

TWO NEW OCCURRENCES OF *HILPERTIA VELENOVSKYI* (SCHIFFN.) ZANDER IN HUNGARY

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Abstract: Two small populations of the continental xerophytic moss species *Hilpertia velenovskyi* were discovered in the Vértes Mts and Mezőföld region (near Csákerény and Lovasberény, respectively) growing on vertical loess cliffs. Both populations are rather small and are restricted just to a small surface of the cliffs, covering only a few square decimeters. At both new sites the species occurs together with *Tortula brevissima* and *Pterygoneurum lamellatum*, two species also protected by law in Hungary.

Keywords: distribution, loess cliffs, protected moss, red-listed species

INTRODUCTION

Loess cliffs, being exposed to intense irradiation and reducing the amount of direct precipitation by their vertical surface, belong to extremely dry habitats (Pócs 1999). They have their own xerophytic bryophyte community with desiccation tolerant species strongly adapted to this semidesert microenvironment. One of them is *Hilpertia velenovskyi* (Schiffn.) Zander, which was first collected by Josef Velenovský in the vicinity of Prague (Sv. Prokop Valley), and based on this specimen, was described by Victor F. Schiffner (1893) under the name *Tortula velenovskyi* Schiffner. Nearly half a century passed until it was collected again by Sándor Polgár near Ravazd, Hungary (Boros and Polgár 1941). In the subsequent decades this was followed by further finds in different regions of Hungary (Boros 1951; Boros and Vajda 1952).

Tamás Pócs has played a leading role in studying the cryptogamic vegetation of loess cliffs in Hungary and the neighbouring countries. As a result of his and his team's work several fundamental papers have been published on floristical, phytocoenological, phytogeographical and ecological aspects of



loess cliffs across the Carpathian Basin, including numerous new localities of *H. velenovskyi* and other rare bryophyte species (Pócs 1999; Kürschner and Pócs 2002; Pócs *et al.* 2002). I am happy to publish this paper in honour of Tamás Pócs's 90th birthday.

MATERIALS AND METHODS

Nomenclature of bryophytes follows Erzberger and Papp (2020). The voucher specimens are deposited in the private herbarium of the author (CSN). Only the exact geographical coordinates are shown in *Table 1*, imprecise localizations (where only degrees and minutes were registered, often erroneously) published in previous works were ignored.

RESULTS AND DISCUSSION

As a result of recent field trips two new occurrences of *Hilpertia velenovskyi* have been discovered in the Central Transdanubian Region, Hungary.

Vértes Mts, Fejér County, Csákberény, Kopasz Hill (Orondiszőlők), 47°20'45.2" N, 18°19'01.8" E, ca 230 m a.s.l., on vertical south-facing loess cliff (*Figure 1a*), leg. & det. C. Németh, 27 December 2015, CSN 7497; 26 December 2019, CSN 9810 [8675.4]. Accompanying bryophytes: *Aloina ambigua* (Bruch et Schimp.) Limpr., *A. rigida* (Hedw.) Limpr., *Bryum argenteum* Hedw., *Pterygoneurum lamellatum* (Lindb.) Jur., *P. ovatum* (Hedw.) Dixon, *Didymodon cordatus* Jur., *Tortula brevissima* Schiffn.

Northern Mezőföld, Fejér County, Lovasberény, Kazal Hill, 47°17'53.1" N, 18°33'48.2" E, ca 160 m a.s.l., on vertical south-east facing loess cliff (*Figure 1b*), leg. & det. C. Németh, 6 January 2023, CSN 11360 [8777.1]. Accompanying bryophytes: *Aloina ambigua*, *A. rigida*, *Pterygoneurum lamellatum*, *P. ovatum*, *Tortula brevissima*.

Hilpertia velenovskyi is a continental-subarctic species, a rare and very scattered element of cold loess steppe. It is ranked as Critically Endangered (CR) in the European red list of bryophytes (Hodgetts *et al.* 2019). In Europe, along with Hungary where it is a species in the Near Threatened (NT) category, it occurs in Austria, the Czech Republic (Critically Endangered), Germany (Critically Endangered), Poland (Rare), Slovakia (Regionally Extinct), Bulgaria

(Data Deficient but recently recorded), Romania (Vulnerable), Serbia (Endangered), and in the European part of the Caucasus (Hodgetts and Lockhart 2020). Outside Europe it occurs in North America where only 3 localities are known (Mogensen and Zander 1999; Zander 2007). In Asia it occurs sporadically in Russia (Ivanova *et al.* 2018) and Mongolia (Tsegmed 2001), but is common in the xeric, northern parts of China (Tan and Yu 1997).

