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New national and regional bryophyte records, 56

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Bryological Notes

New national and regional bryophyte records, 56

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1. ***Acroporium lamprophyllum*** Mitt. var. ***percaudatum*** (E.B.Bartram) B.C.Tan, H.P.Ramsay & W.B.Schofield

Contributors: A. Irmah and M. Suleiman

Borneo: Sabah, Tawau District, Maliau Basin Conservation Area: (1) trail from Nepenthes Camp to Takob Akob Waterfall, on tree trunks, 4°43′59″N, 116°52′40″E, 1100 m a.s.l., 29 September 2016, *leg.* M. Suleiman & A. Irmah *6168* (BORH, SAN); (2) along Nepenthes Trail to Ginseng Camp, on liana, 1000 m a.s.l., 4°4′41″N, 116°54′0″E, 10 July 2017, *leg.* M. Suleiman & A. Irmah *148* (BORH, SAN).

Borneo is the centre of diversity for the genus *Acroporium* Mitt. with 21 species and seven varieties recorded for the island (Suleiman *et al*., 2006, 2009; Mohamed *et al*., 2010). *Acroporium lamprophyllum* var. *lamprophyllum*, one of the smallest species of the genus, is common on the island and abundant in the mid-elevation of primary forests. This species is easily distinguished, even in the field, from other small sized species of the genus by the presence of numerous, erect, flagellifeous branchlets. During a study on the moss flora of the Maliau Basin Conservation Area, a Class 1 Forest Reserve in the centre of Sabah State, Malaysian Borneo, we collected two specimens of *A. lamprophyllum* var. *percaudatum* in the upper montane heath forest locally known as Kerangas Forest. This is the first record of this variety in Borneo, it having previously been recorded in northern Queensland in Australia, Samoa and Papua New Guinea (Tan *et al*., 2007).

The specimens from Borneo have very long flagelliferous branches, up to 10–12 mm. In contrast, in var. *lamprophyllum,* the flagelliferous branches are much shorter, only reaching 2–3 mm. Several other features separate var. *percaudatum* from the type variety. The former is generally larger with short, divergent leaves below the flagelliferous shoots, and possesses longer (40–90 µm) and thicker-walled laminal cells that abaxially are strongly unipapillose. The relatively smaller type variety has long, acuminate leaves with rather smooth or weakly unipapillose laminal cells (Ramsay *et al*., 2004; Tan *et al*., 2007).

2. ***Amphidium lapponicum*** (Hedw.) Schimp.

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Zaqatala District, the Great Caucasus Range, Mt. Noorbashy (Baskitau), SSW 85° slope, 41°44.467′N, 46°44.501′E, 2870 m a.s.l., on an outcrop of ferruginous schist, 5 August 2004, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9001330); *ibidem*, Dindi tract, southern 80° slope, 41°43.365′N, 46°44.224′E, 2480 m a.s.l., on an outcrop of ferruginous schist, 7 August 2004, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9001331).

Bryologically Azerbaijan is an inadequately investigated country. The original total of moss taxa, based on the latest checklist by Ignatov *et al*. (2006) included 372 species recorded for Azerbaijan and one uncertain record, but 366 of these records were derived directly from an unpublished monograph by Lyubarskaya (1986). From 2006 to 2017, there have been only a few additions to Azerbaijan's moss flora, mainly reported within larger monographic revisions such as Koponen *et al*. (2012), but also some new records were published by Qasımov *et al*. (2016) and Gasimov & Novruzov (2017).

Moscow State University has been granted funding to complete the digitisation of its large herbarium (MW), which includes 73,000 mosses. A preliminary dataset with country-tagged scans of original labels from the bryophyte specimens is available on https://plant.depo.msu.ru/ and via GBIF (Seregin, 2018). Careful comparison of country records with published checklists and double checking of identifications for spotted omissions have revealed some species new for Azerbaijan.

Amphidium lapponicum is known from neighbouring Armenia, Georgia, and the Russian part of the Caucasus (Ignatov *et al*., 2006). Apparently, no records have been reported from Turkey and Iran. The species shows a bipolar range with a disjunct distribution in southern Africa, Chile and probably in New Zealand (Müller in Blockeel *et al*., 2000).

Contributor: R. Ochyra

South Georgia: Cumberland East Bay: (1) rocks behind Grytviken whaling station, 54°16′33″S, 36° 30′45″W, *ca* 100 m a.s.l., moist rock crevice, 3 March 1970, *leg.* R. I. Lewis Smith *1191* (AAS, KRAM); (2) west slope of Brown Mountain, 54°16′54″S, 36° 31′13″W, *ca* 265 m a.s.l., moist rock crevice, 23 February 1970, *leg.* R. I. Lewis Smith *1193* (AAS, KRAM); (3) about 1 mile north-west of Echo Pass, 54°16′43″S, 36°32′44″W, *ca* 335 m a.s.l., on wet rocks, 2 February 1968, *leg.* S. W. Greene *CG 354* (AAS, KRAM); (4) north-east of Hestesletten, 54° 18′20″S, 36°29′22″W, *ca* 8 m a.s.l., dry, shady crevices of south-facing rocks, 5 February 1968, *leg.* S. W. Greene *CG 356* (AAS, KRAM); (5) Greene Peninsula, opposite Aniline Islet, 54°19′27″S, 36° 26′44″W, *ca* 85 m a.s.l., crevices of dry, north-facing rocks, 27 January 1968, *leg.* S. W. Greene *CG 299* (AAS, KRAM); (6) Moraine Fjord, outcrop behind shore, east of Aniline Islet, 54°19′16″S, 36°26′18″W, *ca* 15 m a.s.l., crevices of north-west facing rocks, 4 January 1968, *leg.* S. W. Greene *CG 214* (AAS, KRAM); (7) Barff Peninsula, small bay north of Sandebugten, 54°18′44″S, 36°21′20″W, *ca* 8 m a.s.l., crevices of wet rocks by waterfall associated with *Triandrophyllum subtrifidum* (Hook.f. & Taylor) Fulford & Hatcher, *Riccardia georgiensis* (Steph.) Hässel and *Cryptolophocolea chiloscyphoides* (Lehm.) L.Söderstr. & Crand.-Stotl., 15 January 1961, *leg.* S. W. Greene *1057E* (AAS, KRAM).

Amphidium Schimp. is a pancontinental oreophyte genus consisting of three species, with its maximum occurrence in the northern hemisphere (Frahm *et al*., 2000). In the austral polar regions two species of the genus have been recorded, namely *A. tortuosum* (Hornsch.) Cufod. from subantarctic South Georgia (Cardot & Brotherus, 1923 as *A. cyathicarpum* (Mont.) Broth.; Ochyra *et al*., 2002) and *A. lapponicum* (Hedw.) Schimp. from the subantarctic Îles Kerguelen (Ochyra & Poulsen 2003) and the maritime Antarctic (Ochyra *et al*., 2008a; Ochyra *et al*., 2008b). A critical re-assessment of the South Georgian specimens named as *A. tortuosum* revealed that they actually represented *A. lapponicum*. The leaves were not linear-lanceolate, 1.5–4.0 mm long, the leaf margins were not recurved and dentate or notched distally, and the upper laminal cells were not semi-pellucid and only slightly obscured by small and elliptic papillae covering their lumina as is the case in *A. tortuosum*. Instead, the leaves were oblong-lanceolate, 1–2 mm long, the leaf margins plane distally and entire throughout, and the upper laminal cells were markedly obscured by relatively large and warty papillae, making the lamina opaque, and these features are typical of *A. lapponicum*. Accordingly, *A, tortuosum* has to be excluded from the moss flora of South Georgia and Subantarctica and replaced by *A. lapponicum*.

