

# New national and regional bryophyte records, 43

L. T. Ellis<sup>1</sup>, A. K. Asthana<sup>2</sup>, A. Srivastava<sup>2</sup>, V. A. Bakalin<sup>3,4</sup>, H. Bednarek-Ochyra<sup>5</sup>, M. J. Cano<sup>6</sup>, J. A. Jiménez<sup>6</sup>, M. Alonso<sup>6</sup>, J. Deme<sup>7</sup>, J. Csiky<sup>7</sup>, M. G. Dia<sup>8</sup>, P. Campisi<sup>8</sup>, P. Erzberger<sup>9</sup>, R. Garilleti<sup>10</sup>, K. V. Gorobets<sup>11</sup>, N. J. M. Gremmen<sup>12</sup>, M. S. Jimenez<sup>13,14</sup>, G. M. Suárez<sup>13,15</sup>, I. Jukonienė<sup>16</sup>, T. Kiebacher<sup>17</sup>, M. Kirmaci<sup>18</sup>, A. Koczur<sup>19</sup>, H. Kürschner<sup>20</sup>, F. Lara<sup>21</sup>, V. Mazimpaka<sup>21</sup>, J. Larraín<sup>22</sup>, M. Lebouvier<sup>23</sup>, R. Medina<sup>24</sup>, R. Natcheva<sup>25</sup>, K. K. Newsham<sup>26,27</sup>, M. Nobis<sup>28</sup>, A. Nowak<sup>29</sup>, M. Ören<sup>6,31</sup>, A. D. Özçelik<sup>6,30</sup>, J. D. Orgaz<sup>6,30,31</sup>, D. F. Peralta<sup>32</sup>, V. Plášek<sup>33</sup>, L. Číhal<sup>33</sup>, R. Ristow<sup>34</sup>, J. Sawicki<sup>33,35</sup>, A. Schäfer-Verwimp<sup>36</sup>, V. R. Smith<sup>37</sup>, A. Stebel<sup>38</sup>, S. Ştefănuţ<sup>39</sup>, M. Subkaitė<sup>40</sup>, B.-Y. Sun<sup>41</sup>, A. Uselienė<sup>42</sup>, G. Uyar<sup>43</sup>, J. Váňa<sup>44</sup>, Y.-J. Yoon<sup>45</sup>, S. J. Park<sup>45</sup>

<sup>1</sup>The Natural History Museum, London, UK, <sup>2</sup>CSIR- National Botanical Research Institute, Lucknow, India, <sup>3</sup>Botanical Garden-Institute, Vladivostok, Russia, <sup>4</sup>Institute of Biology and Soil Science, Vladivostok, Russia, <sup>5</sup>Laboratory of Bryology, Institute of Botany, Polish Academy of Sciences, Poland, <sup>6</sup>Departamento de Biología Vegetal (Botánica), Universidad de Murcia, Spain, <sup>7</sup>University of Pécs, Institute of Biology, Hungary, <sup>8</sup>Laboratorio di Briologia, Università di Palermo, Italy, <sup>9</sup>Berlin, Germany, <sup>10</sup>Departamento de Botánica, Universidad de Valencia, Burjasot, Spain, <sup>11</sup>Department of Biodiversity and Marine Bioresources, Far-Eastern Federal University, Vladivostok, Russia, <sup>12</sup>Diever, The Netherlands, <sup>13</sup>Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina, <sup>14</sup>Instituto de Botánica del Nordeste, Corrientes, Argentina, <sup>15</sup>Fundación Miguel Lillo, San Miguel de Tucumán, Tucumán, Argentina, <sup>16</sup>Nature Research Centre, Institute of Botany, Vilnius, Lithuania, <sup>17</sup>Swiss Federal Research Institute WSL, Birmensdorf, Switzerland, <sup>18</sup>Adnan Menderes Üniversitesi, Biyoloji Bölümü, Kepez-Aydin, Turkey, <sup>19</sup>Institute of Nature Conservation, Polish Academy of Sciences, Kraków, Poland, <sup>20</sup>Freie Universität Berlin, Institut für Biologie, Systematische Botanik und Pflanzengeographie, Berlin, Germany, <sup>21</sup>Departamento de Biología (Botánica), Universidad Autónoma de Madrid, Madrid, Spain, <sup>22</sup>Science & Education, The Field Museum, Chicago, IL, USA, <sup>23</sup>CNRS UMR 6553, Université de Rennes, France, <sup>24</sup>Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs, USA, <sup>25</sup>Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia, Bulgaria, <sup>26</sup>Ecosystems Programme, NERC British Antarctic Survey, Cambridge, <sup>27</sup>Department of Arctic Biology, The University Centre in Svalbard, Longyearbyen, Norway, <sup>28</sup>Jagiellonian University in Kraków, Poland, <sup>29</sup>University of Opole, Poland, <sup>30</sup>Department of Biological Sciences, Hiroshima University, Japan, <sup>31</sup>Bülent Ecevit University, Faculty of Art and Science, Biology Department, Zonguldak, Turkey, <sup>32</sup>Instituto de Botânica, São Paulo, Brazil, <sup>33</sup>University of Ostrava, Czech Republic, <sup>34</sup>Universidade Federal da Fronteira Sul, Edmundo Gaievski, Paraná, Brazil, <sup>35</sup>University of Warmia and Mazury in Olsztyn, Poland, <sup>36</sup>Herdwangen-Schönach, Germany, <sup>37</sup>Department of Botany, University of Stellenbosch, Republic of South Africa, <sup>38</sup>Department of Pharmaceutical Botany, Medical University of Silesia in Katowice, Sosnowiec, Poland, <sup>39</sup>Institute of Biology Bucharest of Romanian Academy, Bucharest, Romania, <sup>40</sup>Faculty of Natural Sciences, Vilnius University, Lithuania, <sup>41</sup>Chonbuk National University, Jeonju, Korea, <sup>42</sup>Viešvile State Strict Nature Reserve, Taurage distr., Lithuania, <sup>43</sup>Gazi University, Polatli Faculty of Art and Science, Biology Department, Ankara, Turkey, <sup>44</sup>Department of Botany, Charles University, Czech Republic, <sup>45</sup>Korea Polar Research Institute, KIOST, Incheon, Korea

## 1. *Acaulon mediterraneum* Limpr

**Contributor:** R. Natcheva

**Bulgaria:** Blagoevgrad region, Belasitsa Nature Park, south of the road between the villages of

Razdak and Drangovo, on soil in pasture, 41.398115°N, 23.270615°E, 285 m a.s.l., 8 April 2013, *leg./det.* R. Natcheva 9433 (SOM-B).

Prior to this new record, only the related *Acaulon muticum* (Brid.) Müll.Hal. had been found in Bulgaria. In the Balkans *A. mediterraneum* is known from Greece, Croatia and Montenegro (the two latter reports based on collections published before 1962) (Ros *et al.*, 2013).

Correspondence to: L. T. Ellis, Department of Life Sciences, The Natural History Museum, Cromwell Road, London, SW7 5BD, UK. Email: l.ellis@nhm.ac.uk

## 2. *Andreaea flabellata* Müll.Hal

**Contributors:** H. Bednarek-Ochyra and M. Lebouvier

**South Indian Ocean, Îles Crozet, Île de la Possession, eastern coast:** (1) a small stream with “Cascade” falling into the cove south of Pointe de ‘Bougainville’ ca 2.5 km south of Port Alfred Faure base and 2.5 km south-east of Mont Branca, 150 m a.s.l., 46°26'40"S 51°51'35"E; on stone on stream banks, 11 November 2006, *leg.* R. Ochyra 230/06 (with M. Lebouvier and N. van der Putten) (KRAM); (2) plateau west of Alfred Faure Station, midway to Mont Branca, 51°50'47.24"E 46°26'08.72"S, 200 m a.s.l.; rock outcrop in the fellfield with petrel burrows, forming small cushions on dry and shaded lava rock, 16 November 2012, *leg.* R. Ochyra 2794/12 (KRAM).

*Andreaea flabellata* was described from Îles Kerguelen (Müller, 1883, 1889) but for nearly a century it remained a poorly known and entirely neglected species. It was resurrected from obsolescence by Greene (1968) who reported it from subantarctic South Georgia and showed that it was a distinct species easily distinguished by its narrow, linear-lanceolate and gradually long-acuminate leaves, 4–7 times as long as wide. Subsequently, the species proved to be widespread in the cool-south-temperate and subantarctic zones in the Southern Hemisphere, including southern South America (Greene, 1986), Tristan da Cunha (Dixon, 1960 as *A. grimmiioides* Dusén) and subantarctic Macquarie Island (Seppelt, 2004). Additionally, it was recently reported from two island groups in the South Indian Ocean Province of the Subantarctic, namely from the Prince Edward Islands and Heard Island (Ellis *et al.*, 2011b). Herein, the species is reported from Île de la Possession in the Îles Crozet archipelago and this discovery completes its distribution in this biogeographical province. The discovery *A. flabellata* on Île de la Possession was expected since this species is a frequent constituent of the tundra vegetation on other islands in the Kerguelen province and there are no phytogeographical or other reasons why it could not occur in this archipelago. The moss flora of Îles Crozet was the least studied of all subantarctic islands, but recent field studies yielded a number of new discoveries (*e.g.* Blockeel *et al.*, 2006a, 2007b,c, 2009c, 2010; Ellis *et al.*, 2010, 2012d, 2013b,c,d, 2014d), which increased the known moss flora to about 70 species.

3. *Brachytheciastrum collinum* (Schleich. ex Müll. Hal.) Ignatov & Huttunen

**Contributor:** J. D. Orgaz

**Bulgaria:** Rila mountains, Mount Malovitcha, 2200 m a.s.l., on soil, 16 June 1967, *leg.* Een *s.n.* (S B30198).

The specimen cited here had been identified as *Eurynchium pulchellum* (Hedw.) Jenn., which sometimes can be very similar to *B. collinum*. However, the latter species has julaceous branches and acuminate leaf apices, while *E. pulchellum* has non julaceous branches and acute or obtuse leaf apices.

*Brachytheciastrum collinum* is a subalpine species that mainly grows in high mountains in both the northern and southern hemispheres (Orgaz *et al.*, 2013; Ignatov *et al.*, 2006; Anderson *et al.*, 1990; Müller, 2009). This species was recently reported as new to Romania (Orgaz *et al.*, 2013) and now it is recorded for the first time from Bulgaria.

## 4. *Bryochenea vestitissima* (Besch.) A.Touw

**Contributors:** Y.-J. Yoon, K. V. Gorobets, S. J. Park and B.-Y. Sun

**Republic of Korea:** Gangwon Prov., Mt. Taebaek, 37°06'851"N 128°56'865"E, 904 m a.s.l.; on humus on rocks, 16 Sept. 2009, *leg.* Y.-J. Yoon 4296 (JNU).

The genus *Bryochenea* C.H.Gao & K.C.Chang, in the Thuidiaceae, is here reported new to the Korean Peninsula. The Thuidiaceae is one of the largest moss families in the world with its representatives widely distributed from tropical rain forests to temperate coniferous forests. It is found on every continent, except for Antarctica. Some genera in the Thuidiaceae are East-Asiatic endemics, such as *Thuidiopsis* (Broth.) M.Fleisch. which is endemic to Japan and Korea (Wu *et al.*, 2002). *Bryochenea vestitissima* differs from other species of the genus by its small size, bipinnately branched stems; paraphyllia crowded on stems, primary and secondary branches, and leaf cells with a single papilla. This species grows on rock cliffs, limestone and humus in forests (Noguchi, 1991).

## 5. *Bryum incacorrallis* Herzog

**Contributors:** M. S. Jimenez, G. M. Suárez and J. Larraín

**Chile:** Antofagasta, San Pedro de Atacama, valle con *Laretia*, 4000 m a.s.l., 05 January 2009, *leg.*: G. Suárez 542 (LIL, CTES).

A collection made by the authors in 2009 in San Pedro de Atacama (Antofagasta Region, Chile) has been identified as *Bryum incacorrallis*, a moss not previously known from Chile (Müller, 2009) and easily confused with some species of *Philonotis* Brid. (Ochi, 1980). Comparison with the type material confirmed its identity (Holotype: Bolivia, Cochabamba: an Felsen der “Estradillas” bei Incacorrall, 3000 m, Herzog *s.n.*, JE! no. 04003475). *Bryum incacorrallis* was first described by Herzog (1909) based on material collected in Cochabamba (Bolivia), and later recorded by Griffin (1977) and O’Shea (2010) from Venezuela. It is placed in the so-called sect. “*Alpiniformia*” within the genus *Bryum* which is characterized by the presence of ovate to ovate-

lanceolate leaves, the costa ceasing just below the leaf apex, the very dense areolation of the leaf, and the possession of long, more or less clavate capsules (Ochi, 1980). This note is the first record of *Bryum incacorrallis* from Chile. It was found in the highlands in the northern part of the country, in San Pedro de Atacama, an arid high plateau at the east of Antofagasta, growing on soil between *Laretia* Gillies & Hook., at ca 4000 m a.s.l.

*Bryum incacorrallis* is a distinctive species characterized by small to medium sized plants, scarcely lustrous, with ovate-lanceolate leaves, not or hardly bordered, equally spaced along the stem, with an acuminate apex and an abruptly narrowed base; laminal cells hexagonal to shortly rectangular, and a costa ceasing just below the leaf apex. The Chilean specimen is synoicous, with antheridia and archegonia mixed within the same gametangium, and with abundant filiform paraphyses longer than the sexual structures. In comparison with the type specimen, the Chilean sample is more robust, its leaf margins are slightly revolute, and the leaf apices vary from slightly to markedly abruptly acuminate, sometimes ending in a small mucro.

6. *Bucklandiella pachydictyon* (Cardot) Bednarek-Ochyra & Ochyra

**Contributors:** H. Bednarek-Ochyra, N. J. M. Gremmen and V. R. Smith

**South Indian Ocean, Heard Island, western part:** (1) Laurens Peninsula, inland from West Cape, 53°00'56"S 73°17'54"E, 50 m a.s.l., small cushions in moss vegetation on lava, 9 February 2001, leg. N.J.M. Gremmen *H-1607*, *H-1615* (KRAM); (2) Azorella Peninsula, N side of Dovers Crater, near top, forming small turfs on scoriae and rock in *Azorella*–*Usnea* feldmark, 53°00'30"S 73°24'40"E, 101 m a.s.l., 9 February 2001, leg. N.J.M. Gremmen *H-1553* (KRAM); (3) crater W of Corinth Head, 53°00'36"S 73°24'41"E, 60 m a.s.l., large cushions on and between rocks, on steep rock fall in crater, damp, sheltered, 9 February 2001, leg. N.J.M. Gremmen *H-1518*, *H-1531* (KRAM); (4) Atlas Cove, near Wharf Point, 53°00'50"S, 73°23'53"E, 26 m a.s.l., coastal pahoehoe slabs, dense clumps on rocks, 5 February 2001, leg. N.J.M. Gremmen *H-1278*, *H-1282*, *H-1283* (KRAM); (5) Mount Drygalski, near summit, small mats, 53°02'26"S 73°24'59"E, 175 m a.s.l., 6 February 2001, leg. N.J.M. Gremmen *H-1240*, *H-1249*, *H-1253* (KRAM). **Eastern part:** (6) Escarpment NE of Round Hill, high exposed vertical rock face, 53°03'57"S 73°37'53"E, 260 m a.s.l., few cushions on rock 4–5 cm in diameter, 13 December 2000, leg. N.J.M. Gremmen *H-0217* (KRAM); (7) E slope of Scarlet Hill, forming cushions on exposed rock, on red consolidated scoriae and lava, 53°06'18"S 73°38'23"E, 340 m a.s.l., 27 January

2001, leg. N.J.M. Gremmen *H-0994*, *H-0995*, *H-1108* (KRAM); (8) Dowers Moraine, a few small cushions on rocks, 53°07'11"S 73°40'55"E, 40 m a.s.l., 10 December 2000, leg. N.J.M. Gremmen *H-01162A* (KRAM); (9) Dowers Moraine, north side, in pioneer vegetation on young moraine, on rock gravel, 53°06'19"S, 73°40'29"E, 82 m a.s.l., 29 December 2000, leg. N.J.M. Gremmen *H-0607* (KRAM); (10) South Barrier, 53°08'40"S, 73°35'24"E, 900 m a.s.l., 22 January 2001, leg. Paul Scott *H-0847* (KRAM); (11) Skua Beach area, on patterned ground forming small cushions on stones, 53°05'44"S 73°41'11"E, 30 m a.s.l., 28 January 2001, leg. N.J.M. Gremmen *H-0871* (KRAM).

