



New national and regional bryophyte records, 54

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Bryological Note

New national and regional bryophyte records, 54

L. T. Ellis¹, J. Wilbraham¹, M. Aleffi², A. K. Asthana³, K. K. Rawat³, D. Gupta³, V. Sahu³, P. Katiyar³, G. Asthana⁴, A. Srivastava⁴, K. Baráth⁵, H. Bednarek-Ochyra⁶, J. Bruno Silva⁷, C. Emanuely de Araújo Farias⁷, S. Rangel Germano⁷, I. V. Czernyadjeva⁸, G. Ya. Doroshina⁸, C. Delgadillo Moya⁹, P. Peña Retes⁹, P. Erzberger¹⁰, E. Fuertes¹¹, D. Garcia-Avila¹², R. Garilleti¹³, T. A. Hedderson¹⁴, A. West¹⁴, V. Hugonnot¹⁵, H. Kürschner¹⁶, J. Lagrandie¹⁷, F. Lara¹⁸, I. Draper¹⁸, M. Lebouvier¹⁹, N. Lönnell²⁰, T. Hallingbäck²⁰, A. Mesterházy²¹, J. Muñoz²², C. S. Németh²³, S. J. Park²⁴, B.-Y. Sun²⁴, G. Pérez²⁵, V. Plášek²⁶, S. Poponessi²⁷, R. Vernanzoni²⁷, D. Gigante²⁷, M. Philippe²⁸, R. D. Porley²⁹, C. Sérgio³⁰, P. Ministro³⁰, S. Ștefănuț³¹, G. M. Suárez^{32,33}, J. R. Flores^{32,33}, M. Sulayman³⁴, N. Wilding³⁵, Y.-J. Yoon³⁶

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1. *Anomobryum bavaricum* (Warnst.) Holyoak & Köckinger

Contributors: G. Ya. Doroshina and I. V. Czernyadjeva

Russia: Caucasus, Republic of North Osetiya, canyon of Fiagdon River, 42°58'N, 43°45'E, 820 m. a.s.l., on soil of slope, 13 July 2015, *leg.* G. Ya. Doroshina, # 16666 (LE).

This is the first report of *Anomobryum bavaricum* for the Caucasus. Until recently, this species was

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considered endemic to the European Alps. It was known in Austria, Germany, Italy and Switzerland (Holyoak & Köckinger, 2010). Recently, it was reported for the first time for Asia from Zabaikalsky Territory, southern Siberia (Ellis *et al.*, 2014a), and was later found in the Republic of Sakha/Yakutia and Primorsky Territory, Far East (Czernyadjeva *et al.*, 2015). These records in Siberia and the Russian Far East confirm a highly disjunctive distribution of the species in Eurasia. Therefore, its presence in the Caucasus was quite predictable. In future, *A. bavaricum* may be found in the other regions of the Caucasus, especially in Dagestan, Chechnya, and Ingushetia.

This species was described and illustrated in revisions of *Anomobryum* Schimp. for Europe and Asia by Holyoak & Köckinger (2010) and for Russia by Czernyadjeva *et al.* (2015). It is characterised by an acuminate leaf apex, mostly excurrent costa, rectangular to long rectangular basal cells in the leaves, often with 1–3 rows of much narrower marginal cells, and numerous reddish-brown bulbils in the leaf axils with leaf primordia mostly confined to the upper half.

Anomobryum bavaricum occurs mainly in mountainous areas, often as a pioneer colonist, preferring calcareous rocky outcrops. In North Osetiya its shoots were collected on bare soil with *Bryum argenteum* Hedw.

2. *Barbula convoluta* Hedw.

Contributors: T. A. Hedderson, A. West and N. Wilding

La Réunion: Commune Sainte Rose, Piton de la Fournaise, Plaine de Sables, 21.23129°S, 55.65274°E, 2270 m a.s.l., forming extensive compact turf on sandy soil in pyroclastic deposit plain, 28 June 2016, *leg.* T. A. Hedderson 18950 (BOL, MO), *det.* R. H. Zander.

Globally, *B. convoluta* is very widespread and is recorded from most continents, often associated with man-made or otherwise disturbed habitats. All African records, except those from the Cape Verde Islands, are from eastern and southern parts of the continent (O'Shea, 2006).

3. *Bartramia strumosa* (Hampe) Mitt.

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Estado de México, Nevado de Toluca, 19° 07'29"N, 99°46'36"W, *leg.* Cuevas 174, 197, 214 (MEXU).

There are several characters that distinguish this species: firm-walled cells of the leaf shoulder, a synoicous condition and gymnostomous capsules. Its known distribution now includes Mexico, Costa Rica, Panama, Colombia and Venezuela.

Crum (1951), followed by Sharp *et al.* (1994), increased the probable number of taxa in the

Mexican moss flora to 942. Subsequently, further taxa new to the Neotropics have been recorded in the LATMOSS database (Delgadillo *et al.*, 1995). The present record and 10 other contributions in this column by CDM and PPR increase the Mexican moss flora to 989 species.

4. *Brachymenium andersonii* H.A.Crum

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Durango, Ridge with *Pinus* L., *Quercus* L., *Arbutus* L. and *Juniperus* L. near Puerto Buenos Aires, on rocks at 2740 m a.s.l., *leg.* Breedlove 69185 (MEXU) (originally identified by H. Ochi).

This species was transferred to *Rosulabryum* J.R.Spence (Spence, 2009) on the basis of 'evenly foliate stems, temperate distribution and ecology (growing on soil)'. The type population could not be located; Spence (2009) did not examine the holotype but suggested that the species was similar to *Rosulabryum densifolium* (Bridel) Ochyra. The present specimen had robust, evenly foliate plants with oblong-spatulate leaves, which were spirally twisted when dry, had a well-differentiated margin, were toothed from mid-leaf to the apex and were narrowly revolute in the lower half with a narrowly decurrent base. Spore capsules were nodding, but poorly preserved.

The species is known from the United States and Mexico.

5. *Brachymenium morasicum* Besch.

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Chiapas, San Juan Chamula, 16°48'N, 92° 42'W, *leg.* Delgadillo 4814; 25 km NW of Motozintla, 15°24'N, 92°20'W, *leg.* Delgadillo 4753, *leg.* Cárdenas 4196, 4212 (MEXU).

The collection consists of small rosulate, bright green plants, with erect to imbricate, concave, oblong to oblong-lingulate leaves. The leaf margins are narrowly revolute in the lower two-thirds and denticulate toward the apex; the hair point is reddish at the base and hyaline distally, smooth or toothed in the same plant. It has cylindrical, erect spore capsules. *Brachymenium morasicum* is similar to *B. systylium* (Müll.Hal.) A.Jaeger (Allen, 2002) and occurs in Mexico, Guatemala, Costa Rica, Colombia and Brazil.

6. *Brachythecium salebrosum* (F.Weber & D.Mohr) Schimp.

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Puebla, Pico de Orizaba, 19°03'N, 97° 18'W, *leg.* De Luna 674; San Cayetano region above Serdán, *leg.* Sharp 764; Popocatepetl, *leg.* Sharp 4756b; Veracruz: El Volcancillo cerca de Las Vigas, 19°38'N, 97°05'W, *leg.* Juárez 541 (MEXU).

This species is distinguished by its autoicous condition, slightly falcate, plicate and lanceolate leaves with serrulate margins, and narrow laminal cells. The alar cells, in a small group, are smaller than

adjacent cells. According to Ignatov (2014), the distribution of this species includes California and New Mexico in the United States but not Mexico. The specimens cited above come from high elevations and seem to conform well with Ignatov's description. *Brachythecium salebrosum* occurs in Canada, United States, Mexico, Europe, Asia, Africa and Australia.

7. *Braunia plicata* (Mitt.) A. Jaeger

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Aguascalientes, La Congoja, 22°09'08"N, 102°39'32"W, leg. Delgadillo 7744; leg. Villalobos *et al.* 8 (MEXU).

Crum (1951) listed this species for Mexico but did not include it in his treatment for the *Flora of Mexico* (Crum, 1994a). However, recent taxonomic work by De Luna & Gómez-Velasco (2008) indicates that this is a distinct taxon distinguished from other Mexican species of *Braunia* Bruch & Schimp. by the dentate hyaline leaf apex and cylindrical capsule. Also, '*B. plicata* has strongly plicate leaves with the leaf acumen broad, hyaline, strongly papillose and with a dentate margin' (De Luna, 2016).

The species is known from Mexico, Peru, Bolivia, Brazil, Paraguay and Argentina.

8. *Bryoerythrophyllum inaequalifolium* (Taylor) R.H.Zander

Contributors: R. D. Porley, C. Sérgio and P. Ministro

Portugal: (1) Algarve, Marmeleite, E. of Picos, Serra de Monchique, 458 m a.s.l., 37°18'28.62"N, 8°38'46.79"W, on compacted soil on track through maquis dominated by *Cistus salvifolius* L. and *Erica arborea* L., with *Fossombronia caespitiformis* De Not. ex Rabenh., *Epipterygium tozeri* Lindb. and *Trichostomum brachydontium* Bruch, 3 November 2016, leg. Porley *s.n.*, conf. J. Jiménez (Hb. Porley); (2) Algarve, Montinhos da Serra, W. of Picota, Serra de Monchique, 251 m a.s.l., 37°18'52.63"N, 8°32'25.22"W, on soil path through open *Quercus suber* L. woodland, with *Barbula unguiculata* Hedw., *Bryoerythrophyllum campylocarpum* (Müll.Hal.) H.A.Crum, *Claopodium whippleanum* (Sull.) Renauld & Cardot, *Dicranella howei* Renauld & Cardot, *Epipterygium tozeri* and *Fissidens curvatus* Hornsch., 2 March 2017, leg. Porley *s.n.* (Hb. Porley); (3) Estremadura, Serra de Sintra, between Malveira da Serra and Cascais, 258 m a.s.l., 38°45'42.82"N, 9°20'33.17"W, on soil path of gabbro-dioritic origin in an exposed forest (*Cupressus lusitanica* Mill.), with *Bryum dichotomum* Hedw., 15 May 2017, leg. Pedro Ministro *s.n.* (LISU265750).

Bryoerythrophyllum inaequalifolium shows a widely disjunctive distribution with circumpolar, tropical and temperate-mediterranean forms. It is known in western North, Central and South America (Churchill *et al.*, 2000), Asia, India, E. China (Li

et al., 2001) and in Russia (Siberia) (Fedosov & Ignatova, 2008). In the tropics it is apparently frequent from Mexico north to Peru, but is less widespread in Africa where it is recorded from Ethiopia, Tanzania, Reunion and Rwanda (O'Shea, 2006; Sollman & Ochyra in Ellis *et al.*, 2012b). It is also present in Macaronesia, Azores, Madeira, Canary Islands and in the Cape Verde Islands (Frahm *et al.*, 1996).

In mainland Europe, it was very recently reported from France (Pyrénées-Orientales, Saint-Laurent-de-Cerdans) (Hugonnot & Chavoutier, 2015), close to the only hitherto known European locality in Spain (Gerona), also in the eastern Pyrenees (Lloret, 1988), but it has not been seen in the latter locality since 1987 and is listed as Near Threatened (Brugués & González-Mancebo, 2012). *Bryoerythrophyllum inaequalifolium* is thus reported as new to Portugal, represented by two localities in Serra de Monchique and one locality in Serra de Sintra.

Bryoerythrophyllum inaequalifolium occurred as scattered individuals or in small patches mixed with the above associates, restricted to only a few metres of ground. Sporophytes were not seen but abundant distinctive unicellular dark brown axillary gemmae were present. It is noteworthy that *B. campylocarpum* (Müll.Hal.) H.A.Crum was recorded as an associate of *B. inaequalifolium* in Rwanda (Sollman & Ochyra in Ellis *et al.*, 2012b), an association also seen in Serra de Monchique in Portugal.

9. *Bryoerythrophyllum rubrum* (Jur.) P.C.Chen

Contributor: H. Bednarek-Ochyra

Antarctica, South Shetland Islands, Nelson Island: In a small valley at a cape north of Stansbury Peninsula between Drake Passage and Fildes Strait, 62°14'S, 59°03'W, 7 m a.s.l., on ground on coastal rocks in a community dominated by lichens and mosses, 20 February 2009, leg. L. E. Kurbatova L103-15 (KRAM, LE).

Bryoerythrophyllum recurvirostrum (Hedw.) P.C.Chen has long been considered the only species of *Bryoerythrophyllum* P.C.Chen in the Antarctic (Ochyra & Zander, 2002; Ochyra *et al.*, 2008b). However, Sollman (2015) has shown that this genus actually consists of three species in this biome, *B. recurvirostrum*, *B. antarcticum* (L.I.Savicz & Smirnova) P.Sollman and *B. rubrum* (Geh.) P.C.Chen. The latter is widely distributed but rare and scattered in the maritime Antarctic, occurring in the South Orkney Islands and South Shetland Islands archipelagoes, as well as on Alexander Island, whilst in the continental Antarctic it is exceedingly rare in the Vestfold Hills in Princess Elizabeth Land. In the South Shetland Islands, it is known only from King George Island, the largest island of the archipelago (Ellis *et al.*, 2016). Now this species is recorded from the neighbouring Nelson Island

from where it was previously reported also as *B. recurvirostrum* (Ellis *et al.*, 2013a) and it is very likely that it is a newcomer in the moss flora of this island, having reached here after the Last Glacial Maximum (Birkenmajer *et al.*, 1985). Until recently, 111 species and two varieties had been recorded from the Antarctic (Ochyra *et al.*, 2008a, 2008b), but the latest discoveries of four distinct species (Ellis *et al.*, 2013a, 2013b; Sollman, 2015) increased this number to 115 species and two varieties.

10. *Bryum capillare* Hedw. var. *flaccidum* (Brid.) Bruch & Schimp.

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: State of Mexico, Barranca de Malinaltenango, 18°46'N, 99°42'W, *leg.* Delgadillo 5921; Michoacán, Cascada de la Tzaráracua, 19°21'N, 102°06'W, *leg.* Delgadillo 5425, 6040, *leg.* Cárdenas 5049; Morelos: Cerro del Tepozteco, 18°59'N, 99°07'W, *leg.* Delgadillo 5653 (MEXU).

Spence (2007) cited this taxon as *Rosulabryum flaccidum* (Brid.) J.R.Spence, which he characterised in a later publication (Spence, 2014). In Mexico, it is represented by small evenly foliate plants; the leaves remote and erect with margins distally serrulate and weakly bordered by 1–2 rows of cells; the costa ends below the leaf apex. The reddish to brown filiform gemmae are papillose, abundant and evident in the Mexican specimens which are otherwise sterile. *B. capillare* var. *flaccidum* occurs in the United States, Mexico and the West Indies.

11. *Bucklandiella dichelymoides* (Herzog) Bednarek-Ochyra & Ochyra

Contributor: H. Bednarek-Ochyra

Colombia, Department of Boyáca: (1) Sierra Nevada de Cocuy, Valle de las Playas, 6°29'09"N, 72°20'46"W, ca 4100 m a.s.l., on stones in a small stream, mixed with *Codriophorus mollis* (Cardot) Bednarek-Ochyra & Ochyra and *Bucklandiella lamprocarpa* (Müll.Hal.) Bednarek-Ochyra & Ochyra, 8 August 1957, *leg.* P. J. Grubb & D. A. Guymer B.226A & B.229A (Cambridge Expedition to the Cordillera Oriental, 1957) (BM); (2) Sierra Nevada de Cocuy, Valle del Corallitos, 6°29'10"N, 72°21'24"W, ca 4000 m a.s.l., on boulders at edge of Weinmania Forest, mixed with *Bucklandiella subsecunda* (Harv.) Bednarek-Ochyra & Ochyra, 6 September 1957, *leg.* P. J. Grubb & D. A. Guymer No. B.402a-1 (Cambridge Expedition to the Cordillera Oriental, 1957) (BM).

Bucklandiella dichelymoides is one of the rarest species of *Bucklandiella* Roiv. It is a narrow endemic of the Colombian Andes, where it occurs mostly in the Cordillera Oriental and some solitary localities in the Cordillera Central and Cordillera Occidental at altimontane elevations, ranging from 3150 to 4520 m a.s.l. (Bednarek-Ochyra, 2006). Hitherto, the species has been recorded in three departments of Colombia,

namely Caldas, Cundinamarca and Nariño, and herein it recorded for the first time in the fourth department of Boyáca. Two specimens of *B. dichelymoides* were collected by the Cambridge Expedition to the Cordillera Oriental in 1957 at elevations of 4000 and 4100 m a.s.l. which, beside the collection from department of Caldas, are the highest records of the species.

Bucklandiella dichelymoides is a rheophytic species growing attached to stones and boulders in streams but it does not exhibit any rheophytic adaptations that are typical for many species growing in the fast-flowing water of rapids and waterfalls, such as variously multistratose laminal cells, salient, percurrent to excurrent costae and strong, fleshy marginal limbidia (e.g. Vitt & Glime, 1984; Sérgio *et al.*, 1995; Ochyra & Vanderpoorten, 1999; Ellis *et al.*, 2017a, 2017b and references therein). Instead, *B. dichelymoides* has entirely unistratose laminal cells and fairly broad but not markedly salient costae and lacks marginal thickenings. However, such features occur in other rheophytic mosses, for example *Touwia laticostata* Ochyra (Ochyra, 1986), *Pseudoparaphysanthus bonianus* (Besch.) S.Olsson, Enroth, Huttunen & D.Quandt, *Neckeropsis moutieri* (Broth. & Paris) S.Olsson, Enroth, Huttunen & D.Quandt (Touw & Ochyra, 1987), *Hydrocyphaea wardii* Dixon (Shevock *et al.*, 2006) and *Yunnanobryon rhyacophilum* Shevock, Ochyra, S.He & D.G.Long (Shevock *et al.*, 2011).