The present taxonomic conclusion does not affect the statistics for the moss flora of South Georgia or the phytogeography of *Amphidium lapponicum*. The moss flora of this subantarctic island still consists of about 120 species and, after Îles Kerguelen, is the second largest flora of these plants in Subantarctica (Ochyra *et al*., 2002; Blockeel *et al*., 2003, 2005, 2007b; Bednarek-Ochyra & Ochyra, 2012a; Ellis *et al*., 2014c, 2016c). This is so as *A. lapponicum* is a replacement of a misnamed species. Although South Georgia was covered by a huge ice cap during the last glacial period (Graham *et al*., 2008), some palaeobotanical data confirm the existence of ice-free refugia on this island (Van der Putten *et al*., 2004, 2009) in which some species of moss such as *A. lapponicum* could have survived the glaciation *in situ*, as is the case with other subantarctic (Van der Putten *et al*., 2010) and Antarctic (Birkenmajer *et al*., 1985; Ingólfsson, 2004; Hodgson *et al*., 2014) islands. The present discovery does not change the phytogeographical status of *A. lapponicum*. It remains a bipolar species, which has a strongly dissected panholantarctic range in the southern hemisphere, covering highly isolated stations in the Antarctic, Subantarctic (South Georgia and Îles Kerguelen), New Zealand and Western Patagonia and penetrating into the tropics in the Archipiélago Juan Fernández, Bolivia and South Africa (Ochyra *et al*., 2008b).

3. ***Anomobryum concinnatum*** (Spruce) Lindb.

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Zaqatala District, Shamilevka Ridge, near summit, 1800 m a.s.l., on south-facing rocks of ferruginous schist, near tree line, 1 September 1997, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9001593).

Traditionally this taxon was treated as conspecific with *A. julaceum* (Schrad. *ex* P.Gaertn., B.Mey. & Scherb.) Schimp. or as a variety *A. julaceum* var. *concinnatum* (Spruce) J.E.Zetterst. Holyoak & Köckinger (2010) demonstrated its status as a species in its own right, which was later confirmed by Czernyadjeva *et al*. (2015) based on examination of a large number of specimens from Russia and adjacent areas. *Anomobryum concinnatum* is distributed mainly in mountainous regions of the boreal and temperate areas of the northern hemisphere. It was reported from neighbouring Turkey, Georgia and the Russian part of the Caucasus (Ros *et al*., 2013; Czernyadjeva *et al*., 2015).

4. ***Bryum alpinum*** Huds. *ex* With. [≡ *Imbribryum alpinum* (Huds. *ex* With.) N.Pedersen]

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Zaqatala District, Shamilevka Ridge, near summit, 1800 m a.s.l., on south-facing rocks of ferruginous schist, near tree line, 1 September 1997, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9072441).

Bryum alpinum has been reported from all the countries neighbouring Azerbaijan; Georgia, Armenia, the Russian part of the Caucasus, Turkey and Iran (Townsend, 2005; Ignatov *et al*., 2006; Safavi & Shirzadian, 2011; Ros *et al*., 2013). It is a typical bipolar species, having a discontinuous boreal-temperate-montane range in the northern hemisphere with deep penetration into the tropics, occurring on African mountains, with stations in Ethiopia, South Africa, eastern Africa and a few records in West Africa. In the Neotropics it is rare or occasional, known from Mexico, Peru, Argentina and Chile. It has also been found on the Îles Kerguelen (Larraín & Ochyra in Blockeel *et al*., 2008b).

5. ***Bucklandiella affinis*** (F.Weber & D.Mohr) Bedn.-Ochyra & Ochyra

Contributors: J. Deme and J. Csiky

Croatia: Papuk Mts, Doljanci, Sokolina, 493 m a.s.l., 45.49330°N, 17.60863°E, on gneiss rocks, 19 October, 2017, *leg.* J. Deme, & J. Csiky, *s.n. det.* P. Erzberger, *conf.* H. Bednarek-Ochyra, (JPU, KRAM).

Bucklandiella affinis, a European temperate species (Hill & Preston, 1998) was recorded for the first time in Croatia (Sabovljević *et al*., 2008). In the surrounding countries, *B. affinis* occurs in Hungary (EN), Montenegro (DD*), Serbia (LC) and Slovenia (LC) (Erzberger *et al*., 2015; Hodgetts, 2015). The species was found on Papuk Mountain, which is the largest mountain of the peri-Pannonian region in Slavonia

(North Croatia), the highest peak rising to 953 m a.s.l. This area is characterised by high geological diversity dominated by metamorphic rocks, including different types of schists and granites. About sixty percent of the almost totally forested area is covered by acidophilous communities of beech forests.

Bucklandiella affinis is considered to be a moderately cryophytic moss (Dierßen, 2001) and the well-developed, dark patches were found on the edge of an acidothermophilic sessile oak forest. The sterile plants occur dispersed within a band approximately 100 × 10 m, on the lower side of partially shaded, siliceous gneiss cliffs, with a mainly north-eastern exposure. In the occupied plots *B. affinis* is sometimes the dominant species on the rocks, but frequently associated with *Cynodontium polycarpon* (Hedw.) Schimp., *Hypnum cupressiforme* Hedw., *Paraleucobryum longifolium* (Hedw.) Loeske and various epilithic lichens. The site, Sokolina, is unique with regard to the vegetation of Croatia because stands of the rather rare thermophilic-acidophilous forests are dominant here and also a second stand of *Fagus sylvatica-Sphagnum quinquefarium* forest has been found here, with several rare and newly discovered species for the Croatian moss flora (e.g. *Andreaea rothii* F.Weber & D.Mohr subsp. *rothii*, *Buxbaumia aphylla* Hedw., *Dicranum spurium* Hedw., *Rhabdoweisia fugax* (Hedw.) Bruch & Schimp. and *Sphagnum quinquefarium* (Braithw.) Warnst. Ellis *et al*., 2014d, 2016b, 2017b; Alegro *et al*., 2015).

