bryophytes, The Scientific Basis for Bryophyte Conservation, Program & Abstracts, Trondheim, Norway, p. 14.
- PAPP, B. & ERZBERGER, P. (2010): Contribution to the bryophyte flora of South-Eastern Serbia: Suva Planina Mts and its surroundings – 10th Symposium on the Flora of Southeastern Serbia and Neighbouring Regions, 17–20. June 2010, Vlasina lake, Abstracts: 35.
- PAPP, B. & SABOVLJEVIĆ, M. (2009): Interesting and new national bryophyte records in the historical collection of the Hungarian Natural History Museum – 5th Balkan Botanical Congress, Belgrade, Serbia, September, 07–11, 2009, Book of Abstracts: 80.
- PAPP, B., RAJCZY, M., GANEVA, A. & YURUKOVA, L. (1997): Bryophytes and water quality along the river Iskur (Bulgaria). – First Balkan Botanical Congress, Abstracts, Thessaloniki, Greece, September 19–22, 1997. p. 113.
- PAPP, B., LÖKKÖS, L. & SZOLLÁT, GY. (2002a): Botanical expeditions of the Hungarian Natural History Museum in North Korea. – Proceedings of the First KAST/HAS Bilateral Symposium on Biodiversity Research in the Korean Peninsula. The Korean Academy of Science and Technology, Seoul, 69–79.
- PAPP, B., ÓDOR, P. & SZURDOKI, E. (2002b): Threatened status of bryophyte species of Bern Convention in Hungary and problems in their monitoring. – Abstracts, World Conference of Bryology, January 23–30, 2002, Lucknow, India, International Association of Bryologists, National Botanical Research Institute, Lucknow-226001, India, p.40.
- PAPP, B., ÓDOR, P. & SZURDOKI, E. (2005a): Bryophyte Biodiversity Monitoring System in Hungary – International Bryological Symposium for Prof. Pan-Chieh Chen's Centennial Birthday, Nanjing, China, 2005.10.25–31, p. 54–55.
- PAPP, B., ÓDOR, P. & SZURDOKI, E. (2005b): Methodological overview and a case study of the Hungarian Bryophyte Monitoring Program – *Bol. Soc. Esp. Briol.* **26-27**: 23–32.
- PAPP, B., GANEVA, A. & NATCHEVA, R. (2006a): Bryophyte vegetation of Iskur River and its main tributaries – *Phytol. Balcanica* **12**(2): 181–189.

- PAPP, B., ERZBERGER, P. & SABOVLJEVIĆ, M. (2006b): New, interesting and red-listed bryophyte species collected during the expeditions of the Hungarian Natural History Museum in Serbia between 2000–2005. – Books of abstracts. IV. Balkan Botanical Congress, Sofia, Bulgaria, 20–26 June 2006., p. 90.
- PAPP, B., ERZBERGER, P. & SABOVLJEVIĆ, M. (2009): European red-listed bryophyte species collected during the expeditions of the Hungarian Natural History Museum in Serbia between 2000–2006. – In: IVANOVA, D. (ed.), Plant, fungal and habitat diversity investigation and conservation. Proceedings of IV Balkan Botanical Congress, Sofia, 20–26 June 2006. Institute of Botany, Sofia, pp. 541–546.
- PAPP, B., ÓDOR, P. & SZURDOKI, E. (2010): Bryophyte Biodiversity Monitoring System in Hungary, Eastern Central Europe – International Academic Memorial Issue for Pan-Chieh. Nanjing Normal University, Nanjing, China, pp. 95–111.
- PAPP, B., NATCHEVA, R. & GANEVA, A. (2011): The bryophyte flora of Northern Mt Strandzha – *Phytol. Balcan.* **17**(1): 21–32
- PAPP, B., NATCHEVA, R., ERZBERGER, P. & SABOVLJEVIĆ, M. (2012a): *Didymodon siccus*, new to Bulgaria, Serbia and some notes on its ecology – *Nova Hedwigia* **95**(1-2): 221–226.
- PAPP, B., SZURDOKI, E. & SABOVLJEVIĆ, M. (2012b): Bryophyte flora of the Vlasina lake and its surrounding (SE Serbia). – *Studia bot. hung.* **43**: 27–45.
- PAPP, B., SZURDOKI, E., PANTOVIĆ, J. & SABOVLJEVIĆ, M. (2013a): *Physcomitrium eurystomum* and *Pohlia prolifera*, new mosses in the bryophyte flora of Serbia – *Arch. Biol. Sci., Belgrade* **65**(2): 703–706.