Bucklandiella dichelymoides has a somewhat intricate taxonomic history. It was originally described as *Racomitrium dichelymoides* Herzog (Herzog, 1934) and later was placed in a separate monotypic section, *Racomitrium* Brid. sect. *Andicola* Bednarek-Ochyra (Bednarek-Ochyra, 1995). The species was subsequently transferred to the genus *Codriophorus* P.Beauv. as *C. dichelymoides* (Herzog) Bednarek-Ochyra & Ochyra (Ochyra *et al.*, 2003) on the basis of its costa which vanished well below the leaf apex, and in this character it resembles species of *Codriophorus* sect. *Fascicularia* (Bednarek-Ochyra) Bednarek-Ochyra & Ochyra. However, subsequent studies revealed that in some populations of the broadly understood *Bucklandiella subsecunda* (Harv.) Bednarek-Ochyra & Ochyra the costae also cease far below the leaf apex and *C. dichelymoides* shares with them entirely smooth laminal cells and chlorophyllose innermost perichaetial leaves. Accordingly, the species was transferred to the genus *Bucklandiella* (Bednarek-Ochyra & Ochyra, 2011).

12. *Bucklandiella heterostichoides* (Cardot) Bednarek-Ochyra & Ochyra

Contributor: H. Bednarek-Ochyra

Argentina, Isla Grande de Tierra del Fuego: Eastern part of Glaciar Martial north-west of Ushuaia, 575 m

a.s.l., 54°47'32"S, 68°23'13"W, on rocks in the periglacial zone, 19 February 1984, *leg.* Marian Kuc *s.n.* (KRAM B-210192).

Bucklandiella heterostichoides is an austral cool-adapted species which is very rare in Argentina being known only from a single record from Isla de los Estados, the easternmost island of the Tierra del Fuego archipelago from whence it was described (Cardot, 1905). This contrasts with Chile, where its main centre of its occurrence is in western and southern Patagonia, in the XII Región Magallanes. It also occasionally extends northwards to the X Región de Los Lagos (Müller, 2009), reaching its northernmost locality in the South American mainland in Parque Nacional Puyuhue in Osorno province at lat. 40°40'10"S (Ellis *et al.*, 2016), and also to the Falkland Islands (Ochyra *et al.*, 2015a). Herein, the species is recorded from the Argentine part of Isla Grande de Tierra del Fuego, and this is the second record of *B. heterostichoides* from Argentina.

Bucklandiella heterostichoides is a vicariant species of the Australasian *B. seppeltii* Bednarek-Ochyra, Ochyra, Sawicki & Szczecińska (Bednarek-Ochyra *et al.*, 2014) and it is a typical example of an Afro-American species. This type of distribution is primarily exhibited by many tropical species of liverworts (Gradstein, 2013, 2017; Pócs *et al.*, 2016) and mosses (e.g. Allen & Crosby, 1986; Ochyra *et al.*, 1992; Zomlefer, 1993; Ellis *et al.*, 2012c, 2017b and references therein). However, there is a relatively small group of austral cool-adapted south-temperate species of liverworts (e.g. Váňa *et al.*, 2010a; Ellis *et al.*, 2016) and mosses (e.g. Ellis *et al.*, 2016) which are bicentric in distribution in the austral cool-temperate regions. They occur not only in southern South America and its offshore islands but also in South Africa and/or on the Southern Ocean islands, primarily in the Kerguelen Biogeographical Province. *Bucklandiella heterostichoides* perfectly fits this distribution pattern and it is designated as an amphiatlantic subantarctic species since it has its maximum occurrence on subantarctic islands and penetrates into the south-cool-temperate zone where it usually occurs at high elevations. It is common and abundant on South Georgia in the South American sector of the subantarctic (Bell, 1974) and also appears in Îles Kerguelen and on Heard Island (Ellis *et al.*, 2014a; Ochyra *et al.*, 2015a) in the African sector of this biome, with an intermediate station on Gough Island in the cool-temperate zone, where it occurs only at high elevations (Ellis *et al.*, 2012a). The record of *B. heterostichoides* from Tristan da Cunha (Dixon, 1960) proved to be based upon a misdetermination and the voucher material belongs to *B. striatipila* (Cardot) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2010, 2013).

13. *Calypogeia grandistipula* (Steph.) Steph.

Contributor: E. Fuertes

Argentina: Misiones, Departamento Guaraní, Parque provincial de Moconá, Reserva de la Biosfera Yabotí, cuenca del río Uruguay, límite con la frontera brasileña, en tocones o madera en descomposición, en bosques cálidos y húmedos de la selva tropical paranaense, *prope* El Soberbio, 27° 15'S, 54°02'W, 450 m a.s.l., 27 September 2007, *leg. & det.:* E. Fuertes *s.n.* (BM, MACB 109637).

The plants were medium sized, formed dense, light green to whitish mats on decaying wood or damp soil in the forest, and were frequently associated with other bryophytes. They conformed to the following description: stems creeping, fairly rigid; from 10–15 mm long × 2–3 mm broad (including leaves), irregularly pinnate, branches infrequent; cross-section stem to 210 µm; cortex and medulla scarcely differentiated, cortical cells rectangular, thin walled. Leaves imbricate 0.7–1.0 × 0.5–0.7 mm, incubus, erect, convex, asymmetrical, broadly ovate, the dorsal base curved; rounded or pointed apex, rarely acute; leaf cells thin walled, apical cells sub quadrate or hexagonal, 25 × 34 µm, basal cells 50 × 34 µm. Underleaves bifid, 3–4 times as broad as the stem, tending to be transversely elliptical, divided to half, the segments broadly triangular, sometimes with a broad tooth or projection on lateral margins, apical cells 35 × 30 µm, mid cells 45 µm × 30(–40) µm; the sinus broad, U or V shaped, base decurrent. Rhizoids restricted to the base of the under-leaves. Paroicous; inflorescences on dwarf ventral branches. Male bracts 2–3(–4) pairs, suborbicular with 2–4 acute lobes; female bracts 2–3 pairs, entire; marsupia sessile, hyaline or brownish, capsule cylindrical, black, 4 valves linear, becoming spirally twisted. (Illustrations: Bischler, 1962, Figure 28a–f; Fulford, 1968, Figure 15a–d).

The first specimens of *C. grandistipula* were collected from Brazil; one by Wainio in Sitio, s.d. 66 (G) (determined by Stephani in 1908) (Bischler, 1962) and another by Puiggari in Apyabi (reported as the type of *C. puiggarii* Steph. (Fulford, 1968)). It is also known from Colombia (Antioquia) and from Ecuador (Andean Bryophytes project, 2012) (Trópicos. org., 2017). This contribution is a new record for the bryophyte flora of Argentina.

14. *Campylopus atrovirens* De Not.

Contributors: S. Poponessi, M. Aleffi, R. Venanzoni and D. Gigante

Italy: Boschi di Ferretto – Bagnolo, Province of Perugia, Umbria Region. This is a Special Area of Conservation (SAC) IT5210020, 43°9.568'N, 11°59.481'E, ca 274 m a.s.l., on acidic soil in a heathland, 12 May 2016, *leg.* S. Poponessi & D. Gigante, *Det.* S. Poponessi (PERU); this species was discovered as a result of investigations focused on a system of

Mediterranean temporary ponds categorised as a priority habitat under the EU Directive 92/43/EEC and listed in Annex I with the code 3170*. The research was carried out during a study of the bryophytic component started in 2015 (Poponessi *et al.*, 2016).

Campylopus atrovirens is newly reported in Umbria. It has been found in heathland, associated with *Campylopus introflexus* (Hedw.) Brid. and *Hypnum cupressiforme* Hedw. var. *cupressiforme*. This species has been assigned to the Hyperoceanic Temperate geographic element (Smith, 2004). In Italy, it is very rare but its presence has been confirmed by recent records especially in the northern regions of the Italian peninsula: Piedmont, Lombardy, Trentino Alto Adige (the report is by Philippi only *in litteris* on 04 January 1994) and Sardinia (Aleffi *et al.*, 2008). Its European range includes the Faroe Islands, Norway, Sweden, Great Britain, Ireland, Andorra, Azores, France, Italy, Spain, Austria, Switzerland and Montenegro. It is also distributed in North Caucasus, Pacific coast of North America and North Carolina.

Campylopus atrovirens is considered as Endangered (EN) in Sweden, Data Deficient (DD) in Azores, Not Evaluated (NE) in Austria, Near Threatened (NT) in Switzerland and Vulnerable (VU) in Montenegro (Hodgetts, 2015).

15. *Campylopus heterostachys* (Hampe) A. Jaeger

Contributors: J. Bruno Silva, C. Emanuely de Araújo Farias and S. Rangel Germano

Brazil: Biological Reserve (ReBio) Guaribas, Paraíba State (Area SEMA 3), 06°48'034"S, 35°05'717"W, 14 m a.s.l., on damp soil, 22 May 2016, *leg.* C. E. A. Farias 1801; *det.* J. B. Silva (ACAM).

Campylopus heterostachys is a Neotropical species, occurring from Argentina to Mexico (Frahm, 1981, 1982; Allen, 1994; Forzza *et al.*, 2010). It is usually found on tree trunks and decaying wood. In Brazil, *C. heterostachys* is widely distributed, occurring in all regions (Forzza *et al.*, 2010) but colonising soil or rock. However, this is the first record for Paraíba state, a hotspot for bryophytes in Brazil (Germano *et al.*, 2016), and the first time it has been collected so close to sea level. The collection was made in the Biological Reserve Guaribas, which encompasses one of the last fragments of Atlantic Forest in the state, with a total of 4051.62 hectares. The climate is wet tropical and is only dry in summer (ICMBio, 2012).

Campylopus heterostachys resembles *C. flexuosus* (Hedw.) Brid. but is distinguished by its long spine-like serrate awn and costa. Seen in transverse section, the costa has large ventral leucocysts, typical of plants living in wetter habitats. Furthermore, the steroids present in the costa are good protection against shrinkage caused by desiccation and should optimise water conduction in the dry season (Frahm, 1990).

According to Frahm (1990), species of *Campylopus* Brid. living in the tropics are evolutionarily recent as the genus originated in the subantarctic.

16. *Cololejeunea latilobula* (Herzog) Tixier

Contributors: G. Asthana and A. Srivastava

India: Western Ghats, Maharashtra, Mahabaleshwar, forest near Venna Lake, 17.934009°N, 73.665026°E, epiphytic in association with *Lejeunea* Lib. sp. and *Metzgeria* Raddi sp., 12 September 2001, *leg.* S. C. Srivastava and party *s.n.* (LWU 13910/01); forest near Lingmala Fall, ca 1326 m a.s.l., 17°54'N, 73°41'E epiphytic in association with *Metzgeria* sp., 5 October 2014, *leg.* Abha Srivastava *s.n.* (LWU 22909/14, LWU 22910/14, LWU 22913/14).

Cololejeunea latilobula (= *C. himalayensis* (Pandé & Misra) Schust., ≡ *Leptocolea himalayensis* Pandé & Misra) is a widely distributed species known from India, China, Myanmar, Vietnam, Reunion, Nigeria, Uganda, Malawi (Nyasaland), Tanzania and Japan (Jones, 1957; Tixier, 1985; Zhu & So, 2001; Asthana & Srivastava, 2003). In India, it was reported for the first time by Pandé & Misra (1943) as *L. himalayensis*, from Loharkhet (as a rupicolous population) and Bageshwar (as a corticolous population) in Western Himalaya. Subsequently, *C. latilobula* has been reported from all major regions of the country as corticolous, foliicolous (epiphyllous) and rupicolous populations (Asthana & Srivastava, 2003; Dey & Singh, 2012; Singh & Singh, 2016): Western Himalaya: Uttaranchal; Eastern Himalaya: Arunachal Pradesh, Manipur, Meghalaya, Sikkim, West Bengal; Central India: Madhya Pradesh and South India: Karnataka, Kerala, Tamil Nadu.

During investigations of liverworts collected from Mahabaleshwar (Maharashtra), the taxon was found growing on bark (corticolous) from the forest area near Lingmala Falls and Venna Lake. This is the first report of this species from Maharashtra (Mahabaleshwar), showing an extension of its distribution in South India (Western Ghats). *Cololejeunea latilobula* is characterised by monoicous plants with ovate to oblong leaves; leaf lobes are bordered with rectangular hyaline cells; leaf lobules are triangular, lingulate, lanceolate with an apical hyaline papilla and without a second tooth. The cuticle of the leaf is minutely papillose.

17. *Drummondia sinensis* Müll. Hal.

Contributors: Y.-J. Yoon, S. J. Park and B.-Y. Sun

Republic of Korea: Gangwon-do, Jeollanam-do, Haenam-gun, Samsan-myeon, Duryun Provincial Park, vicinity around Daeheung Temple, 34°28'34.8"N, 126°36'51.7"E, 135 m a.s.l.; on tree trunk near the parking area, 29 October 2015, *leg.* B. C. Tan & S. J. Park 2015-733, 2015-734 (JNU, UC).

Drummondia Hook. and *Macromitrium* Brid. are two genera in the Orthotrichaceae identified by their

creeping and pinnately branching habit. However, none of the known species of *Macromitrium* have the oblong leaf outline and smooth laminal cells of *D. sinensis*. Noguchi (1989) who provided an excellent illustration of the species described the genus as having uniquely large, multicellular spores, but the South Korean specimens were sterile.

Park (2007) and Gao (1977) reported two localities for *D. sinensis* in North Korea, from Baekdu Mountain (Jangbaek Mountain) and Jogae Mountain. The present collection is its first documented presence in South Korea. Outside the Korean Peninsula, *D. sinensis* is widespread in India, China, Japan and the Russian Far East.

18. *Ephemerum cohaerens* (Hedw.) Hampe

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Coahuila, Jiménez, at river edge, 29°4'6"N, 100°41'17"W, *leg.* Peña 354, *leg.* Delgadillo 7781 (MEXU).

This species has oblong-lanceolate leaves with irregularly dentate margins and smooth cells nearly parallel to the costa; the sporophytes are cleistocarpous, sessile, and the spores are coarsely papillose. Its occurrence in Mexico is not unexpected as it has been previously reported from Texas (Mahler, 1980; Bryan, 2007). *Ephemerum cohaerens* is known from Canada, United States, Mexico, Europe and Asia.

19. *Ephemerum crassinervium* (Schwägr.) Hampe subsp. *sessile* (Bruch) Holyoak

Contributors: S. Poponessi, M. Aleffi, R. Venanzoni and D. Gigante

Italy: Boschi di Ferretto – Bagnolo, Province of Perugia, Umbria Region. This is a Special Area of Conservation (SAC) IT5210020, 43°9.558'N, 11°59.436'E, ca 275 m a.s.l., on clayey soil at the edge of a temporary pond, 5 May 2016, *leg.* S. Poponessi, *det.* S. Poponessi (PERU); this species was discovered as a result of investigations focused on a system of Mediterranean temporary ponds categorised as a priority habitat under the EU Directive 92/43/EEC and listed in Annex I with the code 3170*. The research was carried out during a study of the bryophytic component started in 2015 (Poponessi *et al.*, 2016).

This subspecies is very rare in Italy, but its presence has been confirmed by new records in Piedmont, Abruzzo, Campania and Calabria (Aleffi *et al.*, 2008). *Ephemerum crassinervium* subsp. *sessile* was found at the edge of a temporary pond; the associated species included *Entosthodon fascicularis* (Hedw.) Müll.Hal., *Archidium alternifolium* (Hedw.) Mitt., *Fossombronina pusilla* (L.) Nees. and *Isöetes hystrix* Bory.

This taxon has been assigned to the European Southern-Temperate geographic element (Smith, 2004). In the Mediterranean area, it is widespread in

Portugal, Spain, Corsica, Greece, Morocco and Sardinia (Ros *et al.*, 2013). It also occurs in Ireland and Scotland. It is considered Extinct in Finland, Data Deficient in Sweden and 'presumably threatened' in Germany (Lockhart *et al.*, 2012).

In a recent taxonomic revision, Holyoak (2010) proposed a taxonomic system treating *Ephemerum sessile* (Bruch) Müll.Hal., *E. crassinervium* and *E. rutheanum* as subspecies of *E. crassinervium*. *E. crassinervium* subsp. *sessile* was considered as a European endemic.

20. *Ephemerum serratum* (Hedw.) Hampe

Contributors: S. Poponessi, M. Aleffi, R. Venanzoni and D. Gigante

Italy: Boschi di Ferretto – Bagnolo, Province of Perugia, Umbria Region. Special Area of Conservation (SAC) IT5210020, 43°9.578'N, 11°59.466'E, ca 275 m a.s.l., on clayey soil at the edge of a temporary pond, 05 May 2016, *leg.* S. Poponessi *s.n.*, *Det.* S. Poponessi (PERU); this species was discovered as a result of investigations focused on a system of Mediterranean temporary ponds, categorised as a priority habitat under the EU Directive 92/43/EEC and listed in Annex I with the code 3170*. The research was carried out during a study of the bryophytic component started in 2015 (Poponessi *et al.*, 2016).

The present report is the first for Umbria. *Ephemerum serratum* is rarely found in Italy and has only been confirmed in Piedmont, Tuscany, Lazio and Campania. According to Aleffi *et al.* (2008), the taxon is known in other Italian regions (Lombardy, Trentino Alto Adige, Veneto and Sardinia) from ancient reports. Its range includes Northern Europe (to Fennoscandia), China, Morocco and North America with a European Temperate phytogeographical element (Smith, 2004). It has been included in the Red Lists of several European countries (Hodgetts, 2015).

21. *Fissidens grandifrons* Brid.

Contributor: D. García-Avila

Mexico: Queréndaro, Michoacán, 19°43'46"N, 100°50'03"W, 2320 m a.s.l., on rocks in a waterfall, 28 December 2009, *leg.* S. Zamudio *et al.* *s.n.*, *det.* D. García-Avila (EBUM).

The specimen did not have sporophytes but possessed structures of vegetative propagation as described by Hill (1902). This aquatic moss has a Holarctic distribution with some records in the neotropics. In Mexico, *F. grandifrons* occurs in Sonora (north of Mexico), Veracruz (east of Mexico) and Oaxaca (south-west of Mexico). This species is a new record for Michoacán state (west of Mexico). The neotropical distribution of *F. grandifrons* extends south to Guatemala (Pursell, 2007). *Fissidens grandifrons* belongs to a complex of nine species within subgenus

Pachyfidens (Müll.Hal.) Kindb. section *Pachyfidens* Müll.Hal. This record is the first record of a species from this complex for Michoacán state.

22. *Fossombronia incurva* Lindb.

Contributor: P. Erzberger

Hungary: Vas County (9164.3, on the border with 9264.1, Central European Mapping Scheme), region of Órség, less than 1 km from the border with Slovenia, north of the settlement Kercaszomor, on bare soil of narrow path caused by trampling of wild animals, in a moist depression in a flat stream valley, ca 270 m a.s.l., 46°48'00.1"N, 16°20'41.0"E, 9 August 2017 and 10 August 2017, *leg. et det.* Peter Erzberger (B-Erzberger 23678, 23687).