6. ***Bucklandiella chlorocarpa*** (Paris) Bedn.-Ochyra & Ochyra

Contributor: R. Ochyra

Australia, Victoria: (1) Bogong High Plain, Bogong Creek Saddle, December 1983, *leg.* Peter J. Michell *10 & 12* (AD); (2) Bogong High Plain, Pretty Valley, 36° 52′S, 147°14′E, *ca* 1700 m a.s.l., near river, 24 January 1967, *leg.* Lindley D. Williams *3004* (AD); (3) Mount Buffalo, Eurolin Falls, on rocks, 14 October 1969, *leg.* D. G. Catcheside *69.209* (AD); (4) Erokine River, Lorna, November 1919, *leg.* W. W. Watts *1033* (H). **New South Wales**: (5) Snowy Monaro Regional Council, Snowy Mountains, Kiandra, 35°53′S, 148° 30′E, December 1901, *leg.* W. Forsyth *1047* (JE); (6) Riverina Region, western edge of the Snowy Mountains, Tumbarumba, 35°47′S, 148°01′E, November 1900, *leg.* W. Forsyth *850* (H-Brotherus, KRAM).

Bucklandiella chlorocarpa is an Australasian endemic species whose occurrence on mainland Australia has been expected since there are no phytogeographical or ecological reasons which could preclude extension of its range to this area. This species has long been neglected and only recently resurrected from obsolescence and it is now considered a separate species in its own right (Bednarek-Ochyra, 2014a). It is a very distinct and unmistakable aquatic species, often growing in swiftly flowing water in streams and waterfalls. As a result it exhibits a number of structural adaptations for rheophytic habitats, including broad and strong costae, 2–3-layered laminal cells and strongly thickened, fleshy marginal borders. These characters are typical for a number of unrelated moss species growing in such habitats (Vitt & Glime, 1984; Ochyra, 1985a, 1985b, 1986, 1987a, 1987b; Ochyra & Enroth, 1989; Sérgio *et al*., 1995; Ochyra & Vanderpoorten, 1999; Stech & Frahm, 2001; Ochyra & Bednarek-Ochyra, 2011; Bednarek-Ochyra & Váňa, 2014). The same adaptations are known in two other species of the genus *Bucklandiella* Roiv. which are predominantly distributed in the western hemisphere, namely *B. lamprocarpa* (Müll.Hal.) Bedn.-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 1994, 1998, 2012b; Bednarek-Ochyra *et al*., 1996; Blockeel *et al*., 2002, 2009; Ochyra & van Rooy, 2013; Bednarek-Ochyra, 2014b, 2015) and *B. orthotrichacea* (Müll.Hal.) Bedn.-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2012c; Bednarek-Ochyra, 2014c).

Eight species of *Bucklandiella* are currently known to occur in Australia (Bednarek-Ochyra *et al*., 2014). Including the present discovery of *B. chlorocarpa*, four species of this genus are now recorded on the mainland, including *B. sudetica* (Funck) Bedn.-Ochyra & Ochyra (Frisvoll, 1986; Bednarek-Ochyra & Ochyra, 2013a), *B. didyma* (Mont.) Bedn.-Ochyra & Ochyra (Blockeel *et al*., 2008a) and *B. pycnotricha* (Müll.Hal.) Bedn.-Ochyra & Ochyra (Ellis *et al*., 2015b). Of the remaining species, *B. seppeltii* Bedn.-Ochyra, Ochyra, Sawicki & Szczecińska is distributed in Tasmania, whilst *B. angustissima* Bedn.-Ochyra & Ochyra, *B. crispula* (Hook.f. & Wilson) Bedn.-Ochyra & Ochyra and *B. lamprocarpa* occur only on subantarctic Macquarie Island (Seppelt, 2004; Blockeel *et al*., 2007a; Bednarek-Ochyra & Ochyra, 2011; Bednarek-Ochyra *et al*., 2014).

7. ***Bucklandiella microcarpa*** (Hedw.) Bedn.-Ochyra & Ochyra fo. ***afoninae*** (Frisvoll) Bedn.-Ochyra & Ochyra

Contributor: R. Ochyra

U.S.A. Alaska, Alaska Peninsula: (1) Ivanof Bay, near village, 55°54′N, 159°30′W, 588 m a.s.l.; *Empetrum nigrum*−*Vaccinium uliginosum* alpine heath, 7 July 1999, *leg.* S. S. Talbot *99-17-47 & 99-18-40* with W. B. Schofield (KRAM, UBC); (2) Izembek NWR, slopes of Mt. Simeon ('Baldy'), 55° 10′N, 162°30′W, tundra slope, 7 August 1997, *leg.* W. B. Schofield 108988 (KRAM, UBC); (3) Shumagin Islands: Simeonof Island, peninsula lowlands and mountain slopes, 54°55′N, 159°15′W, boulders of blowout patch, subalpine, 15 July 1995, *leg.* W. B. Schofield & S. S. Talbot *103982* (DUKE, KRAM, UBC) and October 1981, S. S. Talbot *SI-104* (NY). **St. Mathew Island**: bay near Sea Lion

Point, 60°30′N, 172°30′W, tundra slope, 19 July 1997, *leg.* W. B. Schofield *108486* (KRAM, UBC).

This remarkable and unique expression of the otherwise well circumscribed *Bucklandiella microcarpa* was originally known from only a single record from mainland North America, namely the Seaward Peninsula in Alaska (Frisvoll, 1988). Recently, it was also reported from two islands in the Central Aleutian Islands (Ellis *et al*., 2014c) and herein its geographical range is extended to the Alaska Peninsula in continental North America and the remote St Mathew Island in the Bering Sea. These discoveries consolidate *B. microcarpa* fo. *afoninae* as a Beringian taxon occurring in coastal areas of the north Pacific in Asia and North America. This type of distribution is typical of many species of moss and liverwort (e.g. Schofield, 1969, 1984; Bednarek-Ochyra, 2004, 2006; Bednarek-Ochyra *et al*., 2010), and many of these appear to be ancient relicts from Tertiary times.

8. ***Cephalozia crossii*** Spruce

Contributors: A. Schäfer-Verwimp and †J. Váňa

Tenerife: Anaga Mountains above Chamorga, Laurisilva, old forest track near TF 123, on volcanic tuff at road cut, c. per., 770–780 m a.s.l., 28°33.5′N, 16°10.0–2′W, 11 January 2014, *leg.* Schäfer-Verwimp & Verwimp *TF-79*, det. J. Váňa (JE, PRC), *TF-85* (JE).

The plants have narrow leaves with long-lanceolate segments from a 2- to 4-celled base, ending usually in a uniseriate tip of 3–4 cells. Thus the plants well agree with those described and figured by Fulford (1968) as *Cephalozia bischlerae* Fulford from Colombia and Venezuela. This taxon, as well as *C. dussii* Fulford also from the Neotropics, had been synonymised under *C. crossii* by Váňa (1988). The female bracts are similar to those of *C. bischlerae*, mostly ending in three uniseriate cells followed by three superposed twin-cells. The perianth mouth has cilia mostly two cells long, a character which seems highly variable, depending on environmental conditions and developmental state (Váňa & Long, 2011); compare also the crenulate perianth mouth of *C. bischlerae* and the irregularly crenulate to setulose perianth mouth of *C. dussii* (Fulford, 1968, pl. 80).