*Bucklandiella pachydictyon* is a very distinct and quite isolated species, which is characterised by its entire, or only slightly cleft and perforated peristome teeth in the distal part, and lanceolate, epilose leaves that have a narrowly rounded to acute apex. *B. pachydictyon* is an amphiatlantic south-cool-temperate species that is widely distributed but scattered in southern South America, from the Valdivian region to Tierra del Fuego, and extending to subantarctic South Georgia (Bell, 1974) and the northern maritime Antarctic. In the latter, it occurs in geothermal sites on the volcanic Deception Island (Ochyra *et al.*, 2008a,b). The species occurs frequently on subantarctic islands in the South Indian Ocean Province, including the Prince Edward Islands, Îles Crozet (Blockeel *et al.*, 2008a) and Îles Kerguelen (Cardot, 1916). Herein, the range of *B. pachydictyon* is extended to Heard Island, an isolated and heavily glaciated island in the Kerguelen biogeographical province which is situated about 500 km south-east of Îles Kerguelen and is among the most remote places on the globe. This small speck of land has been only rarely visited by biologists and its moss flora was rather poorly known. Although direct palaeobotanical evidence is lacking for Heard Island (van der Putten *et al.*, 2010), it is very likely that a cryptogamic flora, including mosses, could not have survived here, but was established via long distance dispersal after the Last Glacial Maximum. Selkirk *et al.* (2008) reported about 40 species from Heard Island but since then no less than 14 species have been added to the island's bryoflora (e.g. Ellis *et al.*, 2011a,b, 2012a,b). These include four species of *Bucklandiella* Roiv., namely *B. lamprocarpa* (Müll.Hal.) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2010), *B. sudetica* (Funck) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2013a), *B. orthotrichacea* (Müll.Hal.) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2013b), and *B. heterostichoides* (Cardot) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2014b). *Bucklandiella pachydictyon* appears to be the commonest species of the genus on Heard Island.

7. *Bucklandiella pycnotricha* (Müll.Hal.) Bednarek-Ochyra, Ochyra & Seppelt

**Contributor:** H. Bednarek-Ochyra

**Australia, Victoria:** East Gippsland, Victorian Alps, Great Dividing Range, Alpine National Park, north side of Lightbound creek near falls, ½ mile NE of Langley Plains Hut, between Mount Buller and Omeo valley and south of Mount Hotham, NNW of Bairnsdale, 37°06'20"S 147°11'53"E, ca 1420 m a.s.l., 23 March 1973, leg. F. W. Aslin for L. D. Williams 4659(a) (AD).

The genus *Bucklandiella* Roiv. is not well represented in mainland Australia and hitherto only six species of this genus have been described from this continent, and given names under *Grimmia* Hedw. (Streimann & Curnow, 1989). Two of these, *G. amoena* Broth. and *G. procumbens* Mitt. are conspecific with *B. sudetica* (Funck) Bednarek-Ochyra & Ochyra (Frisvoll, 1986; Bednarek-Ochyra & Ochyra, 2013a), but the remaining three species, including *Grimmia compactula* Müll.Hal., *G. cylindropyxis* Müll.Hal. and *G. pseudopatens* Müll.Hal., have never been taxonomically assessed. Additionally, Frisvoll (1988) reported *B. emersa* (Müll.Hal.) Bednarek-Ochyra & Ochyra and Blockeel *et al.* (2008a) reported *B. didyma* (Mont.) Bednarek-Ochyra & Ochyra in SE Australia, and herein a fifth species, *B. pycnotricha* is added to the moss flora of continental Australia. This species was entirely neglected and considered to be conspecific with the catch-all *B. crispula* (Hook.f. & Wilson) Bednarek-Ochyra & Ochyra and it was only recently reinstated as a distinct species (Bednarek-Ochyra & Ochyra, 2010). It was subsequently discovered in the South Island (Ellis *et al.*, 2014a) and on Stewart Island (Ellis *et al.*, 2014c) in New Zealand. The species is distinct and easily known from other Australian congeners by its entirely hyaline, flexuose and distinctly denticulate leaf hair-points, leaf margins that are plane on one side, and in the proximal part on the other side only narrowly recurved, and by the possession of large spores, 18–28 µm in diameter. Thus, considering the present record of *B. pycnotricha*, the moss flora of mainland Australia comprises four species of *Bucklandiella*; two additional ones, *B. seppeltii* Bednarek-Ochyra, Ochyra, Sawicki & Szczecińska (Bednarek-Ochyra *et al.*, 2014) and *B. chlorocarpa* (Paris) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra, 2014), are known from Tasmania, and three others occur on subantarctic Macquarie Island, namely *B. angustissima* Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2011), *B. lamprocarpa* (Müll.Hal.) Bednarek-Ochyra & Ochyra (Blockeel *et al.*, 2007a) and *B. crispula* (Seppelt, 2004).

8. *Campylopus fragilis* (Brid.) Bruch & Schimp.

**Contributors:** J. Deme, J. Csiky and P. Erzberger

**Hungary:** Baranya County, Western Mecsek Mountains, 9974.2 (Central European Mapping Scheme), Kővágószőlős, boulder scree on the southern slope of Jakab-hegy, below Zsongor-kő, on soil between sandstone blocks in deciduous forest (mainly *Quercus petraea* agg.), associated with *Cladonia* sp., *Cephaloziella divaricata* (Sm.) Schiffn., *Hypnum cupressiforme* Hedw. and *Bryum moravicum* Podp., 46°05'30.8" N 18°08'22.4" E, ca 500 m a.s.l. 8 October 2014, leg. J. Deme, J. Csiky and P. Erzberger, det. P. Erzberger (*Hb. Erzberger* 19109, 19112; dupl. conf. J. Deme in *JPU*).

The Jakab-hegy and its surroundings make up the south-western part of the Mecsek Mountains, situated about 30 km north of the Croatian border. The sandstone area is built up of two formations of Late Permian-Early Triassic age, the older Kővágószőlős Sandstone and the younger Jakabhegy Sandstone. The latter is harder and forms the high, sharp ridges of the mountains. The majority of the sand grains and the cement of the Jakabhegy Sandstone are composed of quartz, which results in a typical acidophilous vegetation. The climate of the area is moderately warm, with a sub-Mediterranean influence. It has a mean annual temperature of 10–12° C, and the annual precipitation is 700–1000 mm, with spring and autumn maxima (Csiky *et al.*, 2007). The conglomerate rocks and boulders of the Jakabhegy sandstone are the only site where *Grimmia montana* Bruch & Schimp. occurs in Hungary (Erzberger, 2009; Papp *et al.*, 2010).

*Campylopus fragilis* is new to Hungary, since the most recent checklist of Hungarian bryophytes (Papp *et al.*, 2010) contains only two species of *Campylopus*: *C. pyriformis* (Schultz) Brid., and *C. introflexus* (Hedw.) Brid., which had been added to the list only seven years ago (Blockeel *et al.*, 2007b). A third species was found recently: *C. flexuosus* (Hedw.) Brid. (Ellis *et al.*, 2014b; Erzberger & Németh, 2014).

When typical, *C. fragilis* can be recognized at first glance by the presence of bundles of tiny, linear, deciduous leaves in the axils of normal leaves, and by its shiny white leaf bases. Among its Hungarian congeners, *C. pyriformis* also produces deciduous leaves for vegetative propagation, but these are spoon-shaped, with an expanded, oval base. *C. flexuosus* differs in forming deciduous branchlets similar to those of *Dicranum flagellare* Hedw., and *C. introflexus* usually has conspicuous hair-points. In critical cases, the transverse section of the costa is diagnostic, with wide ventral cells occupying up to 2/3 of the thickness of the costa.

*Campylopus fragilis* is a suboceanic-temperate species that occurs in Europe, as far north as

Scandinavia, in Turkey, the Himalayas and Japan, the Canary Islands, as well as in North, Central and South America (Smith, 2004).

In countries surrounding Hungary, *C. fragilis* is known from Austria (Köckinger *et al.*, 2011), Slovenia (Martinčič, 2003), Romania (Ștefănuț & Goia, 2012), Ukraine (Ignatov *et al.*, 2006), the Czech Republic (Kučera *et al.*, 2012), and Slovakia (Kubinská *et al.*, 2001), whereas it seems to be missing from Croatia and Serbia (Sabovljević *et al.*, 2008; Hodgetts, 2014).

It is puzzling that three species of the same genus should be discovered within only seven years in a country that can be considered reasonably well explored bryologically. In the case of *C. introflexus*, the invasive nature of this species from the southern hemisphere is sufficiently known, and its spread within Hungary is impressive (Szűcs *et al.*, 2014). There is some evidence that *C. flexuosus*, although thought to be a native European species, is also spreading (Kučera *et al.*, 2012; observations). Notwithstanding that the area has been thoroughly explored by Hungarian bryologists during the 20<sup>th</sup> century (e.g. Boros 1968), it is conceivable that *C. fragilis* might have escaped their attention, since these slopes are the most difficult ground to access on Jakab-hegy.

9. *Coscinodon cribrosus* (Hedw.) Spreng.

**Contributors:** A. Stebel and H. Bednarek-Ochyra

**Poland, Sudetes, Eastern Sudetes, Góry Opawskie range:** Jarnołtówek, rock outcrop called 'Karolinki', 50°17'18"N 17°25'58"E, 403–420 m a.s.l., on slate, 21 July 2006 and 4 September 2014, *leg.* A. Stebel *s.n.* (KRAM, SOSN).

*Coscinodon cribrosus* is a very rare and threatened species of moss in Poland (Żarnowiec *et al.*, 2004). All of its records date from the nineteenth century (Milde, 1869; Limpricht, 1890) and the recent discovery of the species in the Silesian Beskid in the Polish Carpathians (Ellis *et al.*, 2014c) was actually based upon herbarium material which had been collected by A. Graw in 1932. A newly discovered locality in the Góry Opawskie range in the Eastern Sudetes is very rich and *C. cribrosus* grows abundantly in exposed or slightly shaded slate crevices, covering an area of several dozen square metres. The plants produce sporophytes profusely. This locality was discovered for the first time in 2006, and monitoring in subsequent years showed that the moss still grows there in perfect conditions, and is not threatened. It is difficult to explain why *C. cribrosus* is so rare in the Polish part of the Sudetes, while in the Czech part of these mountains it occurs frequently (Kučera *et al.*, 2004, 2009). Possibly, its occurrence is affected by the different climatic and habitat conditions. A similar situation prevails in the

Carpathians, where *C. cribrosus* is rare and scattered in the Southern and Eastern Carpathians, but it is extremely rare in the Western Carpathians (Blockeel *et al.*, 2009a; Ellis *et al.*, 2014c).

10. *Dicranoweisia cirrata* (Hedw.) Lindb

**Contributors:** I. Jukonienė and M. Subkaitė.

**Lithuania:** Curonian Spit, Nagliai Strict Nature Reserve, on aspen trunk and on sandy soil in aspen forest stand, 55°26'36.93"N 21°5'37.79"E, 04 July 2013, *leg.* M. Subkaitė, *det.* I. Jukonienė B16693, B16708 (BILAS).

*Dicranoweisia cirrata* is a cosmopolitan species usually occurring on tree trunks or wood in the early stages of decomposition, it also grows on rocks and stones (Dierßen 2001). In Lithuania the species was recorded at one locality on the Curonian Spit from two different substrata; sandy soil and a tree trunk. Single localities of the species are known from other Baltic countries, Latvia and Estonia (Ignatov *et al.*, 2006; Vellak *et al.*, 2009) and neighbouring Belarus (Rykovsky & Maslovsky, 2004). Meanwhile in Poland, another neighbouring country to Lithuania, expansion of the species in urban areas has been observed (Stebel & Plášek, 2001; Fudali, 2012).

11. *Didymodon brachyphyllus* (Sull.) R.H.Zander

**Contributors:** H. Bednarek-Ochyra and M. Lebouvier

**South Indian Ocean, Îles Kerguelen:** Golfe Du Morbihan, Presqu'île Jeanne d'Arc, north-western-most part of the peninsula, an unnamed stream north of le Dôme Rouge, debouching into Baie des Swains at the base of Halage des Swains, 49°33'14.1"S 69°47'05.1"E; ca 45 m a.s.l.; on wet soil on stream bank, associated with *Dicranella campylophylla* (Taylor) A.Jaeger and *Pohlia wahlenbergii* (F.Weber & D.Mohr) A.L.Andrews, 5 December 2006, *leg.* Ochyra 1481/06, *det.* R. H. Zander (KRAM).

*Didymodon brachyphyllus* is a bipolar species which has an arctic-alpine distribution in western North America, ranging from Alaska to central Mexico (Zander, 1994, 2007), with some isolated occurrences in west Greenland (Mogensen & Zander, 1999) and Iceland (Jóhannsson, 2003). In the southern hemisphere it is widespread in the northern maritime Antarctic, in West Antarctica on Alexander Island and in East Antarctica in Victoria and Marie Byrd Lands (Zander & Ochyra, 2001; Ochyra & Zander, 2002). Moreover, it is also known from subantarctic South Georgia (Blockeel *et al.*, 2005). Here, the geographical range of *D. brachyphyllus* is extended to Îles Kerguelen, the oldest and the largest subantarctic archipelago, situated in the South Indian Ocean Province. It has the richest moss flora in this biome consisting of about 135 species, many of which were discovered in

recent field studies (e.g. Bednarek-Ochyra & Ochyra, 1998; Ochyra & Poulsen, 2003; Blockeel *et al.*, 2009b; Ochyra, 2010; Ochyra *et al.*, 2014).

12. *Diplasiolejeunea involuta* Winkler subsp. *andicola* Pócs

**Contributors:** A. Schäfer-Verwimp, D. F. Peralta and R. Ristow

**Brazil:** Paraná, Serra do Mar north of Curitiba, 25°07.9'S 48°49.2'W, Capivari Grande, edge of cloud forest, 1550 m a.s.l., on small branches of shrub, c. per., 17 November 2012, leg. Schäfer-Verwimp 33888, with D.F. Peralta, M. Stech, R. Ristow & L. Prochazka (JE, SP).

This collection also contains other pioneer hepatics, such as *Cheilolejeunea xanthocarpa* (Lehm. & Lindenb.) Malombe, *Brachiolejeunea laxifolia* (Taylor) Schiffn., and *Microlejeunea squarrosa* (Steph.) Heinrichs, Schäf.-Verw., Pócs & Dong. In the material of *D. involuta* subsp. *andicola*, (2–)3–6(–7) finely crenulate, spherical, short-oval or  $\pm$  fusiform oil bodies were observed in the mid-leaf cells. These ranged from  $3\text{--}4 \times 4\text{--}5\text{ }\mu\text{m}$  up to  $3.5\text{--}4 \times 10\text{--}12\text{ }\mu\text{m}$ , largely in accordance (but their surface somewhat less rugose) with those described for subsp. *andicola* by León *et al.* (1998). The lobes of the underleaves were 12–14 cells wide, also in accordance with the description of subsp. *andicola* (in the subspecies type they reach (20–)22–28(–30) cells wide). There is also evidence for two genetically distinct entities of *D. involuta* as shown by Dong *et al.* (2012).

*Diplasiolejeunea involuta* subsp. *involuta* is known from El Salvador, Costa Rica, Panama, Ecuador, and the Dominican Republic at altitudes between 1900–3450 m a.s.l. (Schäfer-Verwimp, 2004; Schäfer-Verwimp & Pócs, 2009; Dong *et al.*, 2012), whereas the subsp. *andicola* Pócs is so far only known from Venezuela and Ecuador at altitudes between 2860–3300 m a.s.l. (León *et al.*, 1998; Nöske *et al.*, 2003; Dong *et al.*, 2012). The present record from southern Brazil is the first one outside the tropical Andes and means a considerable extension to its geographical and altitudinal range.

13. *Ephemerum minutissimum* Lindb

**Contributor:** R. Natcheva

**Bulgaria:** (1) Haskovo region, Sakar Mt., along the road between the villages of Mladinovo and Kostur, on soil along a cart-road in *Quercus* L. scrub at a military range, collected together with *Riccia sorocarpa* Bisch., 41.953778°N 26.249278°E, ca 400 m a.s.l., 15 March 2004, coll./det. R. Natcheva 8772 (SOM-B); (2) Vidin region, Vrashka Chuka hill, S-SE slopes, on disturbed soil along the road to the hunter house, 43.828028°N, 22.379472°E, 500 m a.s.l., 20 February 2007, coll./det. R. Natcheva 8913 (SOM-B); (3) Blagoevgrad region, Struma river valley, Belasitsa Nature Park, south of the road

between the villages of Razdak and Drangovo, on bare soil in opening in a thicket of *Ostrya carpinifolia* Scop. and *Quercus pubescens* Willd. and *Q. cerris* L., together with *Cephaloziella divaricata* (Sm.) Schiffn., 41.39798°N 23.271783°E, 281 m a.s.l., 8 April 2013, coll./det. R. Natcheva 9432 (SOM-B).

On the Balkan Peninsula *E. minutissimum* is known only from Montenegro (a record before 1962) (Ros *et al.*, 2013). It is likely that the species is more widespread but overlooked owing to its extremely small size.

14. *Fissidens crispulus* Brid

**Contributors:** Y.-J. Yoon, K. V. Gorobets, S. J. Park and B.-Y. Sun

**Republic of Korea:** Jeju Prov. (Island), Hyodoncheon, 33°15'837"N 126°37'406"E, 40 m a.s.l.; on humus rocks, 31 January 2011, leg. Y.-J. Yoon 1180-1 (JNU), Wonang waterfall, 33°18'018"N 126°34'835"E, 40 m a.s.l.; on humus rocks, 30 January 2011, Y.-J. Yoon 1107 (JNU), Cheonjeyeon waterfall, 33°14'868"N 126°25'050"E, 11 m a.s.l.; on humus rocks, 7 April 2011, Y.-J. Yoon 2384 (JNU).