The collections were associated with *Atrichum undulatum* (Hedw.) P.Beauv., *Fissidens bryoides* Hedw., *Oxyrrhynchium hians* (Hedw.) Loeske, *Plagiomnium affine* (Blandow ex Funck) T.J.Kop., *Dicranella rufescens* (Dicks.) Schimp., *Lophocolea bidentata* (L.) Dumort., *Pohlia melanodon* (Brid.) A.J.Shaw, *Pseudephemerum nitidum* (Hedw.) Loeske, *Ephemerum stoloniferum* (Hedw.) L.T.Ellis & M.J.Price and *Fissidens exilis* Hedw. Vascular plants in the habitat include *Quercus* L. spp., *Fagus sylvatica* L., *Alnus glutinosa* (L.) Gaertn., *Carpinus betulus* L., *Deschampsia caespitosa* (L.) P.Beauv., *Carex sylvatica* Huds., *Mentha arvensis* L., *Galeopsis pubescens* Besser, *Persicaria hydropiper* (L.) Spach, *Oxalis stricta* L., *Lycopus europaeus* L. and *Geum urbanum* L.

Fossombronia incurva is distinguished from most European species of *Fossombronia* Raddi, and in particular from its three Hungarian congeners, *F. foveolata* Lindb., *F. pusilla* (L.) Nees and *F. wondraczekii* (Corda) Lindb., by its small size, with plants usually no longer than 5 mm, and small spores, only 22–32 (–38) µm in diameter, often remaining in tetrads; the distal face of the spores usually has very small alveolae, 2–5 µm wide. In the other species mentioned above, spores are larger, 30–64 µm in diameter, not united in tetrads, and the distal face is ornamented by lamellae or if alveolate then with alveolae 8–12 µm wide.

According to Damsholt (2002), *F. incurva* was considered endemic to north-western Europe. Among the countries surrounding Hungary, it is found only in Austria (Hodgetts, 2015), therefore its occurrence in Hungary was quite unexpected and represents a major extension of its distribution into the south-eastern part of Central Europe. Within Hungary, however, the region of Órség has the most 'Atlantic' type of climate, with more precipitation and cooler temperatures than the rest of the country (Borhidi, 1961).

Fossombronia incurva is a candidate for the new European Red List and is Red-listed in 6 out of the 14 countries in which it occurs (Hodgetts, 2015).

23. *Grimmia dissimulata* E.Maier

Contributor: S. Ştefănuţ

Romania: Braşov County, Coloanele de basalt de la Racoş Reserve, 46°01'36"N, 25°25'25"E, 515 m a.s.l., 19 July 2017, *leg.* S. Ştefănuţ *s.n.*, *det.* S. Ştefănuţ (BUCA B4835).

This is the first report of *Grimmia dissimulata* for Romania (Ştefănuţ & Goia, 2012). It was found on basaltic rocks along with *Grimmia laevigata* (Brid.) Brid. and *Schistidium crassipilum* H.H.Blom.

In Europe, *G. dissimulata* has been reported from Sweden, Great Britain, Ireland, Balearic Islands, Cyprus, France, Italy, Portugal, Sardinia, Spain, Austria, Belgium, Czech Republic, Germany, Luxembourg, Switzerland, Albania, Crete, Croatia, Greece, Hungary, Montenegro, Serbia (Hodgetts, 2015) and now Romania.

24. *Grimmia trinervis* R.S.Williams

Contributors: G. M. Suárez, J. R. Flores and J. Muñoz

Argentina: Tucumán, Departamento Tafi del Valle, 4033 m a.s.l., llegando a las Lagunas de Huaca Huasi, 20 March 2007, *leg.* G. Suárez 1117 (LIL); Departamento Tafi del Valle, 26°45'S, 65°44'W, 2900 m a.s.l., Cerca del alto del Tío, Pastizales de Altura, 20 km de Tafi del Valle, 2 December 1999, *leg.* S. Churchill & M. Schiavone 20138 (LIL, MO).

Grimmia trinervis is present on the Andean plateau of Peru, Bolivia (Muñoz, 1999) and Chile (Larraín & Vargas, 2009). This report for Argentina completes the range of this species in the Austro-Neotropical countries of the Andean region.

In Argentina, *G. trinervis* occurs in the high elevation grasslands between 2900 and 4000 m a.s.l., a phytogeographical area where other bryophytes, such as *Saitobryum lorentzii* (Müll.Hal.) Ochyra, *Dicranella lorentzii* (Müll.Hal.) Broth., *Pohlia chilensis* (Mont.) A.J.Shaw and *Neosharpiella aztecorum* H.Rob. & Delgad., were recorded recently (Suárez & Schiavone, 2008; Suárez *et al.*, 2010, 2013; Jimenez *et al.*, 2015).

Although it is markedly variable according to its habitat, the diagnostic characters for this species are the leaves strongly plicate on both sides of the costa; the seta curved with a gymnostomous, asymmetric capsule and a ventricose base and a mitrate calyptra, which is not plicate and does not exceed the capsule mouth. A complete description and illustration of *G. trinervis* can be found in Muñoz (1999, pp. 179–82).

25. *Holomitrium xolocotzianum* H.A.Crum

Contributor: D. García-Avila

Mexico: Coalcomán de Vazquez Pallares, Michoacan, 18°41'25.29"N, 103°0'36.53"W, 2060 m a.s.l., collected on the side of a mountain in *Pinus-Quercus* forest on lithosol soil, 4 May 2000, *leg.* X. Madrigal-Sánchez 4666, *det.* D. García-Avila (EBUM).

This species is endemic to Mexico and was originally described by Crum (1952) based on specimens from Chilpancingo, Guerrero, Mexico, collected by Sharp in 1940. The collection reported here extends the range of this species over 350 km to the north along the Mexican Pacific coast within the physiographic province of Sierra Madre del Sur. The specimen possessed structures for vegetative propagation (microphyllous branches in axils of upper leaves).

26. *Lejeunea pallide-virens* S.Hatt.

Contributors: V. Sahu, P. Katiyar and A. K. Asthana

India: Eastern Himalaya, Manipur, Shirui Hills Top, epiphytic, 25°7.372'N 94°26.480'E, ca 2164 m a.s.l., 2 June 2017, leg. P. Katiyar, K. J. Singh & D. Husain s.n. (LWG-306695E).

In India about 50 species of *Lejeunea* Lib. are known at present (Asthana & Sahu, 2012; Singh et al., 2016). *Lejeunea pallide-virens* has been recorded from the Western Ghats (Pócs et al., 2007). During a recent study of the bryophytes of Manipur, it has been identified from the Shirui hills (Ukhrul, Manipur) and is a new record for north-eastern India.

The plants were yellowish-green, 8–12 mm long, with imbricate to contiguous, ovately lobed leaves. Distant, suborbicular amphigastria were bilobed to half underleaf length, with an obtuse to acute sinus, and outer margins slightly toothed in mid-basal region on one or both sides. Leaf lobules were about $\frac{1}{3}$ of the leaf length, inflated, ovate, with a large, unicellular tooth projecting towards the leaf apex and possessing a hyaline papilla on the proximal side, a second indistinct tooth and an arched keel.

27. *Lewinskya shawii* (Wilson) F.Lara, Garilleti & Goffinet

Contributors: F. Lara, N. Lönnell and T. Hallingbäck

Sweden: Skåne prov., Hörby, Råby, Råbyhill Vandrarhem garden area, 55°50'20.5"N, 13°40'51.7"E, 112 m a.s.l., on trunk of *Acer platanoides* L., 22 July 2017, leg. F. Lara, N. Lönnell & T. Hallingbäck (Lara 1707/43) (MAUAM 5119).

Lewinskya shawii (\equiv *Orthotrichum shawii* Wilson) has a wide disjunct distribution that includes both the Western Palearctic and the Western Nearctic (Lara et al., 2016). In North America, it has been reported only from California (Garilleti et al., 2006), where its actual distribution is still unknown (Vitt, 2014). In Europe, it is reported from several continental and island territories: United Kingdom, mainland Spain, mainland France and Corsica, the Italian Peninsula and Sicily, Poland and Greece (Mazimpaka et al., 2000), as well as mainland Portugal (Blockeel et al., 2005), Balearic islands (Lara & Garilleti, 2014), the Netherlands (van der Pluijm, 2004) and Belgium (Sotiaux et al., 2007). It has also been reported from Hungary (Erzberger & Papp, 2004) and Albania (Kárpáti & Vajda, 1961; Colacino &

Sabovljević, 2006), although no recent revisions of the voucher specimens have been made. Hodgetts (2015) included Germany among the territories from where this moss is reported, although the locality involved is presently in Poland (see Garilleti et al., 2006). *Lewinskya shawii* also reaches northern Africa, where it has been reported from northernmost Morocco (Draper et al., 2003, 2006). Finally, this moss is also known from SW Asia as it has been reported from at least two localities in southern Anatolia in Turkey (Ellis et al., 2010a; Kırmacı et al., 2013).

Lewinskya shawii mainly grows as an epiphyte on diverse broadleaf trees, frequently on large tree trunks. It seems to prefer montane-Mediterranean or sub-Mediterranean environments (Garilleti & Albertos, 2012), usually being scarce or very scarce, except in some meridional beech forest where it can be moderately abundant (Mazimpaka et al., 2000). Interestingly, *L. shawii* was first described (Schimper, 1864) from quite northerly (55°16'N) collections in Ayrshire, SW Scotland. The material from this locality, collected between June 1860 and July 1873, is abundant, although all the cushions apparently came from a single tree (Mazimpaka et al., 2000). Since then it has not been found, being considered as a regionally extinct species in the United Kingdom (Bosanquet, 2009; Hodgetts, 2015). Bosanquet (2012) suggested that the original colony could have originated from a vagrant spore or even have occurred on an imported non-native tree of *Fraxinus ornus* L. In continental Europe, the two northernmost localities for *L. shawii* are in the Netherlands, next to Drachten (approx. 53°06'N, after van der Pluijm, 2014), and in Poland, in the vicinity of Barwice (approx. 53°44'N, after Garilleti et al., 2006; see note at end of column for additional detail on this locality), both of them situated 900 km north of the nearest locality where *L. shawii* grows within its main submediterranean area of distribution.

The southern Swedish locality here reported, although at a similar latitude to that of the original Scottish one, is the northernmost locality ever found for *L. shawii*. A single, large cushion was found, similar to those described for other northern populations of this species (van der Pluijm, 2004). It grew on a planted Norway maple, within a xerophytic epiphytic community, with *L. affinis* (Schrad. ex Brid.) F.Lara, Garilleti & Goffinet, *L. rupestris* (Schleich. ex Schwägr.) F.Lara, Garilleti & Goffinet, *L. speciosa* (Nees) F.Lara, Garilleti & Goffinet, *Pulvigerella lyellii* (Hook. & Taylor) Plášek, Sawicki & Ochrya, *Orthotrichum pumilum* Sw. and *O. diaphanum* Brid.

28. *Lewinskya striata* (Hedw.) F.Lara, Garilleti & Goffinet

Contributors: F. Lara, I. Draper and R. Garilleti

Portugal, Madeira: Montado do Pereiro, 32°42'04"N, 16°53'09"W, 1180 m, on trunks of *Castanea sativa* Mill.

in a chestnut grove with other alien tree species, 7 December 2016, *leg.* F. Lara 1612/05 (MAUAM 5117). *Ibidem*, 32°42'02"N, 16°53'06"W, 1185 m, on trunks of *Castanea sativa*, 7 December 2016, *leg.* F. Lara 1612/06, (MAUAM 5110). *Ibidem*, 32°42'05"N, 16°53'00"W, 1215 m, on trunks and main branches of *Quercus* L. sp. in a recreational area, 7 December 2016, *leg.* F. Lara 1612/08, (MAUAM 5109).

Lewinskya striata (\equiv *Orthotrichum striatum* Hedw.) has a Holarctic disjunct distribution including part of Asia (Ignatov *et al.*, 2006) and western North America (Vitt, 2014), being widespread in Europe and the Mediterranean area (Lara & Garilleti, 2014; Lara *et al.*, 2016). In Macaronesia, this species has only been previously reported from Gran Canaria Island in the archipelago of the Canary Islands (Arechavaleta *et al.*, 2010).

On the island of Madeira, *L. striata* has been found in an area where the natural lauroid forests have been largely replaced with allochthonous deciduous broad-leaf trees. Chestnut groves predominate, in some places including oaks and beeches. There, *L. striata* seems to be a rare moss, since it has been found in very small amounts, colonising scattered trees. This moss grows with *L. acuminata* (H.Philib.) F.Lara, Garilleti & Goffinet, a species with a similar gametophyte, which is considerably more frequent and abundant in that area although formerly it had been found only once on Madeira (Sim-Sim *et al.*, 2008).

29. *Lophocolea minor* Nees.

Contributors: A. Srivastava and G. Asthana

India: Western Ghats, Maharashtra, Mahabaleshwar, forest area near Lingmala fall, 17°55'N, 73°41'E, terrestrial, growing in association with *Cyathodium* Kunze *ex* Lehm. sp., *Cephalozella* (Spruce) Schiffn. sp., *Jungermannia* L. sp., 12 October 2001, *leg.* S. C. Srivastava and party *s.n.* (LWU 13926/01, LWU 13937/01, LWU 13941/01); ca 1250 m, 17°55'N, 73°41'E, 5 October 2014, *leg.* Abha Srivastava *s.n.* (LWU 22915/14, LWU 22916/14).

Lophocolea minor is widely distributed in Europe, Asia and America (Schuster, 1980; Srivastava & Srivastava, 2002; Singh & Singh, 2008). In India, the species has been reported from Central India, Madhya Pradesh: Pachmarhi (Jambu Dweep, Vanshi Vihaar); Western Himalaya Jammu and Kashmir: Yusmarg, Himachal Pradesh: Lahul, Great Himalayan National park, Uttarakhand: Berinag, Bhowali, Ghangaria, Hemkund, Kausani, Munsyari, Mussoorie, Nainital, Valley of flowers (Srivastava & Srivastava, 2002; Singh & Singh, 2008). During recent studies on the liverworts of Mahabaleshwar and adjoining areas in Maharashtra, *L. minor* was discovered in the forest area near Lingmala Falls, an extension is known distribution from Central India

and Western Himalaya to the Western Ghats in southern India. The plants were dioicous, very small, with distant, ovate, quadrate to rectangular bilobed leaves. Gemmae were present in abundance, forming clusters on the leaf apices, margins and apices of underleaves, male and female bracts, bracteoles and perianth mouth.

30. *Niphotrichum canescens* (Hedw.) Bednarek-Ochyra & Ochyra

Contributors: H. Bednarek-Ochyra, V. Plášek and M. Sulayman

China: Xinjiang Uyghur Autonomous Region: (1) Burquin County, Altai Mountains, Kanas Nature Reserve, on the way from the village of Kanas to Bolbaday, in coniferous forest with *Picea obovata* Ledeb., *Pinus sibirica* Du Tour, *Abies sibirica* Ledeb. and *Larix sibirica* Ledeb. and grassland with outcrops, ca 2200 m a.s.l., 48°49'N, 87°02'E, on rock, 22 August 2006, *leg.* M. Sulayman in hb. K. Sonoyama 2150 & 2152 (KRAM, XJU); (2) Xihu County, Tian Shan mountains, Ha shi li gen, big bay on the highway between Kucha county and Maytagh (Dushanzi) district, 3360 m a.s.l., 43°44'451"N, 84°24'844"E, on soil and rocks, 23 July 2013, *leg.* M. Sulayman 20473, 20489 & 20517 (KRAM, XJU); (3) same locality, 3440 m a.s.l., 43°43'618"N, 84°25'265"E, on rocks, 23 July 2013, *leg.* M. Sulayman 20517 & 20546 (KRAM, XJU).

The actual distribution of *Niphotrichum canescens* in China is still debatable since many specimens so named correctly belonged to *N. japonicum* (Dozy & Molk.) Bednarek-Ochyra & Ochyra, as has already been stressed by the authors of the broadly conceived genus *Racomitrium* Brid. in the 'Moss Flora of China' (Cao *et al.*, 2003). They reported this species from several provinces in the north, central and south-east of China, but a revision of the voucher specimens cited by Cao *et al.* (2003) from the provinces of Anhui, Henan, Hebei and Jiangsu, as well as from Taiwan, showed that they were misdetermined and actually represented *N. japonicum* and *N. barbulooides* (Cardot) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra, unpublished data). Most probably the records of this species from the provinces of Jilin and Heilongjiang, as well as the Inner Mongolia Autonomous Region may represent *N. canescens* but, unfortunately, the relevant voucher collections have not been located. Hitherto, authentic specimens of *N. canescens* were discovered in the Xizang Autonomous Region and actually belong to *N. canescens* subsp. *latifolium* (C.E.O.Jensen) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2010b). On the other hand, specimens that represent the type subspecies of *N. canescens* have recently been collected in the Tian Shan and Altai mountains in the Xinjiang Uyghur Autonomous Region. These localities are situated in

Central Asia and are the southernmost extensions of the continuous range of the species in the huge area that covers eastern Kazakhstan and Central Siberia in Russia (Ignatova, 2017), as well as northern Mongolia (Tsegmed, 2010).

Niphotrichum Bednarek-Ochyra & Ochyra needs taxonomic revision of all available specimens in China in order to establish the number of species and their distribution in this country. On the basis of a partial revision of the Chinese material, it is evident that *N. japonicum* and *N. barbulooides* are the most frequent and abundant species of the genus, whilst *N. canescens* is rare and localised. Many specimens named *N. ericoides* (Brid.) Bednarek-Ochyra & Ochyra which have been revised by the first author actually referred to *N. barbulooides*, so the occurrence of *N. ericoides* in China requires confirmation.