Cephalozia crossii is a widespread neotropical species, known under several synonyms from Guadeloupe, Martinique, Dominican Republic, México, Costa Rica, Colombia, Venezuela, Ecuador, Peru, Bolivia and Brazil, occurring from 460 m above sea level in Guadeloupe (type of *C. dussii*) up to 4100 m in Colombia (Menzel, 1985; Váňa, 1988; Dauphin, 2005; Schäfer-Verwimp & Pócs, 2009). The species is new to Macaronesia and Europe.

There are several liverwort species with a Neotropical-Macaronesian (-western European) distribution pattern, among these *Acanthocoleus aberrans* (Lindenb. & Gottsche) Kruijt, *Cephalozia crassifolia* (Lindenb. & Gottsche) Fulford, *Cephaloziella granatensis* (J.B.Jack *ex* Steph.) Fulford, *Cololejeunea azorica* V.Allorge & Jovet-Ast, *Plagiochila longispina* Lindenb. & Gottsche, *P. papillifolia* Steph., *P. retrorsa* Gottsche, *P. stricta* Lindenb. (also known from Madagascar), *Radula nudicaulis* Steph., *Solenostoma callithrix* (Lindenb. & Gottsche) Steph., *Syzygiella rubricaulis* (Nees) Steph. and among mosses for example *Campylopus cygneus* (Hedw.) Brid. and *C. shawii* Wilson.

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

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Zaqatala District, the Great Caucasus Range, Mt. Noorbashy (Baskitau), Dindi tract, southern 80° slope, 41°43.365′N, 46°44.224′E, 2480 m a.s.l., on an outcrop of ferruginous schist, 7 August 2004, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9029713).

Coscinodon cribrosus is a boreo-temperate species distributed from northern Europe and northern Africa to north-east Asia and Middle Asia, also occurring in North America (Ignatov *et al*., 2006; Hespanhol *et al.* in Ellis *et al*., 2012a; Ros *et al*., 2013). It is considered to be rare and threatened in many European countries with at least three country records published recently in this series for Hungary, Portugal and Poland (Blockeel *et al*., 2009; Ellis *et al*., 2012a, 2014c, 2015b).

The species was reported from neighbouring Georgia, the Russian part of the Caucasus, and Turkey (Ignatov *et al*., 2006; Ros *et al*., 2013). It was also indicated as occurring in Iran by Crum & Anderson (1981) and originally reported by Froehlich (1955).

10. ***Cyrtomnium hymenophylloides*** (Huebener) T.J.Kop.

Contributors: E. Ruiz, P. Aymerich, L. Sáez and M. Brugués

Spain: (1) Catalonia, Eastern Pyrenees, Cadí-Moixeró Natural Park, Bagà, Serra Pedregosa, 42° 16′39″N, 1°41′18″E, 2270–2310 m a.s.l., on north-facing limestone cliffs and rock outcrops, September 2017, *leg*. P. Aymerich *s.n.* (BCB 59515); (2) Aragon, Central Pyrenees, Ordesa and Monte Perdido National Park, Bielsa, Pineta Valley, 42°40′N, 0°4′E, 1350 m a.s.l., on slopes in a fir forest, July 1973, *leg*. M. Brugués *s.n.* (BCB 6558).

Cyrtomnium Holmen is mainly a genus of Arctic and Subarctic regions. However, *C. hymenophylloides* is also found far south as a relict in lowland gorges or in mountains (Miller & Mogensen, 2014). In the Mediterranean region *C. hymenophylloides*, although rare, has been reported from Bosnia–Herzegovina, Croatia, France, Italy, Macedonia, Montenegro, Serbia and Slovenia (Ros *et al*., 2013). Here, the species is reported for the first time not only from Spain and the rest of the Iberian Peninsula but also from the Pyrenees.

Cyrtomnium, the only genus of Mniaceae with phaneropore stomata, includes two species: *C. hymenophylloides* (Huebener) T.J.Kop. and *C. hymenophyllum* (Bruch & Schimp.) Holmen. Both species often show bluish green leaves, with leaf margins entire and unistratose, but in *C. hymenophylloides* the leaf base is not decurrent and the border is formed by 2–4 rows of linear cells.

Cyrtomnium hymenophylloides is a calcicole, typically growing in crevices in limestone cliffs, often in shaded situations (Koponen, 1980). In locality (1), samples were collected from calcareous rock crevices and small holes, samples were collected accompanied by *Cephalozia bicuspidata* (L.) Dumort., *Distichium capillaceum* (Hedw.) Bruch & Schimp., *Myurella julacea* var. *scabrifolia* Lindb. *ex* Limpr., *Pohlia cruda* (Hedw.) Lindb., *Scapania calcicola* (Arnell & J.Perss.) Ingham and *Scapania cuspiduligera* (Nees) Müll.Frib. Locality (2) is a fir forest and the species occurred on calcareous slopes together with *Campyliadelphus chrysophyllum* (Brid.) R.S.Chopra, *Fissidens dubius* P.Beauv., *Hypnum vaucheri* Lesq., *Scapania aequiloba* (Schwägr.) Dumort., *Scapania aspera* Bernet & M.Bernet and *Tortella tortuosa* (Hedw.) Limpr.

11. ***Dicranum setifolium*** Cardot

Contributors: D. Ya. Tubanova, V. E. Fedosov and O. Yu. Pisarenko

Russia, Far East, Khabarovsk Territory: (1) Khabarovsk District, the southern spurs of the Badzhalskiy Ridge, upper Yarap River, the watershed of the right-hand tributary of the Bugor River, rocky outcrops on a narrow crest, 50.29556°N, 134.7177°E, 1571 m a.s.l., on soil, 03 August 2016, *leg.* Pisarenko *s.n.* NSK2006704 (NSK, UUH); (2) Nanaiskiy District, Tardoki-Yani Range, *ca* 1 km west of Tardoki-Yani Mt. Peak, alpine belt, N-facing steep slope with vertical cliffs, 48°53′13.6″N, 138° 02′46.1″E, 2010 m a.s.l., cliff crevice in full shade, 22 August 2013, *leg.* Ermolenko #Hb-10-4 (MW, UUH).

This is the first report of *Dicranum setifolium* for continental Russia. For a long time, this rare species with a sporadic eastern Asian distribution had been considered endemic to Japan (Noguchi, 1987). Subsequently, it was reported from China, Jilin (Gao *et al*., 1999) and Shikotan Island (Bakalin *et al*., 2009).

In Japan *Dicranum setifolium* grows on rocks at high altitude (1800–2590 m a.l.s.); in China it occurs on soil and bases of tree trunks; on Shikotan Island it was collected on a horizontal area of wet cliff on Notoro Mt. (320 m a.s.l.), and in Khabarovsk Territory this species was found on rock outcrops in the alpine belt. The newly found localities provide a northward extension in the continental range for this species. Morphologically *D. setifolium* is quite distinctive and rather hard to confuse with other species. In some respects it resembles species of the *D. elongatum* Schleich. *ex* Schwägr. complex, but differs in having a very strong and long costa and growing in loose tufts.

