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NEW DISTRIBUTIONAL DATA ON BRYOPHYTES OF POLAND, 2

Piotr Górski, Michał Smoczyk, Paweł Pawlikowski, Grzegorz Vončina, Adam Stebel, Tomasz Paciorek, Monika Staniaszek-Kik, Maciej Romański, Albert Wiaderny, Maciej Gąbka, Sylwia Wierzcholska

Editors of the column: Piotr Górski, Anna Rusińska

M. Gąbka, Department of Hydrobiology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland, e-mail: gmaciej@amu.edu.pl

P. Górski, Department of Botany, Poznań University of Life Sciences, Wojska Polskiego 71 C, 60-625 Poznań, Poland, e-mail: peter@up.poznan.pl

T. Paciorek, W. Szafer Institute of Botany Polish Academy of Sciences, Lubicz 46, 31-512 Kraków, Poland, e-mail: tomasz.paciorek@vp.pl

P. Pawlikowski, Department of Plant Ecology and Environmental Conservation, Institute of Botany, Faculty of Biology, Biological and Chemical Research Centre, University of Warsaw, Żwirki i Wigury 101, 02-096 Warsaw, Poland, e-mail: p.pawlikowski@uw.edu.pl

M. Romański, Wigry National Park, Krzywe 82, 16-402 Suwałki, e-mail: maciej.romanski@wigry.org.pl

A. Rusińska, Natural History Collections, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland, e-mail: annarus@amu.edu.pl

M. Smoczyk, Wojska Polskiego 30/5, 69-110 Rzepin, Poland, e-mail: msmoczyk@wp.pl

M. Staniaszek-Kik, Department of Geobotany and Plant Ecology, Faculty of Biology and Environmental Protection, University of Łódź, Banacha 12/16, 90-237 Łódź, Poland, e-mail: kik@biol.uni.lodz.pl

A. Stebel, Department of Pharmaceutical Botany, Medical University of Silesia in Katowice, Ostrogórska 30, 41-200 Sosnowiec, Poland, e-mail: astebel@sum.edu.pl

G. Vončina, Pieniny National Park, Jagiellońska 107 B, 34-450 Krościenko nad Dunajcem, e-mail: gvoncina@poczta.onet.pl

A. Wiaderny, pl. Ratuszowy 51/3, 58-500 Jelenia Góra, Poland, e-mail: albert_wiaderny@onet.eu

S. Wierzcholska, Białowieża Geobotanical Station, Faculty of Biology, University of Warsaw, Sportowa 19, 17-230 Białowieża, Poland, e-mail: sylwia.wierzcholska@gmail.com

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1. ***Bazzania trilobata*** (L.) Gray

Author: A. Stebel

ATMOS Ge–30: S Poland, Pieniny Klippen Belt (Pieniński Pas Skałkowy), Skalice Nowotarskie range (Skalice Nowotarskie), Małopolskie Province, Las Soślina, near Ludźmierz, 49°26'39.3"N, 19°58'36.8"E, on ground in a boggy *Picea abies* forest near the Ludźmierz-Maruszyna road, alt. 625 m above sea level (a.s.l), *leg*., *det*. A. Stebel, 14.05.2009 (SOSN).

Bazzania trilobata, a boreal-montane liverwort that is quite frequent in the Polish part of the Carpathian Mountains, thus far has not been reported from the Skalice Nowotarskie and Spiskie Klippen ranges (Ochyra & Cykowska 2008). During the bryological investigation in 2009, a fairly abundant locality was found in a place called Las Soślina (= Soślina Forest), located near the village of Ludźmierz, where rather large patches of boggy *Picea abies* forests occur, with many locally rare bryophytes, such as *Straminergon stramineum* (Dicks. ex Brid.) Hedenäs and *Warnstorfia fluitans* (Hedw.) Loeske (Stebel & Vončina 2011).

2. ***Buxbaumia aphylla*** Hedw.

Authors: M. Staniaszek-Kik, M. Romański, P. Górski

ATMOS Bg–90: NE Poland, Białystok Upland (Wysoczyzna Białostocka), Knyszyńska Primeval Forest (Puszcza Knyszyńska), Podlaskie Province, 53°17'58.2"N, 23°7'23.484"E, on the soil of a forest roadside slope, *leg*., *det*. M. Staniaszek-Kik, 28.04.2011 (LOD); ATMOS Cf–09: NE Poland, Białystok Upland, Knyszyńska Primeval Forest, Podlaskie Province, 53°16'47.028"N, 22°57'21.6"E, on a sandy soil in a roadside ditch near a young pine plantation, *leg*., *det*. M. Staniaszek-Kik, 30.04.2011 (LOD); ATMOS Fb–19: NE Poland, Suwałki Lakeland (Pojezierze Suwalskie), Podlaskie Province, Wigry National Park, north-west of Leszczewek forester's lodge, edge of the forest road in a *Tilio-Carpinetum calamagrostietosum* association, 54°4'22.6"N, 23°2'47.92"E, M. Romański, 1.05.2013 (observation); ATMOS Fb–09: NE Poland, Suwałki Lakeland, Podlaskie Province, Wigry National Park, west of Pierty Lake, edge of the forest road in a *Serratulo-Pinetum* association, 54°6'0.76"N, 23°3'26.89"E, M. Romański, 17.11.2013 (observation); ATMOS Gb–10: NE Poland, Suwałki Lakeland, Podlaskie Province, Wigry National Park, Pogorzelec, forest section 333a, 54°2'16.06"N, 23°13'59.1"E, edge of the forest road in a *Peucedano-Pinetum* association, *leg*., *det*. P. Górski, M. Romański, 1.10.2014 (POZNB).

In Poland, *Buxbaumia aphylla* is widely distributed throughout the lowlands (with very scattered localities), and it is less common in mountains (Szafran 1957, Kowalczyk & Stebel 2000). This moss is generally rare, but in some areas it likely is not recorded due to the small size of its gametophyte and ephemeral sporophyte (Horn et al. 2003). *Buxbaumia aphylla* grows on humus-rich, acidic, sandy soils, in either exposed or shady habitats in forests, especially coniferous stands and, less frequently, in deciduous woods. It prefers roadsides and ditches (Hancock & Brassard 1974, Smith 2004, Rutkowski & Maciejewska-Rutkowska 2008). Five new localities of *B. aphylla* were found in north-eastern Poland. The species was recorded for the first time in the Knyszyńska Primeval Forest (Karczmarz & Sokołowski 1995) and a second time in Wigry National Park (Wierzcholska et al. 2010).

3. ***Campylopus introflexus*** (Hedw.) Brid.