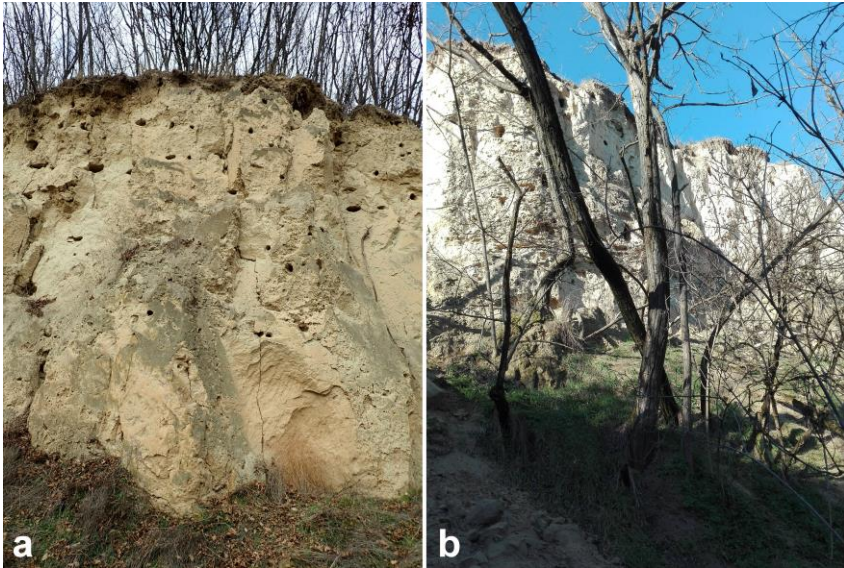


Figure 1. Habitat of *Hilpertia velenovskyi* near Csákberény (a) and Lovasberény (b) (photos: C. Németh).

In Hungary, *Hilpertia velenovskyi* is protected by law with an ideal value of 5000 HUF (Anon. 2022). It has hitherto been observed altogether on 32 loess cliffs scattered all over the loess regions of the country (Boros and Polgár 1941; Boros 1951; Boros and Vajda 1952; Pócs 1999; Kürschner and Pócs 2002; Papp 2008; Table 1, Figure 2). The record published in Boros (1968) from the Pannonthalma Hills on Nyúl Hill is rather uncertain. Based on floristical notes of Ádám Boros (Boros 1915–1971) he visited the Nyúl Hill once on 25 September 1946, and listed only 3 moss species on loess cliffs, but no *H. velenovskyi*. Furthermore, no voucher specimens documenting this occurrence are known either in BP or elsewhere.

Table 1. Occurrences of *Hilpertia velenovskyi* in Hungary. ○ previously known occurrences with unknown recent status (<2008), ● previously known and still existing populations (> 2008), ▲ new occurrences.

No.	Locality	Geographical coordinates	KEF	Population status	References
1	Nyúl, Nyúl Hill		8472.1	○	Boros 1968
2	Ravasz, Likas-horog Gorge		8472.3	●	Boros and Polgár 1941, Boros 1968, Papp 2008
3	Agostyán		8376.1	○	Boros 1951, 1968
4	Neszemély, Vár Hill		8276.3	●	Boros 1951, 1968, Papp 2008, Szűcs 2007
5	Süttő, Diós-árok Gorge		8276.2	●	Boros 1951, 1968, Kürschner and Pócs 2002, Papp 2008
6	Nyergesújfalu, Akasztó Hill		8277.3	○	Boros 1951, 1968, Kürschner and Pócs 2002
7	Bajót, Mt Öreg-kő	47°43'40.9"N 18°33'49.7"E	8277.3	●	Kürschner and Pócs 2002, Papp 2008
8	Sárisáp		8378.1	○	Kürschner and Pócs 2002
9	Úny		8378.3	○	Kürschner and Pócs 2002
10	Basaharc		8179.3	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008
11	Vác	47°46'56.1"N 19°08'49.9"E	8280.2	○	Kürschner and Pócs 2002
12	Valkó		8483.1	○	Kürschner and Pócs 2002
13	Isaszeg, in front of Keresztes Hill		8482.3	○	Boros and Vajda 1952, Boros 1968
14	Pécel, Vár Hill		8582.1	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008
15	Pécel		8582.1	○	Kürschner and Pócs 2002
16	Mende		8582.4	○	Pócs 1999, Kürschner and Pócs 2002
17	Vértesacs, Váli Gorge		8677.2	●	Papp 2008
18	Csákberény, Kopasz Hill		8675.4	▲	Németh 2023
19	Lovasberény, Kazal Hill		8777.1	▲	Németh 2023