31. *Niphotrichum elongatum* (Frisvoll) Bednarek-Ochyra & Ochyra

Contributor: H. Bednarek-Ochyra

Aleutian Islands: Western, Near Islands, Attu Island: (1) Loran C Base, 52°50'N, 173°04'E, on boards in grassy area, 5 August 2000, leg. W. B. Schofield 115403 with S. S. Talbot (KRAM, UBC as *Racomitrium ericoides* (Brid.) Brid.); (2) Casco Point, 52°49'N, 173°10'E, on gravel, open area, 7 August 2000, leg. W. B. Schofield 115572 with S. S. Talbot (KRAM, UBC as *Racomitrium ericoides*); (3) 37 Hill, near Mascarene Bay, 52°50'N, 173°09'E, common on slope, 22 September 2002, leg. W. B. Schofield 120504 with S. S. Talbot (KRAM, UBC as *Racomitrium ericoides*). Central, Andreanof Islands; Tanaga Island: (4) Tanaga Bay, 51°44'22.0"N, 178°02'28.0"W, blowout slope, 13 August 2005, leg. W. B. Schofield 124069 with S. S. Talbot and S. Looman Talbot (KRAM, UBC as *Racomitrium ericoides*); (5) Tanaga Island, 51°47'34.0"N, 177°55'43.0"W, blowout on slope, 19 August 2005, leg. W. B. Schofield 124264 with S. S. Talbot and S. Looman Talbot (KRAM, UBC as *Racomitrium ericoides*). Eastern, Fox Islands: (6) Amaknak Island, Dutch Harbor, base of slopes of Bunker Hill, 53°55'N, 166°36'W, disturbed area, 29 July 1995, leg. W. B. Schofield 104413 (KRAM, UBC); (7) Unalaska Island, mountain pass on road from Unalaska to Summer Bay, ca 53°40'N, 166°40'W, 31 July 1995, leg. W. B. Schofield 104580 (KRAM, UBC).

Niphotrichum elongatum is a temperate species having a bicentric distribution in continental North America. It is very rare in the eastern part of the continent where it is scattered in Ontario, Michigan and New York, but it is widely distributed in the Pacific part of North America, ranging from south-eastern Alaska to California and extending inland to Alberta, Montana and Wyoming. Additionally, the species is exceedingly rare in southernmost Greenland and it

was only occasionally found at lat. 70°N in East Greenland (Ochyra & Bednarek-Ochyra, 2007). Herein, its geographical range is markedly extended westwards to the Aleutian Islands where it is scattered throughout the whole archipelago. These localities bridge the localities of *N. elongatum* in Pacific North America and Pacific East Asia where the species is very rare and scattered in the Chukotka Peninsula, the Commander Islands and the Kuril Islands (Ignatova, 2017). This Beringian distribution pattern is exhibited by a number of bryophyte species (Schofield, 1984; Bednarek-Ochyra, 2004, 2006), including *N. muticum* (Kindb.) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra *et al.*, 2010). *Niphotrichum elongatum* is exceedingly rare in Asia where it is actually known only from Russia. The only record of this species from China (Liu *et al.*, 2011) correctly refers to *Dilutineuron corrugatum* (Bednarek-Ochyra) Bednarek-Ochyra, Sawicki, Ochyra, Szczecińska & Plášek (Ellis *et al.*, 2015c). These two genera, *Niphotrichum* Bednarek-Ochyra & Ochyra and *Dilutineuron* Bednarek-Ochyra, Sawicki, Ochyra, Szczecińska & Plášek, are very distinct segregates of the traditionally conceived genus *Racomitrium* Brid (Bednarek-Ochyra *et al.*, 2015; Sawicki *et al.*, 2015).

32. *Orthotrichum scanicum* Grönvall

Contributors: F. Lara, I. Draper and R. Garilleti

Portugal, Madeira: Montado do Pereiro, 32°42'02"N, 16°53'06"W, 1185 m a.s.l., on trunks of *Castanea sativa* Mill., 7 December 2016, leg. F. Lara 1612/06 (MAUAM 5114). *Ibidem*, 32°42'06"N, 16°53'04"W, 1210 m a.s.l., on trunks and main branches of *Castanea sativa*, 7 December 2016, leg. F. Lara 1612/07 (MAUAM 5106).

Orthotrichum scanicum is a widespread European moss that was considered a Vulnerable species until very recently (Bryophyte Specialist Group, 2012). Nowadays it is known from more than 25 European countries and some major Mediterranean islands, from southern Fennoscandia to the Balkans and from Great Britain and continental Portugal to the European Caucasus, including large parts of central Europe, although in several areas it is considered a Regionally Threatened species (Hodgetts, 2015). Recorded in many Mediterranean countries (Ros *et al.*, 2013), it reaches North Africa in northern Morocco (Draper *et al.*, 2006), from where this moss was first described as *O. lewinskyae* F.Lara, Garilleti & Mazimpaka (Garilleti *et al.*, 1997; Medina *et al.*, 2009). The distribution also extends to Asia, where it is known from three different areas: (a) Asian Caucasus and Turkish Anatolia in the south-west extreme of the continent (Lara *et al.*, 2010); (b) Tian Shan Mts. (Kazakhstan and Kyrgyzstan) in Central Asia (Medina *et al.*, 2009; Ellis *et al.*, 2015a) and (c) Russian Subarctic Siberia in north Central Asia

(Fedosov *et al.*, 2009). The populations from Central Asia, and those from Arctic European Russia, were ascribed to *O. holmenii* Lewinsky (Lewinsky-Haapasaari, 1996; Fedosov *et al.*, 2009) until Medina *et al.* (2009) synonymised it with *O. scanicum*. Finally, this species has been recently reported from a park in New York City (USA), this being the only record from North America (Ellis *et al.*, 2015b).

Until now, *Orthotrichum scanicum* was unknown from Macaronesia (Ros *et al.*, 2013; Hodgetts, 2015). It has been found growing on chestnut trees in the same chestnut grove reported above for *Lewinskya striata*, with which it was collected from the same tree. As in that species, *O. scanicum* seems to be a rare and scarce moss in Madeira.

The only other small *Orthotrichum* species on the island with which *O. scanicum* could be confused is *O. comosum* F.Lara, R.Medina & Garilleti, a moss first recorded from the same area as *O. paivanum* Schimp. *nom. nud.* (Medina *et al.*, 2013). Both *O. scanicum* and *O. comosum* have been collected from the same trees, although the latter is more frequent and abundant in the area.

33. *Pellia neesiana* (Gottsche) Limpr.

Contributor: P. Erzberger

Hungary: Vas County (1) (9062.4, Central European Mapping Scheme), region of Vendvidék, Vasi-hegyhát, north of the settlement Felsőszölnök, Alsó-Jánoshegy, in a stream valley less than 1 km from the Austrian border). Associated with *Atrichum undulatum* (Hedw.) P.Beauv., *Fissidens bryoides* Hedw., *Oxyrrhynchium hians* (Hedw.) Loeske, 46°54'04.9"N, 16°09'45.7"E, ca 320 m a.s.l., 7 August 2017 and 8 August 2017, *leg. et det.* Peter Erzberger (B-Erzberger 23633, 23644, dupl. BP; (2) [9162.2] near the first site, in the same valley, ca 310 m a.s.l., 46°53'59.3"N, 16°09'49.9"E, 8 August 2017, *leg. et det.* Peter Erzberger (B-Erzberger 23654, 23655).

Pellia neesiana is close to *P. epiphylla* (L.) Corda with respect to thallus anatomy, i.e. the presence of thickened bands, and the distribution of slime papillae at the emarginate thallus apex: these are found on both ventral and dorsal surfaces of the costa, contrary to *P. endiviifolia* (Dicks.) Dumort., which only has them on the ventral side and on a longer stalk consisting of 1–5 cells (the stalk is 1-celled in *P. neesiana* and *P. epiphylla*). The differences between *P. neesiana* and *P. epiphylla* include the shape of the involucre surrounding the young sporophyte, tubular in *P. neesiana* and flap-like in *P. epiphylla*, and the sexual condition: *P. neesiana* is dioicous, whereas *P. epiphylla* is monoicous and usually has antheridial cavities behind the involucre. The Hungarian plants were purely female, with a (mostly) tubular involucre. According to Paton (1999), tubular involucre sometimes are distally incomplete, but such aberrations are usually

accompanied by typical involucre, as in our plants. *Pellia epiphylla* also grows near the locations detailed above and clearly differs in the listed characters.

The collection site in the extreme west of Hungary is in a region characterised by siliceous pebble alluvium that have formed plateaus into which the water courses have carved valleys. This part of the country receives more precipitation than average and has a cooler climate (Borhidi, 1961). The stream near which our plants were found is only temporary and generally falls dry in summer. In the vascular vegetation, *Alnus glutinosa* (L.) Gaertn. is dominant, apart from *Carpinus betulus* L. *Pellia neesiana* grows on nearly horizontal surfaces somewhat elevated above the water level, which have a sparse vegetation of mainly *Persicaria hydropiper* (L.) Spach. *Pellia epiphylla* is also found in these places but in addition grows on the slopes near the water.

Apart from Europe, where *P. neesiana* is found mostly in the northern and western parts and occurs more scarcely in the Mediterranean region, it has been recorded from the Faroes, Iceland, Greenland, eastern North America and Asia (Paton, 1999; Hodgetts, 2015). *Pellia neesiana* is found in all the countries surrounding Hungary (Hodgetts, 2015), therefore its occurrence here was not totally unexpected. However, it can easily be overlooked, and can only be safely told apart from *P. epiphylla* when fertile, which means it can be recorded only during a short favourable season.

In Hungary with its mostly calcareous or base-rich siliceous bedrock, *P. endiviifolia* is widespread. *P. epiphylla* had until recently been considered Data Deficient in Hungary and was only known from a single site, collected in 1924 (Erzberger & Papp, 2004, Papp *et al.*, 2010). It is now well known not only from the western part of the country (Vendvidék, Örség: Erzberger *et al.*, 2015; Kőszeg Mts and Alsó-Kemeneshát: unpublished observations) but also from other regions, e.g. the Zemplén Mts. in the Northern Mountain Range (unpublished observations). *Pellia neesiana* was hitherto unknown in Hungary (Papp *et al.*, 2010).

34. *Plagiochila defolians* Grolle & M.L.So

Contributors: K. K. Rawat, D. Gupta, V. Sahu and A. K. Asthana

India: Uttarakhand, Uttarkashi, Govind Wildlife Sanctuary, Taluka to Osla, GPS: 31°05'56.36"N, 78°17'35.94"E; ca 2360 m, grows on rocks, *leg.* K. K. Rawat (LWG 264851F).

This species was described from the Yunnan province of China by Grolle & So (1998) and subsequently was also found in Xizang province (So, 2001). In India, the species was discovered by Rawat & Srivastava (2007) from West Bengal. Later Das & Sharma (2016) reported it from Assam. This present

finding occurred on the way from Taluka to Osla at Govind Wildlife Sanctuary Uttarkashi, Uttarakhand, and is a new record for the bryo-flora of the western Himalayan region of India. However, the species seems rare in the area as it was found only at one site during the exploration.

The plants were sterile, filiform, up to 23 mm long and pale-brown (dry herbarium sample); paraphyllia were absent and the leaves distant, caducous, oblong-ovate, $0.70\text{--}1.26 \times 0.42\text{--}0.70$ mm; the dorsal leaf base was long decurrent, and the ventral leaf base shortly decurrent; 4–7 teeth were present at the apex of the ventral margin; leaf cells were thin walled with small trigones.

35. *Plagiothecium orthocarpum* Mitt.

Contributors: H. Bednarek-Ochyra and M. Lebouvier

Îles Crozet, Île de la Possession: (1) Eastern coast, Pointe Lieutard, rock outcrops 300 m south of Alfred Faure Station, $46^{\circ}26.132'S$, $51^{\circ}51.513'E$, 100 m a.s.l., forming small patches under overhanging volcanic rock in a shaded and dry situation; 16 November 2012, *leg.* R. Ochyra No. 2712/12 (with M. Lebouvier) (KRAM); (2) same area, rock outcrops 100 m north of Alfred Faure base by road to Cirque du Navire, $46^{\circ}25.859'S$, $51^{\circ}51.551'E$, 90 m a.s.l., under overhang of volcanic rock on cliff, in shaded and damp situation in association with *Plagiochila heterodonta* (Hook.f. & Taylor) Gottsche, Lindenb. & Nees, 22 November 2012, *leg.* R. Ochyra No. 3123/12 (with M. Lebouvier) (KRAM).

The genus *Plagiothecium* Schimp. is poorly represented in the austral polar regions in terms of frequency, cover and species diversity. Hitherto, only two species, *P. ovalifolium* Cardot and *P. orthocarpum* Mitt., have been recorded from the Antarctic (Bednarek-Ochyra *et al.*, 1999; Ochyra *et al.*, 2008b) and the Subantarctic (Bednarek-Ochyra *et al.*, 1999; Ochyra *et al.*, 2002; Ochyra & Hertel, 1990). The latter is an amphiatlantic south cool-temperate species, which extends at high elevations along the Andean chain from Tierra del Fuego into the Neotropics, reaching southern Mexico and the West Indies in the north (Buck & Ireland, 1989 as *P. conostegium* Herzog). In the Subantarctic, *P. orthocarpum* occurs infrequently in South Georgia and Îles Kerguelen (Bednarek-Ochyra *et al.*, 1999; Ochyra *et al.*, 2002 both as *P. georgicoantarcticum* (Müll.Hal.) Kindb.), and in the present account it is recorded from Îles de la Possession in the Îles Crozet archipelago. Although palaeobotanical evidence is lacking for this island (Van der Putten *et al.*, 2010), it is very likely that this species is a postglacial immigrant which could have reached this archipelago after the Last Glacial Maximum via long distance aerial dispersal, as is the case with other islands in

the vast Southern Ocean (Van der Putten *et al.*, 2004, 2009; Ochyra *et al.*, 2010; Váňa *et al.*, 2010b, 2014, 2015). Additionally, *P. orthocarpum* has also been recorded from Schirmacher Oasis in the Dronning Maud Land in Continental Antarctica where it occurs at considerable depths in lakes (Li *et al.*, 2009), and it probably survived the last glacial period in this refugium (Singh *et al.*, 2012). *Plagiothecium orthocarpum* is a valuable addition to the moss flora of Îles Crozet, which is still the least studied of all subantarctic archipelagoes. Nevertheless, intensive field studies carried out in recent decades continuously yield many additions to the moss flora of Îles Crozet (e.g. Blockeel *et al.*, 2006; Ellis *et al.*, 2013c, 2014b; Ochyra *et al.*, 2015b) which currently consists of about 75 species.

36. *Pohlia flexuosa* Hook.

Contributors: V. Hugonnot and J. Lagrandie

France: Haute-Garonne, Bagnères-de-Luchon, Hospice de France, Sajust, 1820 m a.s.l., $42^{\circ}42'49''N$, $00^{\circ}38'10''E$, 13 June 2017 (Herb. V. Hugonnot); Manche, Sourdeval, La Bruyère, 195 m a.s.l., $0^{\circ}55'53''N$, $48^{\circ}43'34''W$, 27 May 2017 (vid. R. Skrzypczak & V. Hugonnot, Herb. J. Lagrandie & V. Hugonnot).

Pohlia flexuosa is newly reported from two distinct locations in France. First, in the Central Pyrenees, where the species is not uncommon, being recorded in several places nearby. It occurred on moist mineral soils, on steep slopes most often corresponding to erosion and avalanche corridors, and was associated with *Dichodontium pellucidum* (Hedw.) Schimp., *Bryoerythrophyllum ferruginascens* (Stirt.) Giacom., *Pohlia wahlenbergii* (F. Weber & D. Mohr) A.L. Andrews, etc. The second specimen, from Normandy, inhabited a bare acidic bank among grazed grasslands and settlements. Associated species were *Dicranella heteromalla* (Hedw.) Schimp., *Pogonatum aloides* (Hedw.) P. Beauv. and *Bryum* Hedw. sp. Perhaps significantly the population of *Pohlia flexuosa* was located at the outlet of a rain pipe coming from a farm building.

Populations in the localities cited above were sterile, relying on vegetative reproduction by means of characteristic caducous axillary bulbils. Interestingly, we noticed clear-cut morphological differences between the bulbils from the plants originating in upland Haute-Garonne and those of lowland Manche. Pyrenean plants possess only oblong stipitate propagula with a knobby appearance and small protuberances at the apex, which fit very well those described for *P. myyldermansii* R. Wilczek & Demaret var. *pseudomyyldermansii* (Arts *et al.*, 1987). The Manche population is clearly distinct, being made of a mix of three types of individuals: those with oblong propagula, those with filiform propagula and those with

oblong propagula in the proximal part of stem and fili-form ones in the distal part. In this case, the oblong propagula are not of the same type as those observed in the Pyrenees: they are much less angular in outline and do not show any apical protuberant cell. The plants of Manche match the type variety. These two varieties are no longer recognised on account of the occurrence of intermediates, which were mentioned by Townsend (1995). Much literature has been devoted to the question (Arts *et al.*, 1987; Townsend, 1995, 2007; Shaw & Toren, 2009; Liu *et al.*, 2015).

In our opinion, previously underlined by Wigginton (in Blockeel *et al.*, 2014), the species has the appearance of a native to Europe. It is able to spread in anthropogenic secondary habitats such as eroded banks or quarries.

The specimens from the Pyrenees and Manche were not shiny and both had a long and wide (often 4 cells wide) foliar decurrency on the stem. The plants from Pyrenees also have longer leaves than those from Manche, and this supports their distinctiveness.

In France, *Pohlia flexuosa* was previously recorded from the Vosges (Frahm & Bick, 2013), where it occurred in a quarry. It is also known from northern Spain, Italy, the British Isles, Ireland, Scandinavia and eastward to Austria and Romania. It is also known in Asia.

37. *Pohlia melanodon* (Brid.) A.J.Shaw

Contributor: H. Kürschner

Jordan: Province Irbid, Yarmouk Nature Reserve north-west of Irbid, vicinity of Umm Qays/Gadara, Wadi Kursi, Khirbet al-Kursi, 32°40'23"N, 35°42'12"E, 130 m a.s.l., on wet soil near water runnel in *Quercus ithaburensis* Decne. *ex* Decne. woodland, 22 April 2017, *leg.* H. Kürschner (17-13) (B; Private herb. Kürschner).