Author: M. Smoczyk

ATMOS Ca–94: W Poland, Lubuskie Lakeland (Pojezierze Lubuskie), Łagów Lakeland (Pojezierze Łagowskie), 1.2 km north of the village of Lubiechnia Mała, forest section 723f of the Ośno Lubuskie Forest Inspectorate, 52°25'10"N, 14°50'53"E, mineral soil near the forest road in a pine forest complex, *leg*., *det*. M. Smoczyk, 7.10.2014 (KRAM); ATMOS Da–03: W Poland, Lubuskie Lakeland, Torzym Plain (Równina Torzymska), 0.4 km north-west of the Zielony Bór settlement, forest section 223d of the Rzepin Forest Inspectorate, 52°18'39"N, 14°41'18"E, dried peat, *leg*., *det*. M. Smoczyk, 6.04.2014 (KRAM); ATMOS Da–04: W Poland, Lubuskie Lakeland, Torzym Plain, Rzepinek settlement, 2.4 km south-west from the church in Rzepin, forest section 109a of the Rzepin Forest Inspectorate, 52°19'38"N, 14°49'16"E, on mineral sandy soil in a young pine plantation, *leg*., *det*. M. Smoczyk, 9.11.2013 (KRAM); 0.2 km south-east of Długie Lake, forest section 14g of the Rzepin Forest Inspectorate, 52°20'9"N, 14°51'54"E, sandy soil in a young pine plantation, *leg*., *det*. M. Smoczyk, 17.11.2013 (KRAM); village of Nowy Młyn, forest section 178g of the Rzepin Forest Inspectorate, 52°18'38"N, 14°48'53"E, acidophilus oak forest, edge of the footpath, *leg*., *det*. M. Smoczyk, 9.11.2013 (KRAM); 0.4 km north-west of Bledzewskie Lake, forest section 63a of the Rzepin Forest Inspectorate, 52°20'19"N, 14°47'56"E, on sandy soil under the overhead power line, in an *Airetum praecocis* association, *leg*., *det*. M. Smoczyk, 21.05.2012 (KRAM); north-eastern shore of Głębiniec Lake, forest section 153h of the Rzepin Forest Inspectorate (from this area a locality given by A. Rusińska in Fudali et. al. [2009] still exists), 52°19'24"N, 14°45'32"E, edge of the forest road in an *Airetum praecocis* association, *leg*., *det*. M. Smoczyk, 19.06.2012 (KRAM); 1 km south-east of the village of Gajec, forest section 25a of the Rzepin Forest Inspectorate, 52°20'30"N, 14°47'1"E, edge of the pine forest, *leg*., *det*. M. Smoczyk, 21.05.2012 (KRAM); ATMOS Da–05: W Poland, Lubuskie Lakeland, Torzym Plain, fish pond complex along the Tarnawka stream, 2.2 km south-east of the village of Starościn, forest section 144a of the Torzym Forest Inspectorate, 52°21'22"N, 14°53'7"E, edge of the path in the pine forest, *leg*., *det*. M. Smoczyk, 16.11.2013 (KRAM); forest section 150a of the Torzym Forest Inspectorate, 52°21'3"N, 14°52'54"E, sandy soil at the edge of a young pine plantation in an *Spergulo vernalis-Corynephoretum* association, *leg*., *det*. M. Smoczyk, 16.11.2013 (KRAM); forest section 160j of the Torzym Forest Inspectorate, 52°20'39"N, 14°52'30"E, *leg*., *det*. M. Smoczyk, 30.11.2013 (KRAM); ATMOS Da–14: W Poland, Lubuskie Lakeland, Torzym Plain, forest section 30g of the Cybinka Forest Inspectorate, 52°17'57"N, 14°46'57"E, young pine plantation, *leg*., *det*. M. Smoczyk, 9.11.2013 (KRAM); 2.3 km north-east from Maczków, forest sections 97d and 71j of the Cybinka Forest Inspectorate, 52°17'1"N, 14°46'41"E, sandy soil at the edge of a young pine plantation in an *Spergulo vernalis-Corynephoretum* association, *leg*., *det*. M. Smoczyk, 9.11.2013 (KRAM).

Campylopus introflexus is a neophytic moss in the bryoflora of Poland (Ochyra 1983), regarded as an aggressive invader in Europe. It colonises mostly

disturbed habitats; the majority of its European and Polish localities are recorded from mineral soil on the edges of pine forests and plantations, on forest roads, and in drained bogs (Fudali et al. 2009, Mikulášková et al. 2012, Górski 2014, Piwowarski 2014, Staniaszek-Kik 2014). The same situation takes place in the Lubuskie Lakeland. In most of the findings recorded there, *C. introflexus* grows in dense cushions of ca 3–9 m^2 and often produces sporophytes.

3. ***Campylopus introflexus*** (Hedw.) Brid.

Author: P. Górski

ATMOS Ac–37: N Poland, East Pomerania (Pomorze Wschodnie), Pomerania Province, Puck County, ca 1 km north-east of the village of Odargowo, "Zielone" nature reserve, *leg*., *det*. P. Górski, 22.04.2013 (POZNB); ATMOS Cb–23: NW Poland, Wałcz Lakeland (Pojezierze Wałeckie), West Pomerania Province, Człopa Forest Inspectorate, Borowik forestry, forest section 161f, ca 1 km west of the village of Golin in an *Spergulo vernalis-Corynephoretum* association, *leg*., *det*. P. Górski, 5.07.2008 (POZNB).

4. ***Cephaloziella elachista*** (J.B. Jack ex Gottsche et Rabenh.) Schiffn.

Authors: P. Górski, M. Gąbka

ATMOS Cb–07: NW Poland, West Pomerania (Pomorze Zachodnie), Wałcz Plain (Równina Wałecka), Wielkopolska Province, "Smolary" nature reserve, transitional bog (poor fen) near the south-eastern and south-western shores of Żabie Lake, 53°17'18.6"N, 16°43'9.6"E, 53°17'15.12"N, 16°43'5.04"E, *leg*. P. Górski, M. Gąbka, *det*. P. Górski, 27.09.2014 (POZNB).

Localities of *Cephaloziella elachista* are known from central and northern Poland (Szweykowski 2006). It seems to be a rare, poor fen species. However, in West Pomerania, it is probably more frequent than the published data indicate and is overlooked in the field. After the year 2000, *C. elachista* was recorded in this region in the vicinity of Koszalin (Górski 2013).

5. ***Diplophyllum albicans*** (L.) Dumort.

Authors: A. Stebel, T. Paciorek

ATMOS Ge–11: S Poland, Western Carpathians (Karpaty Zachodnie), Gorce range, Małopolskie Province, Gorczański National Park, Białe Skały sandstone outcrops, 49°34'38.5"N, 20°11'10.3"E, shaded sandstone, alt. 1058 m a.s.l., *leg*., *det*. A. Stebel, T. Paciorek, 20.06.2014 (SOSN); ATMOS Ge–11: S Poland, Western Carpathians, Gorce range, Małopolskie Province, Gorczański National Park, Kudłoński Baca sandstone outcrops, 49°34'36.2"N, 20°10'16.2"E, shaded small sandstone rock in thicket, alt. 1034 m a.s.l., *leg*., *det*. A. Stebel, T. Paciorek, 21.06.2014 (SOSN).

In the Polish part of the Carpathians, *Diplophyllum albicans* is a fairly frequent species, known from 50 localities (Cykowska 2006). Until now, it has not been reported from the Gorce range (Mierzeńska 1994). Both newly discovered localities are quite scarce.

6. ***Entodon concinnus*** (De Not.) Paris

Authors: M. Smoczyk, S. Wierzcholska

ATMOS Fb–24: SW Poland, Central Sudetes Mountains (Sudety Środkowe), Orlickie Foothills (Pogórze Orlickie), Lower Silesia Province, village of Zielone, near Duszniki-Zdrój, 0.5 km north of Mount Gomoła, 50°24'22"N, 16°20'49"E, alt. 705 m a.s.l., small patches on limestone gravel in initial dry grassland with *Koeleria pyramidata* (pH 7.6, conductivity 170 μS cm^{-1}) and scattered shoots on soil in dense *Bromion erecti* grassland (pH 7.8, conductivity 250 μS cm^{-1}), growing with *Homalothecium lutescens*, *Ctenidium molluscum*, *Abietinella abietina*, *Rhytidiadelphus triquetrus*, *Hypnum cupressiforme* var. *lacunosum*, *Encalypta streptocarpa*, *Tortella tortuosa*, *Fissidens taxifolius*, and *Distichium capillaceum*, no sporophytes observed in the population, *leg*., *det*. M. Smoczyk, S. Wierzcholska, 15.08.2014, *conf*. A. Stebel (KRAM).