No.	Locality	Geographical coordinates	KEF	Population status	References
20	Beloianisz	47°10'46.0"N 18°49'50.4"E	8878.2	○	Kürschner and Pócs 2002
21	Ivácsa		8879.3	○	Kürschner and Pócs 2002
22	Kisapostag		9079.4	●	Kürschner and Pócs 2002, Papp 2008
23	Dunaföldvár, Alsó Óreg Hill		9179.4	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008
24	Dunaföldvár, Kálvária Hill		9179.4	●	Kürschner and Pócs 2002, Papp 2008
25	Dunakömlőd, Sánc Hill	46°39'25.7"N 18°52'51.8"E	9379.1	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008, 2014 leg. B. Papp unpublished, BP-BR 189310)
26	Dunakömlőd		9379.1	○	Kürschner and Pócs 2002
27	Nagyszékely, cellars		9377.3	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008
28	Szekszárd, Szarvas-szurdik Gorge	46°20'29.6"N 18°38'40.1"E	9677.4	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008
29	Szekszárd	46°22'00.0"N 18°42'00.0"E	9678.1	○	Kürschner and Pócs 2002
30	Báta, Csóka Hill		9878.4	●	Pócs 1999, Papp 2008
31	Dunaszekcső, Vár Hill		9978.2	○	Kürschner and Pócs 2002
32	Tokaj, Nagykopasz Hill, Donáth dűlő		7894.3	●	Kürschner and Pócs 2002, Papp 2008
33	Tokaj, N edge of the town	48°07'51.8" 021°24'21.1"	7894.3	●	Pócs 1999, Kürschner and Pócs 2002, Papp 2008, 2017 leg. Erzberger <i>et al.</i> unpublished, B-Erzberger 23058

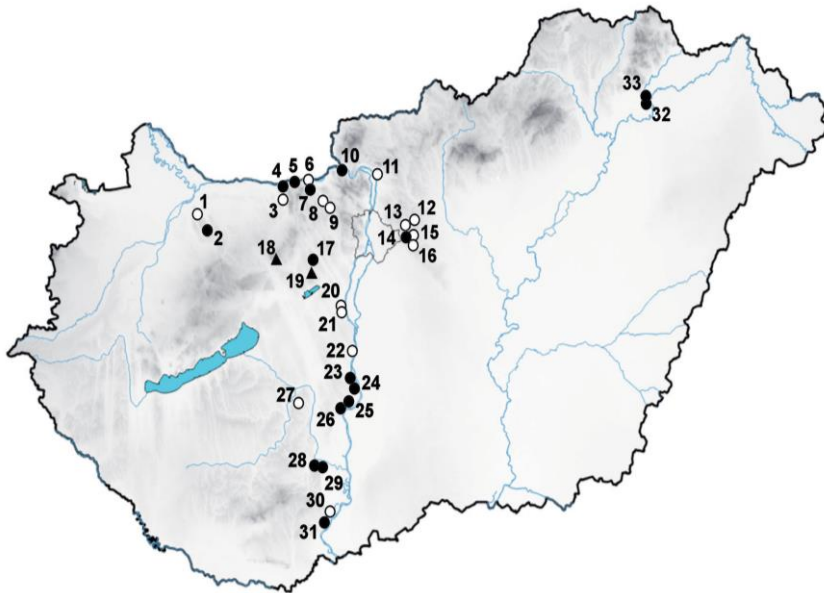


Figure 2. Distribution of *Hilpertia velenovskyi* in Hungary; ○ previously known occurrences with unknown recent status (< 2008), ● previously known and still existing populations (> 2008), ▲ new occurrences.