- PAPP, B., SZURDOKI, E. & SABOVLJEVIĆ, M. (2013b): Bryophyte flora of Vlasina lake and its surroundings – 11th Symposium on the Flora of Southeastern Serbia and Neighbouring Regions, 13–16. June 2013, Vlasina lake, Abstracts.
- PAPP, B., PANTOVIĆ, J., SABOVLJEVIĆ, M. & SZURDOKI, E. (2014a): *Myurella sibirica* (C. Muell.) Reim., new to Montenegro and Serbia – *Cryptog. Bryol.* **35**(3): 321–326.
- PAPP, B., PANTOVIĆ, J., SZURDOKI, E. & SABOVLJEVIĆ, M. (2014b): Interesting and new species for the bryophyte flora of Serbia – *Herzogia* **27**(1): 221–225
- PAPP, B., SZURDOKI, E., PANTOVIĆ, J. & SABOVLJEVIĆ, M. (2014c): Contribution to the bryophyte flora of Pešter plateau, Serbia – *Studia bot. hung.* **45**: 33–47. DOI: 10.17110/StudBot.2014.45.33
- PAPP, B., SZURDOKI, E., PANTOVIĆ, J. & SABOVLJEVIĆ, M. (2016a): New records of Mediterranean-Atlantic mosses in the flora of Serbia. – *Herzogia* **29**(1): 185–189.
- PAPP, B., SZURDOKI, E., PANTOVIĆ, J. & SABOVLJEVIĆ, M. (2016b): An insight into the bryophyte flora of the Ibar gorge and its surroundings (C and SW Serbia) – *Acta Bot. Hung.* **58**(3-4): 411–423. 10.1556/ABot.58.2016.3-4.10
- PAPP, B., SZURDOKI, E., SABOVLJEVIĆ, M., SABOVLJEVIĆ, A., PANTOVIĆ, J. & ÓDOR, P. (2015): Szerb-magyar akadémiai együttműködés (2013-2015) mohászati eredményei (Bryological results of Serbian-Hungarian inter-academic cooperation (2013–2015)). – III. Aktuális eredmények a kriptogám növények kutatásában – Absztrakt kötet (Conference of Cryptogams: Recent Research in Cryptogamic Botany III – Book of Abstracts) 2015. november 17–18, Eger, p. 28.
- PAPP, B., SZURDOKI, E., SABOVLJEVIĆ, M., SABOVLJEVIĆ, A., PANTOVIĆ, J. & ÓDOR, P. (2016c): Exploration of the bryophyte flora of Serbia last five years – 12th Symposium on the Flora of Southeastern Serbia and Neighboring Regions, 16–19, June 2016, Kopaonik, Abstracts, Niš, 2016, p. 37.
- PAPP, B., NATCHEVA, R. & GANEVA, A. (2018): Bryophyte diversity along the northern part of the Black Sea coast in Bulgaria – *Phytol. Balcanica* **24**(1): 25–33.

- PAPP, B., SZURDOKI, E., PANTOVIĆ, J. & SABOVLJEVIĆ, M. (2019): Contribution to the exploration of the bryophyte flora of Serbia in the last 20 years with a special attention to the species of conservation interest. – 13th Symposium on the Flora of Southeastern Serbia and Neighboring Regions, 20-23, June 2019, Stara Planina, Book of Abstracts, Institute for Nature Conservation of Serbia, Department of Biology and Ecology, Faculty of Science and Mathematics, University of Niš, p. 68.
- PAPP, B., NATCHEVA, R. & GOSPODINOV, G. (2021): New bryophyte species in the Bulgarian bryophyte flora (Új moha fajok Bulgária mohaflórájában). In Szűcs, P. (ed.): The abstracts of the 5th International Conference on Cryptogams, 25–26 November 2021, Eger, Hungary. – *Acta Biologica Plantarum Agriensis* 9(1): 67. <https://doi.org/10.21406/abpa.2021.9.1.67>
- PAPP, B., SZURDOKI, E., SABOVLJEVIĆ, M.S. & SABOVLJEVIĆ, A. (2022): Reintroduction of *Hamatocaulis vernicosus* to Hungary. – Book of abstracts, 10th ECCB (Conference of the European Committee for Conservation of Bryophytes) 24–27 May, Zagreb, Croatia, p. 24.