Entodon concinnus is a rare calciphilous moss, preferring open, dry grassland and limestone habitats, that often occurs in small quantities. The new finding of *E. concinnus* is the first in the Polish part of the Sudetes Mts and Lower Silesia Province. It has not been recorded in the former Silesian floras (Milde 1869, Limpricht 1876) nor in the modern ones in the Sudetes Mts ranges, where calcareous rocks occur (Berdowski 1974, Wilczyńska 1974, Szmajda 1979). It is worth noting that the species was not recorded by Milde (1853), who explored the particular Zielone area, which is known for its extraordinary floristic values, especially those caused by limestone habitats, a few times in the second half of the 19th century. As reported by Ochyra & Bednarek-Ochyra (2000) and Callaghan (2010), this species can be overlooked and mistaken for *Pleurozium schreberi* or *Calliergonella cuspidata* in the field.

7. ***Frullania tamarisci*** (L.) Dumort.

Authors: A. Stebel, T. Paciorek

ATMOS Ge–11: S Poland, Western Carpathians, Gorce range, Małopolskie Province, Gorczański National Park, sandstone outcrops near the Adamówka glade, 49°34'40.2"N, 20°11'29.1"E, shaded sandstone, alt. 1134 m a.s.l., *leg*., *det*. A. Stebel, T. Paciorek, 20.06.2014 (SOSN); ATMOS Ge–21: S Poland, Western Carpathians, Gorce range, Małopolskie Province,

Gorczański National Park, sandstone outcrops near the Kopa glade, 49°34'26.1"N, 20°09'15"E, shaded sandstone, alt. 1037 m a.s.l., *leg*., *det*. A. Stebel, 21.06.2014 (SOSN).

Frullania tamarisci is a threatened (category E) liverwort in Poland (Klama 2006). In the Polish part of the Carpathians it is very rare (Zubel & Stebel 2008). Most of its localities has been recorded in the Tatra Mountains (Zubel & Stebel 2008, Górski & Váňa 2014). In the Gorce range, *F. tamarisci* is known from only one locality on Mount Kudłoń (Mierzeńska 1994). New localities are quite abundant, with liverworts covering several square decimetres. Both localities lie far from hiking trails and seem to be unthreatened.

8. ***Fuscocephaloziopsis macrostachya*** (Kaal.) Váňa et L. Söderstr. (= *Cephalozia macrostachya* Kaal.)

Authors: P. Górski, M. Gąbka

ATMOS Cb–07: NW Poland, West Pomerania, Wałcz Plain, Wielkopolska Province, "Smolary" nature reserve, transitional bog (poor fen) near south-eastern shore of Żabie Lake, 53°17'18.6"N, 16°43'9.6"E, *leg*. P. Górski, M. Gąbka, *det*. P. Górski, 27.09.2014 (POZNB).

The distribution centre of *Fuscocephaloziopsis macrostachya* in Poland is situated in the northern part of the country (Szweykowski 2006). However, only a few of its localities are known from West Pomerania (Szweykowski 1958), especially those published in the recent years (Szweykowski & Koźlicka 1969, Górski 2013). According to Szweykowski (2006), this species is actually more frequent than it would appear from the published data. It is worth noting that *F. macrostachya* still occurs in the locality found by J. Szweykowski in 1950 (Szweykowski & Koźlicka 1969) in the "Bagno Kusowo" nature reserve near Szczecinek (*leg*., *det*. P. Górski, 11.05.2010 [POZNB]).

9. ***Geocalyx graveolens*** (Schrad.) Nees

Authors: P. Górski, M. Gąbka

ATMOS Cb–07: NW Poland, West Pomerania, Wałcz Plain, Wielkopolska Province, "Smolary" nature reserve, 53°17'23.4"N, 16°43'27.24"E, on soil near the Rurzyca river, *leg*. P. Górski, M. Gąbka, *det*. P. Górski, 27.09.2014 (POZNB).

Geocalyx graveolens is a frequent species only in north-eastern Poland (Szweykowski 2006). In western Poland, where the present locality occurs, it is known only from a few scattered localities (Szweykowski & Koźlicka 1974).

10. ***Helodium blandowii*** (F. Weber & D. Mohr) Warnst.

Author: P. Pawlikowski

ATMOS Bg–72: NE Poland, Podlasie Province, Sokółka County, Sidra commune, 0.75 km north-east of the village of Makowlany by the Kolonia Makowlany settlement, 53°31'58.7"N, 23°26'43.4"E, sedge-brown moss vegetation in a rich fen developing on the slopes of moderately desiccated spring-cupola in the valley of a small tributary rivulet of the Sidra River; scattered patches among extensive carpets of *Aulacomnium palustre*, *leg*., *det*. P. Pawlikowski, 11.07.2009 (KRAM).

Helodium blandowii is a species growing in minerotrophic fens not uncommonly found in the post-glacial landscapes of northern and north-western Poland as well as the uplands of southern Poland (Ochyra et al. 1988a) but is rare elsewhere (Pawlikowski 2014a); it is considered vulnerable in Poland (category V; Żarnowiec et al. 2004). In the Podlasie Province, the species has numerous, abundant populations in the young, post-glacial landscape of the Lithuanian Lake District as well as in the Biebrza valley (Bloch & Bloch 1975, Pałczyński 1975, Karczmarz & Sokołowski 1985, Ochyra et al. 1988a, Pawlikowski 2010, Wołejko et al. 2012). Aside from those regions, *H. blandowii* has been reported from nearly a dozen localities in the Białowieża and Knyszyn Primeval Forests (Gocławska 1966, Bloch & Bloch 1975, Karczmarz & Sokołowski 1977, 1981, Ochyra et al. 1988a, Matowicka et al. 2000, Wołejko et al. 2012) and three scattered sites elsewhere (Bloch & Bloch 1975, Karczmarz & Sokołowski 1977, Ochyra et al. 1988a); however, the latter sites have not been confirmed during the past decades.

11. ***Heterogemma laxa*** (Lindb.) Konstant. & Vilnet (= *Lophozia laxa* (Lindb.) Grolle)

Authors: P. Górski, M. Gąbka, M. Romański

ATMOS Cb–07: NW Poland, West Pomerania, Wałcz Plain, Wielkopolska Province, "Smolary" nature reserve, transitional bog (poor fen) near the south-western shores of Żabie Lake, 53°17'15.12"N, 16°43'5.04"E, *leg*. P. Górski, M. Gąbka, *det*. P. Górski, 27.09.2014 (POZNB).

Heterogemma laxa is a very rare poor fen species in Poland (Szweykowski 2006). It is known from about 10 localities in the country (Szweykowski 1958, Rejment-Grochowska & Mickiewicz 1962). In Poland, the last known data of this species came from Wigry National Park (north-western Poland; Rejment-Grochowska & Mickiewicz 1962), where the species was rediscovered in 2013 and 2014 (Górski & Romański, unpublished).

12. ***Hookeria lucens*** (Hedw.) Sm.

Author: T. Paciorek

ATMOS Ge–20: S Poland, Western Carpathians, Gorce range, Małopolska Province, ca 1 km south-east of the village of Białonie, 49°34'24.64"N, 20°03'21.22"E, soil in a beech forest, slope over the stream, alt. 729 m a.s.l, *leg*. A. Przemyski, *det*. T. Paciorek, 5.06.2014 (KRAM).

Hookeria lucens is a very rare species in Poland. It occurs exclusively in the mountains in the southern part of the country, including the Sudetes and the Western Carpathians. In this area, *H. lucens* is associated with the humid climate and predominantly acidic soils originating from the geological Carpathian flysch formation (Stebel et al. 2004). This species was recorded in Gorce more than 40 years ago (Kornaś & Medwecka-Kornaś 1956, 1967, Lisowski 1956a, Lisowski & Kornaś 1966, Ochyra et al. 1985, Stebel et al. 2004) from 14 sites.