12. ***Didymodon icmadophilus*** (Schimp. *ex* Müll.Hal.) R.H.Zander

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Vicinity of Baku, Mardakan, arboretum, in a plot of remnant native vegetation of Apsheron, on stones, 10 April 2010, *leg.* T. Konovalova, N. Shevyreva & Yu. Pirogov *s.n., det.* E. Ignatova (MW9035946 ex MHA).

Didymodon icmadophilus has been reported from mostly mountainous or northern regions of Europe, Asia, and North, Central and South America, although the distribution details are obviously obscured by the difficult delimitation from similar taxa (Kučera *et al.* in Ellis *et al*., 2016c). Nevertheless, molecular data (Kučera & Ignatov, 2015) confirmed this as a distinct species.

The species has been reported from all countries neighbouring Azerbaijan; Georgia, Armenia, the Russian part of the Caucasus, Iran, and recently from Turkey (Townsend, 2005; Ignatov *et al*., 2006; Kürschner & Frey, 2011; Kırmacı *et al*., 2012). In the eastern Mediterranean and the Caucasus, *D. icmadophilus* has usually been collected on limestone and sandstone outcrops at high altitudes above 1000 m (Ignatov *et al*., 2010; Kırmacı *et al*., 2012; Kučera *et al.* in Ellis *et al*., 2016c; specimens in MW). The present collection was made at 0–5 m a.s.l., not far from the Caspian Sea, which presently lies about 28 m below sea level, and the collection site is most probably the lowest ever recorded for the species.

13. ***Ditrichum ditrichoideum*** (Cardot) Ochyra

Contributors: R. Ochyra and M. Lebouvier

Subantarctic, Îles Crozet, Île de la Possession: (1) eastern coast, Pointe Lieutard, rock outcrops 300 m south of Alfred Faure Station, 46°26.132′S, 51° 51.513′E, 100 m a.s.l., on bare ground between stones in the fellfield in fairly dry and sheltered situations, 16 November 2012, *leg.* R. Ochyra *2712/12* (KRAM); (2) same area, rock outcrops 100 m north of Alfred Faure base by road to Crique du Navire, 46°25.859′S, 51°51.551′E, 90 m a.s.l., on ground at foot of cliff in the fernbrake dominated by *Blechnum penna-marina* (Poir.) Kuhn and *Acaena magellanica* (Lam.) Vahl, forming small patches in somewhat shaded and slightly moist situation, 22 November 2012, *leg*. R. Ochyra *3123/12* (KRAM); (3) plateau 2 km south of Port Alfred base and 2 km south-east of Mont Branca, 185 m, 46°44′59″S, 51°841′35″E, in crevices and on ledges of lava rock in a dry and exposed situation associated with *Valdonia microcarpa* (Mitt.) Ochyra and *Andreaea acutifolia* Hook.f. & Wilson, 11 November 2006, *leg.* R. Ochyra *186/06* (KRAM).

Ditrichum districhoideum is one of the most distinctive and unmistakable species of the genus *Ditrichum*

Hampe which is immediately distinguished from all other congeners by the presence of copious rhizoidal 3–5-cellular gemmae and coarsely mamillose leaf subulae. It was described as a separate species, *D. gemmiferum* Ochyra & R.I.L.Sm. (Ochyra & Lewis Smith, 1998) which proved to be conspecific with the poorly known and neglected species originally described as *Philibertiella ditrichoidea* Cardot from Patagonia (Cardot, 1914; Ochyra *et al*., 2008b). The species is fairly common on Deception Island in the South Shetland Islands and in the South Sandwich Islands in the maritime Antarctic (Ochyra *et al*., 2008b), but these are volcanic islands and *D. ditrichoideum* grows there exclusively on heated ground. Apart from the Antarctic it is known from the Prince Edward Islands and Îles Kerguelen in the Subantarctic (Ochyra & Lewis Smith, 1998; Ochyra & Poulsen, 2003). The species was also mentioned from Îles Crozet (Ochyra *et al*., 2008b) and this record is substantiated in the present note by citation of the relevant voucher specimens. The second centre of occurrence of *D. ditrichoideum* is southern South America where it occurs in western Patagonia in southern Chile (Ochyra & Deguchi, 1999).

Ditrichum ditrichoideum is considered an Afro-American amphiatlantic south-cool-temperate species, penetrating to the Antarctic where its localities are associated with warm ground on volcanic islands. This distribution pattern is exhibited by well over 80 species of mosses. Most of them are tropical lowland and montane species (e.g. Allen & Crosby, 1986; Ochyra *et al*., 1992; Zomlefer, 1993; Bednarek-Ochyra *et al*., 1999; Ellis *et al*., 2012c; Atwood, 2015), but there is also a relatively small group of south-temperate cool-adapted moss species (e.g. Ochyra & Ireland, 2004, 2016; Ochyra & Singh, 2008; Ochyra, 2010; Bednarek-Ochyra & Ochyra, 2010, 2013b; Ochyra *et al*., 2014, 2015) to which *D. ditrichoideum* is another addition.

The moss flora of Îles Crozet has long been the most underinvestigated of all subantarctic islands. In the early 1970s, merely *ca* 40 species had been recorded from this archipelago (Hébrard, 1970; Desplanques & Hébrard, 1972). In the last decade progress has been made in studies of mosses in this area and both floristic and taxonomic studies have yielded over 35 new moss reecords for Îles Crozet (e.g. Ellis *et al*., 2012b, 2013, 2016a, 2016b, 2017a, 2017b, 2018b; Ochyra & Bednarek-Ochyra, 2013; Bednarek-Ochyra, 2014d). Accordingly, at present about 75 species of moss are known from this archipelago, but further new discoveries are expected. The real moss flora of Îles Crozet is probably at the level of 90–100 species as is the case with the neighbouring Prince Edward Island archipelago, which has a similar size, climate and vegetation (Ochyra, 2008).

14. ***Encalypta affinis*** R.Hedw.

Contributors: E. Yücel and T. Ezer

Turkey: Eskişehir Province, Mihalıççık District, Üçbaşlı Village, Kocagöz creek, Ağdacık: 39°48′N, 31°39′E, growing on moist soil of calcareous origin, 982 m a.s.l., 26 May 1986, *leg.* and *det.* E. Yücel & T. Ezer *s.n.* (ANES 19640).

Following the identification of specimens collected in 1986 in Eskişehir Province in Central Anatolia, *Encalypta affinis* is here reported for the first time from Turkey and south-west Asia.