This species is reported new to the Korean Peninsula. *Fissidens* is one of the largest genera in the moss flora of Korea, with 16 species reported (Park and Choi, 2007). *F. crispulus* is very common in South China. It is easily recognized by its lanceolate to narrowly lanceolate leaves with mammillose laminal cells, its acute, tightly curled leaf tips, and its remarkably differentiated hyaline nodules (Li & Iwatsuki, 2001). This species was found in three localities on Jeju Island: the Hyodoncheon stream, and the Cheonjeyeon and Wonang waterfalls. Its well-developed hyaline nodules distinct in each leaf axil and mammillose cells distinguish it from other species in the genus (Noguchi, 1987).

15. *Fissidens griffithii* Gangulee

**Contributors:** A. K. Asthana and A. Srivastava

**India:** Eastern Himalayas: Meghalaya, on way to Shillong peak, Shillong, terricolous, 24°58'–26°8'N 89°47'–92°50'E, 27 October 2010, leg. Vinay Sahu & Vishal Awasthi s.n. (LWG. 252328A).

*Fissidens* Hedw. is represented by 62 species in India, of which 33 occur in the Eastern Himalayas, 25 in the Western Himalayas, 26 in southern India, 11 in the Gangetic Plains and 14 in central India (Lal, 2005). *Fissidens griffithii* is known from southern India and Bhutan, and is here reported for the first time from the Eastern Himalayas, hence making a total of 34 species of *Fissidens* in this region.

The plants found are small, ca 4 mm  $\times$  3 mm, lacking axillary hyaline nodules. Leaves are in 6–7 pairs, 0.9–1.5 mm  $\times$  0.2–0.3 mm, oblong-ligulate, elimbate, with an acute to narrowly acute apex. The costa is stout, percurrent to shortly excurrent, the vaginant

lamina is half the leaf length, unequal; often ending at the costa, and the leaf margins crenulate. Sporophytes are not present.

16. *Fissidens robinsonii* Broth

**Contributors:** A. K. Asthana and A. Srivastava

**India:** Eastern Himalaya: Meghalaya, Shillong, on way to Shillong peak, terricolous, 24°58'–26°8'N 89°47'–92°50'E, 07 April 1965, *leg.* S. Chandra *s.n.* (LWG no. 201136 A).

*Fissidens robinsonii* has been reported from the Andaman and Nicobar Islands. It is here reported for the first time from Meghalaya in the Eastern Himalayas.

Plants in the specimen are medium sized, 1.00 – 1.50 × 0.25 – 0.34 cm. Their leaves are in 10–15 pairs, 1.5–2 mm × 0.2–0.3 mm, oblong-ligulate, elimbate, with an acute apex; the costa stout, excurrent in a short spiny arista. The base of the dorsal lamina is rounded; the sheathing lamina half the leaf length, unequal, and open; leaf margins are crenulate. Fertile plants were not found.

17. *Fossombronia incurva* Lindb

**Contributor:** I. Jukonienė.

**Lithuania:** Kupiškis region, Šepeta peatland, on bare peat, 55°47'45.6"N, 25°02'05.0"E, 13 July 2009, *leg. et det.* I. Jukonienė B16811 (BILAS).

*Fossombronia incurva* is a northern oceanic species endemic to NW Europe, known from Ireland, Great Britain, the Netherlands, central and northern Germany, eastwards to Poland, occurring on acidic sandy-peaty soils (Damsholt, 2009). The species is widespread in the British Isles (Paton, 1999), while in the Nordic countries it is rare (Damsholt, 2009). Hitherto, *F. incurva* has not been recorded in the Baltic countries (Söderström *et al.*, 2002a).

*Fossombronia incurva* is here recorded from the eastern part of Lithuania. The Šepeta peatland is a site of heavy anthropogenic activity, and is still used for peat extraction. The species was found in an abandoned part of the cutover peatland on a patch of bare peat surrounded by *Betula pubescens* Ehrh. trees and shrubs of *Salix aurita* L., the herbaceous layer was dominated by *Calamagrostis epigeios* (L.) Roth. Associated liverworts were *Cephalozia bicuspidata* (L.) Dumort. and *Pellia epiphylla* (L.) Corda. After one year, the locality was totally destroyed by peat extraction. Plants collected in Šepeta peatland had abundant spores (22.37 μm ± 2.13SD), adhering in tetrads. The occurrence of *F. incurva* in cutover peatland suggests that the species may also be found at other sites in Lithuania. It could be more frequent in the territory despite its rarity in neighbouring countries. Finding the species is difficult because of its minute size, its biology and the transience of its habitat.

18. *Gongylanthus ericetorum* (Raddi) Nees

**Contributor:** R. Natcheva

**Bulgaria:** Blagoevgrad region, Belasitsa Nature Park, south of the road between the villages Razdak and Drangovo, on soil in a thicket of *Ostrya carpinifolia* Scop., *Quercus pubescens* Willd. and *Q. cerris* L., together with *Polytrichum piliferum* Hedw., *Scleropodium touretii* (Brid.) L.F.Koch and *Bartramia ithyphylla* Brid., 41.397459°N, 23.2722°E, 274 m a.s.l., 8 April 2013, *coll./det.* R. Natcheva 9430 (SOM-B).

This Mediterranean-Atlantic species is known from Albania, Greece, and Croatia on the Balkans (Ros *et al.*, 2007).

19. *Grimmia atrata* Miel. ex Hornsch

**Contributors:** M. J. Cano, J. A. Jiménez and M. Alonso

**Peru:** Pasco, al N del abra Uchucchama, 10°34'S, 76°41'W, 4745 m a.s.l., on acidic rocks with ferruginous veins, 31 May 2013, *leg.* M.J. Cano, J.A. Jiménez & M. Alonso 7542, 7554, 7561, 7562, 7563, 7567 (MUB, USM).

*Grimmia atrata* is an orophytic species reported from Europe, Asia, North America and South America (Ochyra & Bednarek-Ochyra, 2004; Hastings & Greven, 2007). In South America it is known from a few Bolivian collections in the department of La Paz between 4270 and 4750 m a.s.l. (Muñoz, 1999; Churchill *et al.*, 2009), Santa Catarina (Sehnem, 1976) and Rio Grande do Sul (Yano & Bordin, 2006) states in Brazil, and in the department of Boyacá in Colombia at an altitude of 4300 m a.s.l. (Ellis *et al.*, 2012b, as *Streptocolea atrata* (Miel. ex Hornsch.) Ochyra & Żarnowiec).

The new specimens cited above were collected during a field trip in 2013 to Central Peru (departments of Ancash, Lima, Huánuco, and Pasco) and are the first collections of *G. atrata* in this country. One of the collections (Cano *et al.* 7542) was fertile and grew in tufts on dry and exposed acidic rocks or in fissures in rock in a Puna formation with sparse vegetation at an altitude of 4745 m a.s.l. The rocks were iron-rich, and in fact, *G. atrata* is considered a “copper moss” associated with heavy metal bearing rock (Bates, 2009).

20. *Hypnum imponens* Hedw

**Contributors:** I. Jukonienė, M. Subkaitė and A. Uselienė.

**Lithuania:** Tauragė region, Šilinė forest (Viešvilė Strict Nature Reserve), forest compartment N 66, on fallen ash trunk, 55°8'25.27"N, 22°23'52.63"E, 24 April 2012, *leg. et det.* A. Uselienė B16812, *conf.* I. Jukonienė, (BILAS); Curonian Spit, Nagliai Strict Nature Reserve, on sandy soil in aspen forest stand, near Curonian Lagoon, 55°26'36.93"N, 21°5'37.79"E, 04 July 2013, *leg. et det.* M. Subkaitė B16691, *conf.* I. Jukonienė (BILAS).

These specimens are the first collections of *Hypnum imponens* from Lithuania. Both were collected in the western part of the country. This Mediterranean-temperate species has a circumpolar distribution (Dierßen, 2001). It is rare in neighbouring Latvia and has not been recorded in Estonia (Ignatov *et al.*, 2006). Usually *H. imponens* grows in acid fens and bogs and more rarely on rotten logs (Dierßen, 2001), but in Lithuania, the species was also found growing on sandy soil.

The species was recognised by its reddish-brown stem, yellow to brown alar cells in the leaves and irregularly lobed pseudoparaphyllia.

21. *Leptodontium longicaule* Mitt. var. *microuncinatum* (Mitt.) R.H.Zander

**Contributors:** H. Bednarek-Ochyra and V. R. Smith

**Prince Edward Islands, Marion Island:** Trypot stream near Tom, Dick and Harry Hills, halfway between Nellie Humps and Fred Hill, 46°53'45"S 37°50'45"E, 100–120 m a.s.l., in *Blechnum penna-marina* (Poir.) Kuhn fernbrake on the steep slopes above stream, 16 April 1999, *leg.* R. Ochyra 1062/99 (KRAM).

*Leptodontium longicaule* var. *microuncinatum* is a large and handsome moss which was mentioned in the latest list of mosses of the Prince Edward Islands as *L. microuncinatum* Dusén but without citation of any voucher collections (Ochyra, 2008). In fact this taxon was reported from Marion Island, the larger island of this archipelago, as *Tortula* Hedw. *cf. geheebiopsis* (Müll.Hal.) Broth. (Zanten, 1971). However, the presence of two distinct stereid bands in the costa immediately excludes any relationships of this moss with *Syntrichia* Brid. in which the latter species is positioned. *Leptodontium longicaule* var. *microuncinatum* is a temperate Afro-American variety widely distributed in southern South America in the *Nothofagus* zone and extending northwards to Venezuela at high elevations along the Andean chain (Zander, 1972). It is relatively frequent on Tristan da Cunha and Gough Island, in the middle of the South Atlantic Ocean, and it is rare and scattered in East Africa and on Réunion Island in the Indian Ocean. This variety penetrates into the subantarctic, where it is known from Îles Crozet and herein, is reported from the Prince Edward Islands, a subantarctic archipelago situated about 900 km to the west from Îles Crozet in the Southern Ocean. This distribution pattern is exhibited by a number of temperate moss species, for example *Ditrichum ditrichoideum* (Cardot) Ochyra (Ochyra & Lewis Smith, 1998), *Pohlia drummondii* (Müll.Hal.) A.L.Andrews (Blockeel *et al.*, 2008b), *Bucklandiella orthotrichacea* (Müll.Hal.) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2012), and *B. striatipila* (Cardot) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2013b).

22. *Marsupella sparsifolia* (Lindb.) Dumort

**Contributor:** S. Ștefănuț

**Romania:** Southern Carpathians, Făgăraș Mountains, below Vârtopu Roșu Peak, Sibiu County, 45°34'53"N 24°29'02"E, 1900 m a.s.l., on rocks, 18 August 2014, *leg.* S. Ștefănuț *s.n.*, *det.* S. Ștefănuț (BUCA B4794); 45°34'51.5"N, 24°28' 44.5"E, 2150 m a.s.l., on rocks, 19 August 2014, *leg.* S. Ștefănuț *s.n.*, *det.* S. Ștefănuț (BUCA B4795).

Fertile samples of *Marsupella sparsifolia* were collected from the alpine zone of the Făgăraș Mountains, Avrig Glacial Ring, in an area of *Saponaria pumilio* Fenzl. *ex* A.Braun. The plants grew in association with other liverworts, such as *Gymnomitrium brevissimum* (Dumort.) Warnst., *G. commutatum* (Limpr.) Schiffn., *G. concinnum* (Lightf.) Corda, *Marsupella boeckii* (Austin) Kaal., *Nardia scalaris* Gray and *Anthelia juratzkana* (Limpr.) Trevis.

This is the first report of *Marsupella sparsifolia* for Romania and the south-eastern Carpathians (Ștefănuț, 2008; Ștefănuț & Goia, 2012). The nearest other station for this species could be in Bulgaria, but the report was without precise collection data or locality (Ros *et al.*, 2007). The conservation status of *M. sparsifolia* in Romania is Critically Endangered – CR B1ab(ii,iii) + 2ab(ii,iii).

In Europe, *M. sparsifolia* has been reported from Iceland, the Faroe Islands, Norway, Sweden, Finland, Britain, France, Germany, Switzerland, Austria, Poland, Czech Republic, Slovakia, Spain, Andorra, Azores, Italy, Bulgaria, northwest Russia, north Russia, (Söderström *et al.*, 2002b, 2007) and now, Romania.

23. *Nardia lescurii* (Austin) Underw

**Contributor:** V. A. Bakalin

**Russian Federation (Northern Far East).** Magadan Province, Yagodninsky District, Sokhokhy Stream upper course in Debin Riner Basin, 62°12'05"N 149°28'23"E, 800 m a.s.l., moist clay in stream bank, 25 July 2014, *leg.* V.A. Bakalin (VBGI: Mag-21-27-14); the pass from Sokhokhy Stream basin to Jack London Lake, the tundra belt, 62°06'46"N, 149°28'58"E, 1090 m a.s.l., solifluction spot in moist condition, 26 July 2014, *leg.* V.A. Bakalin (VBGI: Mag-22-9-14); middle course of Debin River, ca 15 km eastward of Yagodnoye Settlement, 62°26'44"N, 149°49'01"E, 510 m a.s.l., solifluction spot in open *Larix* Mill. forest, 3 August 2014, *leg.* V.A. Bakalin (VBGI: Mag-28-1-14).

*Nardia lescurii* was regarded for a long time as strictly endemic to the Appalachian Mountains (Schuster, 1969), until it was found in Japan (Furuki, 1997), where it shares the same ecological niche as *Nardia japonica* Steph. As was also shown by Furuki (1997), these species are very similar in morphology, but have strikingly different oil-bodies

(granulate in *N. lescurii* and homogenous in *N. japonica*). Furuki (1997) also showed that *N. lescurii* is not a rarity in Japan and even fairly common in some areas. The study of living material from the north of the Russian Far East revealed *N. lescurii* for the first time in north-east Asia, where too, the species is probably not rare, and will be found in many additional localities in future studies if living material can be analyzed.

**24. *Orthotrichum hispanicum*** F.Lara, Garilleti & Mazimpaka

**Contributor:** T. Kiebacher

**Switzerland:** Canton Bern, Thun, 200 m west of Buechholz, 46°43'47.0"N, 07°36'15.5"E, 572 m a.s.l., edge of a forest, epiphytic on stem bark of *Fraxinus excelsior* L. approximately two meters above ground, 04 June 2014, *leg.* T. Kiebacher (priv. herb. T. Kiebacher), *conf.* R. Garilleti.

*Orthotrichum hispanicum* was described in 2000 from two mountain chains of the Iberian Peninsula (Lara *et al.*, 2000). So far, the species is known from Europe and Asia from the following regions and countries: the Pyrenees, Serranía de Cuenca and Majorca (Balearic archipelago) in Spain (Lara *et al.*, 2000; Pericas, 2008), Alpes-Maritimes (Blockeel *et al.*, 2004) and Lozère (Bardat & Boudier, 2006) in Southern France, mainland Greece (Lara *et al.*, 2003), the Turkish Caucasus (Garilleti *et al.*, 2009; Lara *et al.*, 2010), the Netherlands (van der Pluijm, 2004) and the Indian Kashmir (Garilleti *et al.*, 2009).

The species seems to perform well in Mediterranean- and sub-Mediterranean mountain environments where abundant populations have been observed (Lara *et al.*, 2000, 2003; Garilleti *et al.*, 2009). The Dutch locality refers to a single collection (van der Pluijm, 2004) and the record in Kashmir refers to a specimen found intermixed in herbarium material of *Orthotrichum striatum* Hedw. collected in 1892 (Garilleti *et al.*, 2009).

The record presented here is the first one for this species in Switzerland (NISM 2014). Only one cushion was observed, and no further cushions were found on the surrounding trees. Owing to the density of the adjacent forest, potentially suitable sites with sufficient light supply were mainly limited to inaccessible tree crowns.

*Orthotrichum hispanicum* is similar to *O. scanicum* Grönvall from which it differs in the exothetical bands formed by 4–5 rows of cells (as opposed to 2(–3) rows), the capsule strongly constricted below the mouth when dry (as opposed to slightly constricted), the edentate leaf apices (as opposed to mostly dentate) and a strongly papillose endostome (as opposed to smooth or slightly papillose) (Lara & Garilleti, 2014).

## 25. *Orthotrichum scanicum* Grönvall

**Contributors:** V. Plášek, A. Nowak, M. Nobis, J. Sawicki and L. Číhal

**Middle Asia, Kyrgyzstan:** Kyrgyz Alatau Range, Susamyrtau Mts, Chichkan River Valley, 20 km NNW of Toktogul town, on bark of *Abies semenovii* B.Fedtsch. on the edge of a mixed forest, GPS coordinates (WGS 84): 42°30.07'N, 72°49.16'E, 1477 m a.s.l., 10 June 2013, *leg.* V. Plášek *s.n.* (OSTR).