12. ***Hookeria lucens*** (Hedw.) Sm.

Author: G. Vončina

ATMOS Gf–10: S Poland, Beskid Niski range, Podkarpacie Province, Jasło County, Dębowiec commune, Folusz village, Kłopotnica valley in Magurski National Park, on the mineral soil of the bank of the stream in a Carpathian beech forest of the *Dentario glandulosae-Fagetum festucetosum drymejae* association, alt. 465 m a.s.l., 49°35'53.5"N, 21°21'50.9"E, *leg.*, *det.* G. Vončina, 11.10.2014, *conf.* A. Stebel (SOSN); on the mineral soil of the bank of the stream in the Carpathian beech forest, alt. 636 m a.s.l., 49°34'55.2"N, 21°22'30.3"E, G. Vončina, 11.10.2014 (observation); on the mineral soil of the bank of the stream in the Carpathian beech forest, alt. 709 m a.s.l., 49°34'37.9"N, 21°22'31.9"E, G. Vončina, 11.10.2014 (observation).

Hookeria lucens is a rare, vulnerable moss species in the Polish Carpathians (category V; Żarnowiec et al. 2004) that occurs in scattered localities, especially in the Western Beskidy (Beskidy Zachodnie) – Beskid Śląski, Beskid Wysoki, Beskid Mały, Beskid Wyspowy, and Gorce ranges; moreover, it occurs in the Sub-Tatra Trough (Rów Podtatrzański) and Rożnowskie Foothills (Pogórze Rożnowskie) (Ochyra et al. 1985, Stebel et al. 2004, Stebel 2006). There is also the first record of this species in the Beskid Niski range, making it the eastern-most locality in the Polish Carpathians. The patches were relatively large (covering ca 1 m^2), and some individuals were fertile.

13. ***Isopterygiopsis pulchella*** (Hedw.) Z. Iwats.

Author: G. Vončina

ATMOS Gd–16: S Poland, Beskid Wysoki range (= Beskid Żywiecki range), Babia Góra massif, Małopolska Province, Sucha Beskidzka County, Zawoja commune, village of Zawoja, west of the Polana Markowe Szczawiny glade in Babiogórski National Park, on the sandstone in the spruce forest of the upper montane belt in a *Plagiothecio-Piceetum* association, alt. 1100 m a.s.l., 49°35'23.7"N, 19°30'44.3"E, *leg.*, *det*. G. Vončina, 20.07.2013, *conf.* A. Stebel (SOSN).

Isopterygiopsis pulchella is very rare moss species in the Polish Carpathians (Stebel 2006), Tatra Mts (Lisowski 1959), and Bieszczady range (Lisowski 1956b). On the Babia Góra massif, it was recorded by G. Limpricht in the 19th century (Limpricht 1873) but was not rediscovered during subsequent botanical investigations. The species prefers shade and humid conditions and weakly acidophilus rocks. In the field, the moss has been observed with other bryophytes in small turf areas; some plants produced sporophytes.

14. ***Lophoziopsis excisa*** (Dicks.) Konst. et Vilnet (= *Lophozia excisa* (Dicks.) Dumort.)

Author: P. Górski

ATMOS Ac–39: N Poland, East Pomerania (Pomorze Wschodnie), Pomerania Province, Chłapowo, sandy cliff in a *Trifolio-Anthyllidetum maritimae* association, *leg.*, *det*. P. Górski, 4.07.2006 (POZNB); ATMOS Cb–99: W Poland, Wielkopolska region, Wielkopolska Province, city of Poznań, Wilczy Młyn, 52°25'55.2"N, 16°58'37.26"E, sandy trail slope, community with *Pinus sylvestris*, *leg.*, *det*. P. Górski, 28.10.2004 (POZNB).

Lophoziopsis excisa is a widespread liverwort across the country (Szweykowski & Koźlicka 1980, Szweykowski 2006, Górski 2010). The presented new locality from Chłapowo is the northern-most in Poland. From cliffs near the Baltic Sea, *L. excisa* was recorded on Wolin Island (north-western Poland; Szweykowski & Koźlicka 1966).

15. ***Nowellia curvifolia*** (Dicks.) Mitt.

Authors: P. Górski, M. Gąbka

ATMOS Cb–07: NW Poland, West Pomerania, Wałcz Plain, Wielkopolska Province, near the village of Płytnica, 53°16'59.88"N, 16°44'22.86"E, the Rurzyca River valley, decaying pine log near the river, *leg*. P. Górski, M. Gąbka, *det*. P. Górski, 27.09.2014 (POZNB).

Nowellia curvifolia is a lignicolous species associated with coniferous wood. Its centre of occurrence in Poland is in the north-eastern part of the country, where it is a frequent species (Szweykowski 1969,

2006). In central Poland and mountainous areas, it is rare (Szweykowski 1969, 2006, Górski 2006, Cykowska-Marzencka 2014, Górski & Váňa 2014). Recent observations (Górski 2010, 2013) indicate that *N. curvifolia* is no longer a rare species in West Pomerania. In this region, it also has been noted in commercial forests and secondary forest communities.

16. ***Odontoschisma fluitans*** (Nees) L. Söderstr. et Váňa (= *Cladopodiella fluitans* (Nees) H. Buch)

Authors: P. Górski, M. Gąbka

ATMOS Cb–07: NW Poland, West Pomerania, Wałcz Plain, Wielkopolska Province, "Smolary" nature reserve, transitional bog (poor fen) near the south-eastern shore of Żabie Lake, 53°17'18.6"N, 16°43'9.6"E, *leg*. P. Górski, M. Gąbka, 27.09.2014, *det*. P. Górski (POZNB); ATMOS Cb–07: NW Poland, West Pomerania, Wałcz Plain, West Pomerania Province, floating *Sphagnum* mats near the western shore of Lake Bagnisko between Nadarzyce and Starowice (Piława River valley), 53°29'57.8"N, 16°28'40.6"E, *leg*. M. Gąbka, 27.09.2014, *det*. P. Górski (POZNB).

Distribution characteristics of *Odontoschisma fluitans* in Poland is presented in the works by Klama (1998) and Górski (2013). From West Pomerania, where these data were collected, relatively many localities of this plant are known (Szweykowski 1958, 1964, Górski 2013). On a whole-country scale, *O. fluitans* is a species threatened with extinction (category V; Klama 2006).

17. ***Orthotrichum pulchellum*** Brunt. in Sm.