At present, 18 existing populations are known: 16 are listed in Papp (2008), in addition to the two newly discovered ones in Csákberény and Lovasberény. The recently found two populations are very small and are confined just to a small surface of the loess cliffs and covering not more than a few square decimeters (*Figures 3a-b*). The habitat in the neighbourhood of Lovasberény is threatened by shading of a *Robinia pseudoacacia* L. stand growing up densely next to the cliff (*Figure 1b*). At both new Hungarian locations *H. velenovskyi* grows together with *Tortula brevissima* and *Pterygoneurum lamellatum*, two species also protected by law in Hungary.

H. velenovskyi, with its strongly enrolled and papillose laminal margin forming a spiral tube to protect the assimilatory tissue (*Figure 3c*), is a characteristic element of extremely dry loess cliffs, co-occurring with the representatives of other moss genera (e.g., *Aloina*, *Pterygoneurum*, *Crossidium*) having also various special xeromorphic adaptations (e.g., revolute leaf margins, lamellae or filaments on the nerve, hyaline hair-points).

Since the vast majority of *H. velenovskyi* populations in Europe can be found in the Hungarian part of the Carpathian Basin, Hungary holds the highest responsibility for the conservation of this species.

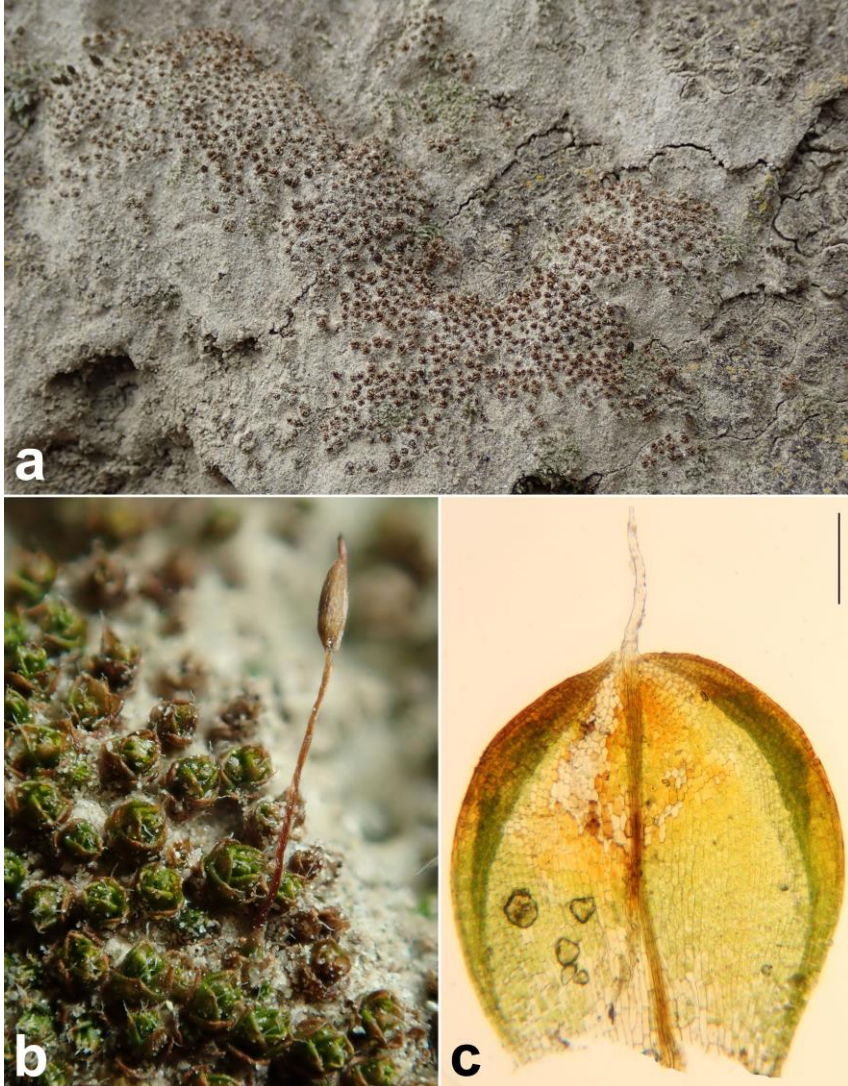


Figure 3. *Hilpertia velenovskyi*. **a.** hundreds of sterile shoots forming characteristic herd like groups on the loess cliff near Csákberény, **b.** habit with a sporophyte on the loess cliff near Lovasberény, **c.** leaf with the characteristic strongly recurved margins (CSN 11360). Scale bar = 20 μm (photos: C. Németh).

Acknowledgement – I would like to thank Peter Erzberger and Beáta Papp for the careful review of the manuscript.

REFERENCES

- ANON. (2022). Az agrárminiszter 20/2022. (VII. 29.) AM rendelete a Duna-Ipoly Nemzeti Park létesítéséről szóló 34/1997. (XI. 20.) KTM rendelet, valamint a védett és a fokozottan védett növény- és állatfajokról, a fokozottan védett barlangok köréről, valamint az Európai Közösségben természetvédelmi szempontból jelentős növény- és állatfajok közzétételéről szóló 13/2001. (V. 9.) KöM rendelet módosításáról (ministerial order concerning protection of nature). *Magyar Közlöny* **128**: 5431–5463.
- BOROS, Á. (1915–1971): *Florisztikai jegyzetek*. MTM, Tudománytörténeti Gyűjtemény, Budapest, mscr.