A total of 18 taxa of the genus *Orthotrichum* (incl. *Nyholmella*) have previously been reported from Kyrgyzstan (Lazarenko, 1938; Rakhmatulina, 1970, 1990; Lewinsky-Haapasaari, 1994; Mamatkulov *et al.*, 1998; Ignatov *et al.*, 2006; Ellis *et al.*, 2014b, d, 2015). The specimen cited above is an epiphytic moss new to the bryoflora of the country.

A recent revision of *Orthotrichum* collections showed that *O. holmenii* Lewinsky-Haapasaari and *O. lewinskyae* F.Lara, Garilleti & Mazimpaka, formerly considered as separate taxa, have to be placed in synonymy with *O. scanicum* (Medina *et al.*, 2009). The collections of *O. scanicum* from Africa (Garilleti *et al.*, 1997) were previously considered as *O. lewinskyae* and the specimens from Kazakhstan (Lewinsky-Haapasaari, 1996) and Russia (Fedosov *et al.*, 2009) as *O. holmenii*. The current distribution of *Orthotrichum scanicum* includes central Europe, southern Fennoscandia, the Mediterranean basin (including northern Africa), the Balkans, Georgia, Russia, Kazakhstan and most recently Kyrgyzstan.

In Kyrgyzstan, *Orthotrichum scanicum* was first collected during a Czech-Polish expedition in 2013 to the north-western part of the country, in a mountain area forming part of the southern foreland of the Kyrgyz Alatau Range. The species occurred on the bark of *Abies semenovii* at the edge of a mixed forest along a public road (Bishkek-Osh highway). The moss cushions were located about 1.8–2.5 m above the ground, with a northern exposure. All of the populations were richly fertile. Examples of associated species include *Orthotrichum speciosum* Nees, *O. anomalum* Hedw. and *O. pallens* Bruch. *ex* Brid.

The specimens of *Orthotrichum scanicum* collected in Kyrgyzstan show some features that differ from those of typical European plants, *e.g.* they have exerted capsules, a completely naked calyptra, and in particular, 16 roughly papillose endostome segments. However according to Medina *et al.*, 2009, these character states are considered as the extremes of the variability within the species.

**26. *Orthotrichum speciosum*** Nees var. *brevisetum* F.Lara, Garilleti & Mazimpaka

**Contributors:** A. D. Özçelik, F. Lara, R. Garilleti, G. Uyar and M. Ören

**Turkey:** Antalya province, Isaurian Taurus Mountains, Geyik Mountains; Akseki, Irmasan Pass, small ruined military base in cedar-fir forest area, 37°06'19"N, 031°48'06"E, 1525 m a.s.l., 17 July 2006, on *Populus canadensis* Moench, leg. R. Garilleti *et al. s.n.* (MAUAM-Brio 4601, 4603). 15 km North of Akseki, pine forest with scattered oaks, 37°09'N, 031°48'E, 1150 m a.s.l., 19 July 1998, on *Quercus cerris* L., leg. E. Bermejo & F. Martínez 19, (MAUAM-Brio 4600). Konya province, Hadim, Beyreli village; cedar-fir forest with scattered pines and oaks, 36°49'01.0"N, 032°26'38.1"E, on *Quercus* sp., 1515 m a.s.l., 22 April 2013, leg. A.D. Özçelik 198, (ZNG 5066). İçel province: Isaurian Taurus Mountains, Taşeli Plateau; Kaş Plateau; cedar-fir forest in open valley exposed to ENE near Anamara Ermenek, 36°14'12"N, 032°54'56"E, 1375 m a.s.l., 16 July 2006, on *Abies cilicica* ssp. *isaurica* (Coode & Cullen) Silba, leg. R. Garilleti *et al. s.n.*, (MAUAM-Brio 4611).

*Orthotrichum speciosum* var. *brevisetum* is an epiphytic moss that grows in Mediterranean mountain areas under climates with relatively high precipitation levels and severe summer drought. To date it has been reported from Spain, Morocco, Algeria, Sicily, (Draper *et al.*, 2003), and Cyprus (Frahm *et al.*, 2009).

It is known from four localities in Turkey, in the Central sector of the Taurus Mountains, a region where this moss seems to be frequent at medium altitudes. It forms part of epiphytic bryophyte communities in a wide range of open forests (cedar-fir, oak or pine forests), living on trees having different ecological affinities. It has been found growing on *Populus canadensis*, *Quercus cerris*, and *Abies cilicica* ssp. *isaurica*.

Although considered a variety of *O. speciosum* Nees, this moss is more easily confused with *O. affine* Schrad. ex Brid., with which it shares the general aspect and some sporophytic traits, especially the capsule shape and the well-developed exothecial ribs. For a safe distinction of these two mosses, it is fundamental to observe the position of the exostome when dry. In *O. affine* the exostome teeth are completely bent at their bases, with their complete length lying against the exothecium. In *O. speciosum* var. *brevisetum* the exostome is revolute, with only the teeth tips touching the exothecium. Besides this, *O. speciosum* var. *brevisetum* has strongly papillose and stouter endostome segments, long-acuminate leaves and very densely hairy calyptrae, whereas in *O. affine* the endostome segments are thinner and less papillose, leaf apices are usually acute, and calyptrae are sparsely hairy (Lara & Garilleti, 2014).

For distinction between *O. speciosum* var. *speciosum* and var. *brevisetum* it is necessary to study

well-developed sporophytes. The type variety has emergent to long exerted capsules, that are almost smooth or with ribs only marked in the upper half, and conic or fusiform mature calyptrae with whitish or golden hairs, whereas var. *brevisetum* has hemi-emergent capsules with marked, long exothecial ribs, and oblong-conic mature calyptrae with yellow-greenish hairs (Lara & Garilleti, 2014). Ecological behaviour is also somewhat different, since var. *speciosum* prefers territories where summer drought is moderate compared to those where var. *brevisetum* has been found.

**Contributors:** F. Lara, R. Garilleti, R. Medina and V. Mazimpaka

**Greece:** Crete, Lasithi district, Oropedio Lasithiou, Psychro, way to Dikteon cave, *Quercus* and *Acer sempervirens* L. forest, 35°09'47"N, 025°26'42"E, 740 m a.s.l., 14 August 2005, on trunk of *Quercus* sp., leg. R. Medina *s.n.* (MAUAM-Brio 2396).

The Lasithi Plateau is an endorheic basin nested in the Dikti Mountain massif, devoted to agriculture and farming. The new specimen was collected in the south-western slope of the plateau, which supports a sparse sclerophyllous vegetation dominated by *Quercus calliprinos* Webb and *Acer sempervirens*. In contrast to the hot and dry coastal plains (dominated by different kinds of Mediterranean low scrublands), the elevation of the area buffers the high temperatures and causes orographic precipitation, allowing a milder Mediterranean climate and the development of garrigue and forest. Since these conditions also occur in the other massifs of Crete (the White Mountains and the Idi Range), it is reasonable to think that this epiphyte could also be present there.

*Orthotrichum speciosum* var. *brevisetum* represents a novelty for Greece (Ros *et al.*, 2013). Its presence on Crete, the largest island in the Eastern Mediterranean, well exemplifies the wide Mediterranean distribution of this moss. It is mainly present in mountains from the western and eastern edges of the Mediterranean basin, a distribution pattern shared with other Mediterranean *Orthotrichum* species such as *O. tortidontium* F.Lara, Garilleti & Mazimpaka (Mazimpaka *et al.*, 2000; Lara *et al.*, 2003) and *O. vittii* F.Lara, Garilleti & Mazimpaka (Lara *et al.*, 2009). However, the record of *O. speciosum* var. *brevisetum* in Sicily (Draper *et al.*, 2003) provides the evidence of its presence in the central part of the basin and, therefore, it can be considered a widespread and representative Mediterranean moss (Lara & Mazimpaka, 2001), comparable, although to date less frequently reported, to *O. philibertii* Venturi, *O. macrocephalum* F.Lara, Garilleti & Mazimpaka and *O. acuminatum* H.Philibert.

27. *Physcomitrella patens* (Hedw.) Bruch & Schimp

**Contributors:** M. G. Dia and P. Campisi

**Sicily:** Ficuzza, province of Palermo, Coda di Riccio pond, 865 m a.s.l. on moist soil at the edge of the water body, 37°52'25"N 13°23'56" E, 17 October 2013, *leg.* M.G. Dia and P. Campisi, *s.n.* (PAL).

*Physcomitrella patens*, the only species of the genus reported from Europe, also occurs in Asia (Siberia) and in eastern and western North America (Goffinet, 2005). It is rare throughout its range, although may be locally abundant (Christy, 2012).

This small moss, which has a short life cycle of three to four months, lives on humid nutrient-rich soils at the edges of lakes, ponds and streams, inundated in winter and spring but exposed in the summer. It has an annual shuttle strategy (*sensu* During, 1992) and colonizes these temporary habitats during the months in which the water level is lowered, the soil is bare and competition with other plants is still minimal. The populations are often threatened by drainage or silting of ponds, as well as by the trampling by livestock. For this reason, in addition to its rarity, it is considered a species at risk in many European countries (Hodgetts, 2014).

The new locality, the first for this taxon in Sicily, is situated in the protected forest area "Bosco della Ficuzza, Rocca Busambra, Bosco del Cappelliere and Gorgo del Drago". It is at the southern limit of the range of the species and, to date, is the only known record for the large islands of the Mediterranean (Ros *et al.*, 2013). In Italy, *P. patens* is rare, especially in the central and southern part of the peninsula (Aleffi *et al.*, 2008).

**28. *Plagiothecium standleyi*** E.B.Bartram

**Contributor:** H. Bednarek-Ochyra

**Tanzania:** Kilimanjaro Mountains, Shira Plateau, 3°02'S, 37°12'E, 4000 m a.s.l., base of *Philippia* Klotzsch, 27 December 1975, *leg.* J. Lewinsky B406 (BR).

For a long time *Plagiothecium standleyi* has been considered to be a neotropical species occurring from southern Mexico to the northern Andes of Colombia and Venezuela (Buck & Ireland, 1989). Additionally, owing to the taxonomic misinterpretation of the type material, it was known under the name *P. drepanophyllum* Renauld & Cardot. However, the type of the latter proved to be *Lepidopilum scabrisetum* (Schwägr.) Steere and therefore the species had to be renamed (Ochyra & Buck, 2002). As is the case with many high mountain neotropical moss species (e.g. Buck & Griffin, 1984; Ochyra *et al.*, 1992; Delgadillo, 1993; Wilbraham & Matcham, 2010), *P. standleyi* was subsequently discovered in the alpine regions of the East African mountains in Uganda (Ochyra *et al.*, 2002) and Ethiopia (Ellis *et al.*, 2012c) and here it is recorded from the Kilimanjaro Mountains.

**29. *Pogonatum otaruense*** Besch

**Contributors:** Y.-J. Yoon, K. V. Gorobets, S. J. Park and B.-Y. Sun

**Republic of Korea:** Jeju Prov. (Island), Hyodoncheon, 33°18'340"N, 126°33'522"E, 463 m a.s.l.; on humus on rocks, 31 Oct. 2011, *leg.* Y.-J. Yoon 8719 (JNU).

The family Polytrichaceae includes about 23 genera with *ca* 220 species recorded around the globe (Higuchi, 2011). Six genera with 26 species were reported from South Korea (Park and Choi, 2007). Until recently, *Pogonatum otaruense* was believed to be endemic to Japan (Noguchi, 1987). However, in the course of our research, we collected this species on Jeju Island, on humus-covered rocks. The irregularly arranged marginal cells of the lamellae and the turgid, ovate capsules are diagnostic for this species. The leaves are wider in proportion to their length than in allied species (Noguchi, 1987).

**30. *Pohlia sphagnicola*** (Bruch & Schimp.) Lindb. & Arnell

**Contributors:** H. Kürschner and M. Kırmacı

**Turkey:** Province Ağrı, Aras Güneyi Dağları, south of Yukarıkent geçidi, river valley between Kağızman and Ağrı, 8 km north of Cumaçay, 39°56'58.0"N, 43°15'48.7"E, 2072 m a.s.l., spring area with small *Sphagnum squarrosum* Crome bog and swampy meadows, 22 June 2014, *leg.* M. Kırmacı & H. Kürschner 14-466, 14-472 (AYDN, priv. *herb.* H. Kürschner Berlin).

Accompanying species: *Cephalozia bicuspidata* (L.) Dumort., *C. pleniceps* (Austin) Lindb. (liverworts), *Drepanocladus aduncus* (Hedw.) Warnst., *Hamatocaulis vernicosus* (Mitt.) Hedenäs, *Plagiomnium ellipticum* (Brid.) T.J.Kop., *Polytrichum commune* Hedw. var. *perigoniale* (Michx.) Hampe, *Sphagnum squarrosum* (mosses).

This is a somewhat problematic, circumpolar, northern species, restricted to acid *Sphagnum* peat bogs. It is close to *Pohlia nutans* (Hedw.) Lindb., but dioicous and with smaller spores [c. 12 µm in diameter *vs.* (18–)20–24 µm in diameter in *P. nutans*, (Nyholm, 1975)]. The taxonomic status of the species is unclear. Nyholm (1975) and Frey *et al.* (2006) treat it as a separate species. However, Nyholm (1975, p. 207) stated "This species is closely related to the foregoing species (*P. nutans*), and the relation to it is uncertain. It seems to be merely a poorly developed form of *P. nutans*". Shaw (2014) did not accept the former record of *P. sphagnicola* in eastern North America (Nova Scotia, Newfoundland; *cf.* Shaw, 1982), as the type of *P. sphagnicola* is European. He treated it within the *P. nutans* complex. In his opinion, the striking habitat (*Sphagnum* hummocks and peat bogs) is not diagnostic, as at least 80 % of *P. nutans* may occur at the same sites.

The Turkish specimen, however, fully matches the characters generally given for *P. sphagnicola*. The pendulous capsules are yellowish-brown with a short neck, presented on very long, slender and flexuose setae up to 5 cm long. The operculum is slightly convex and bluntly pointed and the spores are smaller than in *P. nutans*, mostly varying between 12–15 µm in diameter and smooth to slightly roughened. The loose tufts or solitary plants at the Turkish site are frequently associated, mixed and interwoven with dense *Sphagnum* hummocks (*S. squarrosum*). So far as is known, Cumaçay harbours one of the easternmost *Sphagnum* bogs of Turkey.

Following Shaw (2014), *P. sphagnicola* is an Old World species, known from northern, eastern and central Europe, north Asia and now, documented by the new Turkish record, southwest Asia (high mountain area of eastern Turkey).