Authors: M. Smoczyk, A. Wiaderny

ATMOS Fb–13: SW Poland, Central Sudetes Mountains, Góry Stołowe Mountains, Lower Silesia Province, village of Bukowina Kłodzka, 0.1 km south of the haematological hospital, forest section 69j of the Zdroje Forest Inspectorate, 50°28'24"N, 16°16'41"E, alt. 710 m a.s.l., on the trunk of *Fraxinus excelsior* at a height of 1.6 m above ground with a north-eastern exposure, two tufts ca 1 cm² each growing with *Orthotrichum affine*, *O. diaphanum*, *O. pallens*, *O. speciosum*, *O. stramineum*, *O. anomalum*, *Ulota bruchii*, *U. crispa*, *Dicranum scoparium*, and *Hypnum cupressiforme*, *leg*., *det*. M. Smoczyk, 12.07.2013, *conf.* V. Plášek (KRAM); ATMOS Fb–25: SW Poland, Central Sudetes Mts, Kłodzko basin (Kotlina Kłodzka), Lower Silesia Province, at the culmination of an unnamed hill 0.5 km south-east from the church in the village of Szalejów Górny, forest section 457a of the Zdroje Forest Inspectorate, 50°25'24"N, 16°32'53"E, alt. 360 m a.s.l., on a branch of *Pyrus communis* at height of 1.6 m above ground with a north-eastern exposure and 70° inclination south-west of the branch, size of the population was ca 0.5 cm², associated species were *O. affine*, *O. diaphanum*, *O. patens*, *O. pumilum*, *O. speciosum*, and *H. cupressiforme*, *leg*., *det*. M. Smoczyk, 1.05.2014, *conf.* V. Plášek (KRAM); ATMOS Da–04: W Poland, Lubuskie Lakeland, Torzym Plain, Lubuskie Province, Rzepinek settlement, the Ilanka River valley, 1.7 km south of the church in Rzepin, forest section 143b of the Rzepin Forest Inspectorate, thickets where a building formerly sat, 52°19'15"N, 14°49'21"E, on a trunk of *Acer pseudoplatanus* at a height of 1.9 m above ground with a north-eastern exposure, one tuft ca 1.5 cm², growing with *O. affine*, *O. stramineum*, *U. bruchii*, *U. coarctata*, *Radula complanata*, *Syntrichia virescens*, and *H. cupressiforme*, *leg*., *det*. M. Smoczyk, 24.03.2013, *conf.* V. Plášek (KRAM); village of Nowy Młyn, 5 km south of Rzepin, south side of the road from Rzepin to Maczków, forest section 12b of the Cybinka Forest Inspectorate, 52°18'25"N, 14°48'16"E, on a fallen branch of *Quercus robur*, one tuft ca 1 cm² growing with *O. affine*, *O. diaphanum*, *O. pumilum*, *O. speciosum*, *U. bruchii*, *U. crispa*, and *H. cupressiforme*, *leg*., *det*. M. Smoczyk, 7.04.2013, *conf.* V. Plášek (KRAM); village of Nowy Młyn, 5 km south of Rzepin, the Ilanka River valley, 1 km south of Nowy Młyn, at the right side of the river, forest section 25h of the Cybinka Forest Inspectorate, 52°17'46"N, 14°48'34"E, species was found on four trees on a stretch of ca 100 m in an alluvial forest from a *Alno-Padion* alliance: (1) two tufts ca 3 cm² each on a trunk of *Padus avium,* 1.5–2.0 m above ground at an 80° inclination with southern and north-eastern exposures, growing with *Frullania dilatata*, *H. cupressiforme*, *O. affine*, *O. anomalum*, and *U. crispa*; (2) single tuft 1 cm² on the trunk of *P. avium,* 1.5 m above ground at an 80° inclination with north-western and southern exposures, growing with *H. cupressiforme*, *O. affine*, and *U. bruchii*; (3) single tuft 1.5 cm² on a dead branch of *Sambucus nigra*, 1.1 m above ground at a 60° inclination with southern and northern exposures, other species on this branch (growing separately from *O. pulchellum*) included *Brachythecium rutabulum*, *H. cupressiforme*, and *O. affine*; (4) single tuft 1 cm² on a trunk of young *P. avium* 0.2 m in diameter, 1.8 m above ground at an 80° inclination with southern and north-eastern exposures of tuft, growing among a *H. cupressiforme* mat along with *D. polysetum*, *O. affine*, and *U. crispa, leg*., *det*. A. Wiaderny, 6–9.04.2014 (KRAM).

Orthotrichum pulchellum is an epiphytic moss. In Europe, this oceanic species occurs in the western part of the continent and appears to be spreading eastward (Frahm 2002, Marková & Plášek 2013). In Poland, the only historical record from the 19th century was given from the Myślibórz Lakeland in the Western Pomerania region (Ruthe 1867). It was rediscovered recently in Poland (Plášek et al. 2013) in three new localities in Western Pomerania (north-western Poland). New findings given in this publication are the first ones in western and south-western Poland

and are some of the eastern-most known localities of *O. pulchellum* in Europe. In all the new localities, *O. pulchellum* was found with sporophytes and in small population sizes (usually small, single tufts), the latter which could be the result of recent colonisation.

18. ***Porella arboris-vitae*** (With.) Grolle

Authors: A. Stebel, T. Paciorek

ATMOS Ge–11: S Poland, Western Carpathians, Gorce range, Małopolskie Province, Gorczański National Park, sandstone outcrops near Adamówka glade, 49°34'40.2"N, 20°11'29.1"E, shaded sandstone, alt. 1134 m a.s.l., *leg*., *det*. A. Stebel, T. Paciorek, 20.06.2014 (SOSN).

Porella arboris-vitae is a threatened (category E) liverwort in Poland (Klama 2006) that almost completely has vanished from the Polish part of the Carpathians. Recently, it was observed only in the Bieszczady Zachodnie Mountains (Buczkowska & Bączkiewicz 2010) and the Jasło-Sanok basin (Doły Jasielsko-Sanockie) (Armata 2011). In the Gorce range, the only locality reported from Ochotnica Dolna (Medwecka-Kornaś 1955) was not confirmed recently (Mierzeńska 1994). The new locality covers several square decimetres and lies far from hiking trails, thus seemingly unthreatened.

19. ***Sphagnum russowii*** Warnst.

Author: A. Stebel

ATMOS Fd–67: S Poland, Kraków-Częstochowa Upland (Wyżyna Krakowsko-Częstochowska), Krzeszowice Trough (Rów Krzeszowicki), Małopolskie Province, Rudno, near Krzeszowice, 50°06'36.8"N, 19°34'20.3"E, in a wet place in a *Pinus sylvestris* forest, *leg*., *det*. A. Stebel, 28.08.2014 (SOSN).

Sphagnum russowii is a boreal-montane species (Dierssen 2001); its presence outside mountains is rare in southern Poland. In the Kraków-Częstochowa Upland (Fojcik 2011), it is known from only one locality near Sieraków (Stebel & Fojcik 2003), in the northern part of this region. The new stand is not abundant (ca 0.5 m^2) and occurs in the boggy patch of the *P. sylvestris* forest in the large forest complex north of the village of Rudno, not far from the Droga Krakowska road. *Sphagnum russowii* is a species new to the Krzeszowice Trough meso-region.

20. ***Thamnobryum alopecurum*** (Hedw.) Gangulee

Author: G. Vončina

ATMOS Gf–10: S Poland, Beskid Niski range, Podkarpacie Province, Jasło County, Dębowiec commune, village of Folusz, Kłopotnica valley in Magurski National Park on the sandstone near the stream in the *Dentario glandulosae-Fagetum festucetosum drymejae* Carpathian beech forest, alt. 451 m a.s.l., 49°35'55.7"N, 21°21'45.4"E, *leg*., *det*. G. Vončina, 11.10.2014, *conf*. A. Stebel (SOSN).

Thamnobryum alopecurum is rare or very rare moss species in different ranges in the Polish Carpathians (Bednarek-Ochyra et al. 1994, Stebel 2006, Stebel et al. 2010). The species was noted in the Beskid Niski range by Karczmarz (1987) in the "Kornuty" nature reserve. The moss was not confirmed during the most recent bryological fieldwork (Stebel & Ochyra 2000, Stebel 2011). This species prefers shaded, weakly alkaline rocks. In the Kłopotnica valley, it grows in scattered places, in ca 1 m^2, among other epilithic species. It did not form sporophytes.