- BOROS, Á. (1951). Bryologische Beiträge zur Kenntnis der Flora von Ungarn und der Karpaten. *Acta Biologica Academiae Scientiarum Hungaricae* **2**: 369–409.
- BOROS, Á. & POLGÁR, S. (1941). A *Tortula velenovskyi* Magyarországon. (Die *Tortula velenovskyi* in Ungarn). *Botanikai Közlemények* **38**: 126–130.
- BOROS, Á. & VAJDA, L. (1952). Ergänzungen zur Moosflora der Umgebung von Budapest und des Buda-Pilis-Gebirges. *Annales Historico-naturales Musei Nationalis Hungarici* **3**: 47–77.
- ERZBERGER, P. & PAPP, B. (2020). The checklist of Hungarian bryophytes – second update. *Studia Botanica Hungarica* **51**: 11–76.
<https://doi.org/10.17110/StudBot.2020.51.2.11>
- HODGETTS, N., CÁLIX, M., ENGLEFIELD, E., FETTES, N., GARCÍA CRIADO, M., PATIN, L., NIETO, A., BERGAMINI, A., BISANG, I., BAIŠEVA, E., CAMPISI, P., COGONI, A., HALLINGBÄCK, T., KONSTANTINOVA, N., LOCKHART, N., SABOVLJEVIC, M., SCHNYDER, N., SCHRÖCK, C., SÉRGIO, C., SIM SIM, M., VRBA, J., FERREIRA, C.C., AFONINA, O., BLOCCKEEL, T., BLOM, H., CASPARI, S., GABRIEL, R., GARCIA, C., GARILLETI, R., GONZÁLEZ MANCEBO, J., GOLDBERG, I., HEDENÁS, L., HOLYOAK, D., HUGONNOT, V., HUTTUNEN, S., IGNATOV, M., IGNATOVA, E., INFANTE, M., JUUTINEN, R., KIEBACHER, T., KÖCKINGER, H., KUČERA, J., LÖNNELL, N., LÜTH, M., MARTINS, A., MASLOVSKY, O., PAPP, B., PORLEY, R., ROTHERO, G., SÖDERSTRÖM, L., ȘTEFĂNUȚ, S., SYRJÄNEN, K., UNTEREINER, A., VÁNA, J. Ľ, VANDERPOORTEN, A., VELLAK, K., ALEFFI, M., BATES, J., BELL, N., BRUGUÉS, M., CRONBERG, N., DENYER, J., DUCKETT, J., DURING, H.J., ENROTH, J., FEDOSOV, V., FLATBERG, K.-I., GANEVA, A., GORSKI, P., GUNNARSSON, U., HASSEL, K., HESPAHOL, H., HILL, M., HODD, R., HYLANDER, K., INGERPUU, N., LAAKALINDBERG, S., LARA, F., MAZIMPAKA, V., MEŽAKA, A., MÜLLER, F., ORGAZ, J.D., PATIÑO, J., PILKINGTON, S., PUCHE, F., ROS, R.M., RUMSEY, F., SEGARRA-MORAGUES, J.G., SENECA, A., STEBEL, A., VIRTANEN, R., WEIBULL, H., WILBRAHAM, J. & ŽARNOWIEC, J. (2019). *A miniature world in decline: European Red List of Mosses, Liverworts and Hornworts*. Brussels, Belgium: IUCN, 87 p.
<https://doi.org/10.2305/IUCN.CH.2019.ERL.2.en>
- HODGETTS, N. & LOCKHART, N. (2020). *Checklist and country status of European bryophytes – update 2020*. Irish Wildlife Manuals, No. 123. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