31. *Schistochila splachnophylla* (Hook.f. & Taylor) Steph

**Contributors:** J. Váňa and K. K. Newsham

**South Georgia:** Cumberland East Bay, Moraine Fjord, flushed site in *Festuca* L. moor association, ca 70 m, 14 February 1958, leg. J. Smith 00015A, det. G. G. Hässel de Menéndez (AAS); Cumberland East Bay, south of Grytviken, east facing slopes, wet flush in *Festuca* moor association, ca 73 m a.s.l., 23 December 1958, leg. J. Smith 00150, det. J. Váňa (AAS); Right Whale Bay, south west side of Reef Point, on wet rocks by waterfall, ca 7 m a.s.l., 2 January 1961, leg. S. W. Greene 00674A, det. G. G. Hässel de Menéndez (AAS); Stromness Bay, running north-east of Husvik, near the east end of the valley, wet banks of stream, ca 30 m a.s.l., 27 January 1961, leg. S. W. Greene 01430, det. G. G. Hässel de Menéndez (AAS); Cumberland West Bay, near head of *Sphagnum* L. valley, behind plain, on north-facing wet rocks at the edge of a waterfall, ca 150 m a.s.l., 1 February 1961, leg. S. W. Greene 01563B, 01564A, both det. G. G. Hässel de Menéndez (AAS); Prince Olav Harbour, north shore of North Bay, amongst wet *Deschampsia* P.Beauv. sward, ca 6 m a.s.l., 2 February 1961, leg. S. W. Greene 01644, det. G. G. Hässel de Menéndez (AAS); Cumberland East Bay, to east of snout of Hodges Glacier, on wet rock faces on south-facing slopes, ca 1250 m a.s.l., 10 February 1961, leg. S. W. Greene 01810, det. G. G. Hässel de Menéndez (AAS); Royal Bay, north-west shore of Moltke Harbour, moist stony ground by river behind beach, ca 6 m a.s.l., 18 February 1961, leg. S. W. Greene 02115B, 02121B, both det. G. G. Hässel de Menéndez (AAS); Royal Bay, corrie between Brocken and Mount Krokisius, wet bryophyte flush by shore of lower lake, ca 60 m a.s.l., 21 February 1961, leg. S. W. Greene 02364B, det. G. G. Hässel de Menéndez (AAS); Larsen Harbour, above Bonner Beach, north facing

slopes, on wet rocks above shore, ca 75 m a.s.l., 9 March 1961, leg. S. W. Greene 02463C, det. G. G. Hässel de Menéndez (AAS); between Esmark Glacier and Holmestrand Peninsula, behind inner beach, on wet rock of stream, at mouth of small gorge, ca 6 m a.s.l., 11 March 1961, leg. S. W. Greene 02705A, det. G. G. Hässel de Menéndez (AAS); Larsen Harbour, behind Bonner Beach, on north-facing rocks, ca 60 m a.s.l., 12 March 1961, leg. S. W. Greene 02868B, det. G. G. Hässel de Menéndez (AAS); Stromness Bay, valley running NW from Husvik, top of grassy stream bank, ca 150 m a.s.l., 20 December 1963, leg. R. E. Longton 0052A, det. J. Váňa, 00052C, det. G. G. Hässel de Menéndez as *S. carnosa* (Mitt.) Steph., rev. J. Váňa (AAS); Jumbo Cove, on moist rocks near waterfall, ca 75 m a.s.l., 14 December 1967, leg. G. S. C. Clarke & S. W. Greene 00130, det. J. Váňa (AAS); south shore of Husvik Harbour, north facing *Rostkovia* Desv. flush, ca 30 m a.s.l., 15 December 1967, leg. G. S. C. Clarke & S. W. Greene 00126A, det. J. Váňa (AAS); southern end of Moraine Fjord, 1 March 1968, leg. S. W. Greene & D. M. Greene 02094, det. G. G. Hässel de Menéndez (AAS); to east of Gull Lake, damp bryophyte-covered north-facing bank of shallow gully where late snow lies, ca 100 m a.s.l., 2 January 1970, leg. R. I. L. Smith 01394, det. G. G. Hässel de Menéndez (AAS); west end of Church Bay, well-vegetated off-shore island, ca 25 m a.s.l., 4 April 1970, leg. E. P. Wright 00146B, det. G. G. Hässel de Menéndez as *S. carnosa*, rev. J. Váňa (AAS); north side of King Haakon Bay, opposite Vincent Islands, ca 3–38 m a.s.l., 28 December 1970, leg. R. I. L. Smith 00308B, det. J. Váňa (AAS); headland to south of Leith Harbour, ca 15–120 m a.s.l., 22 November 1974, leg. R. I. L. Smith 01588A, det. J. Váňa (AAS); St. Andrews Bay area between snout of Heaney Glacier and south side Mt. Skittle, on eroded tussocks, 10 November 1976, leg. R. I. L. Smith 00092B, det. J. Váňa (AAS); to west of Nordenskjold Glacier, ca 30–90 m a.s.l., 19 November 1976, leg. R. I. L. Smith 00064, det. J. Váňa (AAS); between Dartmouth Point and Harker Glacier, in *Rostkovia*-bryophyte bog, ca 15 m a.s.l., 13 January 1981, leg. R. I. L. Smith 00047, det. J. Váňa (AAS); Prince Olav Harbour area, various (but typical) habitats, 10–50 m a.s.l., 6 February 1981, leg. R. I. L. Smith 00087A, det. J. Váňa (AAS); Stromness, Shackleton Valley, wet slope with mosses and *Juncus* L., ca 15 m a.s.l., 20 December 1991, leg. R. I. L. Smith 08424, det. J. Váňa (AAS); at the foot of Brown Mountain, on the south side of Junction Valley (54° 17.868'S, 36° 31.318'W, 3 November 2011, leg. K. K. Newsham 117 p.p., det. J. Váňa (AAS); at the side of a stream flowing down from Gull Lake (54°17.008'S, 36° 30.852'W), 5 November 2011, leg. K. K. Newsham 118, det. J. Váňa (AAS);

on the south-western shore of Maivatn on ground near to the lower of two waterfalls flowing from Lancetes Lake into Maivatn (54°15.665'S, 36°30.149'W), 6 November 2011, *leg.* K. K. Newsham 122 *p.p.*, *det.* J. Váňa (AAS); on the southern shore of Lancetes Lake, on level ground amongst *Acaena Mutis ex L.* and *Festuca* at the water margin (54°15.749'S, 36°30.346'W), 104 m a.s.l., 6 November 2011, *leg.* K. K. Newsham 121 *p.p.*, 139 *p.p.*, *det.* J. Váňa (AAS).

*Schistochila splachnophylla* was originally described from two localities in Chile, *i.e.* Cape Horn and the Straits of Magellan, *Mr. Menzies* (Hooker & Taylor 1844). Hooker's collection from the Hermite Islands was selected by Schuster & Engel (1977) as the lectotype. The species has a southern South American (Valdivian – Magellanian group) distribution pattern. It has been reported from Juan Fernandez (Mas Afuera), Chile (Los Rios region: Valdivia province; Los Lagos region: Osorno, Llanquihue and Chiloé provinces; Aisén region: Aisén province, and Magallanes region: Ultima Esperanza, Magallanes, Tierra del Fuego and Antártica Chilena provinces), Argentina (Tierra del Fuego province) and the Falkland Islands (references *cf.* Schuster & Engel, 1977 and Hässel de Menéndez & Rubies, 2009).

The late G. G. Hässel de Menéndez determined some specimens collected from South Georgia by S. W. Greene and R. I. L. Smith as *Schistochila splachnophylla*. She did not publish finding the species on the island (*vide* Hässel de Menéndez & Rubies, 2009), but *S. splachnophylla* is mentioned as being new to South Georgia in an incomplete and unpublished manuscript (*The liverwort flora of South Georgia*, G. G. Hässel de Menéndez & R. I. L. Smith).

A detailed description of *Schistochila splachnophylla* with drawings was published by Schuster & Engel (1977). These authors described the species as being “extremely robust”, but this apparently applies only to plants from mainland South America. South Georgian plants are relatively small, with more abbreviated leaves, and are relatively similar to plants of *Schistochila pachyphylla* (Lehm. & Lindenb.) Steph., a species known only from the Tristan da Cunha area (*cf.* Váňa & Engel, 2013). The problem of separating these two species has been discussed by Schuster & Engel (1977). It may be possible that these taxa are conspecific, or that populations of small plants may represent “an adaptation to growth under Antarctic to subantarctic and/or alpine conditions” (*l.c.*: 319). Future studies based on molecular characteristics may solve this problem if the size of plants and slightly different leaf forms are insufficient characters for separating these taxa at the species level.

### 32. *Seligeria trifaria* (Brid.) Lindb

**Contributor:** R. Natcheva

**Bulgaria:** (1) Smolyan region, Rhodopi Mts, along the road to Chairski lakes, on shaded north facing calcareous rocks, with sporophytes, 41.5833°N 24.4333°E, *ca* 1300 m a.s.l., 19 September 2006, *coll./det.* R. Natcheva 9306 (SOM-B); (2) Vratsa region, Vrachansky Balkan Nature park, on overhanging calcareous rocks at the Borov kamak waterfall, with sporophytes, 43.15167°N 23.50472°E, 1087 m a.s.l., 18 July 2006, *coll./det.* R. Natcheva 8789 (SOM-B).

On the Balkan Peninsula *S. trifaria* is known from Greece and Romania, and in a pre 1962 report, from Bosnia-Herzegovina, (see Ros *et al.*, 2013). In Romania the species is Red-listed as VU (Stefanut & Goia, 2012).

### 33. *Sphagnum affine* Renauld & Cardot

**Contributor:** A. Koczur

**Poland:** Western Carpathians, Kotlina Orawsko-Nowotarska, ombrotrophic bog “Młaka Brzeże” near Ludźmierz, 49°27'29"N, 19°57'41"E, 610 m a.s.l., a broad, wet depression in the southern part of the peat bog, covered by a community of the *Rhynchosporion albae* alliance (probably a dry variant of *Caricetum limosae*), 7 September 1994, *leg.* A. Koczur *s.n.*, *det.* I. Melosik (KRAM); *loc. cit.*, 620 m a.s.l., in a hollow on peat-bog, 5 September 2014, *leg.* A. Koczur *s.n.*, *conf.* R. Ochrya (KRAM).

Information on the occurrence of *Sphagnum affine* in the Kotlina Orawsko-Nowotarska basin was published a few years ago (Koczur, 2006; Melosik, 2006) but without any locality data. These records are now substantiated by the citation of the relevant voucher specimens. The species grows along with *S. papillosum* Lindb. in a system of wide bog hollows in which the most hydrated places are dominated by *S. cuspidatum* Ehrh. In drier slightly elevated places *S. fallax* (H.Klinggr.) H.Klinggr. and *S. rubellum* Wilson grow. Bog hollows are surrounded by the hummocks formed mainly by *S. magellanicum* Brid., *S. rubellum*, *S. fallax* and *Polytrichum strictum* Menzies *ex* Brid. and densely covered by shrubby forms of *Pinus × rhaetica* Brügger. Long-term observations from 1994 to the present showed no fluctuation in species abundance, and habitat parameters have not changed. In the Polish Western Carpathians *S. affine* is extremely rare and so far has been found at only two localities in the Beskid Mały (Stebel & Stebel, 1998). Likewise, the species is extremely rare in the Czech part of the Western Carpathians, where it currently occurs only at one locality in Rybníky in the Moravskoslezské Beskydy. At a second site in Hutě pod Smrkem it is already extinct (Hájková & Hájek, 2007). In the Slovak part of the Western Carpathians several historical

records of *S. affine* are known, including Turany (Pilous, 1988), Slaná Voda (Rybníček & Rybníčková, 1972), Sucha Hora (Peciar, 1958), and Zuberec and Velká Studená dolina (Pilous, 1971), but none of them have been confirmed recently (R. Šoltés, personal communication, 2014).

34. *Streptocolea atrata* (Hornsch.) Ochyra & Żarnowiec

**Contributor:** H. Bednarek-Ochyra

**Mexico:** Mexico, Nevado de Toluca at summit on NE side of mountain on outer wall of crater, 19°06'30"N 99°45'30"W, 13,100 ft [= ca 4000 m a.s.l.], on rocks, 19 December 1976, *leg.* D. G. Horton 6889a (KRAM).

*Streptocolea atrata* is a predominantly Holarctic species with its main centre of occurrence in Europe, it is rare and widely scattered in the Himalayas, Taiwan and Japan in Asia and exceedingly rare in Canada in North America (Ochyra & Bednarek-Ochyra, 2004; Blockeel *et al.*, 2006b). In addition, the species penetrates deeply into the Neotropics, where it occurs at altimontane stations in Brazil, Bolivia and Colombia (Muñoz, 1999; Ellis *et al.*, 2012b). Herein, the species is recorded from Mexico. It was recorded from this country by Maier (2010) who considered *Grimmia mexicana* Greven to be conspecific with this species. As this taxonomic conclusion raises some controversy (Delgadillo, 2000; Muñoz & Pando, 2000), the present specimens undoubtedly belong within the otherwise variable *S. atrata*. Although the plant lacks sporophytes, the leaves have markedly differentiated bistratose alar cells in the leaf angles and this is a characteristic trait of this species.

35. *Trichostomum brachydontium* Bruch

**Contributors:** Y.-J. Yoon, K. V. Gorobets, S. J. Park and B.-Y. Sun

**Republic of Korea:** Jeju Prov. (Island), Musucheon, 33°25'132"N, 126°26'948"E, 490 m a.s.l.; on soil, 28 October 2010, *leg.* Y.-J. Yoon 6615 (JNU).

*Trichostomum brachydontium* is new to the Korean Peninsula. It is similar to *Hyophila involuta* (Hook.) A.Jaeger in leaf shape and some other characters, and likewise sometimes lacks peristome teeth. In cross section, the leaves often show the adaxially bulging distal cells which are also typical of *H. involuta*. However, the latter lacks laminal papillae superimposed on the mammillae, and are hygrophytic (Eckel, 2007). It can be distinguished from other species by its rounded-obtuse, apiculate stem leaves with plane margins and shortly excurrent costa. This species is widely distributed in the northern hemisphere (Noguchi, 1988).

36. *Weissia longidens* Cardot

**Contributors:** Y.-J. Yoon, K. V. Gorobets, S. J. Park and B.-Y. Sun

**Republic of Korea:** Jeju Prov. (Island), Musucheon, 33°27'419"N, 126°26'833"E, 154 m a.s.l.; on soil, 6 April 2011, *leg.* Y.-J. Yoon 2319 (JNU).

This is the first finding of *W. longidens* on the Korean Peninsula. In Korea, the Pottiaceae are represented by a large number of genera, and within the family, identification is commonly considered difficult owing to the small size of the plants and apparent phenotypic variation (Choe, 1980). *W. longidens* is very similar to *W. controversa* (Nees & Hornsch.) Müll.Hal., but can be distinguished from this allied species by the form and the length of its peristome teeth. *W. longidens* is characterized by involute leaf margins, the seta being 9–12 mm long, and the possession of well-developed linear-lanceolate peristome teeth. Hitherto, *W. longidens* had been considered as endemic to Japan (Noguchi, 1988), now it is also known from Jeju Island.

### Acknowledgements

J. D. Orgaz thanks the curator in Stockholm (S) for the loan of samples. The research of M. S. Jimenez, Guillermo M. Suárez and J. Larraín was supported by PIUNT, PIP 0078 and PICT 1838. A. K. Asthana and A. Srivastava are grateful to the Director, CSIR-National Botanical Research Institute, Lucknow for encouragement and providing facilities, and the Ministry of Environment, Forests & Climate Change, New Delhi is acknowledged for providing financial assistance.

The work of M. J. Cano, J. A. Jiménez and M. Alonso was carried out with the financial support of the Spanish government (project CGL2010-15959 co-financed by FEDER). They are very grateful to Asunción Cano and the rest of the staff from Museo de Historia Natural of Universidad Nacional Mayor de San Marcos (Lima, Peru) for their assistance during their trip to Peru. The contribution of I. Jukonienė has been in connection with the long-term programme of the Nature Research Centre, Institute of Botany, Vilnius, Lithuania "Biological diversity investigations and projections under conditions of global change and anthropogenic activity".

S. Ștefănuț acknowledges the support by project no. RO1567-IBB03/2014 through the Institute of Biology Bucharest of Romanian Academy. The work of V. Bakalin was supported by grants from the Russian Foundation for Basic Researches (13-04-00775, 15-34-20101). That of Y.-J. Yoon, K. V. Gorobets, S. J. Park and B.-Y. Sun was supported by the grant "Survey of Korean Indigenous Species" (NIBR No. 2013-02-001) from the National Institute of Biological Resources of the Ministry of Environment in Korea. The contributions by H. Bednarek-Ochyra have been financially supported by the Polish National Science Centre through grant No.

N N 303 796 940 and, in part, by the statutory fund of the Institute of Botany of the Polish Academy of Sciences. She is also grateful to the Curators at AD, BR and C for the loan of the herbarium material and to Richard Zander, St. Louis, for naming the specimen of *Didymodon brachyphyllus*. The field work of Marc Leboubier on Île Amsterdam was organised within the programme 136 ECOBIO of the French Polar Institute (IPEV) and Valdon R. Smith on the Prince Edward Islands was logistically supported from the South African Department for Environmental Affairs and Tourism. F. Lara, R. Garilleti and V. Mazimpaka are grateful for financial support by the Spanish MICINN through grant CGL2011-28857/BOS and MINECO through grant CGL2013-43246-P. A. D. Özçelik, G. Uyar and M. Ören would like to thank The Scientific and Technological Research Council of Turkey for financial support (Project Number: 112T653). The contribution by V. Plášek is part of a research project of the Institute of Environmental Technologies, reg. no. CZ.1.05/2.1.00/03.0100, supported by the 'Research and Development for Innovations' Operational Programme, and financed by the Structural Funds of the European Union and by the state budget of the Czech Republic, Project LO1208 of the National Feasibility Programme I of the Czech Republic. The contribution by L. Číhal is a part of grant project SGS27/PRF/2014 financed by University of Ostrava. For J. Váňa and K. K. Newsham, logistic support was provided by the British Antarctic Survey's Operations Group, officers and crew of the RRS Ernest Shackleton and staff at King Edward Point research station. Helen J. Peat loaned the AAS herbarium specimens, and funding was provided by the Natural Environment Research Council. All are gratefully acknowledged.

Taxonomic Additions and Changes: Nil.