This is a small annual to short-lived plant, usually growing in lax patches on wet clay soils or sandy soils on steep banks of ditches, streams and rivers. Records from the Near and Middle East include Israel (Upper Galilee; Bilewsky & Nachmony, 1955), Iraq, Lebanon and United Arab Emirates (Kürschner & Frey, 2011). According to Blockeel *et al.* (2014), it is commonly present in a typical clay-bank community that include, as at the Jordan site, *Didymodon tophaceus* (Brid.) Lisa, *Lunularia cruciata* (L.) Dumort. *ex* Lindb. and *Fissidens* Hedw. species. Further accompanying species in Jordan are *Ditrichum pusillum* (Hedw.) Hampe, *Fissidens bambergeri* Schimp. (*F. viridulus* (Sw.) Wahlenb. complex), *Funaria hygrometrica* Hedw. and *Rhynchostegiella tenella* (Dicks.) Limpr. As *P. melanodon* is a higher ranked character species of the *Funarietalia hygrometricae* v. Hübschm. 1957 order, it remains unclear at present if this species assemblage forms an undescribed phytosociological community of its own.

38. *Pohlia vexans* (Limpr.) H.Lindb.

Contributor: T. A. Hedderson

Canada: Newfoundland and Labrador, Newfoundland: Great Northern Peninsula, 10 km S of Watson's Brook on old Northern Peninsula road, 51°29'N, 56°07'W, 20 m a.s.l., on disturbed clay along road in limestone barrens, 31 July 1987, *leg.* T. A. Hedderson 5463 (BOL, DUKE, NFLD), *conf.* A. J. Shaw.

Predominantly a western species in North America, ranging from Alaska and NW Canada south to Washington and Montana and extending eastward only as far as Manitoba (Shaw, 2014). Recently reported from north-east Greenland (Hassel *et al.*, 2014); the Newfoundland populations are considerably isolated from these.

39. *Pterobryon julaceum* Broth.

Contributor: T. A. Hedderson

La Réunion: Commune St. Pierre, Piton Mont Vert, 21.3270°S, 55.5413°E, 590 m a.s.l., on rock in part shade in remnant transitional dry forest on steep S-facing slope, 26 May 2015, *leg.* T. A. Hedderson 18875 (BOL, NY, REU), *conf.* W. R. Buck.

Previously known only from the type locality in the Usambara region of Tanzania and one additional collection from the same area (Argent, 1973). The disjunction is particularly interesting as all of the known populations are sterile, so there is no obvious means of easy dispersal between the two areas. However, the floras of intervening areas (e.g. the Comores, Madagascar) remain poorly documented and the species may occur in other localities. The dry forests of La Réunion are among the most threatened vegetation types on the island and harbour numerous endemic plant species (Strasberg *et al.*, 2005). These remain poorly known from a bryological perspective and the present record suggests that they should receive higher priority for exploration.

40. *Rhacopilopsis trinitensis* (Müll.Hal.) E.Britton & Dixon

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Veracruz: Ejido Miguel Hidalgo, 18°21'N, 94°57'W, *leg.* Delgadillo 7112b (MEXU).

This species was described and illustrated by Crum (1994b) as an unconfirmed member of the Mexican flora. The long-prostrate, branched stems, with dimorphic ecostate leaves in four rows are characteristic. The lateral stem leaves bear strongly dentate margins. Bourell (1992) cited it from Chiapas, listing a specimen collected by Dennis Breedlove. Watling & O'Shea (2000) mentioned Mexico in the distribution of this taxon, but made no reference to material examined. *Rhacopilopsis trinitensis* is known from Mexico, Guatemala, Costa Rica, Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil, Lesser Antilles, Africa and Madagascar.

41. *Rosulabryum moravicum* (Podp.) Ochyra & Stebel

Contributor: H. Kürschner

Jordan: Province Irbid, Yarmouk Nature Reserve north-west of Irbid, vicinity of Umm Qays/Gadara, 32°39'53.47"N, 35°41'13.76"E, 240 m a.s.l., on thin soil over rock near the ancient stone quarry in *Quercus ithaburensis* Decne. ex Decne. woodland, 26 April 2017, leg. H. Kürschner (17-51) (B; Private herb. Kürschner).

With the basionym, *Bryum moravicum* Podp., this species was also known as *Ptychostomum moravicum* (Podp.) R.M.Ros & V.Mazimpaka. Species of the *Rosulabryum* (*Bryum*) *capillare* complex are widely distributed in the Near and Middle East. Those taxa bearing filamentous axillary gemmae are known as *R. moravicum*, a characteristic species which is frequent on tree trunks, branches and rotten wood. It may occur, however although more rarely, on thin soils over rocks in woodland (for the confusion with *Bryum flaccidum* auct., *B. laevifilum* Syed and *B. subelegans* Kindb., see Holyoak, 2004). At present, the species is known in the Near and Middle East only from Iraq and Saudi Arabia (Kürschner & Frey, 2011). Accompanying species in the Yarmouk Nature Reserve are *Clevea spathysii* (Lindenb.) Müll.Frib., *Gymnostomum viridulum* Brid., *Scorpiurium circinatum* (Bruch) M.Fleisch. & Loeske and *Timmiella barbuloidea* (Brid.) Mönk.

42. *Seligeria acutifolia* Lindb.

Contributor: M. Philippe

Switzerland: Valais, Saint-Gingolph, cliff known as Tombeau des Allemands, 46°21'45.59"N, 6°47'55.76"E, 1105 m. a.s.l., and gorge known as Combégée, 46°22'11.97"N, 6°48'13.37"E, 1025 m. a.s.l., only a few stems, with sporophyte, within a thin moss-carpet dominated by *S. patula* (Lindb.) Lindb. with some *S. pusilla* (Hedw.) Bruch & Schimp. (see above for setting details), 2 July 2017, leg. M. Philippe s.n. (LY00019112).

This small rupicolous *Seligeria* Bruch & Schimp. is not Red Listed in Switzerland, despite being reported from only one locality in the Swiss Jura Mountains, Canton de Neuchatel, where it was observed by Culmann in 1923 (NISM, 2004–2017). Original material was confirmed by Lydia Gos in 1991 but the species was not recently observed (NISM, 2004–2017).

43. *Seligeria carniolica* (Breidl. & Beck) Nyholm

Contributor: M. Philippe

France: Auvergne-Rhône-Alpes, Ardèche department, Saint-Priest, 44°43'13.23"N, 4°30'15.28"E, 593 m. a.s.l., several small groups, with no sporophytes, on a shaded marly cliff (Oxfordian stage, Upper Jurassic) with dripping water, on the right bank of the Ouvèze river, in almost pure stands, associated

with only a few sparse stems of *Eucladium verticillatum* (With.) Bruch & Schimp., *Jungermannia atrovirens* Dumort., *Pellia endiviifolia* (Dicks.) Dumort. and *Scytonema* sp. 19 February 2017, leg. M. Philippe s.n. (LY00019109).

This relatively large amphibious *Seligeria* Bruch & Schimp. is listed as Endangered in Europe (Porley, 2013). Several populations documented before 1960 have not been seen recently (Germany, Serbia, Slovenia, Switzerland). Recent research reported several populations in the French Jura Mountains (Philippe & André, 2014) and Northern French Alps (Philippe & Ochyra, 2017).

The species is often considered as a suboceanic boreal-montane element (Porley, 2013), a view challenged by the several numerous and abundantly reproducing populations in eastern France (Philippe & Ochyra, 2017). The Ardèche population is the first reported for the Massif Central. At the rim of the Mediterranean biogeographical domain, it suggests that the species might be encountered in wet Mediterranean settings. Owing to its inconspicuous appearance, it is probably somewhat overlooked, especially when sterile and with a *Scytonema*-like appearance.

44. *Seligeria patula* (Lindb.) Lindb.

Contributor: M. Philippe

Switzerland: Valais, Saint-Gingolph, cliff known as Tombeau des Allemands, 46°21'45.59"N, 6°47'55.76"E, 1105 m. a.s.l., and gorge known as Combégée, 46°22'11.97"N, 6°48'13.37"E, 1025 m. a.s.l. At the first locality, it is found in the most shaded parts of a steep limestone cliff (undifferentiated Jurassic) with dripping water, as several groups, with numerous mature sporophytes; the only other associated species are a few stems of *Jungermannia atrovirens* Dumort., *Seligeria acutifolia* Lindb. and *S. pusilla* (Hedw.) Bruch & Schimp. At the second site, it is found in a narrow gully cut through Triassic quartzite, in places dripping with carbonated water, associated with the same species, 2 July 2017, leg. M. Philippe s.n. (LY0019110, LY0019111 and Z-000128533).

This rupicolous trifarious *Seligeria* Bruch & Schimp. is Red Listed as Vulnerable in Switzerland, where it is reported from only two other localities: one in the Alps, canton of Schwyz, by Lübenau-Nestle in 1993; and another in the Swiss Jura Mountains, canton de Neuchatel, by Bergamini in 2009 (NISM, 2004–2017). It was observed this summer 2017 by Heike Hoffmann (pers. comm.) near La Dôle (Switzerland, Vaud). For a long time, this taxon was considered as critical (Hagen, 1906), until Gos & Ochyra (1994) clearly circumscribed it. However, some works have perpetuated the confusion (Mogensen & Goldberg, 2003); the European distribution of *S. patula* is

probably unknown and underestimated (Eckstein *et al.*, 2015).

45. *Sematophyllum adnatum* (Michx.) E. Britton

Contributors: P. Erzberger, Cs. Németh, K. Baráth and A. Mesterházy

Hungary: Vas County (8967.1, Central European Mapping Scheme), region of Alsó-Kemeneshát, south of the settlement Kám, Jeli-Arborétum Botanical Garden, on strongly decomposed coniferous wood under planted exotic conifers, e.g. *Abies concolor* (Gordon & Glend.) Lindl. ex Hildebr., ca 230 m a.s.l., 47°04'31.2"N, 16°53'11.6"E, 14 July 2017, leg. Peter Erzberger, Csaba Németh, Kornél Baráth and Attila Mesteházy (B-Erzberger 23568, dupl. BP, herb. K. Baráth, herb. Cs. Németh HCsN 8708, Z), det. P. Erzberger, conf. N. Schnyder, Zürich, Switzerland. Associated bryophyte: *Lophocolea heterophylla* (Schrad.) Dumort.

This small pleurocarp with nerveless, acuminate leaves that are turned upwards, away from the substrate, is reminiscent of *Pylaisia polyantha* (Hedw.) Schimp., but possessing leaves with conspicuous groups of large, hyaline alar cells places it with the Sematophyllaceae. In the field, numerous sporophytes form a striking feature. The small erect capsule is borne on a seta less than 10 mm long, the capsule lid is longly rostrate, and after dehiscence the urn is slightly constricted below the orifice, which displays a whitish peristome.

The collection site was in a plantation of exotic trees growing on siliceous-pebbled alluvium, into which streams have cut valleys. The most important of these is Kópányás-patak, which flows from an area rich in bryophytes, such as *Sphagnum* L. spp., *Calypogeia fissa* (L.) Raddi, *Chiloscyphus polyanthos* (L.) Corda, *Fissidens adianthoides* Hedw., *Mnium hornum* Hedw., *Bryum pseudotriquetrum* (Hedw.) P.Gaertn., E.Mey. & Scherb., *Riccardia multifida* (L.) Gray and others.

Sematophyllum adnatum is widespread in North, Central and South America and tropical Africa (Brusa in Blockeel *et al.*, 2000; Schofield, 2014).

In Hill *et al.* (2006), *S. adnatum* is listed among the non-native mosses in Europe. The first European occurrence was found in Italy in a former nursery garden, and the plants were assumed to have been an accidental introduction on trees (Brusa in Blockeel *et al.*, 2000). Since its discovery, the moss has spread considerably in northern Italy (Brusa, 2001) and has recently been recorded in Switzerland (Schnyder, 2015). Our collection appears to be the third country in Europe to record this species. That it was found in an arboretum among exotic trees, also suggests that, as in Italy, it was an accidental introduction on trees. In Italy, *S. adnatum* was found to grow predominantly on the bark of *Quercus* species, less frequently on dead

wood, rarely on siliceous rocks (Brusa, 2001). The abundant production of sporophytes enables this moss to effectively colonise suitable habitats. These facts suggest that *S. adnatum* has the potential to spread further into adjacent regions and possibly become an invasive alien.

46. *Sematophyllum tequendamense* (Hampe) Mitt.

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Chiapas, Finca Liquidambar, 15°42'N, 92°45'W, leg. Delgadillo 4721 (MEXU).

These are golden green plants growing in dense mats. The stem leaves are lanceolate, gradually acuminate and concave, with entire or subcrenulate margins. They possess large and slightly inflated, coloured alar cells. Pseudoparaphyllia are foliose. Buck (1998) cited Mexico in the distribution of the species without supporting specimens, although the present collection was originally identified by him and fits his description. *Sematophyllum tequendamense* is known from Mexico, Colombia, Venezuela, Brazil, Cuba, Jamaica and the Lesser Antilles.

47. *Solmsiella biseriata* (Austin) Steere

Contributor: G. Pérez

Colombia: Departamento de Antioquia, Municipio de Buriticá, Corregimiento Angelina, Sector Tubería, 6°43'1.34"N, 75°52'59.93"W, 765 m a.s.l., Epífita sobre *Theobroma cacao* L. en bosque ripario, 17 March 2017, leg. Carmona D. 425 (HUA).

Solmsiella biseriata (Erpodiaceae) is a geographically widespread species from dry areas at low elevations, characterised by its liverwort-like appearance. It has complanate dimorphic leaves arranged in 4 rows, with dorsal leaves asymmetric and larger than the ventral symmetrical leaves. Although this species occurs in various continents (Pursell & Allen, 2007) and it has been collected in neighbouring countries in South America such as Venezuela, Brazil and Paraguay, it has not previously been reported from Colombia. The species was found growing epiphytically on a planted cacao tree, in a fragmented forest near running water. It has been pointed out that this species is frequently encountered in man-made habitats (Touw, 1992; Ma & Shevock, 2015), which is true for this collection, since it was collected in an area highly disturbed by human activities, such as mining, livestock farming and fishing. Possibly *Solmsiella biseriata* has not been found due to the limited sampling of bryophytes in these disturbed sites and should be looked for in such localities.

48. *Syrrophodon gaudichaudii* Mont.

Contributors: T. A. Hedderson and L. T. Ellis

Society Islands: Tahiti, trail from Belvedere to Aorai Peak, forest along trail just below Fare Mato, 17°34'59.4"S, 149°30'32.9"W, alt 1250 m, on soil banks in cloud forest, 12 October 2013, leg. T. A. Hedderson 18691 (BOL, BM), det. L. T. Ellis.

Although observed to be fairly common on Tahiti, at least at mid-elevation, the species was not recorded for the Society Islands in previous checklists and floras (e.g. Whittier, 1976). However, it may have been overlooked as the superficially similar *Syrrhopodon banksii* Müll.Hal., which is common and abundant in similar habitats on the island. *S. gaudichaudii* is a largely tropical species with some extension into temperate areas. It is not frequently recorded from the Pacific Islands, but its distribution extends eastward from here, across the Neotropics and continental Africa, to the islands of the western Indian Ocean (Ellis, 2005).

49. *Syrrhopodon prolifer* Schwägr. var. *prolifer*

Contributor: D. García-Avila

Mexico: Morelia, Michoacan, close to the Venadero, 19°35.016'N, 101°07.641'W, 2243 m a.s.l. In *Quercus-Pinus* forest, on the base of an oak tree trunk near the river, 25 March 2011, *leg. & det.* D. García-Avila 498 (EBUM).

The moss colony was scarce and did not have sporophytes, but possessed structures for vegetative propagation. This species has five known varieties in the Neotropics (Reese, 1993) and even though it has a wide distribution, this is the first collection in Michoacán state. In the New World, this species mainly occurs in the neotropical region of Central and South America, the West Indies and the Galapagos Islands. In Mexico, there are reports for Chiapas, Oaxaca, Hidalgo, Nayarit, Puebla, Veracruz (Reese, 1994) and recently for Queretaro (Herrera-Paniagua and Martínez, 2014). The family Calymperaceae has eight genera (Goffinet *et al.*, 2009) but only two species of this family have been reported for Michoacán: *Octoblepharum albidum* Hedw. (Delgadillo 1998, IBUNAM: MEXU: BR2178) and *Syrrhopodon ligulatus* Mont. (IBUNAM: MEXU: BR2179). The collections of *O. albidum* are from three different municipalities: Ario de Rosales, La Huacana and Queréndaro. Meanwhile *S. ligulatus* occurs only in Ario de Rosales.

50. *Thamniopsis guatemalensis* (E.B.Bartram) B.H.Allen

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Chiapas, Estación Chajul, 16°09'N, 90°56'W, *leg.* Cárdenas 5764. Veracruz, Santa Martha, 18°18'N, 94°53'W, *leg.* Delgadillo 7441 (MEXU).

This species has stems with a hyalodermis and 2–3 rows of thick-walled cells, but no sclerodermis or central strand. Lateral and dorsal leaves are somewhat crispate, oblong-ovate to oblong-lanceolate, or ovate-lanceolate with an acute to short-acuminate apex and serrate to dentate margins. There are slightly swollen bifid teeth in the upper two-thirds of the leaf margin next to somewhat elongated cells. The leaf cells are smooth, long-rhomboidal, and the costae

are divergent, unequal and distally dentate on the back. Ventral leaves are ovate-lanceolate, acuminate. *Thamniopsis guatemalensis* is known from Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama and Suriname.

51. *Trachyphyllum borgenii* (Renauld & Cardot) Broth.

Contributors: T. A. Hedderson and N. Wilding

La Réunion: Commune Le Tampon, Grand Bassin, along trail down to village, 21.1847°S, 55.5365°E, 800 m a.s.l., abundant on shaded rock slabs on steep, N-facing slope, 23 November 2014, *leg.* T. A. Hedderson 18746 (BOL, MO, NY, REU), *conf.* W. R. Buck.

Previously known only from a few collections in the interior mountains of Madagascar (Buck, 1979), *T. borgenii* joins a substantial list of species shared between Madagascar and the Mascarene archipelago, especially La Réunion. The species was fairly frequent along a large section of the steep, N-facing slope that makes up the southern boundary of Grand Bassin, and tended to be abundant where it occurred. The golden colour, lax habit, and the straight, relatively long, branches (rather than dark green, short and in-curved) make it easy to distinguish from *T. inflexum* (Harvey) Gepp., the more common species of the genus on La Réunion. Sporophytes have not previously been found for the species; the collection reported here was fertile but sporophytes were all in the spear stage of development.