- IVANOVA, E.I., IGNATOVA, E.A., ISAKOVA, V.G., BALAKIREV, I.A., KUZNETSOVA, O.I. & IGNATOV, M.S. (2018). Moss flora of the Ust-Nera region in the upper course of Indigirka River, East Yakutia. *Arctoa* **27**(1): 18–28.
<https://doi.org/10.15298/arctoa.27.02>
- KÜRSCHNER, H. & PÓCS, T. (2002). Bryophyte communities of the loess cliffs of the Pannonian basin and adjacent areas, with the description of *Hilpertia velenovskyi*-*Pterygoneuretum compacti* ass. nov. Studies on the cryptogam vegetation of loess cliffs, VI. *Nova Hedwigia* **75**: 101–119.
<https://doi.org/10.1127/0029-5035/2002/0075-0101>
- MOGENSEN, G.S. & ZANDER, R.H. (1999). *Hilpertia velenovskyi* (Musci, Pottiaceae) new to the Arctic from Ellesmere Island, Northeastern Canada. *The Bryologist* **102**: 753–755. <https://doi.org/10.2307/3244261>
- PAPP, B. (2008). Selection of important bryophyte areas in Hungary. *Folia Cryptogamica Estonica* **44**: 101–111.
- PÓCS, T. (1999). Studies on the cryptogam vegetation of loess cliffs, I. Orographic desert in the Carpathian Basin. *Kitaibelia* **4**: 143–156.
- PÓCS, T., GOIA, I., KIS, G., ORBÁN, S., SASS-GYARMATI, A. & VAN ZANTEN, B.O. (2002). *Hilpertia velenovskyi* (Schiffn.) Zander and other pottioid mosses (Bryophyta) new to Romania. Studies on the cryptogamic vegetation on loess cliffs, IX. *Contributii Botanice* **37**: 13–24.
- SCHIFFNER, V.F. (1893). *Tortula Velenovskýi*, eine neue Art der Gattung *Tortula* aus Böhmen. *Nova Acta Academiae Caesareae Leopoldino-Carolinae Germanicae Naturae Curiosorum* **58**: 479–488.
- SZÚCS, P. (2007). Dunaalmás és Neszmély környékének mohafldrája (The bryophyte flora of Dunaalmas and Neszmély region). *Botanikai Közlemények* **94**(1–2): 91–115.
- TAN, B.C. & YU, J. (1997). Mosses on Qinghai-Tibetan Plateau, China. *Journal of the Hattori Botanical Laboratory* **82**: 305–320.
https://doi.org/10.18968/jhbl.82.0_305
- TSEGMED, T. (2001). Checklist and Distribution of Mosses in Mongolia. *Arctoa* **10**: 1–18. <https://doi.org/10.15298/arctoa.10.01>
- ZANDER, R.H. (2007). *Hilpertia*. In: Flora of North America Editorial Committee (eds): *Bryophyte Flora of North America. North of Mexico*. Vol. 27. Bryophyta, part 1., Oxford University Press, New York, pp. 631–632.

(submitted: 29.01.2023, accepted: 25.02.2023)