## References

- Aleffi, M., Tacchi, R. & Cortini Pedrotti, C. †. 2008. Check-list of the hornworts, liverworts and mosses of Italy. *Boccone*, 22: 1–255.
- Anderson, L.E., Crum, H.A. & Buck, W.R. 1990. List of the mosses of North America north of Mexico. *Bryologist*, 93: 448–99.
- Bardat, J. & Boudier, P. 2006. Some remarkable bryophytes of the Causse Méjean (Lozère, France). *Cryptogamie, Bryologie*, 27: 165–80.
- Bates, J.W. 2009. Mineral nutrition and substratum ecology. In: B. Goffinet, A. J. Shaw, eds. *Bryophyte biology*. 2nd edn. Cambridge: Cambridge University Press, pp. 299–356.
- Bednarek-Ochyra, H. 2014. Nomenclatural entanglements associated with *Racomitrium chlorocarpum* (Grimmiaceae). *Phytotaxa*, 188(3): 153–61.
- Bednarek-Ochyra, H. & Ochyra, R. 1998. *Racomitrium lamprocarpum* (Müll.Hal.) A.Jaeger – an addition to the moss flora of Îles Kerguelen and the subantarctic. *Journal of Bryology*, 20(2): 525–8.
- Bednarek-Ochyra, H. & Ochyra, R. 2010. *Bucklandiella allanffiei* (Grimmiaceae), a new moss species from New Zealand, with a note on South American *B. striatipila*. *Journal of Bryology*, 32(4): 245–55.
- Bednarek-Ochyra, H. & Ochyra, R. 2011. *Bucklandiella angustissima* sp. nov. (Grimmiaceae), a new austral amphipacific species with the smallest capsules and the shortest setae in the genus. *Cryptogamie, Bryologie*, 32(1): 13–27.
- Bednarek-Ochyra, H. & Ochyra, R. 2012. A consideration of *Bucklandiella* (Bryophyta (Bryophyta, Grimmiaceae)) in South America, with a taxonomic re-assessment of *Racomitrium looseri*. *Nova Hedwigia*, 95(1-2): 153–63.
- Bednarek-Ochyra, H. & Ochyra, R. 2013a. Taxonomic status of *Grimmia procumbens* (Bryophyta, Grimmiaceae) from Australia. *Journal of Bryology*, 35(2): 149–52.
- Bednarek-Ochyra, H. & Ochyra, R. 2013b. Diversity of Grimmiaceae subfam. Racomitrioideae in sub-Saharan Africa, including an addition of *Bucklandiella striatipila* to the moss flora of the continent. *Cryptogamie, Bryologie*, 34(1): 3–12.
- Bednarek-Ochyra, H., Ochyra, R., Sawicki, J. & Szczecińska, M. 2014. *Bucklandiella seppeltii*, a new species of Grimmiaceae from Australasia, and its phylogenetic position based on molecular data. *Turkish Journal of Botany*, 38(6), 38(6): 1214–28.
- Bell, B.G. 1974. A synoptic flora of South Georgian mosses: *V. Willia* and *Racomitrium*. *British Antarctic Survey Bulletin*, 38: 73–101.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Bruggeman-Nannenga, M.A., Gremmen, N.J.M., Hébrard, J.-P., Luís, L., Matcham, H.W., O'Shea, B.J., Séneca, A., Sérgio, C., Sim-Sim, M., Ștefănuț, S. & Vieira, C. 2004. New national and regional bryophyte records, 10. *Journal of Bryology*, 26(4): 305–9.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Garcia, C., Matcham, H.W., Sérgio, C., Sim-Sim, M., Stebel, A., Townsend, C.C. & Váňa, J. 2005. New national and regional bryophyte records, 11. *Journal of Bryology*, 27(2): 163–8.
- Blockeel, T.L., Chlebicki, A., Hájková, P., Hájek, M., Hradílek, Z., Kürschner, H., Ochyra, R., Parolly, G., Plášek, V., Quandt, D., Townsend, C.C. & Vanderpoorten, A. 2006a. New national and regional bryophyte records, 12. *Journal of Bryology*, 28(1): 68–70.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Hájková, P., Hájek, M., Kučera, J., Kürschner, H., Müller, F., Oliván, G., Parolly, G., Porley, R.D., Rams, S., Séneca, A., Sérgio, C., Townsend, C.C., Tyshchenko, O. & Vieira, C. 2006b. New national and regional bryophyte records, 13. *Journal of Bryology*, 28(2): 151–5.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Düzenli, A., Erdağ, A., Erzberger, P., Ezer, T., Hespánhol, H., Kara, R., Matteri, C.M., Müller, F., Séneca, A., Sérgio, C. & Váňa, J. 2007a. New national and regional bryophyte records, 15. *Journal of Bryology*, 29(2): 139–42.
- Blockeel, T.L., Afridi, H.-ur-R., Bakalin, V.A., Czernyadjeva, I.V., Eckstein, J., Erzberger, P., Frey, W., Fuertes, E., Gilani, S.A., Hedenäs, L., Hugonnot, V., Kürschner, H., Lüth, M., Murad, W., Prada, C., Schnyder, N., Schröder, W., Shah, J., Shinwari, Z.K., Szűcs, P. & Townsend, C.C. 2007b. New national and regional bryophyte records, 16. *Journal of Bryology*, 29(3): 198–204.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Garilleti, R., Glime, J.M., Lara, F., Mazimpaka, V., Rusińska, A., Schaefer-Verwimp, A., Shabbara, H.M., Söderström, L., Stebel, A., Townsend, C.C., Váňa, J., Yayintaş, Ö.T. & Żarnowiec, J. 2007c. New national and regional bryophyte records, 17. *Journal of Bryology*, 29(4): 277–83.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Duckett, J.G., Erzberger, P., Hedenäs, L., Hugonnot, V., Maier, E., Marková, I., Matcham, H.W., Plášek, V., Pócs, T., Seppelt, R.D., Szűcs, P., Thouvenot, L. & van Zanten, B.O. 2008a. New national and regional bryophyte records, 18. *Journal of Bryology*, 30(2): 161–7.
- Blockeel, T.L., Abay, G., Bakalin, V.A., Bednarek-Ochyra, H., Ochyra, R., Çetin, B., Cykowska, B., Fuertes, E., Hespánhol, H., Holyoak, D.T., Hradílek, Z., Keçeli, T., Kürschner, H., Larrain, J., Long, D.G., Parolly, G., Piątek, J., Piątek, M., Rams, S., Ros, R.M., Séneca, A., Sérgio, C., Soldán, Z., Ștefănuț, S., Uyar, G., Váňa, J. & Yayintaş, Ö.T. 2008b. New national and regional bryophyte records, 19. *Journal of Bryology*, 30(3): 231–7.
- Blockeel, T.L., Bakalin, V.A., Bednarek-Ochyra, H., Ochyra, R., Buck, W.R., Choi, S., Cykowska, B., Erdağ, A., Erzberger, P., Kırmacı, M., Kürschner, H., Lebouvier, M., Papp, B., Sabovljević, M., Sabovljević, A., Schröder, W., Singh, S.M., Sun, B.-Y., Townsend, C.C., Váňa, J. & Yayintaş, Ö.T.

- 2009a. New national and regional bryophyte records, 20. *Journal of Bryology*, 31(1): 54–62.
- Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Cykowska, B., Esquivel, M.G., Lebouvier, M., Luis, L., Martins, S., Müller, F., Németh, Cs., Papp, B., Plášek, V., Pócs, T., Sabovljević, M., Sérgio, C., Sim-Sim, M., Stech, M., Váňa, J. & Yayintaş, Ö.T. 2009b. New national and regional bryophyte records, 21. *Journal of Bryology*, 31(2): 132–9.
- Blockeel, T.L., Bastos, C.J.P., Bednarek-Ochyra, H., Ochyra, R., Dulin, M.V., Fovet, I., Garcia, C., Hedenäs, L., Hugonnot, V., Kirmaci, M., Koponen, T., Lebouvier, M., Martins, A., Müller, F., Sabovljević, M., Lakušić, D., Schäfer-Verwimp, A., Sérgio, C., Surina, B. & Yayintaş, Ö.T. 2009c. New national and regional bryophyte records, 22. *Journal of Bryology*, 31(3): 201–10.
- Blockeel, T.L., Bednarek-Ochyra, H., Cykowska, B., Ochyra, R., Düzenli, A., Ezer, T., Holyoak, D.T., Hugonnot, V., Kara, R., Larrain, J., Lebouvier, M., Preston, C.D., Schäfer-Verwimp, A., Smith, V.R., Spitale, D., Ştefănuţ, S. & Váňa, J. 2010. New national and regional bryophyte records, 23. *Journal of Bryology*, 32(2): 140–7.
- Boros, Á. 1968. *Bryogeographie und bryoflora Ungarns*. Budapest: Akadémiai Kiadó.
- Buck, W.R. & Griffin, D. III. 1984. *Trachyphyllum*, a moss genus new to South America with notes on African–South American bryogeography. *Journal of Natural History*, 18(1): 63–9.
- Buck, W.R. & Ireland, R.R. 1989. Plagiotheciaceae. *Flora Neotropica Monograph*, 50: 1–22.
- Cardot, J. 1916. Note sur des mousses de Kerguelen. *Bulletin du Muséum d'Histoire Naturelle*, 22: 336–41.
- Choe, D.M. 1980. *Illustrated flora and fauna of Korea*. Vol. 24. Musci-Hepaticae. Seoul: Ministry of Education. (in Korean).
- Christy, J.A. 2012. Species fact sheet. Interagency Special Status/Sensitive Species Program (ISSSP). Oregon – Washington State. Forest Service/Bureau of Land Management. <http://www.fs.fed.us/>.
- Churchill, S.P., Sanjines, N. & Aldana, C. 2009. *Catálogo de las briofitas de Bolivia: diversidad, distribución y ecología*. St Louis, Santa Cruz de la Sierra: Missouri Botanical Garden, Museo de Historia Natural Noel Kempff Mercado.
- Csikó, J., Sebe, K. & Vadkerti, E. 2007. *Jakabhegy Sandstone (Hungary)*. In: H. Härtel, V. Cilek, T. Herben, A. Jackson, R. Williams, eds. *Sandstone landscapes*. Praha: Academia in collaboration with Bohemian Switzerland National Park Administration and Royal Botanic Gardens Kew, pp. 356–8.
- Damsholt, K. 2009. *Illustrated flora of Nordic liverworts and hornworts*. Lund: Nordic Bryological Society.
- Delgadillo, C.M. 1993. The Neotropical-African moss disjunction. *Bryologist*, 96(4): 604–15.
- Delgadillo, C.M. 2000. The distinction between *Grimmia mexicana* and *G. ochyriana*. *Bryologist*, 103(4): 762–4.
- Dierßen, K. 2001. Distribution, ecological amplitude and phytosociological characterization of European bryophytes. *Bryophytorum Bibliotheca*, 56: 1–289.
- Dixon, H.N. 1960. Mosses of Tristan da Cunha. In: E. Christophersen, ed. *Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937–1938*. No. 48. Oslo: Kommissjon hos H. Aschehoug & Co. (W. Nygaard), pp. 1–49.
- Dong, S., Schäfer-Verwimp, A., Meinecke, P., Feldberg, K., Bombosch, A., Pócs, T., Schmidt, A.R., Reitner, J., Schneider, H. & Heinrichs, J. 2012. Tramps, narrow endemics and morphologically cryptic species in the epiphyllous liverwort *Diplasiolejeunea*. *Molecular Phylogenetics and Evolution*, 65: 582–94.
- Draper, I., Lara, F., Albertos, B., Garilleti, R. & Mazimpaka, V. 2003. The epiphytic bryoflora of the Jbel Bouhalla (Rif, Morocco), including a new variety of moss, *Orthotrichum speciosum* var. *brevisetum*. *Journal of Bryology*, 25: 271–80.
- During, H.J. 1992. Ecological classifications of bryophytes and lichens. In: J.W. Bates, A.M. Farmer, eds. *Bryophytes and lichens in a changing environment*. Oxford: Clarendon Press, pp. 1–31.
- Eckel, P.M. 2007. *Hyophila* Bridel. In: Flora of North America Editorial Committee, editor. *Flora of North America north of Mexico*, Vol. 27. Bryophytes: Mosses. Part 1. New York & Oxford: Oxford University Press, pp. 564–85.
- Ellis, L.T., Asthana, A.K., Sahu, V., Bednarek-Ochyra, B.H., Ochyra, R., Cano, M.J., Costa, D.P., Cykowska, B., Ochyra, R., Philippov, D.A., Dulin, M.V., Erzberger, P., Lebouvier, M., Mohamed, H., Ochyra, R., Orgaz, J.D., Phephu, N., van Rooy, J., Stebel, A., Suárez, G.M., Schiavone, M.M., Townsend, C.C., Váňa, J., Vončina, G., Yayintaş, Ö.T., Yong, K.T. & Zander, R.H. 2010. New national and regional bryophyte records, 25. *Journal of Bryology*, 32(4): 311–22.
- Ellis, L.T., Bednarek-Ochyra, H., Ochyra, R., Calvo Aranda, S., Colotti, M.T., Schiavone, M.M., Dulin, M.V., Erzberger, P., Ezer, T., Kara, R., Gabriel, R., Hedenäs, L., Holyoak, D.T., Ódor, P., Papp, B., Sabovljević, M., Seppelt, R.D., Smith, V.R., Sotiaux, A., Szurdoki, E., Vanderpoorten, A., van Rooy, J. & Żarnowiec, J. 2011a. New national and regional bryophyte records, 26. *Journal of Bryology*, 33(1): 66–73.
- Ellis, L.T., Asthana, A.K., Sahu, V., Srivastava, A., Bednarek-Ochyra, H., Ochyra, R., Chlachula, J., Colotti, M.T., Schiavone, M.M., Hradilek, Z., Jimenez, M.S., Klama, H., Lebouvier, M., Natcheva, R., Pócs, T., Porley, R.D., Sérgio, C., Sim-Sim, M., Smith, V.R., Söderström, L., Ştefănuţ, S., Suárez, G.M. & Váňa, J. 2011b. New national and regional bryophyte records, 28. *Journal of Bryology*, 33(3): 237–47.
- Ellis, L.T., Bednarek-Ochyra, H., Cykowska, B., Ochyra, R., Garcia, C., Sérgio, C., Lebouvier, M., Manolaki, P., Gian-nouris, E., Kadis, C., Marková, I., Papp, B., Szurdoki, E., Peralta, D.F., Plášek, V., Ristow, R., Sabovljević, M., Sim-Sim, M., Smith, V.R., Tsakiri, E., Váňa, 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., Alegro, A., Bednarek-Ochyra, H., Ochyra, R., Bergamini, A., Cogoni, A., Erzberger, P., Górski, P., Gremmen, N., Hespánhol, H., Vieira, C., Kurbatova, L.E., Lebouvier, M., Martinčić, A., Asthana, A.K., Gupta, R., Nath, V., Natcheva, R., Ganeva, A., Özdemir, T., Batan, N., Plášek, V., Porley, R.D., Randić, M., Sawicki, J., Schroder, W., Sérgio, C., Smith, V.R., Sollman, P., Ştefănuţ, S., Stevenson, C.R., Suárez, G.M., Surina, B., Uyar, G. & Surina, Z.M. 2012b. New national and regional bryophyte records, 31. *Journal of Bryology*, 34(2): 123–34.
- Ellis, L.T., Alegro, A., Bansal, P., Nath, V., Cykowska, B., Bednarek-Ochyra, H., Ochyra, R., Dulin, M.V., Erzberger, P., Garcia, C., Sérgio, C., Claro, D., Stow, S., Hedderson, T.A., Hodgetts, N.G., Hugonnot, V., Kučera, J., Lara, F., Perttierra, L., Lebouvier, M., Liepina, L., Mežaka, A., Strazdina, L., Madžule, L., Rēriha, I., Mazooji, A., Natcheva, R., Phephu, N., Philippov, D.A., Plášek, V., Čihal, L., Pócs, T., Porley, R.D., Sabovljević, M., Salimpour, F., Behroozmand Motlagh, M., Sharifnia, F., Akhoondi Darzikolaei, S., Schäfer-Verwimp, A., Šegota, V., Shaw, A.J., Sim-Sim, M., Sollman, P., Spitale, D., Hölzer, A., Stebel, A., Váňa, J., van Rooy, J. & Vončina, G. 2012c. New national and regional bryophyte records, 32. *Journal of Bryology*, 34(3): 231–46.
- Ellis, L.T., Bednarek-Ochyra, H., Ochyra, R., Cykowska, B., Dulin, M.V., Ezer, T., Kara, R., 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., Váňa, J., Vigalondo, B., Lara, F., Draper, I., Virchenko, V.M. & Wolski, G.J. 2012d. New national and regional bryophyte records, 33. *Journal of Bryology*, 34(4): 281–91.
- Ellis, L.T., Asthana, A.K., Gupta, R., Nath, V., Sahu, V., Bednarek-Ochyra, H., Ochyra, R., Cykowska, B., Calvo Aranda, S., Fischer, E., Gabriel, R., Górski, P., Gremmen, N., Hespánhol, H., Kurbatova, L.E., Lewis Smith, R.I., Long, D.G., Bell, D., Mogro, F., Sérgio, C., Garcia, C.A., Stow, S., Martins, A., Smith, V.R., Váňa, J. & Vanderpoorten, A. 2013a. New national and regional bryophyte records, 34. *Journal of Bryology*, 35(1): 62–70.
- Ellis, L.T., Bednarek-Ochyra, H., Ochyra, R., Benjumea, M.J., Saís, L.V., Caparrós, R., Lara, F., Mazimpaka, V., Dulin, M.V., Garilleti, R., Gremmen, N., Grundling, P.-L., Heras, P., Infante, M., Huttunen, S., Ignatov, M.S., Korvenpää, T., Lebouvier, M., Lewis Smith, R.I., Lin, S.-H., Yang, J.-D., Linström, A., Plášek, V., Rosselló, J.A., Sawicki, J., van Rooy, J. & Smith, V.R. 2013b. New national and regional bryophyte records, 35. *Journal of Bryology*, 35(2): 129–39.
- Ellis, L.T., Bakalin, V.A., Baisheva, E., Bednarek-Ochyra, H., Ochyra, R., Borovichev, E.A., Choi, S.S., Sun, B.-Y., Erzberger, P., Fedosov, V.E., Garilleti, R., Albertos, B., Górski, P., Hájková, P., Hodgetts, N.G., Ignatov, M., Koczur, A., Kurbatova,