52. *Trichostomum brachydontium* Bruch

Contributor: H. Kürschner

Jordan: Province Irbid, Umm Qays/Gadara, in the vicinity of the main spring north-west of the city, 32°38'53"N, 35°40'33.2"E, 170 m a.s.l., on thin soil in rock fissures, 23 April 2017, *leg.* H. Kürschner (17-32) (B; Private herb. Kürschner).

This nearly subcosmopolitan and highly variable species is widely distributed on dry soil and in rock crevices in the Near and Middle East (Israel, Lebanon, Oman, Saudi Arabia, Syria, United Arab Emirates, Yemen, incl. Socotra Island; Kürschner & Frey, 2011). It is indifferent to substrate and grows both on acid and base-rich rocks and rock ledges, on thin soil or in crevices in the Mediterranean region. Although *T. crispulum* Bruch (with cucullate leaf apex) is recorded several times from Jordan (Frey & Kürschner, 1983; El Oqlah *et al.*, 1988), *T. brachydontium* (leaf apex plane with excurrent stout mucro) was previously unknown from the country. Accompanying species at the Umm Qays site is *Gymnostomum viridulum* Brid.

53. *Vesicularia vesicularis* (Schwägr.) Broth. var. *vesicularis*

Contributors: C. Delgadillo Moya and P. Peña Retes

Mexico: Chiapas, Estación Tzendales, Montes Azules, 16°17'N, 90°53'W, *Cárdenas 5940*; Crucero San Javier, 16°47'N 91°06'W, *leg. D. Álvarez et al. 2532 (MEXU)*.

Crum (1994c) stated that this variety was to be expected in Mexico. The main distinction between this and *V. vesicularis* var. *rutilans* (Brid.) W.R.Buck involves the marginal cells of the lateral leaves, which in the type variety are not clearly differentiated, and the ventral leaves are relatively broad and short, with the upper leaf cells nearly isodiametric. This taxon is recorded from Mexico, Guatemala, Belize, El Salvador, Venezuela, Guyana, Suriname, French Guiana, Peru, Bolivia, Brazil, Cuba, Jamaica, Haiti, Puerto Rico, and the Lesser Antilles.

54. *Zygodon seriatus* Thér. & Naveau

Contributors: T. A. Hedderson and J. Wilbraham

Malawi: Mount Mulanje, on trail from Sombani Hut to Chinzama, ca 3 km before Chinzama, 15.90523°S, 35.67576°E, 2200 m a.s.l., on trunks of *Xerophyta* Juss. in open grassland, 9 June 2010, *leg. T. A. Hedderson 17447 (BOL, BM)*, *det. J. Wilbraham*.

A tropical east African endemic occurring from Ethiopia south to Tanzania and west to the eastern mountains of the Democratic Republic of Congo (O'Shea, 2006). The Malawi populations recorded here are the southernmost known for the species. Over most of its known range, the species is associated with afro-montane forest habitats, occurring on hosts like *Podocarpus* L'Hér. ex Pers. or *Erica* L.; its association on Mulanje with isolated *Xerophyta* Juss. trunks in open grassland is somewhat anomalous.

Note added in proof for contribution 27. *Lewinskya shawii*

The locality of 'Bärwalde' for the Polish record of *Lewinskya shawii* given by Garilleti *et al.* (2006: p. 511) as "Bellia bei Bärwalde [Barwice]" is erroneous. The actual 'Bärwalde' where Ruthe lived and collected was situated in the former Neumark Province. This town is presently called Mieszkowice in Polish and lies in Zachodniopomorskie Voivodeship in westernmost Poland (52°47'N, 14°29'E). A few km north of this town there is a village now named Bielin in Polish (Germ. Bellin) (52°49'34"N, 14°27'32"E), which name may have been mistakenly read as Bellia, as there is no record of a place bearing the latter name. (pers.comm. R. Ochyra).

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References

- Aleffi, M., Tacchi, R. & Cortini Pedrotti, C. 2008. Check-list of the hornworts, liverworts and mosses of Italy. *Bocconea*, 22: 1–255.
- Allen, B.H. 1994. Moss flora of Central America. Part 1. Sphagnaceae–Calymperaceae. *Monograph in Systematic Botany from the Missouri Botanical Garden*, 49: 1–242.
- Allen, B.H. 2002. Moss flora of Central America. Part 2. Encalyptaceae – Orthotrichaceae. *Monographs in Systematic Botany from the Missouri Botanical Garden*, 90: 1–699.
- Allen, B.H. & Crosby, M.R. 1986. Revision of the genus *Squamidium* (Musci: Meteoriaceae). *Journal of the Hattori Botanical Laboratory*, 61: 423–76.
- Arechavaleta, M., Rodríguez, S., Zurita, N. & García, A. coords. 2010. *Lista de especies silvestres de Canarias. Hongos, plantas y animales terrestres. 2009*. Santa Cruz de Tenerife: Gobierno de Canarias.
- Argent, G.C.G. 1973. A taxonomic study of African Pterobryaceae and Meteoriaceae: I. Pterobryaceae. *Journal of Bryology*, 7: 353–78.
- Arts, T., Nordhorn-Richter, G. & Smith, A.J.E. 1987. *Pohlia myldermansii* Wilcz. & Dem. var. *pseudomyldermansii* var. nov., a new name for *P. myldermansii* Wilcz. & Dem. sensu Lewis & Smith. *Journal of Bryology*, 14: 635–47.
- Asthana, A.K. & Sahu, V. 2012. Current status of genus *Lejeunea* in India. *Annals of Forestry*, 20(1): 67–73.
- Asthana, G. & Srivastava, S.C. 2003. Indian *Cololejeunea* – a taxonomic study. *Bryophytorum Bibliotheca*, 60: 1–155.
- Bednarek-Ochyra, H. 1995. Rodzaj *Racomitrium* (Musci, Grimmiaceae) w Polsce: taksonomia, ekologia i fitogeografia [The genus *Racomitrium* (Musci, Grimmiaceae) in Poland: taxonomy, ecology and phytogeography]. *Fragmenta Floristica et Geobotanica, Series Polonica*, 2: 3–307. (In Polish with extensive English summary).
- Bednarek-Ochyra, H. 2004. *Codriophorus corrugatus* (Bryopsida, Grimmiaceae), a new species from East Asia and Southern Alaska. *Bryologist*, 107(3): 377–84.
- Bednarek-Ochyra, H. 2006. *A taxonomic monograph of the moss genus Codriophorus P. Beauv. (Grimmiaceae)*. Kraków: W. Szafer Institute of Botany, Polish Academy of Sciences.
- Bednarek-Ochyra, H. & Ochyra, R. 2010. *Bucklandiella allanffjei* (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. 2013. 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., Lewis Smith, R.I. & Ochyra, T. 1999. The genus *Plagiothecium* (Plagiotheciaceae, Bryopsida) in Antarctica. *Bryobrothera*, 5: 55–64.
- Bednarek-Ochyra, H., Seppelt, R.D. & Ochyra, R. 2010. *Niphotrichum muticum* (Musci, Grimmiaceae), an addition to the moss flora of the Aleutian Islands. *Botany*, 88: 389–96.
- 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): 1214–28.
- Bednarek-Ochyra, H., Sawicki, J., Ochyra, R., Szczecińska, M. & Plášek, V. 2015. *Dilutineuron*, a new moss genus of the subfamily Racomitrioideae (Grimmiaceae, Bryophyta). *Acta Musei Silesiae, Scientiae Naturales*, 64(2): 1117.
- Bell, B.G. 1974. A synoptic flora of South Georgian mosses: V. *Willia* and *Racomitrium*. *British Antarctic Survey Bulletin*, 38: 73–101.
- Bilewsky, F. & Nachmony, S. 1955. A contribution to the bryophyte flora of Palestine. *Bulletin of the Research Council of Israel*, D 5: 47–58.
- Birkenmajer, K., Ochyra, R., Olsson, I.U. & Stuchlik, L. 1985. Mid-Holocene radiocarbon-dated peat at Admiralty Bay, King George Island (South Shetland Islands, West Antarctica). *Bulletin of the Polish Academy of Sciences, Earth Sciences*, 33 (1–2): 7–13.
- Bischler, H. 1962. The genus *Calypogeia* Raddi in Central and South America. II. Subgenus *Calypogeia*, subgroups 1,2,3. *Candollea*, 18: 53–94.
- Blockeel, T.L., Bergamini, A., Brusa, G., Ertz, D., Sérgio, C., Garcia, C., Hedenäs, L., Müller, F., Nieuwkoop, J.A.W. & Sabovljević, M.S. 2000. New national and regional bryophyte records, 3. *Journal of Bryology*, 22: 303–6.
- 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: 163–8.
- Blockeel, T.L., Chlebicki, A., Hájková, P., Hájek, M., Hradílek, Z., Kürschner, H., Ochyra, R., Parolý, G., Plášek, V., Quandt, D., Townsend, C.C. & Vanderpoorten, A. 2006. New national and regional bryophyte records, 12. *Journal of Bryology*, 28 (1): 68–70.
- Blockeel, T.L., Bosanquet, S.D.S., Hill, M.O. & Preston, C.D. eds. 2014. *Atlas of British & Irish bryophytes*. Vol. 2. Newbury: Pisces Publications.
- Borhidi, A. 1961. Klimadiagramme und klimazonale Karte Ungarns. *Annales Universitatis Scientiarum Budapestinensis, Sectio Biologica*, 4: 21–250.
- Bosanquet, S. 2009. *Orthotrichum* — Britain's Bristle-mosses. *British Wildlife*, 20: 187–94.
- Bosanquet, S. 2012. Vagrant epiphytic mosses in England and Wales. *Field Bryology*, 107: 3–17.
- Bourell, M. 1992. A checklist of the bryophytes of Chiapas, Mexico. *Tropical Bryology*, 6: 39–56.
- Brugués, M. & González-Mancebo, J.M. 2012. Lista Roja de los briófitos amenazados de España. In: R. Garilleti & B. Albertos, coord. *Atlas y Libro Rojo de los Briófitos amenazados*

- de España. Madrid: Organismo Autónomo Parques Nacionales. pp. 25–44.
- Brusa, G. 2001.** *Sematophyllum adnatum* (Michx.) Britt. in Italia: distribuzione ed ecologia di una bryophyta esotica [*Sematophyllum adnatum* (Michx.) Britt. in Italy: distribution and ecology of an alien Bryophyta]. *Archivio Geobotanico*, 7(1): 1–9.
- Bryan, V.S. 2007.** Ephemeraceae Schimper. In: Flora of North America Editorial Committee, ed. *Flora of North America north of Mexico*. Vol. 27, Bryophyta: Mosses Part 1. New York & Oxford: Oxford University Press, pp. 646–53.
- Bryophyte Specialist Group. 2012.** *Orthotrichum scanicum*. The IUCN Red List of Threatened Species 2012: e.T39181A2889717 [accessed 2 July 2017]. Available at <http://dx.doi.org/10.2305/IUCN.UK.2012-1.RLTS.T39181A2889717.en>.
- Buck, W.R. 1979.** A revision of the genus *Trachyphyllum* Gepp (Thuidiaceae). *Brittonia*, 31: 379–94.
- Buck, W.R. 1998.** Pleurocarpous mosses of the West Indies. *Memoirs of the New York Botanical Garden*, 82: 1–400.
- Buck, W.R. & Ireland, R.R. 1989.** Plagiotheciaceae. *Flora Neotropica*, 50: 1–22.
- Cao, T., He, S. & Vitt, D.H. 2003.** Grimmiaceae. In: C. Gao, M.R. Crosby & S. He, eds. *Moss flora of China*. English version. Vol. 3. Grimmiaceae — Tetraphidaceae. St. Louis/Beijing & New York: Missouri Botanical Garden Press/Science Press, pp. 3–76.
- Cardot, J. 1905.** Notice préliminaire sur les mousses recueillies par l'expédition antarctique suédoise. I. Espèces de la région magellanique. *Bulletin de l'Herbier Boissier, Série 2*, 5: 997–1011.
- Churchill, S.P., Griffin III, D. & Muñoz, J. 2000.** A checklist of the mosses of the tropical Andean countries. *Ruizia*, 17: 1–203.
- Colacino, C. & Sabovljević, M. 2006.** Bryophyte flora of Albania: a preliminary check-list. *Cryptogamie, Bryologie*, 27: 1–30.
- Crum, H.A. 1951.** *The Appalachian–Ozarkian element in the moss flora of Mexico with a check-list of all known Mexican mosses*. PhD dissertation, University of Michigan, Ann Arbor.
- Crum, H.A. 1952.** Two new species of Mexican mosses collected by A. J. Sharp. *Bryologist*, 55(1): 51–8.
- Crum, H.A. 1994a.** Hedwigiaceae. In: A.J. Sharp, H.A. Crum & P.M. Eckel, eds. The moss flora of Mexico. *Memoirs of the New York Botanical Garden*, 69: 662–6.
- Crum, H.A. 1994b.** *Rhacopilopsis*. In: A.J. Sharp, H.A. Crum & P.M. Eckel, eds. The moss flora of Mexico. *Memoirs of the New York Botanical Garden*, 69: 1046–51.
- Crum, H.A. 1994c.** *Vesicularia*. In: A.J. Sharp, H.A. Crum & P.M. Eckel, eds. The moss flora of Mexico. *Memoirs of the New York Botanical Garden*, 69: 1046–9.
- Czernyadjeva, I.V., Afonina, O.M. & Ignatova, E.A. 2015.** The genus *Anomobryum* (Bryaceae, Musci) in Russia. *Arctoa*, 24(2): 459–70.
- Damsholt, K. 2002.** *Illustrated flora of Nordic liverworts and hornworts*. Lund: Nordic Bryological Society.
- Das, S. & Sharma, G.D. 2016.** Some noteworthy and new records of liverworts from Barail Wildlife Sanctuary, Assam, India. *Plant Science Today*, 3(2): 100–8.
- De Luna, E. 2016.** Typification, taxonomy, and worldwide distribution of *Braunia secunda* (Hook.) Bruch & Schimp. (Hedwigiaceae). *Journal of Bryology*, 38(4): 286–94. doi:10.1080/03736687.2016.1170319.
- De Luna, E. & Gómez-Velasco, G. 2008.** Morphometrics and the identification of *Braunia andrieuxii* and *B. secunda* (Hedwigiaceae, Bryopsida). *Systematic Botany*, 33: 219–28.
- Delgadillo, M.C. 1998.** Floristic corridors for moss distribution across the Neovolcanic Belt of Mexico. III. The Michoacán corridors. *Journal of Bryology*, 20(1): 27–39.
- Delgadillo, M.C., Bello, B. & Cárdenas S.A. 1995.** LATMOSS, a catalogue of neotropical mosses. *Monographs in Systematic Botany from the Missouri Botanical Garden*, 56: 1–191.
- Dey, M. & Singh, D.K. 2012.** *Epiphyllous liverworts of eastern Himalaya*. Kolkata: Botanical Survey of India.
- 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.
- 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.
- Draper, I., Lara, F., Albertos, B., Garilleti, R. & Mazimpaka, V. 2006.** Epiphytic bryoflora of the Atlas and AntiAtlas Mountains, including a synthesis of the distribution of epiphytic bryophytes in Morocco. *Journal of Bryology*, 28: 312–30.
- Eckstein, J., Preussing, M., Thiel, H. 2015.** Ergänzungen zur Moosflora Niedersachsens und Hessens. *Herzogia*, 28: 9–27.
- El Oqlah, A.A., Frey, W. & Kürschner, H. 1988.** The bryophyte flora of Trans-Jordan. A catalogue of species and floristic elements. *Willdenowia*, 18: 253–79.
- Ellis, L.T. 2005.** A revision of some old world moss taxa in the *Syrrhopodon prolifer* complex (Musci: Calymperaceae), and a new species from Malawi. *Systematics and Biodiversity*, 3(2): 159–78.
- Ellis, L.T., Dickson, J.H., Eckstein, J., Fontinha, S., Hedenäs, L., Horton, D., Hugonnot, V., Kirmaci, M., Erdağ, A., Kučera, J., Lobo, C., Luís, L., Sim-Sim, M., Singh, H., Sahu, V., Husain, T., Asthana, A.K., Stech, M., Kruijjer, J.D., Sotiaux, A., Suarez, G.M., Schiavone, M.M. & Vanderpoorten, A. 2010a.** New national and regional bryophyte records, 24. *Journal of Bryology*, 32(3): 232–41.
- Ellis, L.T., Asthana, A.K., Sahu, V., Bednarek-Ochyra, 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, D.J., Phephu, N., Van Rooy, J., Stebel, A., Suárez, G.M., Schiavone, M.M., Townsend, C.C., Vána, J., Vončina, G., Yayintay, Ö.T., Yong, K.T. & Zander, R.H. 2010b.** New national and regional bryophyte records, 25. *Journal of Bryology*, 32(4): 311–22.
- Ellis, L.T., Bednarek-Ochyra, H., Cykowska, B., Ochyra, R., Garcia, C., Sérgio, C., Lebouvier, M., Manolaki, P., Giannouris, 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., Vána, 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., Bansal, P., Nath, V., Cykowska, B., Bednarek-Ochyra, H., Ochyra, R., Dulin, M.V., Erzberger, P., Garcia, C., Sérgio, C., Claro, D., Stow, S., Hedderston, T.A., Hodgetts, N.G., Hugonnot, V., Kučera, J., Lara, F., Pertierra, L., Lebouvier, M., Liepina, L., Mežaka, A., Strazdiņa, L., Madžule, L., Reriha, 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., Segota, V., Shaw, A.J., Sim-Sim, M., Sollman, P., Spitale, D., Hölzer, A., Stebel, A., Vána, J., van Rooy, J. & Vončina, G. 2012b.** 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., Vána, J., Vigalondo, B., Lara, F., Draper, I., Virchenko, V.M. & Wolski, G.J. 2012c.** 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., Hesperhol, 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., Vána, 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., Saïs, 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, J.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., 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., Ochyra, 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, V.R., Ștefănuț, S., Vána, J. & Wigginton, M.J. 2013c.** New national and regional bryophyte records, 37. *Journal of Bryology*, 35(4): 290–305.