The genus *Encalypta* Hedw. comprises around 28 taxa (including several recently described species, such as *E. sinica* J.C.Zhao & M.Li, *E. texana* Magill, *E. obovatifolia* Nyholm, *E. buxbaumioidea* T.Cao, C.Gao & X.L.Bai, *E. thianschanica* J.C.Zhao, R.L.Hu & S.He (Nyholm, 1995; Cao *et al*., 2001; Magill, 2006; Fedosov, 2012)). Hitherto, half of these 28 taxa have been reported from the Mediterranean Basin (Ros *et al*., 2013). According to the bibliography of Turkish bryological and recent literature, it is represented in Turkey by 11 taxa (Uyar & Çetin, 2004; Kürschner & Erdağ, 2005; Kürschner & Frey, 2011; Ros *et al*., 2013; Batan *et al*., 2016). This new record of *E. affinis,* brings the number of species of *Encalypta* known from Turkey to 12, and is based on a collection from central Anatolia, an area characterised by a continental climate with cold, snowy winters and hot, dry summers. The specimen was collected on moist calcareous soil, found together with *Ptychostomum capillare* (Hedw.) Holyoak & N.Pedersen, *P. torquescens* (Bruch & Schimp.) Ros & Mazimpaka, *Didymodon rigidulus* Hedw. and *Tortella tortuosa* (Hedw.) Limpr.

Encalypta affinis has been reported in Europe from Spain, France, Greece, Italy, Montenegro, and Slovenia (Ros *et al*., 2013) and also from protected mountain or alpine habitats in America (Greenland, Yukon) and Asia (Himalayan Nepal, Kazakhstan, Russia) (Magill, 2007). In addition, the species was included in the new Red List for European Bryophytes in the VU category (Spain), RE category (Czech Republic), R category (Germany), DD category (Montenegro, Serbia) and CR category (Romania) (Hodgetts, 2015).

Encalypta affinis is characterised by a papillose calyptra with a long rostrum and an irregular basal fringe, densely papillose, linear, pink peristome teeth, and small, regularly gemmate spores. Leaf apices in the Turkish specimen vary from hair-pointed to muticous, and as is characteristic of the species, the transverse walls of the basal leaf cells are thick-walled, dark-orange and papillose (Horton, 1983). *Encalypta affinis* is the only species in this genus with papillae on the basal leaf cells (Magill, 2007).

15. ***Encalypta pilifera*** Funck

Contributors: L. Sáez, M. J. Cano, J. Muñoz and R. Ros

Morocco: High Atlas, Toubkal, refuge Neltner, 31° 03′49″N, 7°56′15″W, 3400 m a.s.l., ridges and fissures of quartzitic rocks, 20 June 1998, *leg.* M. J. Cano, J. Muñoz and R. Ros *s.n.* (MUB 9003).

Encalypta pilifera was recently recognised as a distinct species within the *E. vulgaris-rhaptocarpa* complex (Fedosov, 2012; Blockeel, 2013; Batan *et al*., 2016). It has a wide distribution in northern Asia: Mongolia and Russia (Caucasus, Siberia, Urals and Yakutia), mostly associated with subarctic, montane areas (Fedosov, 2012). It is also known from Turkey (Batan *et al*., 2016) and several countries in Europe (France, Germany, Sweden, Switzerland and UK) (Blockeel, 2013). Fedosov (2012) suggested that data from Horton (1983) regarding *E. intermedia* Jur. indicated that the latter may be conspecific with *E. pilifera*, and that if confirmed, this would extend the range of the species to North America and Africa. However Horton (1983) did not report *E. intermedia* from Africa, but from North America and Eurasia. Therefore, the present report from Morocco is an interesting addition to the moss flora of Africa.

According to Fedosov (2012) the combination of well ribbed gymnostomous capsules, calyptra with entire base and short rostrum, and apiculate to hair-pointed leaves separates *E. pilifera* from all other *Encalypta* species. Plants in the collection have stems 3–9 mm tall; leaves 1.1–2.7 mm long (excluding hair-point), from oblong-elliptic to oblong-lanceolate, sometimes broadly spathulate, apices obtuse to acute, mucronate to hair-pointed, margins plane (serrulate due to papillae in the upper part), nerve excurrent as a distinct hair-point to 0.9 mm long, upper median leaf cells 7–18 × 9–20 µm, quadrate to hexagonal, papillose, basal cells 23–45 × 14–20 µm, more or less rectangular, smooth.

Autoicous. Seta 3–7 mm long. Capsules exserted, subcylindrical, 1.5–2.3 mm long, ribbed. Peristome absent. Spores 25–31 µm coarsely papillose. Calyptra cylindrical, entire at base, pale yellow, extending well below capsules.

Encalypta rhaptocarpa Schwägr. was reported from Jbel Toubkal (Ros *et al*., 2000) based on the specimen here referred to as *E. pilifera*. Since this was the only African record for *E. rhaptocarpa*, its presence in Africa requires confirmation.

16. ***Entosthodon hungaricus*** (Boros) Loeske

Contributor: P. Dřevojan

Austria: Niederösterreich, Weinviertel, Zwingendorf (distr. Mistelbach): on the western edge of the site ‘Saliterheide’ 2.3 km ESE of church, 48°42′07.9″N, 16°15′54.1″E, 170 m a.s.l., bottom of dried puddle at the crossroads of field roads, 14 April 2017, *leg.* P. Dřevojan *PDb17/012* (BRNU 657581), *Ibid.*: bottom of dried field wetland in alfalfa field, 14 April 2017, *leg.* P. Dřevojan *PDb17/013* (BRNU 657582); *Ibid.*: in the southern part of the site ‘Saliterheide’ 2.4 km ESE of church, 48°41′59.8″N, 16°15′58.1″E, 170 m a.s.l., exposed soil on the edge of the footpath passing through the dry saline grassland, 14 April 2017, *leg.* P. Dřevojan *PDb17/014* (BRNU 657583), *Ibid.*: exposed soil at top of an old anthill, 6 May 2017, *leg.* P. Dřevojan *PDb17/015* (BRNU 657584).

Entosthodon hungaricus has been reported from the Canary Islands, the Mediterranean area, Central Europe, the Balkans, Romania, Moldova, the Ukraine, the Caucasus and south-eastern Russia (Ros *et al*., 2013; Hodgetts, 2015). In recent years it has been found in Montenegro (Sabovljević *et al.*, in Ellis *et al*., 2016b) and Anatolia in Turkey (Yücel & Ezer, in Ellis *et al*., 2017c). In Austria, it was known only from the eastern shore of Lake Neusiedl (Grims & Köckinger, 1999), where it is abundant in the Seewinkel-area (Zechmeister, 2004). This was one of the type localities for *E. hungaricus* described by Boros (1925).

Entosthodon hungaricus is relatively rare throughout its range. It is included in the Red Lists of several Central European states (Hodgetts, 2015) and in the Red Data book of European bryophytes in the ‘Rare’ category (ECCB, 1995). In Austria, it is listed as an endangered species (Grims & Köckinger, 1999).

17. ***Frullania aculeata*** Taylor

Contributor: A. Schäfer-Verwimp

Panama: Prov. Coclé, El Valle de Anton, Cerro Gaital, cloud forest between Alto de la Mesa and the summit, at edge of trail near mirador, 8°37.4′N, 80° 07.1′W, 1015 m a.s.l., 26 March 2013, *leg.* Schäfer-Verwimp & Verwimp *34229* (JE).