21. ***Tomentypnum nitens*** (Hedw.) Loeske

Author: P. Pawlikowski

ATMOS Bg–52: Podlasie Province, Sokółka County, Nowy Dwór commune, 53°38'03.3"N, 23°28'43"E, sedge-brown moss vegetation in a spring-rich fen in the valley of a small tributary rivulet of the Sidra River in the upper Biebrza basin, 0.5 km south-east of the village of Bieniowce, small, scattered patches growing with *Calliergonella cuspidata* and *Limprichtia cossonii*, *leg*., *det*. P. Pawlikowski, 11.07.2009 (KRAM); ATMOS Bg–62 and Bg–72: Podlasie Province, Sokółka County, Sidra commune, 0.75 km north-east of the village of Makowlany by the Kolonia Makowlany settlement, 53°31'58.7"N, 23°26'43.4"E, sedge-brown moss vegetation in a rich fen developing on the slopes of moderately desiccated spring-cupola in the valley of a small tributary rivulet of the Sidra River with *Aulacomnium palustre* covering a surface of ca 1.5 ha, *leg*., *det*. P. Pawlikowski, 11.07.2009 (KRAM); ATMOS Bg–63: Podlasie Province, Sokółka County, Sidra commune, 0.5 km south-east of the village of Bierniki, 53°34'54.5"N, 23°32'15.5"E, overgrown peat-cuttings with sedge-brown moss vegetation in a soligenous-rich fen in the valley of a small tributary rivulet of the Siderka River in the upper Biebrza basin; large carpets growing with *A. palustre* and *C. cuspidata*, *leg*., *det*. P. Pawlikowski, 11.07.2009 (KRAM).

Tomentypnum nitens is a species related to rich fens, known from quite numerous localities in the post-glacial landscape of northern and north-western Poland as well as the uplands of southern Poland (Ochyra et al. 1988b), but it is rare elsewhere (Pawlikowski 2014b); it is considered vulnerable in Poland (category V; Żarnowiec et al. 2004). In the Podlasie Province, the species has numerous, abundant populations in the young post-glacial landscape of the Lithuanian Lake District as well as the Biebrza valley (Bloch & Bloch 1975, Pałczyński 1975, Bloch et al. 1979, Karczmarz & Sokołowski 1985, Ochyra

et al. 1988b, Pawlikowski 2010, Wołejko et al. 2012). Aside from those regions, there have been only about a dozen localities reported from the Białowieża and Knyszyn Primeval Forests (Gocławska 1966, Bloch & Bloch 1975, Karczmarz & Sokołowski 1977, Bloch et al. 1979, Ochyra et al. 1988b, Matowicka et al. 2000, Wołejko et al. 2012) and only two scattered sites elsewhere (Bloch et al. 1979, Ochyra et al. 1988b), which have not been confirmed during recent decades.

REFERENCES

Armata L. (2011): Invasive tendencies of bryophytes in the flora of the Jasło-Sanok Basin (Carpathian Foothills, SE Poland). In: A. Stebel, R. Ochyra (eds). Chorological studies on Polish Carpathians bryophytes. Sorus, Poznań: 223–232.

Bednarek-Ochyra H., Ochyra R., Szmajda P. (1994): M. 455. *Thamnobryum alopecurum* (Hedw.) Gang. In: R. Ochyra, P. Szmajda (eds). Atlas of the geographical distribution of mosses in Poland. 9. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków: 27–35.

Berdowski W. (1974): Flora mchów i zbiorowiska mszaków Masywu Ślęży. Monographiae Botanicae 45: 1–126.

Bloch M., Bloch M. (1975): Materiały do flory mszaków Niziny Północnopodlaskiej. Annales Universitatis Mariae Curie-Skłodowska, Sectio C, Biologia 30: 129–140.

Bloch M., Karczmarz K., Sokołowski A.W. (1979): Nowe dane do flory mszaków północno-wschodniej Polski. II. Annales Universitatis Mariae Curie-Skłodowska, Sectio C, Biologia 34(5): 47–53.

Buczkowska K., Bączkiewicz A. (2010): Re-apperance of *Porella arboris-vitae* in the Bieszczady National Park. Roczniki Akademii Rolniczej w Poznaniu 389, Botanika-Steciana 14: 33–37.

Callaghan D. (2010): *Entodon concinnus*. In: I. Atherton, S. Bosanquet, M. Lawley (eds). Mosses and Liverworts of Britain and Ireland – a field guide. British Bryological Society, Plymouth: 774.

Cykowska B. (2006): *Diplophyllum albicans* (Hepaticopsida, Scapaniaceae) in the Polish Carpathians. Polish Botanical Journal 51(1): 93–95.

Cykowska-Marzencka B. (2014): 12. *Nowellia curvifolia* (Dicks.) Mitt. In: P. Górski, A. Stebel, A. Rusińska (eds). New distributional data on bryophytes of Poland, 1. Steciana 18(2): 80.

Dierssen K. (2001): Distribution, ecological amplitude and phytosociological characterization of European bryophytes. Bryophytorum Bibliotheca 56: 1–289.

Fojcik B. (2011): Distribution atlas of mosses of the Cracow-Częstochowa Upland. Centrum Dziedzictwa Przyrody Górnego Śląska, Katowice.

Frahm J.-P. (2002): Zur aktuellen Verbreitung von *Orthotrichum pulchellum*. Bryologische Rundbriefe 52: 1–5.

Fudali E., Szczepański M., Rusińska A., Rosadziński S., Wolski G. (2009): The current distribution in Poland of some European neophytic bryophytes with supposed invasive tendencies. Acta Societatis Botanicorum Poloniae 78(1): 73–80.

Gocławska D. (1966): Materiały do flory mszaków Puszczy Knyszyńskiej. Cz. 1. Mszaki nadleśnictwa Złota Wieś. Fragmenta Floristica et Geobotanica 12(2): 185–193.

Górski P. (2006): Liverworts of the nature reserve in Wielkopolska. 2. "Olbina". Roczniki Akademii Rolniczej w Poznaniu 378, Botanika-Steciana 10: 97–102.

Górski P. (2010): A contribution to the liverwort flora of the Drawsko lake district (Western Pomerania, Poland). Roczniki Akademii Rolniczej w Poznaniu 389, Botanika-Steciana 14: 19–26.

Górski P. (2013): Wątrobowce (*Marchantiophyta*) Leśnego Kompleksu Promocyjnego "Lasy Środkowopomorskie" (Pomorze Zachodnie). PGL Lasy Państwe Nadleśnictwo Karnieszewice, Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu, Sianów–Poznań.

Górski P. (2014): 3. *Campylopus introflexus* (Hedw.) Brid. In: P. Górski, A. Stebel, A. Rusińska (eds). New distributional data on bryophytes of Poland, 1. Steciana 18(2): 78.

Górski P., Váňa J. (2014): A synopsis of liverworts occurring in the Tatra Mountains (Western Carpathians, Poland and Slovakia): checklist, distribution and new data. Preslia 86(4): 381–485.

Hancock J.A., Brassard G.R. (1974): Phenology, sporophyte production, and life history of *Buxbaumia apylla* in Newfoundland, Canada. Bryologist 77: 501–503.

Horn K., Kučera J., Pavličko A., Procházka F. (2003): Ein Neufund von *Buxbaumia aphylla* Hedw. (*Buxbaumiaceae*, *Bryatae*) im Orlické hory – Gebirge (Adlergebirge; Böhmen). Acta Musei Reginaehradecensis S. A. 29: 3–5.

Karczmarz K. (1987): Flora mszaków Beskidu Niskiego. Annales Universitatis Mariae Curie-Skłodowska, Sectio C, Biologia 62(10): 111–135.

Karczmarz K., Sokołowski A.W. (1977): Nowe dane do flory mszaków północno-wschodniej Polski. Annales Universitatis Mariae Curie-Skłodowska, Sectio C, Biologia 32: 45–52.