- Ellis, L.T., Afonina, O.M., Asthana, A.K., Gupta, R., Sahu, V., Nath, V., Batan, N., Bednarek-Ochyra, 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., Ștefănuț, S., Stow, S., Suárez, G.M., Flores, J.R., Thouvenot, L., Vána, J., van Rooy, J. & Zander, R.H. 2014a. New national and regional bryophyte records, 39. *Journal of Bryology*, 36(2): 134–51.
- 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., Kiebacher, T., Larrain, J., Long, D., Lüth, M., Malcolm, B., Mamontov, Y.S., Newsham, K.K., Nobis, M., Nowak, A., Ochyra, 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., Ștefănuț, 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. 2014b. New national and regional bryophyte records, 41. *Journal of Bryology*, 36(4): 306–24.
- Ellis, L.T., Asthana, A.K., Srivastava, A., Bakalin, V.A., Bednarek-Ochyra, H., Cano, M.J., Jiménez, J.A., Alonso, M., Deme, J., Csiky, J., Dia, M.G., Campisi, P., Erzberger, P., Garilleti, R., Gorobets, K.V., Gremmen, N.J.M., Jimenez, M.S., Suárez, G.M., Jukonienė, I., Kiebacher, T., Kirmaci, M., Koczur, A., Kürschner, H., Lara, F., Mazimpaka, V., Larrain, J., Lebouvier, M., Medina, R., Natcheva, R., Newsham, K.K., Nobis, M., Nowak, A., Ören, M., Özçelik, A.D., Orgaz, J.D., Peralta, D.F., Plášek, V., Čihal, L., Ristow, R., Sawicki, J., Schäfer-Verwimp, A., Smith, V.R., Stebel, A., Ștefănuț, S., Subkaitė, M., Sun, B.-Y., Uselienė, A., Uyar, G., Vána, J., Yoon, Y.-J. & Park, S.J. 2015a. New national and regional bryophyte records, 43. *Journal of Bryology*, 37(2): 128–46.
- Ellis, L.T., Ah-Peng, C., Aranda, S.C., Bednarek-Ochyra, H., Borovichev, E.A., Cykowska-Marzencka, B., Duarte, M.C., Enroth, J., Erzberger, P., Fedosov, V., Fojcik, B., Gabriel, R., Coelho, M.C.M., Henriques, D.S.G., Ilina, O.V., Gil-Novoa, J.E., Morales-Puentes, M.E., Gradstein, S.R., Gupta, R., Nath, V., Asthana, A.K., Koczur, A., Lebouvier, M., Mesterházy, A., Mogro, F., Mežaka, A., Németh, C.S., Orgaz, J.D., Sakamoto, Y., Paiva, J., Sales, F., Pande, N., Sabovljević, M.S., Pantivić, J., Sabovljević, A.D., Pérez-Haase, A., Pinheiro da Costa, D., Plášek, V., Sawicki, J., Szczecińska, M., Chmielewski, J., Potemkin, A., Schäfer-Verwimp, A., Schofield, W.B., Sérgio, C., Sim-Sim, M., Sjögren, S., Spitate, L., Stebel, A., Ștefănuț, S., Suárez, G.M., Flores, J.R., Thouvenot, L., Vána, J., Yoon, Y.-J., Kim, J.H. & Zubel, R. 2015b. New national and regional bryophyte records, 45. *Journal of Bryology*, 37(4): 308–29.
- Ellis, L.T., Alegro, A., Šegota, V., Bakalin, V.A., Barone, R., Borovichev, E.A., Hugonnot, V., Lebouvier, M., Nobis, M., Nowak, A., Ochyra, R., Papp, B., Szurdoki, E., Piwowarczyk, R., Plášek, V., Čihal, L., Ren, Z.-J., Sabovljević, M.S., Sérgio, C., Garcia, C.A., Melo, I., Sawicki, J., Stebel, A., Ștefănuț, S., Ion, R., Manole, A., Tziortzis, I., Xiong, Y. & Zhao, Z.-T. 2015c. New national and regional bryophyte records, 44. *Journal of Bryology*, 37(3): 228–41.
- Ellis, L.T., Aleffi, M., Alegro, A., Segota, V., Asthana, A.K., Gupta, R., Singh, V.J., Bakalin, V.A., Bednarek-Ochyra, H., Cykowska-Marzencka, B., Benitez, A., Borovichev, E.A., Vilnet, A.A., Konstantinova, N.A., Buck, W.R., Cacciatoro, C., Sérgio, C., Csiky, J., Deme, J., Kovács, D., Damshold, K., Enroth, J., Erzberger, P., Fedosov, V.E., Fuertes, E., Gradstein, S.R., Gremmen, N.J.M., Hallingbäck, T., Jukonienė, I., Kiebacher, T., Larrain, J., Lebouvier, M., Lüth, M., Mamontov, Yu. S. Potemkin, A.D., Németh, C.S., Nieuwkoop, J.A.W., Nobis, M., Osorio, F., Parnikoza, I., Peralta, D.F., Carmo, D.M., Plášek, V., Skoupá, Z., Poponessi, S., Venanzoni, R., Puche, F., Purger, D., Reeb, C., Rios, R., Rodriguez-Quiel, E., Arrocha, C., Sabovljević, M.S., Nikolić, N., Sabovljević, A.D., dos Santos, E.L., Segarra-Moragues, J.G., Ștefănuț, S., Stončius, D., Virchenko, V.M., Węgrzyn, M. & Wietrzyk, P. 2016. New national and regional bryophyte records, 48. *Journal of Bryology*, 38(3): 235–59.
- Ellis, L.T., Alatas, M., Aleffi, M., Alegro, A., Šegota, V., Ozimec, S., Vuković, N., Koletić, N., Prlić, D., Bontek, M., Asthana, A.K., Gupta, D., Sahu, V., Rawat, K.K., Bakalin, V.A., Klimova, K.G., Baráth, K., Beldiman, L.N., Csiky, J., Deme, J., Kovács, D., Cano, M.J., Guerra, J., Czernyjadjeva, I.V., Dulin, M.V., Erzberger, P., Ezer, T., Fedosov, V.E., Fontinha, S., Sim-Sim, M., Garcia, C.A., Martins, A., Granzow-de la Cerda, I., Sáez, L., Hassel, K., Weibull, H., Hodgetts, N.G., Infante, M., Heras, P., Kiebacher, T., Kučera, J., Lebouvier, M., Ochyra, R., Ören, M., Papp, B., Park, S.J., Sun, B.-Y., Plášek, V., Poponessi, S., Venanzoni, R., Purger, D., Reis, F., Sinigla, M., Stebel, A., Ștefănuț, S., Uyar, G., Vončina, G., Wigginton, M.J., Yong, K.-T., Chan, M.S. & Yoon, Y.-J. 2017a. New national and regional bryophyte records, 52. *Journal of Bryology*, 39(3): 285–304.
- Ellis, L.T., Afonina, O.M., Andriamiarisoa, R.L., Bednarek-Ochyra, H., Cykowska-Marzencka, B., Stryjak-Bogacka, M., Bell, N.E., Boiko, M., Callaghan, D.A., Campisi, P., Dia, M.G., Marino, M.L., Proenzano, F., Eckstein, J., Enroth, J., Erzberger, P., Ezer, T., Gargano, M.L., Ginzburg, E., Górski, P., Gradstein, S.R., Reeb, C., Hanoire, C., Infante, M., Jukonienė, I., Kushnevskaia, E.V., Lebouvier, M., Nagy, J., Opmanis, A., Plášek, V., Skoupá, Z., Sabovljević, M.S., Sabovljević, A.D., Shevock, J.R., Singh, D.K., Majumdar, S., Skudnik, M., Uselienė, A., Ventrella, G., Węgrzyn, M., Wietrzyk, P., Yoon, Y.-J., Kim, J.H. & Yücel, E. 2017b. New national and regional bryophyte records, 53. *Journal of Bryology*, 39(4): 368–87.
- Erzberger, P. & Papp, B. 2004. Annotated checklist of Hungarian bryophytes. *Studia Botanica Hungarica*, 35: 91–149.
- Erzberger, P., Németh, C.S., Papp, B., Mesterházy, A., Csiky, J. & Baráth, K. 2015. Revision of the red list status of Hungarian bryophytes 1. New occurrences of species previously thought to be regionally extinct or without recent data. *Studia Botanica Hungarica*, 46(2): 15–53.
- Fedosov, V.E. & Ignatova, E.A. 2008. The genus *Bryoerythrophyllum* (Pottiaceae, Bryophyta) in Russia. *Arctoa*, 17: 19–38.
- 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.
- Forzza, R.C., Filardi, F.L.R., Costa, A., Carvalho Junior, A.A., Peixoto, A.L., Walter, B.M.T., Bicudo, C., Moura, C.W.N., Zappi, D., Costa, D.P., Lleras, E., Martinelli, G., Lima, H.C., Prado, J., Stehmann, J.R., Baumgratz, J.F.A., Pirani, J.R., Sylvestre, L.S., Maia, L.C., Lohmann, L.G., Paganucci, L., Alves, M.V.S., Silveira, M., Mamede, M.M.H., Bastos, M.N.C., Morim, M.P., Barbosa, M.R., Menezes, M., Hopkins, M., Secco, R., Cavalcanti, T. & Souza, V.C. coords. 2010. *Catálogo de plantas e fungos do Brasil*. Rio de Janeiro: Andréa Jakobovits Estúdio, Instituto de Pesquisas do Jardim Botânico do Rio de Janeiro.
- Frahm, J.-P. 1981. New *Campylopus* records from South and Central America. *Bryologist*, 84: 242–43.
- Frahm, J.-P. 1982. New *Campylopus* records South and Central America II. *Bryologist*, 85: 322–3.
- Frahm, J.-P. 1990. *Campylopus*, a modern and successful genus!? *Tropical Bryology*, 2: 91–101.
- Frahm, J.-P. & Bick, F. 2013. La bryoflore des Vosges et des zones limitrophes. 3rd edn. *Archive for Bryology*, 169: 1–135.
- Frahm, J.-P., Lindlar, A., Sollman, P. & Fischer, E. 1996. Bryophytes from the Cape Verde Islands. *Tropical Bryology*, 12: 123–53.
- Frey, W. & Kürschner, H. 1983. New records of bryophytes from Transjordan with remarks on phyto geography and endemism in SW Asiatic mosses. *Lindbergia*, 9: 121–32.
- Fulford, M. 1968. Leafy Hepaticae of Latin America part III, Calypogeiaceae. *Memoirs of the New York Botanical Garden*, 11: 279–310.
- Gao, C. 1977. *Flora muscorum Chinae Boreali-Orientalis*. Beijing: Science Publishing House (In Chinese).
- Garilleti, R. & Albertos, B. coords. 2012. *Atlas y Libro Rojo de los Briófitos Amenazados de España*. Madrid: Organismo Autónomo Parques Nacionales.
- 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., Lara, F. & Mazimpaka, V. 2006. On the presence of *Orthotrichum shawii* Wilson (Orthotrichaceae) in California. *Bryologist*, 109: 510–5.
- Germano, S.R., Silva, J.B. & Peralta, D.F. 2016. Paraíba State, Brazil: a hotspot of bryophytes. *Phytotaxa*, 258: 251–78.
- Goffinet, B., Buck, W.R. & Shaw, A.J. 2009. Morphology, anatomy and classification of the Bryophyta. In: B. Goffinet & A.J.