Frullania aculeata is easy to recognise by its very long and finely acuminate leaf tips and can hardly be confused with any other species of the genus (Clark & Svihla, 1949, as *F. acuminata* Steph., both with description and figures; Uribe-M & Gradstein, 2003). It was described more than 170 years ago (Taylor, 1846) from two collections from Ecuador, one made by Jameson ‘near Cuenca’ and the other made by Darwin in 1835 on the Galápagos Islands. The latter was chosen as lectotype by Uribe-M & Gradstein (2003). The illustrations of *F. aculeata* provided by Stephani (1985, Figures 3778–9, plants from Brazil, Peru and Venezuela) probably belong to *F. peruviana* Gottsche (which is, however, not known to occur in Brazil), and that may explain why he considered *F. acuminata* (Stephani, 1909–1912, 1985, Figs. 3780–1) to be an undescribed species. Finally, Gradstein & Weber (1982) synonymised *F. acuminata* under *F. aculeata*.

Frullania aculeata is now known to be rather widespread in continental Ecuador, reported from the states of Azuay, Bolivar, Chimborazo, Cotopaxi, El Oro, Loja, Pichincha and Los Ríos (Clark & Svihla,

1949; León-Yánez *et al*., 2006; Schäfer-Verwimp *et al*., 2013); it is known also from northern Peru from the type of *F. acuminata*. The altitudinal range of the species is 300–3000 m a.s.l. This new record is a considerable northward extension of its range, and is the first for Central America.

18. ***Grimmia caespiticia*** (Brid.) Jur.

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Zaqatala District, the Great Caucasus Range, Mt. Noorbashy (Baskitau), SSW 85° slope, 41°44.467′N, 46°44.501′E, 2870 m a.s.l., on an outcrop of ferruginous schist, 5 August 2004, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9040413).

Grimmia caespiticia is distributed in the mountains of the western coastal areas of North America, central and southern Europe, Asia Minor, and further east from several localities in the Caucasus, Middle Asia and the mountains of southern Siberia (Ignatova & Muñoz, 2004). It grows above the tree line, on exposed acidic and neutral rocks.

The species has been reported from all countries neighbouring Azerbaijan; the Russian part of the Caucasus, Georgia, Armenia, Turkey and Iran (Ignatova & Muñoz, 2004; Ignatov *et al*., 2006; Safavi & Shirzadian, 2011; Ros *et al*., 2013).

19. ***Grimmia longirostris*** Hook.

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Zaqatala District, the Great Caucasus Range, Mt. Noorbashy (Baskitau), Dindi tract, 80° southern slope, 41°43.365′N, 46°44.224′E, 2480 m a.s.l., on an outcrop of ferruginous schist, 7 August 2004, *leg.* K. Korotkov *s.n., det.* E. Ignatova (MW9041284).

Armenia: Kirovakan [modern Vanadzor] District, Shagali, Aslan-Kharbi, forest margin, 4 September 1941, *leg.* A. Fedorov *s.n., det.* E. Ignatova (MW9041282 ex LE).

Grimmia longirostris was reported from neighbouring Iran, Georgia, the Russian part of the Caucasus and Turkey (Akhani & Kürschner, 2004; Townsend, 2005; Ignatov *et al*., 2006; Ros *et al*., 2013). These records are filling an obvious gap. *Grimmia longirostris*, widely known earlier as *G. affinis* Hornsch., is one of the most widespread species of the genus in northern hemisphere, also growing in the high mountains of South America, New Guinea, East Africa, Australia and New Zealand. It is equally frequent in forest and alpine mountain zones and grows on acidic and neutral rocks, in sunny and shaded places (Ignatova & Muñoz, 2004).

20. ***Gymnocoleopsis cylindriformis*** (Mitt.) R.M.Schust.

Contributors: S. R. Gradstein, F. Osorio and †J. Váňa

Northern Chile: Atacama region, Huasco province, Alto del Carmen, 28°45′24″S, 70°29′12″W, 2120 m a.s.l., in small stream on rocky slope, adjacent to a small *Oxychloë* Phil. bog, 2 November 2017, *leg.* J. L. Muñoz *s.n.* (*F. Osorio 7134*), ster. (SGO-168436); Copiapó province, Tierra Amarilla, 27° 28′56″S, 70°15′12″W, 3270 m a.s.l., alpine bog ('bofedal') dominated by *Oxychloë andina* Phil., submerged in shallow pool (20 cm deep), in stagnant water together with *Pseudocephalozia quadriloba* (Steph.) R.M.Schust., 12 September 2017, *leg.* F. Osorio *7102*, ster. (SGO-168437).

Gymnocoleopsis R.M.Schust. (Cephaloziellaceae) is a small, largely southern-hemisphere genus of two species: *G. capensis* (S.W.Arnell) R.M.Schust. in South Africa and the widespread but rather rare *G. cylindriformism,* which occurs in Mexico and the high Andes from Venezuela to northern Bolivia, in the mountains of East Africa (Democratic Republic of Congo, Rwanda, Tanzania), and on Kerguelen, Crozet Islands and Prince Edwards Islands in the southern Indian Ocean (Schuster, 2002; Váňa in Ellis *et al*., 2011a). The latter species used to be called *G. multiflora* (Steph.) R.M.Schust. in tropical America and Africa, but Váňa *et al*. (2012) showed that *G. multiflora* was a synonym of *G. cylindriformis*, originally described from Kerguelen. *Gymnocoleopsis cylindriformis* grows on moist, peaty soil and rock, often near running water, at elevations between 3300 and 4460 m in the Neotropics and East Africa (Gradstein *et al*., 1983; Váňa in Ellis *et al*., 2011a), and at much lower elevation in the Subantarctic. The two collections reported here from the Chilean Andes are from the southernmost and lowest altitude localities known for the species on the South American continent, and the first ones from Chile. The plants were found submerged in a pool in an alpine *Oxychloë* bog ('bofedal') at 3270 m a.s.l. and in a streamlet near an *Oxychloë* bog at 2120 m a.s.l. Both localities were in the dry Atacama region of northern Chile. Characteristic of *G. cylindriformis* are the greenish-brown plants (*ca* 1 mm wide) with laxly imbricate, concave, bifid leaves, narrowly obtuse to acute leaf lobes, ±uniformly thickened cell walls without distinct trigones and the terete perianth (without keels). The species closely resembles *Lophonardia laxiflora* (Mont.) Grolle (Scapaniaceae *s.l.*), which may occur in the same habitat in the Andes. The latter species, however, has leaf cells with small trigones (or fully thin-walled), plicate perianths and a stoloniform stem base.

21. ***Hydrogonium amplexifolium*** (Mitt.) P.C.Chen

Contributors: O. M. Afonina and J. Kučera

Russia: Republic of Buryatia, Okinsky District, East Sayan Mts, right bank of Irkut River, *ca* 25 km WSW of Mondy Settlement, 51°46′08″N, 100°42′43″E, *ca* 1900 m a.s.l., rock outcrops near road with *Duschekia fruticosa* (Rupr.) Pouzar, and *Salix* sp. 13

September 2017, *leg.* O. M. Afonina *0417/2*, *det.* J. Kučera, (LE).