Karczmarz K., Sokołowski A.W. (1981): Nowe dane do flory mszaków północno-wschodniej Polski. III. Annales Universitatis Mariae Curie-Skłodowska, Sectio C, Biologia 36(11): 125–134.

Karczmarz K., Sokołowski A.W. (1985): Brioflora projektowanego Wigierskiego Parku Narodowego. Annales Universitatis Mariae Curie-Skłodowska, Sectio C, Biologia 40(18): 193–213.

Karczmarz K., Sokołowski A.W. (1995): Mchy i wątrobowce Puszczy Knyszyńskiej. In: A. Czerwiński (ed.). Puszcza Knyszyńska. Monografia przyrodnicza. Zespół Parków Krajobrazowych w Supraślu, Supraśl: 155–171.

Klama H. (1998): Nowe stanowisko *Cladopodiella fluitans* (Hepaticae, Cephaloziaceae) na Wyżynie Śląsko-Krakowskiej. Fragmenta Floristica et Geobotanica Polonica 5: 308–310.

Klama H. (2006): Red list of the liverworts and hornworts in Poland. Czerwona lista wątrobowców i glewików w Polsce. In: Z. Mirek, K. Zarzycki, W. Wojewoda, Z. Szeląg (eds). Red list of plants and fungi in Poland. Czerwona lista roślin i grzybów Polski. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków: 21–33.

Kornaś J., Medwecka-Kornaś A. (1956): *Hookeria lucens* Sm. w Gorcach. Fragmenta Floristica et Geobotanica 2: 72–77.

Kornaś J., Medwecka-Kornaś A. (1967): Zespoły roślinne Gorców. I. Naturalne i na wpół naturalne zespoły nieleśne. Fragmenta Floristica et Geobotanica 13: 173–316.

Kowalczyk B., Stebel A. (2000): *Buxbaumia aphylla* (Musci, Buxbaumiaceae) w Beskidach Zachodnich. Fragmenta Floristica et Geobotanica Polonica 7: 382–385.

Limpricht K.G. (1873): Nachträge zu J. Milde: Bryologia Silesiaca, 1869. Jahresbereicht des Schlesichen Gesellschaft für Vaterländische Cultur 50: 124––140.

Limpricht K.G. (1876): Laubmoose. In: F. Cohn (ed.). Kryptogammen-Flora von Schlesien. Band 1. J.U. Kern's Verlag, Breslau: 27–224.

Lisowski S. (1956a): Bryotheca polonica. Fasc. XII. Nr 326-350, Musci gorcenses. Academia Scientiarum Poloniae, Posnaniae: 9.

Lisowski S. (1956b): Mchy Bieszczadów Zachodnich. Prace Komisji Biologicznej Poznańskiego Towarzystwa Przyjaciół Nauk 17(3): 1–95.

Lisowski S. (1959): Materiały do bryoflory Tatr. Prace Komisji Biologicznej Poznańskiego Towarzystwa Przyjaciół Nauk 21(2): 1–129.

Lisowski S., Kornaś J. (1966): Mchy Gorców. Fragmenta Floristica et Geobotanica 12: 41–114.

Marková I., Plášek V. (2013): *Orthotrichum pulchellum* Brunt. ex Sm. (Bryophyta) in the Czech Republic. Distribution and ecology. Časopis Slezského Zemského Muzea, Series A, Opava 62(1): 73–82.

Matowicka B., Kołos A., Czerniawska D. (2000): Mchy i wątrobowce. In: A. Czerwiński, A. Kołos, B. Matowicka (ed.). Przemiany siedlisk i roślinności torfowisk uroczyska Stare Biele w Puszczy Knyszyńskiej. Politechnika Białostocka, Białystok: 178–182.

Medwecka-Kornaś A. (1955): Zespoły leśne Gorców. Ochrona Przyrody 25: 1–112.

Mierzeńska M. (1994): Wątrobowce Gorców. Fragmenta Floristica et Geobotanica Polonica 1: 235–346.

Mikulášková E., Fajmonová Z., Hájek M. (2012): Invasion of central-European habitats by the moss *Campylopus introflexus*. Preslia 84(4): 863–886.

Milde J. (1853): Die Flora von Reinerz in der Grafschaft Glatz. Botanische Zeitung 11(51): 889–893.

Milde J. (1869): Bryologia silesiaca. Laubmoos-Flora von Nord- und Mittel-Deutschland under besonderer Berücksichtigung Schlesiens und mit Hinzunahme der Floren von Jütland, Holland, der Rheinpfalz, von Baden, Franken, Böhmen, Mähren und der Umgegend von München. Verlag von Arthur Felix, Leipzig.

Ochyra R. (1983): Mszaki synantropijne. Wiadomości Botaniczne 27(1): 31–44.

Ochyra R., Bednarek-Ochyra H. (2000): *Entodon concinnus* (De Not.) Par. (Musci) – an addition to the moss flora of tropical Africa. Arctoa 9: 129–132.

Ochyra R., Cykowska B. (2008): The liverwort flora of the Skalice Nowotarskie and Spiskie Klippen (Polish Western Carpathians). In: A. Stebel, R. Ochyra (eds). Bryophytes of the Polish Carpathians. Sorus, Poznań: 143–167.

Ochyra R., Rusińska A., Szmajda P. (1985): M. 456. *Hookeria lucens* (Hedw.) Sm. In: Z. Tobolewski, T. Wojterski (eds). Atlas of the geographical distribution of spore plants in Poland. Vol. 2. Series V. Mosses (Musci). Państwowe Wydawnictwo Naukowe, Warszawa–Poznań: 21–22.

Ochyra R., Szmajda P., Bednarek H., Bocheński W. (1988a): M. 484. *Helodium blandowii* (Web. & Mohr) Warnst. In: Z. Tobolewski, T. Wojterski (eds). Atlas of the geographical distribution of spore plants in Poland. Vol. 3. Series V. Mosses (Musci). W. Szafer Institute of Botany of the Polish Academy of Science, Państwowe Wydawnictwo Naukowe, Warszawa-Poznań: 27–33.

Ochyra R., Szmajda P., Bednarek H., Bocheński W. (1988b): M. 539. *Tomentypnum nitens* (Hedw.) Limpr. In: Z. Tobolewski, T. Wojterski (eds). Atlas of the geographical distribution of spore plants in Poland. Vol. 3. Series V. Mosses (Musci). W. Szafer Institute of Botany of the Polish Academy of Science, Państwowe Wydawnictwo Naukowe, Warszawa-Poznań: 53–61.

Pałczyński A. (1975): Bagna Jaćwieskie (pradolina Biebrzy). Zagadnienia geobotaniczne, paleofitosocjologiczne i gospodarcze. Rocznik Nauk Rolniczych, Seria D 145: 1–232.

Pawlikowski P. (2010): Wybrane torfowiska północno-wschodniej Polski. In: A. Obidziński (ed.). Z Mazowsza na Wileńszczyznę. Zróżnicowanie i ochrona szaty roślinnej pogranicza Europy Środkowej i Północno-Wschodniej. Polskie Towarzy-

stwo Botaniczne – Zarząd Główny, Warszawa: 327—407.

Pawlikowski P. (2014a): 11. *Helodium blandowii* (F. Weber & D. Mohr) Warnst. In: P. Górski, A. Stebel, A. Rusińska (eds). New distributional data on bryophytes of Poland, 1. Steciana 18(2): 80.

Pawlikowski P. (2014b): 23. *Tomentypnum nitens* (Hedw.) Loeske. In: P. Górski, A. Stebel, A. Rusińska (eds). New distributional data on bryophytes of Poland, 1. Steciana 18(2): 83.