- Shaw, eds. *Bryophyte Biology*. 2nd edn. Cambridge: Cambridge University Press, pp. 55–138.
- Gos, L. & Ochyra, R. 1994. New or otherwise interesting distributional data for species of *Seligeria* [Musci, Seligeriaceae] for Eurasia. *Fragmenta Floristica et Geobotanica*, 39: 383–9.
- Gradstein, S.R. 2013. Afro-American hepatics revisited. *Polish Botanical Journal*, 58(1): 149–77.
- Gradstein, S.R. 2017. Amphitropical disjunctive species in the complex thalloid liverworts (Marchantiidae). *Journal of Bryology*, 39(1): 66–78.
- Grolle, R. & So, M.L. 1998. Notes on sect. *Caducilobae* (*Plagiochila*) in East Asia. *Systematic Botany*, 23: 459–65.
- Hagen, I. 1906. Sur un *Seligeria* critique. *Revue Bryologique*, 33: 49–51.
- Hassel, K., Zechmeister, H. & Presto, T. 2014. Mosses (Bryophyta) and liverworts (Marchantiophyta) of the Zackenberg valley, Northeast Greenland. *Lindbergia*, 2: 66–84.
- Herrera-Paniagua, P. & Martínez, M. 2014. Musgos de bosques húmedos de montaña en la Sierra Madre Oriental: nuevos registros regionales. *Botanical Sciences*, 92(1): 81–8.
- Herzog, T. 1934. Die bryophyten der Andenreisen von C. Troll (Bolivia, Colombia, Panama). *Hedwigia*, 74: 79–114.
- Hill, E.J. 1902. *Fissidens grandifrons*, its habits and propagation. *Bryologist*, 5(4): 56–8.
- Hill, M.O., Bell, N., Bruggeman-Nannenga, M.A., Brugués, M., Cano, M.J., Enroth, J., Flatberg, K.I., Frahm, J.-P., Gallego, M.T., Garilleti, R., Guerra, J., Hedenäs, L., Holyoak, D.T., Hyvönen, J., Ignatov, M.S., Lara, F., Mazimpaka, V., Muñoz, J. & Söderström, L. 2006. An annotated checklist of the mosses of Europe and Macaronesia. *Journal of Bryology*, 28: 198–267. doi:10.1179/174328206X119998.
- Hodgetts, N.G. 2015. *Checklist and country status of European bryophytes—towards a new red list for Europe*. Irish Wildlife Manuals, 84. Dublin: National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
- Holyoak, D.T. 2004. Taxonomic notes on some European species of *Bryum* (Bryopsida: Bryaceae). *Journal of Bryology*, 26(4): 247–64.
- Holyoak, D.T. 2010. Notes on taxonomy of some European species of *Ephemerum* (Bryopsida: Pottiaceae). *Journal of Bryology*, 32(2): 122–32.
- Holyoak, D.T. & Köckinger, H. 2010. A taxonomic revision of some European and Asian bulbiliferous species of *Anomobryum* (Bryophyta: Bryaceae). *Journal of Bryology*, 32(3): 153–69.
- Hugonnot, V. & Chavoutier, L. 2015. *Bryoerythrophyllum inaequalifolium* (Taylor) R.H. Zander in France. *Boletín de la Sociedad Española de Briología*, 44–45: 31–5.
- Ignatov, M.S. 2014. *Brachythecium*. In: Flora of North America Editorial Committee, ed. *Flora of North America north of Mexico*. Vol. 28. Bryophytes: Mosses, Part 2. New York and Oxford: Oxford University Press, pp. 414–28.
- Ignatova, E.A. 2017. Rod 5. *Niphotrichum* Bedn.-Ochyra & Ochyra [Genus 5. *Niphotrichum* Bedn.-Ochyra & Ochyra]. In: M.S. Ignatov, ed. *Flora mkhov Rossii. Tom 2. Oedipodiales – Grimmiales [Moss flora of Russia. Vol. 2. Oedipodiales – Grimmiales]*. Moskva: Tovarishestvo Nauchnykh Izdaniy KMK, pp. 346–61. (In Russian with English keys)
- Ignatov, M.S., Afonina, O.M. & Ignatova, E.A. 2006. Check-list of mosses of East Europe and North Asia. *Arctoa*, 15: 1–130.
- Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio). 2012. *Dados Gerais das Unidades de Conservação*. Brasília. Disponível em [Acesso em 02 July 2017]. Available at <http://www.icmbio.gov.br/>
- Jimenez, M.S., Schiavone, M.M., Suárez, G.M. & Delgadillo, C. 2015. *Neosharpiella aztecorum* H. Rob. & Delgad. (Gigaspermaceae), new to the bryophyte flora of South America. *Cryptogamie, Bryologie*, 36(1): 69–74.
- Jones, E.W. 1957. African Hepatics. XII. Some new or little known Lejeuneaceae. *Transactions of the British Bryological Society*, 3(2): 191–207.
- Kárpáti, L. & Vajda, L. 1961. Beiträge zur Moosflora Albaniens. *Fragmenta Botanica Musei Historico-Naturalis Hungarici*, 1(1–4): 3–16.
- Kirmaci, M., Agcagil, E. & Aslan, G. 2013. The bryophyte flora of ancient cities of Aydin Province (Turkey). *Botanica Serbica*, 37: 31–8.
- Kürschner, H. & Frey, W. 2011. Liverworts, mosses and hornworts of Southwest Asia. Marchantiophyta, Bryophyta, Anthocerotophyta. *Nova Hedwigia Beiheft*, 139: 1–240.
- Lara, F. & Garilleti, R. 2014. *Orthotrichum* Hedw. In: J. Guerra, M.J. Cano & M. Brugués, eds. *Flora Briofítica Ibérica*. Vol. V. Murcia: Universidad de Murcia, Sociedad Española de Briología, pp. 50–135.
- 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.
- Lara, F., Garilleti, R., Goffinet, B., Draper, I., Medina, R., Vigalondo, B. & Mazimpaka, V. 2016. *Lewinskya*, a new genus to accommodate the phaneroporous and monoicous taxa of *Orthotrichum* Hedw. (Bryophyta, Orthotrichaceae). *Cryptogamie, Bryologie*, 37(4): 361–82.
- Larraín, J.B. & Vargas, R. 2009. New records for the Chilean altiplano cryptogamic flora. *Gayana Botanica*, 66(1): 107–10.
- Lewinsky-Haapasaari, J. 1996. *Orthotrichum holmenii*, a new corticolous species from Kazakhstan with comments on *Orthotrichum hallii* in Asia. *Bryologist*, 99: 1–5.
- Li, X.-J., He, S. & Iwatsuki, Z. 2001. Pottiaceae. In: *Moss flora of China*. Vol. 2. Fissidentaceae – Ptychomitriaceae. English version. St. Louis/Beijing & New York: Missouri Botanical Garden/Science Press, pp. 114–249.
- Li, S.-P., Ochyra, R., Wu, P.-C., Seppelt, R.D., Cai, M.-H., Wang, H.-Y. & Li, C.-S. 2009. *Drepanocladus longifolius* (Amblystegiaceae), an addition to the moss flora of King George Island, South Shetland Islands, with a review of Antarctic benthic mosses. *Polar Biology*, 32: 1415–25.
- Liu, Y., Cao, T. & Ge, X.-J. 2011. A case study of DNA barcoding in Chinese Grimmiaceae and a moss recorded in China for the first time. *Taxon*, 60(1): 185–93.
- Liu, Y., Cao, Z., Li, L. & Zhao, J. 2015. Three propaguliferous species of *Pohlia* (Mielichhoferiaceae, Musci) in China. *Journal of Bryology*, 37(2): 120–7.
- Lloret, F. 1988 [1987]. *Bryoerythrophyllum inaequifolium* (Taylor) Zander, new to the European continent. *Lindbergia*, 13: 127–9.
- Lockhart, N., Hodgetts, N. & Holyoak, D. 2012. *Rare and threatened bryophytes of Ireland*. Hollywood: National Museums Northern Ireland.
- Ma, W.-Z. & Shevock, J.R. 2015. The moss family Erpodiaceae in Yunnan Province, China. *Bryophyte Diversity and Evolution*, 37(1): 12–22.
- Mahler, W.F. 1980. *The mosses of Texas*. Dallas: SMU Herbarium.
- Mazimpaka, V., Lara, F., Garilleti, R., Albertos, B. & Lo Giudice, R. 2000. *Orthotrichum shawii* Wilson, a distinct European species. *Journal of Bryology*, 22(3): 183–92.
- 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.
- Medina, R., Lara, F., Goffinet, B., Garilleti, R. & Mazimpaka V. 2013. Unnoticed diversity within the disjunct moss *Orthotrichum tenellum* (Orthotrichaceae) reciprocally validated by morphological and molecular approaches. *Taxon*, 62(6): 1133–52.
- Mogensen, G.S. & Goldberg, I. 2003. The genus *Seligeria* in the Ural Mountains (Seligeriaceae, Bryophyta). *Lindbergiana*, 28: 59–74.
- Müller, F. 2009. An updated checklist of the mosses of Chile. *Archive for Bryology*, 58: 1–124.
- Muñoz, J. 1999. A revision of *Grimmia* (Musci, Grimmiaceae) in the Americas. 1: Latin America. *Annals of the Missouri Botanical Garden*, 86: 118–91.
- NISM. 2004–2017. Online-Atlas der Schweizer Moose [accessed 25 August 2017]. Available at: <http://www.nism.uzh.ch>.
- Noguchi, A. (supplemented by Z. Iwatsuki). 1989. *Illustrated Moss Flora of Japan, part 3*. Nichinan: Hattori Botanical Laboratory.
- Ochyra, R. 1986. *Touwia laticostata*, a remarkable new genus and species of moss from Queensland, Australia. *Journal of Bryology*, 14(1): 103–8.
- Ochyra, R. & Bednarek-Ochyra, H. 2007. *Niphotrichum*. In: Flora of North America Editorial Committee, eds. *Flora of North America north of Mexico*. Vol. 27. Bryophytes: Mosses, part 1. Oxford & New York: Oxford University Press, pp. 285–92.
- Ochyra, R. & Hertel, H. 1990. Contribution to the moss flora of the subantarctic island Marion. *Polish Botanical Studies*, 1: 19–34.
- Ochyra, R. & Vanderpoorten, A. 1999. *Platyhypnidium mutatum*, a mysterious new moss from Germany. *Journal of Bryology*, 21(3): 183–9.
- 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: 287–95.
- Ochyra, R., Bednarek-Ochyra, H. & Lewis Smith, R.I. 2002. New and rare moss species from subantarctic South Georgia. *Nova Hedwigia*, 74(1–2): 121–47.
- Ochyra, R., Żarnowiec, J. & Bednarek-Ochyra, H. 2003. *Census catalogue of Polish mosses*. Kraków: Institute of Botany, Polish Academy of Sciences.
- 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., Weber, W.A. & Bednarek-Ochyra, H. 2010. Discovery of *Grimmia incrassicapulis* (Grimmiaceae, Bryophyta) in Papua New Guinea. *Nova Hedwigia*, 91: 389–98.
- Ochyra, R., Crabtree, D. & Tangney, R. 2015a. Studies on mosses in the Falkland Islands: I. *Bucklandiella* and *Codiophorus* (Grimmiaceae). *Cryptogamie, Bryologie*, 36(3): 289–310.
- Ochyra, R., Sollman, P.H. & Lebouvier, M. 2015b. *Hymenostylium recurvirostrum* (Pottiaceae, Bryophyta), a genus and species newly discovered in the southern polar regions. *Herzogia*, 28(2): 599–606.
- O'Shea, B.J. 2006. Checklist of the mosses of sub-Saharan Africa. *Tropical Bryology Research Reports*, 6: 1–255. Available at: http://www.nhm.ac.uk/hosted_sites/bbstg/resources_lit_africa.html.
- Pandé, S.K. & Misra, R.N. 1943. Studies in Indian Hepaticae II. On the epiphyllous liverworts of India and Ceylon I. *Journal of Indian Botanical Society*, 22: 159–69.
- Papp, B., Erzberger, P., Ódor, P., Hock, Z.S., Szóvényi, P., Szurdoki, E. & Tóth, Z. 2010. Updated checklist and red list of Hungarian bryophytes. *Studia Botanica Hungarica*, 41: 31–59.
- Park, J.-S. 2007. *New list of bryophytes in Korea*. Gyeonggi Province. Gwangneung Forest: Korean National Arboretum of Korean Forest Service.
- Paton, J.A. 1999. *The liverwort flora of the British Isles*. Colchester: Harley Books, pp. 525–30.
- Philippe, M. & André, M. 2014. *Seligeria carniolica* (Breidl. & Beck) Nyholm, nouvelles localités jurassiennes. *Nouvelles archives de la flore jurassienne et du nord-est de la France*, 12: 62–7.
- Philippe, M. & Ochyra, R. 2017. Biogeographical complements for *Seligeria carniolica* and *S. irrigata* (Bryophyta, Seligeriaceae). *Cryptogamie, Bryologie*, 38: 303–12.
- Pócs, T., Manju, C.N., Rajesh, K.P. & Madhusoodanan, P.V. 2007. Liverwort (Marchantiopsida) records from the Western Ghats (Kerala State, Peninsular India). *Acta Botanica Hungarica*, 49: 121–9.
- Pócs, T., Bednarek-Ochyra, H. & Ochyra, R. 2016. *Lepidozia cupressina* (Marchantiopsida, Lepidoziaceae) in sub-Saharan Africa, with a note on the taxonomic status of *L. chordulifera*. *Cryptogamie, Bryologie*, 37: 125–47.
- Poponessi, S., Aleffi, M., Gigante, D. & Venanzoni, R. 2016. Updates on the bryophyte flora of the lowland woods and temporary ponds west of Lake Trasimeno (Central Italy). *Flora Mediterranea*, 26: 151–62.
- Porley, R.D. 2013. *England's rare mosses and liverworts: their history, ecology, and conservation*. Princeton, NJ: Princeton University Press.
- Pursell, R.A. 2007. Fissidentaceae. *Flora Neotropica Monograph*, 101: 1–279.
- Pursell, R.A. & Allen, B.H. 2007. Erpodiaceae Müller Hal. In: *Flora of North America Editorial Committee, ed. Flora of North America, north of Mexico*. Vol. 27, Bryophytes: Mosses, Part 1. New York: Oxford University Press, pp. 470–4.
- Rawat, K.K. & Srivastava, S.C. 2007. *Genus Plagiochila in Eastern Himalaya (India)*. Dehradun: Bishan Singh Mahendra Pal Singh.
- Reese, W.D. 1993. Calymperaceae. *Flora Neotropica Monograph*, 58: 1–101.
- Reese, W.D. 1994. *Syrrhopodon*. In: A.J. Sharp, H.A. Crum & P.M. Eckel, eds. *The moss flora of Mexico*. *Memoirs of the New York Botanical Garden*, 69: 193–4.
- 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., Luís, 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.
- Sawicki, J., Szczecińska, M., Bednarek-Ochyra, H. & Ochyra, R. 2015. Mitochondrial phylogenomics supports segregates of *Racomitrium* (Bryophyta, Grimmiaceae). *Nova Hedwigia*, 100: 293–317.
- Schimper, W.P. 1864. *Musci Europaei novi vel Bryologiae Europaeae supplementum, fasc. 1–2*. Stuttgart: sumptibus Librariae E. Schweizerbart.
- Schnyder, N. 2015. *Sematophyllum adnatum* (Michx.) E. Britton – Neufund in der Schweiz. *Meylania*, 56: 29–31.
- Schofield, W.B. 1984. Bryogeography of the Pacific coast of North America. *Journal of the Hattori Botanical Laboratory*, 55: 35–43.
- Schofield, W.B. 2014. *Sematophyllum* Mitten. In: *Flora of North America Editorial Committee, ed. Flora of North America north of Mexico*, Vol. 28: Bryophyta: Mosses, Part 2. Oxford & New York: Oxford University Press, pp. 573–75.
- Schuster, R.M. 1980. *The Hepaticae and Anthocerotae of North America, east of the hundredth meridian*. Vol. IV. New York: Columbia University Press.
- Sérgio, C., Muñoz, J. & Ochyra, R. 1995. *Racomitrium hespericum*, a new species from the Iberian Peninsula. *Bryologist*, 98: 112–7.
- Sharp, A.J., Crum, H.A. & Eckel, P.M. 1994. The moss flora of Mexico. *Memoirs of the New York Botanical Garden*, 69: 1–1113.
- Shaw, A.J. 2014. *Pohlia* Hedw. In: *Flora of North America Editorial Committee, ed. Flora of North America north of Mexico*. Vol. 28, Bryophytes: Mosses, part 2. Oxford & New York: Oxford University Press, pp. 193–212.
- Shaw, A.J. & Toren, D. 2009. *Pohlia flexuosa* (Mielichhoferiaceae) in North America. *Bryologist*, 112: 178–83.
- Shevock, J.R., Ochyra, R. & Buck, W.R. 2006. Observations on the ecology and distribution of *Hydrocryphaea wardii*, a Southeast Asian monospecific genus, reported new for China from Yunnan Province. *Journal of the Hattori Botanical Laboratory*, 100: 407–18.
- Shevock, J.R., Ochyra, R., He, S. & Long, D.G. 2011. *Yunnanobryon*, a new rheophytic moss genus from southwest China. *Bryologist*, 114: 194–203.
- Sim-Sim, M., Luís, L., Garcia, C., Fontinha, S., Lobo, C., Martins, S. & Stech, M. 2008. New data on the status of threatened bryophytes of Madeira Island. *Journal of Bryology*, 30(3): 226–8.
- Singh, D.K. & Singh, S.K. 2008. Diversity in liverworts and hornworts of Great Himalayan National Park, Western Himalaya, India. In: H. Mohamed, B.B. Baki, A. Nasrullaq-Boyce & P.K.Y. Lee, eds. *Bryology in the New Millennium*. Kuala Lumpur: University of Malaya, pp. 57–81.
- Singh, D.K. & Singh, D. 2016. Epiphyllous liverworts of India: an overview. *Plant Science Today*, 3(2):157–74.
- Singh, S.M., Ochyra, R., Pednekar, S., Asthana, R. & Ravindra, R. 2012. A Holocene moss species preserved in lake sediment core and the present-day status of the moss diversity at Schirmacher Oasis, Antarctica. *Antarctic Science*, 24: 353–8.
- Singh, D.K., Singh, S.K. & Singh, D. 2016. *Liverworts and hornworts of India. An annotated checklist*. Kolkata: Botanical Survey of India.
- Smith, A.J.E. 2004. *The moss flora of Britain and Ireland*. 2nd edn. Cambridge: Cambridge University Press.
- So, M.L. 2001. *Plagiochila* (Hepaticae, Plagiochilaceae) in China. *Systematic Botany Monographs*, 60: 1–214.
- Sollman, P. 2015. The genus *Bryoerythrophyllum* (Musci, Pottiaceae) in Antarctica. *Polish Botanical Journal*, 50(1): 19–25.
- Sotiaux, A., Stieperaere, H. & Vanderpoorten, A. 2007. Bryophyte checklist and European Red List of the Brussels-Capital Region, Flanders and Wallonia (Belgium). *Belgian Journal of Botany*, 140: 174–96.
- Spence, J.R. 2007. Nomenclatural changes in the Bryaceae (Bryopsida) for North America II. *Phytologia*, 89: 110–4.
- Spence, J.R. 2009. New combinations in North American *Rosulabryum* (Bryopsida, Bryaceae). *Novon: A Journal for Botanical Nomenclature*, 19: 397–400.
- Spence, J.R. 2014. *Rosulabryum* J.R.Spence. In: *Flora of North America Editorial Committee, ed. Flora of North America north of Mexico*. Vol. 28. Bryophyta: Mosses, part 2. New York and Oxford: Oxford University Press, pp. 177–85.

- Srivastava, A. & Srivastava, S.C. 2002. *Indian Geocalycaceae (Hepaticae) (a taxonomic study)*. Dehradun: Bishen Singh Mahendra Pal Singh.
- Ștefănuț, S. & Goia, I. 2012. Checklist and Red List of bryophytes of Romania. *Nova Hedwigia*, 95: 59–104.
- Strasberg, D., Rouget, M., Richardson, D.M., Baret, S., Dupont, J. & Cowling, R.M. 2005. An assessment of habitat diversity and transformation on La Réunion island (Mascarene Islands, Indian Ocean) as a basis for identifying broad-scale conservation priorities. *Biodiversity & Conservation*, 14: 3015–32.
- Suárez, G.M. & Schiavone, M.M. 2008. *Pohlia chilensis* (Mont.) Shaw an Afro-American moss. *Bryologist*, 111(2): 318–22.
- Suárez, G.M., Schiavone, M.M. & Zander, R.H. 2010. Sporophytes in the genus *Saitobryum* (Pottiaceae, Bryophyta). *Gayana Botánica*, 67(1): 125–9.
- Suárez, G.M., Larráin, J.B. & Schiavone, M.M. 2013. Rediscovery and lectotypification of *Dicranella lorentzii* (Dicranellaceae, Bryophyta). *Boletín de la Sociedad Argentina de Botánica*, 48(1): 53–7.
- Tixier, P. 1985. Contribution à la connaissance des Coleolejeuneoideae. *Bryophytorum Bibliotheca*, 27: 1–439.
- Touw, A. 1992. A survey of the mosses of the Lesser Sunda Islands (Nusa Tenggara), Indonesia. *Journal of the Hattori Botanical Laboratory*, 71: 289–366.
- Touw, A. & Ochyra, R. 1987. Additional notes on *Neckeropsis* 2. *Lindbergia*, 13: 97–104.
- Townsend, C.C. 1995. On the identity of *Pohlia flexuosa* Harv. with *P. myldermansii* Wilz. & Dem. *Journal of Bryology*, 18: 783–90.
- Townsend, C.C. 2007. Some further remarks on *Pohlia flexuosa* in Europe, and on other propaguliferous species. *Journal of Bryology*, 29: 194–5.
- Tropicos. Org. 2017. Missouri Botanical Garden [accessed 08 September 2017]. Available at: <http://www.tropicos.org>.
- Tsegmed, T.S. 2010. Moss flora of Mongolia. In: M.S. Ignatov & E.A. Ignatova, eds. *Biological resources and environmental conditions of Mongolia: works of joint Russian and Mongolian complex biological expedition*. Vol. 56. Moskva: Institut Problem Ekologii I Evolutsii im. A.N. Severtsova RAN, pp. 1–634.
- Váňa, J., Lebouvier, M., Ochyra, R., Bednarek-Ochyra, H. & Cykowska, B. 2010a. Two noteworthy records of hepatics from Île Amsterdam in the South Indian Ocean. *Nova Hedwigia Beiheft*, 138: 229–39.
- Váňa, J., Long, D.G., Ochyra, R., Bednarek-Ochyra, H., Cykowska, B. & Smith, V.R. 2010b. Range extensions of *Prasanthus suecicus* (Gymnomitriaceae, Marchantiophyta), with a review of its global distribution. *Nova Hedwigia*, 91: 459–69.
- Váňa, J., Ochyra, R., Lebouvier, M. & Cykowska, B. 2014. Bryophytes of Île Amsterdam in the South Indian Ocean: 1. Liverworts. *Cryptogamie, Bryologie*, 35(4): 335–71.
- Váňa, J., Seppelt, R.D. & Ochyra, R. 2015. New additions to the liverwort flora of subantarctic Macquarie Island. *Cryptogamie, Bryologie*, 36: 349–68.
- van der Pluijm, A. 2004. Species of *Orthotrichum* new to the Netherlands. *Lindbergia*, 29: 17–31.
- van der Pluijm, A. 2014. NDFP Verspreidingsatlas. *Orthotrichum shawii* [accessed 23 August 2017]. Available at: www.verspreidingsatlas.nl/3282#.
- Van der Putten, N., Stieperaere, H., Verbruggen, C. & Ochyra, R. 2004. Holocene palaeoecology and climate history of South Georgia (sub-Antarctica) based on a macrofossil record of bryophytes and seeds. *Holocene*, 14: 382–92.
- Van der Putten, N., Verbruggen, C., Ochyra, R., Spassov, S., de Beaulieu, J.-L., De Dapper, M., Hus, J. & Thouveny, N. 2009. Peat bank growth, Holocene palaeoecology and climate history of South Georgia (sub-Antarctica), based on a botanical macrofossil record. *Quaternary Science Reviews*, 28: 65–79.
- 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.
- Vitt, D.H. 2014. Orthotrichaceae Schimper. In: Flora of North America Editorial Committee, ed., *Flora of North America north of Mexico*, Vol. 28, Bryophyta, Mosses, part 2. New York and Oxford: Oxford University Press, pp. 37–82.
- Vitt, D.H. & Glime, J.M. 1984. The structural adaptations of aquatic Musci. *Lindbergia*, 10: 95–110.
- Watling, M.C. & B.J. O'Shea. 2000. British Bryological Society Expedition to Mulanje Mountain, Malawi. 12. A revision of the genus *Rhacopilopsis* Renaud & Cardot (Hypnaceae, Bryopsida). *Journal of Bryology*, 22: 207–16.
- Whittier, H.O. 1976. *Mosses of the Society Islands*. Gainesville: The University Presses of Florida.
- Zhu, R.-L. & So, M.L. 2001. Epiphyllous liverworts of China. *Nova Hedwigia Beiheft*, 121: 1–418.
- Zomlefer, W.B. 1993. A revision of *Rigodium* (Musci: Rigodiaceae). *Bryologist*, 96: 1–72.