- PAPP, B., GOSPODINOV, G. & NATCHEVA, R. (2026): Contribution to the bryophyte flora of the metalliferous areas of the Eastern Rhodopi Mts, Bulgaria. – *Studia bot. hung.* 56(2): 5–30.
- SABOVLJEVIĆ, M., GANEVA, A., TSAKIRI, E. & ŞTEFĂNUŢ, S. (2001): Bryology and bryophyte protection in south-eastern Europe. – *Biological Conservation* 101: 73–84.
- SABOVLJEVIĆ, M., PAPP, B., VUJIČIĆ, M., SZURDOKI, E., SEGARRA-MORAGUES, J.G. & SABOVLJEVIĆ, A. (2012a): *In vitro* micropropagation of rare and endangered moss *Entosthodon hungaricus* (Funariaceae) – *Bioscience Journal, Uberlandia* 28(4): 632–640.
- SABOVLJEVIĆ, M., VUJIČIĆ, M., ŠINŽAR SEKULIĆ, J., SEGARRA-MORAGUES, J.G., PAPP, B., SKORIĆ, M. & SABOVLJEVIĆ, A. (2012b): Reviving, In Vitro Differentiation, Development, and Micropropagation of the Rare and Endangered Moss *Bruchia vogesiaca* (Bruchiaceae) – *HortiScience* 47(9):1347–1350.
- SABOVLJEVIĆ, M., VUJIČIĆ, M., PAPP, B., PETROVIĆ, N., PETROVIĆ, B., SZURDOKI, E. & SABOVLJEVIĆ, A. (2013): Insights into biology of the moss *Entosthodon hungaricus*. – II. Aktuális eredmények a kriptogám növények kutatásában Konferencia, 09.30-01.10.2013, Eger, Book of Abstracts: 28.
- SABOVLJEVIĆ, M., PAPP, B., SZURDOKI, E., VUJIČIĆ, M., SABOVLJEVIĆ, A. & ÓDOR, P. (2015): Eredmények az ex situ moha védelem területén szerb-magyar akadémiai együttműködés keretében (Bryophyte ex situ conservation in the frame of inter-academic cooperation between Serbia and Hungary). – III. Aktuális eredmények a kriptogám növények kutatásában – Absztrakt kötet (Conference of Cryptogams: Recent Research in Cryptogamic Botany III – Book of Abstracts) 2015. november 17–18, Eger, p. 30.
- SABOVLJEVIĆ, M., PAPP, B., VUJIČIĆ, M., SZURDOKI, E., NIKOLIĆ, N. & SABOVLJEVIĆ, A. (2016): Ex situ conservation of bryophytes: rare species biology knowledge and biotechnological skill break through. – Book of Abstracts, 9th Conference of European Committee for Conservation of Bryophytes, 26–29, April, Bečići, Montenegro, p. 17.
- SABOVLJEVIĆ, M., NIKOLIĆ, N., VUJIČIĆ, M., ŠINŽAR-SEKULIĆ, J., PANTOVIĆ, J., PAPP, B. & SABOVLJEVIĆ, A. (2018): Ecology, distribution, *in vitro* propagation, *ex situ* conservation and native population strengthening of the rare and threatened halophytomoss *Entosthodon hungaricus* in Serbia – *Wulfenia* 25: 117–130.
- VANDERPOORTEN, A., PAPP, B. & GRADSTEIN, R. (2010): Sampling of bryophytes – In EYMANN, J., DEGREEF, J., HÄUSER, CH., MONJE, J.C., SAMYN, Y. & VANDENSPIEGEL, D. (eds.): Manual on field recording techniques and protocols for All Taxa Biodiversity Inventories and Monitoring. – *Abe Taxa Vol.* 8(2): 331–345.

- VUJIČIĆ, M., MILOŠEVIĆ, S., PAPP, B., SZURDOKI, E., SABOVLJEVIĆ, M. & SABOVLJEVIĆ, A. (2013a): Does antioxydative system increase salt stress survival in facultative halophytic moss *Entosthodon hungaricus*? – 4th Croatian Botanical Symposium with international participation, Split, Croatia, 27-29.09.2013. Book of Abstracts: 148.
- VUJIČIĆ, M., SABOVLJEVIĆ, A., SZURDOKI, E., PAPP, B. & SABOVLJEVIĆ, M. (2013b): The first report of apogamous *Entosthodon hungaricus* and the spores directly producing sporophytes in bryophytes. – 4th Croatian Botanical Symposium with international participation, Split, Croatia, 27-29.09.2013. Book of Abstracts: 153.

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