Piwowarski B. (2014): Nowe stanowiska ekspansywnych gatunków mchów – prostoząbka taurydzkiego *Orthodicranum tauricum* (Sapjegin) Smirnova i krzywoszczeci przywłoki *Campylopus introflexus* (Hedw.) Brid. na Wyżynie Małopolskiej. Naturalia 2(2013): 119–123.

Plášek V., Ochyra R., Smoczyk M., Wiaderny A., Koopman J. (2013): Recent rediscovery of the epiphytic moss *Orthotrichum pulchellum* Brunt. in Poland. Časopis Slezského Zemského Muzea, Seria A, Opava 62(2): 97–100.

Rejment-Grochowska I., Mickiewicz J. (1962): Materiały do flory mszaków Suwalszczyzny. Fragmenta Floristica et Geobotanica 8(1): 3–22.

Ruthe R. (1867): Verzeichniss der in der Umgebung von Bärwalde in der Neumark beobachteten Moose nebst Bemerkungen zu einigen Arten. Verhandlungen des Botanischen Vereins für die Provinz Brandenburg 9: 44–75.

Rutkowski P., Maciejewska-Rutkowska I. (2008): Charakterystyka siedliskowa stanowisk *Buxbaumia aphylla* Hedw. w Nadleśnictwie Smolarz (południowe Pomorze). Badania Fizjograficzne nad Polską Zachodnią, Seria B, 57: 69–76.

Smith A.J.E. (2004): The Moss Flora of Britain and Ireland. Second edition. Cambridge University Press, United Kingdom.

Staniaszek-Kik M. (2014): 3. *Campylopus introflexus* (Hedw.) Brid. In: P. Górski, A. Stebel, A. Rusińska (eds). New distributional data on bryophytes of Poland, 1. Steciana 18(2): 78.

Stebel A. (2006): The mosses of the Beskidy Zachodnie as a paradigm of biological and environmental changes in the flora of the Polish Western Carpathians. Medical University of Silesia in Katowice, Sorus, Poznań.

Stebel A. (2011): Kilka nowych gatunków z Magurskiego Parku Narodowego (Beskid Niski, Karpaty Zachodnie). Roczniki Bieszczadzkie 19: 141–147.

Stebel A., Fojcik B. (2003): Atlas rozmieszczenia mchów chronionych Polski w województwie śląskim. Materiały Opracowania Centrum Dziedzictwa Przyrody Górnego Śląska w Katowicach 7: 1–110.

Stebel A., Ochyra R. (2000): Flora mchów Magurskiego Parku Narodowego w Beskidzie Niskim (Karpaty Zachodnie). Fragmenta Floristica et Geobotanica Polonica 7: 229–263.

Stebel A., Ochyra R., Bednarek-Ochyra H., Stachnowicz W., Krause R., Zubel R., Rusińska A. (2004): *Hookeria lucens* (Bryopsida, Hookeriaceae) in the Polish Carpathians. In: A. Stebel, R. Ochyra (eds). Bryological studies in the Western Carpathians. Sorus, Poznań: 63–70.

Stebel A., Ochyra R., Vončina G. (2010): Mosses of the Pieniny range (Polish Western Carpathians). Sorus, Poznań.

Stebel A., Vončina G. (2011): Nowe dane do rozmieszczenia mchów zbiorowisk z klasy *Scheuchzerio-Caricetea nigrae* w polskiej części Karpat. Roczniki Bieszczadzkie 19: 149–159.

Szafran B. (1957): Mchy (*Musci*). Tom I. Flora Polska. Rośliny zarodnikowe Polski i ziem ościennych. Państwowe Wydawnictwo Naukowe, Warszawa.

Szmajda P. (1979): Bryoflora Gór Stołowych i jej charakterystyka geobotaniczna. Prace Komisji Biologicznej Poznańskiego Towarzystwa Przyjaciół Nauk 52: 1–72.

Szweykowski J. (1958): Prodromus Florae Hepaticarum Poloniae. Prace Komisji Biologicznej Poznańskiego Towarzystwa Przyjaciół Nauk 19: 1–600.

Szweykowski J. (1964): H. 215. *Cladopodiella fluitans* (Nees) Buch. In: Z. Czubiński, J. Szweykowski (eds). Atlas of geographical distribution of spore plants in Poland. Vol. 2. Ser. IV. Liverworts (Hepaticae). Polska Akademia Nauk, Poznańskie Towarzystwo Przyjaciół Nauk, Poznań.

Szweykowski J. (1969): H. 213. *Nowellia curvifolia* (Dicks.) Mitten. In: J. Szweykowski, T. Wojterski (eds). Atlas of geographical distribution of spore plants in Poland. Vol. 6. Ser. IV. Liverworts (Hepaticae). Polska Akademia Nauk, Poznańskie Towarzystwo Przyjaciół Nauk, Poznań.

Szweykowski J. (2006): An annotated checklist of Polish liverworts and hornworts. – Krytyczna lista wątrobowców i glewików Polski. Biodiversity of Poland. Vol. 4. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków.

Szweykowski J., Koźlicka M. (1966): Wątrobowce wyspy Wolina i południowo-wschodniego Uznamu. Badania Fizjograficzne nad Polską Zachodnią 18: 155–178.

Szweykowski J., Koźlicka M. (1969): Materiały do flory wątrobowców Pomorza. Badania Fizjograficzne nad Polską Zachodnią 23: 125–149.

Szweykowski J., Koźlicka M. (1974): H. 201. *Geocalyx graveolens* (Schrad.) Nees. In: J. Szweykowski, T. Wojterski (eds). Atlas of geographical distribution of spore plants in Poland. Vol. 8. Ser. IV. Liverworts (Hepaticae). Polska Akademia Nauk, Poznańskie Towarzystwo Przyjaciół Nauk, Poznań: 17–18.

Szweykowski J., Koźlicka M. (1980): H. 91. *Lophozia excisa* (Dickson) Dumortier. In: J. Szweykowski, T. Wojterski (eds). Atlas of geographical distri-

bution of spore plants in Poland. Vol. 10. Ser. IV. Liverworts (Hepaticae). Polska Akademia Nauk, Poznańskie Towarzystwo Przyjaciół Nauk, Poznań: 17–20.

Wierzcholska S., Plášek V., Krzysztofiak A. (2010): Mszaki *Bryophyta*. In: L. Krzysztofiak (ed.). Ślużowce *Myxomycetes*, grzyby *Fungi* i mszaki *Bryophyta* Wigierskiego Parku Narodowego. Przyroda Wigierskiego Parku Narodowego, seria naukowa. Stowarzyszenie "Człowiek i Przyroda", Suwałki: 229–298.

Wilczyńska W. (1974): Flora mchów i zbiorowisk mszaków Gór Kaczawskich: studium florystyczno-ekologiczne. Monographiae Botanicae 44: 3–112.

Wołejko L., Stańko R., Pawlikowski P., Jarzombkowski F., Kiaszewicz K., Chapiński P., Bregin M., Kozub Ł., Krajewski Ł., Szczepański M. (2012): Krajowy program ochrony torfowisk alkalicznych (7230). Wydawnictwo Klubu Przyrodników, Świebodzin.

Zubel R., Stebel A. (2008): Occurrence of *Frullania tamarisci* (Marchantiophyta, Frullaniaceae) in the Polish Carpathians. In: A. Stebel, R. Ochyra (eds). Bryophytes of the Polish Carpathians. Sorus, Poznań: 257–266.

Żarnowiec J., Stebel A., Ochyra R. (2004): Threatened moos species in the Polish Carpathians in the light of a new Red-list of mosses in Poland. In: A. Stebel, R. Ochyra (eds). Bryological Studies in the Western Carpathians. Sorus, Poznań: 9–28.

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