- L.E., Lebouvier, M., Mežaka, A., Miravet, J., Pawlikowski, P., Porley, R.D., Rosselló, J.A., Sabovljević, M.S., Pantović, J., Sabovljević, A., Schröder, W., Štefănuț, S., Suárez, G.M., Schiavone, M., Yayintaş, Ö.T. & Vána, J. 2013c. New national and regional bryophyte records, 36. *Journal of Bryology*, 35(3): 228–38.
- Ellis, L.T., Aranda, S.C., Asthana, A.K., Bansal, P., Nath, V., Sahu, V., Bayliss, J., Asthana, G., Srivastava, S., Yadav, S., Brugués, M., Cano, M.J., Dulin, M.V., Fudali, E., Fuertes, E., Gabriel, R., Pereira, F., Silva, J. A.F., Gradstein, S.R., Hájková, P., Hájek, M., Heras, P., Infante, M., Lebouvier, M., Marka, J., Newsham, K.K., Ochrya, R., Pantović, J., Sabovljević, M.S., Phephu, N., van Rooy, J., Philippov, D.A., Porley, R.D., Puche, F., Schäfer-Verwimp, A., Segarra-Moragues, J.G., Sérgio, C., Smith, C., Štefănuț, S., Vána, J. & Wigginton, M.J. 2013d. New national and regional bryophyte records, 37. *Journal of Bryology*, 35(4): 290–305.
- Ellis, L.T., Bayliss, J., Bruggeman-Nannenga, M.A., Cykowska, B., Ochrya, R., Gremmen, N.J.M., Frahm, J.-P., Hedderson, T.A., Heras, P., Infante, M.V., Hugonnot, V., Mogro, F., Plášek, V., Čihal, L., Sawicki, J., Schäfer-Verwimp, A., Stebel, A., Štefănuț, S., Vána, J., Yang, J.-D. & Lin, S.-H. 2014a. New national and regional bryophyte records, 38. *Journal of Bryology*, 36(1): 61–72.
- Ellis, L.T., Afonina, O.M., Asthana, A.K., Gupta, R., Sahu, V., Nath, V., Batan, N., Bednarek-Ochrya, H., Benitez, A., Erzberger, P., Fedosov, V.E., Górski, P., Gradstein, S.R., Gremmen, N., Hallingbäck, T., Hagström, M., Köckinger, H., Lebouvier, M., Meinunger, L., Németh, C., Nobis, M., Nowak, A., Özdemir, T., Pantović, J., Sabovljević, A., Sabovljević, M.S., Pawlikowski, P., Plášek, V., Čihal, L., Sawicki, J., Sérgio, C., Ministro, P., Garcia, C.A., Smith, V.R., Štefănuț, S., Stow, S., Suárez, G.M., Flores, J.R., Thouvenot, L., Vána, J., van Rooy, J. & Zander, R.H. 2014b. New national and regional bryophyte records, 39. *Journal of Bryology*, 36(2): 134–51.
- Ellis, L.T., Aleffi, M., Asthana, A.K., Srivastava, A., Bakalin, V.A., Batan, N., Özdemir, T., Bednarek-Ochrya, H., Borovichev, E.A., Brugués, M., Cano, M.J., Choi, S.S., De Beer, H., 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., Čihal, L., van der Pluijm, A., Poponessi, S., Mariotti, M.G., Reyniers, J., Sabovljević, M.S., Sawicki, J., Smith, V.R., Stebel, A., Štefănuț, S., Sun, B.-Y., Vána, J. & Venanzoni, R. 2014c. New national and regional bryophyte records, 40. *Journal of Bryology*, 36(3): 223–44.
- Ellis, L.T., Aleffi, M., Tacchi, R., Alegro, A., Alonso, M., Asthana, A.K., Sahu, V., Biasuso, A.B., Callaghan, D.A., Ezer, T., Kara, R., Seyli, T., Garilleti, R., Gil-López, M.J., Gwynne-Evans, D., Hedderson, T.A., Kiebach, T., Larraín, J., Long, D., Lüth, M., Malcolm, B., Mamontov, Y.S., Newsham, K.K., Nobis, M., Nowak, A., Ochrya, R., Pawlikowski, P., Plášek, V., Čihal, L., Potemkin, A.D., Puche, F., Rios, D., Gallego, M.T., Guerra, J., Sawicki, J., Schäfer-Verwimp, A., Segarra-Moragues, J.G., Šegota, V., Sofronova, E.V., Štefănuț, S., Szűcs, P., Bidló, A., Papp, B., Szurdoki, E., Tan, B.C., Vána, J., Vigalondo, B., Draper, I., Lara, F., Yoon, Y.-J., Sun, B.-Y. & Nishimura, N. 2014d. New national and regional bryophyte records, 41. *Journal of Bryology*, 36(4): 306–24.
- Ellis, L.T., Aleffi, M., Bakalin, V.A., Bednarek-Ochrya, H., Bergamini, A., Beveridge, P., Choi, S.S., Fedosov, V.E., Gabriel, R., Gallego, M.T., Grdović, S., Gupta, R., Nath, V., Asthana, A.K., Jennings, L., Kürschner, H., Lebouvier, M., Nair, M.C., Manjula, K.M., Rajesh, K.P., Nobis, M., Nowak, A., Park, S.J., Sun, B.-Y., Plášek, V., Čihal, L., Poponessi, S., Mariotti, M.G., Sabovljević, A., Sabovljević, M.S., Sawicki, J., Schnyder, N., Schumacker, R., Sim-Sim, M., Singh, D.K., Singh, D., Majumdar, S., Singh Deo, S., Štefănuț, S., Suleiman, M., Seng, C.M., Chua, M.S., Vána, J., Venanzoni, R., Bricchi, E. & Wigginton, M.J. 2015. New national and regional bryophyte records, 42. *Journal of Bryology*, 37(1): 68–85.
- Erzberger, P. 2009. The genera *Grimmia* and *Coscinodon* (Grimmiaceae Musci) in Hungary. *Studia Botanica Hungarica*, 40: 37–124.
- Erzberger, P. & Németh, C. 2014. faj Magyarország mohafőrájában: *Campylopus flexuosus* (Hedw.) Brid. [*Campylopus flexuosus* (Hedw.) Brid.: a moss new to the Hungarian bryophyte flora]. *Kitaibelia*, 19: 22–8.
- Fedosov, V.E., Ignatova, E.A. & Ivanov, O.V. 2009. *Orthotrichum holmenii* Lewinsky-Haapasaari (Orthotrichaceae, Musci), a new species for Russian moss flora. *Arctoa*, 18: 195–200.
- Frahm, J.-P., Lüth, M. & van Melick, H. 2009. Die Moose Zyperns. *Archive for Bryology*, 46: 1–8.
- Frey, W., Frahm, J.-P., Fischer, E. & Lobin, W. 2006. *The liverworts, mosses and ferns of Europe*. translated, revised and edited by T.L. Blockeel. Colchester: Harley Books.
- Frisvoll, A.A. 1986. Southern hemisphere synonyms of *Racomitrium sudeticum* (Funck) Bruch & Schimp. *Journal of Bryology*, 14(2): 339–46.
- Frisvoll, A.A. 1988. A taxonomic revision of the *Racomitrium heterostichum* group (Bryophyta, Grimmiaceae) in N. and C. America, N. Africa, Europe and Asia. *Gunneria*, 59: 1–289.
- Fudali, E. 2012. Recent tendencies in distribution of epiphytic bryophytes in urban areas: a Wrocław case study (south-west Poland). *Polish Botanical Journal*, 57(1): 231–41.
- Furuki, T. 1997. *Nardia lescurii* (Aust.) Underw. (Jungermanniaceae, Hepaticae) new to Japan, hitherto known only from the Appalachian Mountains. *Bryological Research*, 7(3): 69–71, (in Japanese).
- Garilleti, R., Lara, F. & Mazimpaka, V. 1997. *Orthotrichum lewinskyae* sp. nov. (Orthotrichaceae, Musci), a Moroccan epiphytic moss related to *O. scanicum* Grönv. and *O. holmenii* Lew.-Haap. *Journal of Bryology*, 19: 457–64.
- Garilleti, R., Medina, R., Mazimpaka, V. & Lara, F. 2009. *Orthotrichum hispanicum* in the Turkish Caucasus and Kashmir. *Journal of Bryology*, 31(1): 46–7.
- Goffinet, B. 2005. *Physcomitrella* Bruch & Schimper. In: Flora of North America Editorial Committee, eds. *Flora of North America, north of Mexico*. Vol. 27. Bryophyta. Mosses. Part 1. New York & Oxford: Oxford University Press, pp. 194–5.
- Greene, D.M. 1986. *A conspectus of the mosses of Antarctica, South Georgia, the Falkland Islands and southern South America*. Cambridge: British Antarctic Survey.
- Greene, S.W. 1968. Studies in Antarctic bryology. II. – *Andreaea*, *Neurolooma*. *Revue Bryologique et Lichénologique, Nouvelle Série*, 36: 139–46.
- Griffin, D. III. 1977. Más adiciones a la flora musqueña de Venezuela. *Bryologist*, 80(1): 181–4.
- Hájková, P. & Hájek, M. 2007. *Sphagnum affine*. In: J. Kučera, ed. *Zajímavé bryofloristické nálezy X. Bryonora*, 40., p. 42.
- Hässel de Menéndez, G.G. & Rubies, M.F. 2009. Catalogue of Marchantiophyta and Anthocerotophyta of southern South America. *Nova Hedwigia, Beiheft*, 134: 1–672.
- Hastings, R.I. & Greven, H.C. 2007. *Grimmia* Hedwig. In: Flora of North America Editorial Committee, editor. *Flora of North America north of Mexico*. Vol. 27. Bryophyta. Mosses. Part 1. New York & Oxford: Oxford University Press, pp. 225–58.
- Herzog, T. 1909. Beiträge zur Laubmoosflora von Bolivia. *Beihefte zum Botanischen Zentralblatt*, 26: 45–102.
- Higuchi, M. 2011. Endemic species of bryophytes in Japan. *Bulletin of the National Science Museum, Tokyo, Series B*, 37(3): 117–26.
- Hodgetts, N.G. 2014. Checklist and country status of European bryophytes – towards a new Red List for Europe. (Accessed 4 November 2014) Available at <[http://eccbbryo.nhmus.hu/sites/eccbbryo.nhmus.hu/files/pdf\\_files/european\\_list/Checklist%20and%20country%20status%20of%20European%20bryophytes%20-%20towards%20a%20new%20Red%20List%20for%20Europe\\_version%201.pdf](http://eccbbryo.nhmus.hu/sites/eccbbryo.nhmus.hu/files/pdf_files/european_list/Checklist%20and%20country%20status%20of%20European%20bryophytes%20-%20towards%20a%20new%20Red%20List%20for%20Europe_version%201.pdf)>.
- Hooker, J.D. & Taylor, T. 1844. Hepaticae Antarcticae; being characters and brief descriptions of the Hepaticae discovered in the southern circumpolar regions during the voyage of H.M. Discovery ships Erebus and Terror. *London Journal of Botany*, 3: 366–400, 454–81.
- Ignatov, M.S., Afonina, O.M. & Ignatova, E.A. 2006. Check-list of mosses of East Europe and North Asia. *Arctoa*, 15: 1–130.
- Jóhannsson, B. 2003. Icelandic bryophytes. Lists and additions. *Fjölrit Náttúrufræðistofnunar*, 44: 1–135, (In Icelandic with English summary).
- Köckinger, H., Schröck, C., Krisai, R. & Zechmeister, H.G. 2011. Checklist of Austrian bryophytes., Available at: <http://131.130.59.133/projekte/moose> (Accessed 5 November 2014).

- Koczur, A. 2006. Importance of vegetation in the Orawsko-Nowotarskie peat bogs to biological diversity in the Polish Carpathians. *Acta Agrophysica*, 7(2): 383–93.
- Kubinská, A., Janovicová, K. & Šoltés, R. 2001. Aktualizovaný zoznam pečeňoviek, rožtekov a machov Slovenska [Updated checklist of liverworts, hornworts and mosses of Slovakia]. *Byronora*, 28: 4–10.
- Kučera, J., Zmrhalová, M., Buryová, B., Plášek, V. & Vána, J. 2004. Bryoflora of the Úpská jáma cirque and adjacent localities of the Eastern Krkonoše Mts. *Slezského Zemského Muzea, Serie A – Vědy Přírodní*, 58: 143–73.
- Kučera, J., Zmrhalová, M., Shaw, B., Košnar, J., Plášek, V. & Vána, J. 2009. Bryoflora of selected localities of the Hrubý Jeseník Mts summit regions. *Časopis Slezského Zemského Muzea, Serie A – Vědy Přírodní*, 58: 115–67.
- Kučera, J., Vána, J. & Hradílek, Z. 2012. Bryophyte flora of the Czech Republic: updated checklist and Red List and a brief analysis. *Preslia*, 84: 813–50.
- Lal, J. 2005. *A checklist of Indian mosses*. Dehradun: Bishen Singh Mahendra Pal Singh.
- Lara, F. & Garilleti, R. 2014. *Orthotrichum*. In: J. Guerra, M.J. Cano, M. Brugués, eds. *Flora Briofítica Ibérica. Volumen V*. Murcia: Universidad de Murcia – Sociedad Española de Briología, pp. 50–135.
- Lara, F. & Mazimpaka, V. 2001. Diversité et originalité du genre *Orthotrichum* Hedw. (Orthotrichaceae) dans le Bassin Méditerranéen occidental. *Bocconea*, 101: 6.
- Lara, F., Garilleti, R. & Mazimpaka, V. 2000. *Orthotrichum hispanicum* sp. nov. (Bryopsida, Orthotrichaceae), from eastern Spain. *Journal of Bryology*, 22(4): 263–7.
- Lara, F., Blockeel, T.L., Garilleti, R. & Mazimpaka, V. 2003. Some interesting *Orthotrichum* species from mainland Greece and Evvia. *Journal of Bryology*, 25: 129–34.
- Lara, F., Garilleti, R., Medina, R. & Mazimpaka, V. 2009. A new key to the genus *Orthotrichum* in Europe and the Mediterranean Region. *Cryptogamie, Bryologie*, 30: 129–42.
- Lara, F., Mazimpaka, V., Medina, R., Caparrós, R. & Garilleti, R. 2010. Northeastern Turkey, an unnoticed but very important area for the Orthotrichaceae (Bryophyta). *Nova Hedwigia, Beiheft*, 138: 165–80.
- Lazarenko, A.S. 1938. Materials on bryoflora of Middle Asia. *Žurnal Instytutu Botaniky Vseukrajins'koji Akademijii Nauk*, 26–67: 191–216, [in Russian].
- León, V.Y., Pócs, T. & Rico, R. 1998. Registros para la brioflora de los Andes venezolanos, I. *Cryptogamie, Bryologie Lichénologie*, 19(1): 1–25.
- Lewinsky-Haapasaari, J. 1994. Miscellaneous notes of *Orthotrichum* 5. *Orthotrichum vicarium* Laz. *Lindbergia*, 19: 37–9.
- Lewinsky-Haapasaari, J. 1996. *Orthotrichum holmenii*, a new corticolous species from Kazakhstan with comments on *Orthotrichum hallii* in Asia. *Bryologist*, 99: 1–5.
- Li, Z.-H. & Iwatsuki, Z. 2001. Fissidentaceae. In: X.-J. Li, M.R. Crosby, S. He, eds. *Moss flora of China, English Version*. New York & Beijing: Science Press, and St. Louis: Missouri Botanical Garden, Vol. 2, pp. 367..
- Limpriht, K.G. Die Laubmoose Deutschlands, Oesterreichs und der Schweiz. I. Abtheilung: Sphagnaceae, Andreaeaceae, Archidiaceae, Bryineae (Cleistocarpaceae, Stegocarpaceae [Acrocarpaceae]). In: Dr. L. Rabenhorst *Kryptogamen-Flora von Deutschland, Oesterreich und der Schweiz*. Zweite Auflage. Vierter Band: Die Laubmoose Deutschlands, Oesterreichs und der Schweiz. Leipzig: Verlag von Eduard Kummer.
- Maier, E. 2010. The genus *Grimmia* Hedw. (Grimmiaceae, Bryophyta) – a morphological-anatomical study. *Boissiera*, 63: 1–377.
- Mamatkulov, U.K., Baitulin, I.O. & Nesterova, S.G. 1998. *Bryophytes of Middle Asia and Kazakhstan*. Almaty: MNAN. [in Russian].
- Martinčič, A. 2003. Seznam listnatih mahov (Bryopsida) Slovenije. *Hacquetia*, 2(1): 91–166.
- Mazimpaka, V., Lara, F. & Garilleti, R. 2000. *Orthotrichum tortidontium* new for Turkey. *Lindbergia*, 25: 15–16.
- Medina, R., Garilleti, R., Mazimpaka, V. & Lara, F. 2009. A new look at *Orthotrichum scanicum* Grönvall (Orthotrichaceae, Bryophyta). *Journal of Bryology*, 31(2): 86–92.
- Melosik, I. 2006. Species of the type section of *Sphagnum* (Bryophyta, Sphagnaceae) in Poland. *Biodiversity: Research and Conservation*, 1–2: 69–76.
- Milde, J. 1869. *Bryologia Silesiaca. Laubmoos-Flora von Nord- und Mittel-Deutschland, unter besonderer Berücksichtigung Schlesiens und Hinzunahme der Floren von Jütland, Holland, der Rheinpfalz, von Baden, Böhmen, Mähren und der Umgegend von München*. Leipzig: Arthur Felix.
- Mogensen, G.S. & Zander, R.H. 1999. Four moss species new to Greenland: *Barbula amplexifolia*, *Didymodon brachyphyllus*, *D. michiganensis*, and *Gyroweisia tenuis* (Pottiaceae, Musci). *Lindbergia*, 24(2): 77–83.
- Müller, F. 2009. An updated checklist of the mosses of Chile. *Archive for Bryology*, 58: 1–124.
- Müller, K. 1883. Die auf der Expedition S.M.S. “Gazelle” von Dr. Naumann gesammelten Laubmoose. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie*, 5: 76–88.
- Müller, K. 1889. Laubmoose (Musci frondosi). In: A. Engler, editor. *Die Forschungsreise S.M.S. “Gazelle” in den Jahren 1874 bis 1876 unter Kommando des Kapitäns zur See Freiherrn von Schleinitz*. 4. Botanik. Berlin: Ernst Siegfried Mittler und Sohn, pp. 1–64.
- Muñoz, J. 1999. A revision of *Grimmia* (Musci, Grimmiaceae) in the Americas. 1: Latin America. *Annals of the Missouri Botanical Garden*, 86: 118–91.
- Muñoz, J. & Pando, F. 2000. A world synopsis of the genus *Grimmia* (Musci, Grimmiaceae). *Monographs in Systematic Botany from the Missouri Botanical Garden*, 83: 1–8+1–133.
- NISM. 2014. Online-Atlas of Swiss Bryophytes. Available at <www.nism.uzh.ch> [accessed 17 December 2014].
- Noguchi, A. 1987. *Illustrated moss flora of Japan*. Vol. 1. Nichinan: The Hattori Botanical Laboratory.
- Noguchi, A. 1988. *Illustrated moss flora of Japan*. Vol. 2. Nichinan: The Hattori Botanical Laboratory.
- Noguchi, A. 1991. *Illustrated moss flora of Japan*. Vol. 4. Nichinan: The Hattori Botanical Laboratory, pp. 743–1012.
- Nöske, N.M., Gradstein, S.R., Kürschner, H., Parolly, G. & Torracchi, S. 2003. Cryptogams of the Reserva Biológica San Francisco (Province Zamora-Chinchipe, Southern Ecuador). I. Bryophytes. *Cryptogamie, Bryologie*, 24(1): 15–32.
- Nyholm, E. 1975. *Illustrated moss flora of Fennoscandia. II. Musci*. Fasc. 3, 2nd ed. Copenhagen and Lund: Nordic Bryological Society.
- Ochi, H. 1980. A revision of the Neotropical Bryoideae, Musci. Part I. *Journal of the Faculty of Education, Tottori University, Natural Science*, 29: 49–154.
- Ochyra, R. 1998. Antarctic species in the genus *Ditrichum* (Ditrichaceae, Bryopsida), with a description of *D. gemmiferum* sp. nov. *Annales Botanici Fennici*, 35(1): 33–53.
- Ochyra, R. 2008. Mosses. In: S.L. Chown, P.W. Froneman, eds. *The Prince Edward Islands: land-sea interactions in a changing ecosystem*. Stellenbosch: Sun Press, pp. 383–9.
- Ochyra, R. 2010. Antipodal mosses: XVI. The first record of the genus *Sematophyllum* (Sematophyllaceae) in the Subantarctic, with a description of *S. lebouvieri* sp. nov. *Cryptogamie, Bryologie*, 31(3): 223–32.
- Ochyra, R. & Bednarek-Ochyra, H. 2004. *Streptocolea atrata* (Bryopsida, Grimmiaceae), newly found in western North America, with a review of its global distribution. *Bryologist*, 107(4): 542–9.
- Ochyra, R. & Buck, W.R. 2002. A re-appraisal of the type material of *Plagiothecium drepanophyllum*. *Bryologist*, 105(4): 641–4.
- Ochyra, R. & Poulsen, R. 2003. Four new moss records from Îles Kerguelen. *Journal of Bryology*, 25(2): 136–8.
- Ochyra, R. & Zander, R.H. 2002. The genera *Didymodon* and *Bryoerythrophyllum* (Pottiaceae) in Antarctica. *Journal of Bryology*, 24(1): 33–44.
- Ochyra, R., Bednarek-Ochyra, H., Pócs, T. & Crosby, M.R. 1992. The moss *Adelothecium bogotense* in continental Africa, with a review of its world range. *Bryologist*, 95(3): 287–95.
- Ochyra, R., Wesche, K., Miehe, G. & Miehe, U. 2002. New records of pleurocarpous mosses for Africa and Uganda. *Journal of Bryology*, 24(3): 256–9.
- Ochyra, R., Bednarek-Ochyra, H. & Lewis Smith, R.I. 2008a. New and rare moss species from the Antarctic. *Nova Hedwigia*, 87(3–4): 457–77.
- Ochyra, R., Lewis Smith, R.I. & Bednarek-Ochyra, H. 2008b. *The illustrated moss flora of Antarctica*. Cambridge: Cambridge University Press.
- Ochyra, R., Zander, R.H. & Lebouvier, M. 2014. Antipodal mosses: XVIII. *Syntrichia christophei*, a new species from subantarctic Îles Kerguelen. *Cryptogamie, Bryologie*, 35(1): 37–46.
- Orgaz, J.D., Cano, M.J. & Guerra, J. 2013. Taxonomic revision of genus *Brachythecium* (Brachytheciaceae, Bryophyta) from the Mediterranean region. *Systematic Botany*, 38: 283–94.

- O'Shea, B. 2010. Mosses of Venezuela. *Archive for Bryology*, 75: 1–23.
- Papp, B., Erzberger, P., Ódor, P., Hock, Zs., Szövényi, P., Szurdoki, E. & Tóth, Z. 2010. Updated checklist and Red List of Hungarian bryophytes. *Studia Botanica Hungarica*, 41: 31–59.
- Park, K.W. & Choi, K. 2007. *New list of bryophytes of Korea 2007*. Pocheon: Korea national Arboretum (in Korean).
- Paton, J. 1999. *The liverwort flora of the British Isles*. Colchester: Harley Books.
- Peciar, V. 1958. Niekoľko bryofloristických údajov z oravských rašelinísk a Babej Gory. *Acta Facultatis Rerum Naturalium Universitatis Comenianae Botanica*, 14: 25–81.
- Pericas, J. 2008. New bryophyte records from the Balearic Islands. *Cryptogamie, Bryologie*, 29(1): 99–102.
- Pilous, Z. 1971. Bryophyta, Mechorosty, Sphagnidae – Mechy rašeliníkové. In: A. Pilát, ed. *Flora ČSSR. C. Řada Bryologická. Svazek 1*. Praha: Academia, Nakladatelství Československé Akademie Věd.
- Pilous, Z. 1988. Výsledky bryologického výzkumu Československa. *Časopis Národního Muzea, Řada Přírodovědná*, 157: 156–71.
- Rakhmatulina, E.K. 1970. Mosses of spruce forest of northern slope of Terskei Ala-Too. *Flora Kyrgyzskoj SSR, Supplement 2*. Frunze, pp. 50–59. [in Russian].
- Rakhmatulina, E.K. 1990. Mosses of herbarium of Institute of Biology of Academy of Science of Kyrgyz SSR. *Izvestiya Akademii Nauk Kyrgyzskoj SSR, seriya Khimiko-technologicheskije i biologicheskije nauki*, 4: 48–56. [Russian].
- Ros, R.M., Mazimpaka, V., Abou-Salama, U., Aleffi, M., Blockeel, T.L., Brugués, M., Cros, R.M., Dia, M.G., Dirkse, G.M., Draper, I., El-Saadawi, W., Erdağ, A., Ganeva, A., Gabriel, R., González-Mancebo, J.M., Granger, C., Herrnstadt, I., Hugonnot, V., Khalil, K., Kürschner, H., Losada-Lima, A., Luis, L., Mifsud, S., Privitera, M., Puglisi, M., Sabovljević, M., Sérgio, C., Shabbara, H.M., Sim-Sim, M., Sotiaux, A., Tacchi, R., Vanderpoorten, A. & Werner, O. 2013. Mosses of the Mediterranean, an annotated checklist. *Cryptogamie, Bryologie*, 34(2): 99–283.
- Ros, R.M., Mazimpaka, V., Abou-Salama, U., Aleffi, M., Blockeel, T.L., Brugués, M., Cano, M.J., Cros, R.M., Dia, M.G., Dirkse, G.D., El-Saadawi, W., Erdağ, A., Ganeva, A., González-Mancebo, J.M., Herrnstadt, I., Khalil, K., Kürschner, H., Lanfranco, E., Losada-Lima, A., Refai, M.S., Rodríguez-Núñez, S., Sabovljević, M., Sérgio, C., Shabbara, H.M., Sim-Sim, M. & Söderström, L. 2007. Hepatics and Anthocerotae of the Mediterranean, an annotated checklist. *Cryptogamie, Bryologie*, 28(4): 351–437.
- Rybníček, K. & Rybníčková, E. 1972. Nálezy vzácných rašelinných mechorostů na Orave. *Biológia (Bratislava)*, 10: 795–8.
- Rykovsky, G.F. & Maslovsky, O.M. 2004. *Flora of Belarus. Bryophytes*. Vol. 1. *Andreaeaeopsida–Bryopsida*. Minsk: Technalohija.
- Sabovljević, M., Natcheva, R., Dihoru, G., Tsakiri, E., Dragičević, S., Erdağ, A. & Papp, B. 2008. Check-list of the mosses of SE-Europe. *Phytologia Balcanica*, 14: 207–44.
- Schäfer-Verwimp, A. 2004. The genus *Diplasiolejeunea* (Lejeuneaceae, Marchantiopsida) in the tropical Andes, with description of two new species. *Cryptogamie, Bryologie*, 25(1): 3–17.
- Schäfer-Verwimp, A. & Pócs, T. 2009. Contributions to the hepatic flora of the Dominican Republic, West Indies. *Acta Botanica Hungarica*, 51(3–4): 367–425.
- Schuster, R.M. 1969. *The Hepaticae and Anthocerotae of North America east of the hundredth meridian*. Vol. II. New York: Columbia University Press.
- Schuster, R.M. & Engel, J.J. 1977. Austral Hepaticae, V. The Schistochilaceae of South America. *Journal of the Hattori Botanical Laboratory*, 42: 273–423.
- Sehnem, A. 1976. Musgos sub-brasileiros IV. *Pesquisas Botanica*, 30: 1–79.
- Selkirk, P.M., Whiman, J.P., Downing, A.J. & Skotnicki, M.L. 2008. Mosses of sub-Antarctic Heard Island: an updated list and discussion of their distribution. *Polar Record*, 44(229): 155–64.
- Seppelt, R.D. 2004. *The moss flora of Macquarie Island*. Kingston: Australian Antarctic Division.
- Shaw, A.J. 1982. *Pohlia* in North and Central America and the West Indies. *Contributions of the University of Michigan Herbarium*, 15: 217–95.
- Shaw, A.J. 2014. *Pohlia* Hedwig. In: *Flora of North America Editorial Committee*, ed. *Flora of North America north of Mexico*, Vol. 28, Bryophytes, part 2. New York, Oxford: Oxford University Press.
- Smith, A.J.E. 2004. *The moss flora of Britain and Ireland*. 2nd ed. Cambridge: Cambridge University Press.
- Söderström, L., Hassel, K. & Weibull, H., eds. 2002a. *Preliminary distribution maps of bryophytes in Northwestern Europe*. Trondheim: Nordic Bryological Society & Mossornas Värner.
- Söderström, L., Urmi, E. & Váňa, J. 2002b. Distribution of Hepaticae and Anthocerotae in Europe and Macaronesia. *Lindbergia*, 27: 3–47.
- Söderström, L., Urmi, E. & Váňa, J. 2007. The distribution of Hepaticae and Anthocerotae in Europe and Macaronesia – Update 1–427. *Cryptogamie, Bryologie*, 28: 299–350.
- Stebel, A. & Plášek, V. 2001. *Dicranoweisia cirrata* and *Orthodicranum tauricum* (Musci) in the Polish and Czech part of Upper Silesia – distribution and ecology. *Natura Silesiae Superioris*, 5: 21–31.
- Stebel, A. & Stebel, A.M. 1998. Materiały do brioflory Beskidu Małego i północnej części Kotliny Żywieckiej (Karpaty Zachodnie). *Fragmenta Floristica et Geobotanica, Series Polonica*, 5: 217–36.
- Ștefănuț, S. 2008. *The hornwort and liverwort atlas of Romania*. București: Ars Docendi, Universitatea din București.
- Ștefănuț, S. & Goia, I. 2012. Checklist and Red List of Bryophytes of Romania. *Nova Hedwigia*, 95: 59–104.
- Streimann, H. & Curnow, J. 1989. Catalogue of mosses of Australia and its external territories. *Australian Flora and Fauna Series*, 10: i-viii+1–479.
- Szücs, P., Csiky, J. & Papp, B. 2014. A neophyte *Campylopus introflexus* (Hedw.) Brid. elterjedése Magyarországon. [The spreading of the neophytic *Campylopus introflexus* (Hedw.) Brid. in Hungary]. *Kitaibelia*, 19(2): 212–9.
- van der Pluijm, A. 2004. Species of *Orthotrichum* new to the Netherlands. *Lindbergia*, 29: 17–32.
- van der Putten, N., Verbruggen, C., Ochyra, R., Verleyen, E. & Frenot, Y. 2010. Subantarctic flowering plants: pre-glacial survivors or post-glacial immigrants? *Journal of Biogeography*, 37: 582–92.
- Váňa, J. & Engel, J.J. 2013. The liverworts and hornworts of the Tristan da Cunha group of islands in the South Atlantic Ocean. *Memoirs of the New York Botanical Garden*, 105: 1–137.
- Vellak, K., Ingerpuu, N., Kannukene, L. & Leis, M. 2009. New Estonian records and amendments: liverworts and mosses. *Folia Cryptogamica Estonica*, 45: 92.
- Wilbraham, J. & Matcham, H.W. 2010. *Zygodon oeneus* Herzog (Bryophyta: Orthotrichaceae) new to Uganda and Africa. *Journal of Bryology*, 32(3): 237–9.
- Wu, P.-C., Wang, M.-z. & Zhong, B.-g. 2002. Thuidiaceae. In: P.-C. Wu, M.R. Crosby & H. Si, eds. *Moss flora of China*. English Version. Volume 6. Hookeriaceae - Thuidiaceae. Beijing, New York: Science Press & St. Louis: Missouri Botanical Garden, pp. 150–207.
- Yano, O. & Bordin, J. 2006. Novas ocorrências de briófitas para o Rio Grande do Sul, Brasil. *Boletim do Instituto de Botanica*, 18: 111–22.
- Zander, R.H. 1972. Revision of the genus *Leptodontium* (Musci) in the New World. *Bryologist*, 75(3): 213–80.
- Zander, R.H. 1994. *Didymodon*. In: A.J. Sharp, H. Crum, P.M. Eckel, eds. *The moss flora of Mexico*. Part one Sphagnales to Bryales. *Memoirs of the New York Botanical Garden*, 69, pp. 299–319.
- Zander, R.H. 2007. *Didymodon* Hedwig. In: *Flora of North America Editorial Committee*, ed. *Flora of North America north of Mexico*. Vol. 27, Bryophytes: Mosses. Part 1. New York & Oxford: Oxford University Press, pp. 539–61.
- Zander, R.H. & Ochyra, R. 2001. *Didymodon tectorum* and *D. brachyphyllus* (Musci, Pottiaceae) in North America. *Bryologist*, 104(3): 372–7.
- Zanten, B.O. van, 1971. Musci. In: E.M. van Zinderen Bakker, J.M. Winterbottom Sr., R.A. Dyer, eds. *Marion and Prince Edward Islands. Report on the South African Biological and Geological Expedition 1965–1966*. Cape Town: A.A. Balkema, pp. 173–227.
- Żarnowiec, J., Stebel, A. & Ochyra, R. 2004. Threatened moss 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*. Poznań: Sorus, pp. 9–28.