Hydrogonium amplexifolium was found in a small tuft associated with *Distichium capillaceum* (Hedw.) Bruch & Schimp., *Didymodon icmadophilus* (Schimp. *ex* Müll.Hal.) K.Saito, *Encalypta procera* Bruch and *Flexitrichum gracile* (Mitt.) Ignatov & Fedosov; it is quite a widely distributed species. Having been described from the Indian Himalaya, it was later found to be present throughout south-eastern Asia and extending to central and north-eastern Asia, North America and Greenland Recently has also been recorded from Europe (Köckinger & Kučera, 2007). In Russia, it was recorded initially from Altai (Ignatov & Zander, 1993), later it was found in Yakutia (Ivanova *et al*., 2005), East Taimyr (Fedosov & Zolotov, 2008) and Zabaikalsky Territory (Afonina *et al*., 2013).

22. ***Hydrogonium gregarium*** (Mitt.) Jan Kučera

Contributors: O. M. Afonina and J. Kučera

Russia: Republic of Buryatia, Okinsky District, East Sayan Mts, right bank of Irkut River, *ca* 25 km WSW of Mondy Settlement, 51°46′08″N, 100°42′43″E, *ca* 1900 m a.s.l., on rock outcrops near road with *Duschekia fruticosa* (Rupr.) Pouzar and *Salix* L. sp., 13 September 2017, *leg.* O. M. Afonina *0417/1*.

Hydrogonium gregarium was found associated with *Didymodon icmadophilus* (Schimp. *ex* Müll.Hal.) K.Saito and *Encalypta procera* Bruch. and has a similar distribution to *Hydrogonium amplexifolium* (Mitt.) P.C.Chen (see above), although it also extends along the Pacific coast of North America farther south to Mexico (Kučera *et al*., 2013) and is not recorded from Europe. In Russia, this moss was discovered first in the central part of Yakutia (Ignatova *et al*., 2013), but according to the latest research it has been found surprisingly to be fairly common in the south of Yakutia (M.S. Ignatov, pers. comm.). The present record expands the known distribution of the species in Russia.

23. ***Molendoa taeniatifolia*** Herzog

Contributor: N. Schnyder

Switzerland: Canton of Bern, Schiltbach waterfall, on calcareous rock, 46°32′53″N, 7°52′44″E, 1660 m a.s.l., 4 November 2017, *leg*. N. Schnyder *s.n.* (Z), *conf*. T. Kiebacher, J. Kučera.

Molendoa taeniatifolia Herzog [≡ *Anoectangium taeniatifolium* (Herzog) M.O.Hill] is a species of the *M. hornschuchiana* complex, which consists of up to five species, depending on the taxonomical concept. It is similar to *M. tenuinervis* Limpr. but the leaf tips are characteristically swollen and deciduous, forming asexual distribution units. Up to now, sporophytes have not been found. The species grows in compact tufts on vertical or overhanging calcareous rocks, often beside waterfalls, at altitudes mostly above 2000 m a.s.l. and up to 2800 m a.s.l. It was first described by Herzog in 1942 in the Austrian alps (Herzog, 1943). This was the only known locality until it was found at Mont-Cenis, in the province of Savoie, France in 1955. There it was described by Castelli (1966) under the name *M. clavuligera* Castelli but later the same author synonymised it under *M. taeniatifolia* (Castelli, 1968).

In France, it is known to occur at nine sites in the province of Savoie, only one of which has been seen since 2000 (Chavoutier & Hugonnot, 2013). In Austria, there are about six recent localities, all near the original site in the Hohe Tauern mountains which has not been confirmed in recent times (C. Schröck, pers. comm.).

The new site in Switzerland is situated on overhanging, calacareous rocks below a waterfall. It lies at a relatively low elevation of 1660 m a.s.l. The site is often rather dry as it is not exposed to rainfall but it is moistened by the waterfall spray in times of high water level. Including this first record in Switzerland, there are only about 16 sites known worldwide. The new record links the two formerly known distribution areas in Austria and France. This very rare species is not known from other countries (Hodgetts, 2015) so it is considered an alpine endemic in Central Europe (Berg, 1999).

24. ***Molendoa warburgii*** (Crundw. & M.O.Hill) R.H.Zander

Contributor: D. G. Long

Bhutan: Trongsa Dzongkhag, Trongsa District, west of Kemla La, between Phobsikha and Black Mountain, 27°23′39.8″N, 90°18′09.3″E, *ca* 4190 m a.s.l., rocky ridge with calcareous rock outcrops and *Rhododendron* L., on damp schist face in cleft on low crag, 2 October 2017, *leg*. D. G. Long *45183* (E).

China: Yunnan Province, Yulong County, Yulong Shan, head of valley above Wo Tu Di, *ca* 3800 m a.s.l., on damp acid cliff near waterfall, 10 October 1990, *leg*. D. G. Long *19026* (E00145982); Gongshan County, Dulong Xiang, west slope of Gaoligong Shan, Irrawaddy catchment, Qiqi trail between San Dui and Xishaofang, 27°42′21.5″N, 98° 25′54.1″E, *ca* 2922 m a.s.l., degraded *Rhododendron* bamboo scrub with old dead *Abies* trunks and young regenerating *Abies*; in cracks on wet shady rock outcrop, 1 November 2004, *leg*. D. G. Long *33811* (E00272071, KUN, CAS, MO); Gongshan County, Bingzhongluo Xiang, east slope of Gaoligong Shan, Nu Jiang (Salween) catchment, N side of lake at head of Nianwaluo He valley below Gawagapu Mountain, 27°58′53.2″N, 98°28′35.9″E, *ca* 3715 m a.s.l., metamorphic rock outcrops and low cliffs on alpine lake shore; on rock face by inflow stream, 18 August 2006, *leg*. D. G. Long *35823* (E00266869,

KUN, CAS, MO); Nu Jiang (Salween) catchment, valley above NW end of lake at head of Nianwaluo He valley below Gawagapu Mountain, 27° 59′02.2″N, 98°28′22.0″E, *ca* 3735 m a.s.l., steep-sided alpine valley with eroding schist banks and rock outcrops; on crumbling gravelly bank of stream, 19 August 2006, *leg*. D. G. Long *35859* (E00266848, KUN, CAS, MO).

India: Sikkim, West District, tributary of Prek Chhu opposite Lambi, N of Thangshing, 27°31′N, 88°11′E, *ca* 4195 m a.s.l., steep rocky ravine; on rock face, 20 July 1992, *leg*. D. G. Long *22744* (E00147010); Prek Chhu valley between Thangshing and Onglakthang, 27°32′N, 88°11′E, *ca* 4075 m a.s.l., huge calcareous boulders on river bank; in crevices of soft schist rock, 21 July 1992, *leg*. D. G. Long *22774* (E00147008).

Nepal: Central Region, Nuwakot District, Thare Danda ridge 2 km south of Thare Pati, 27°59′N, 85° 29′E, *ca* 3680 m a.s.l., *Juniperus*/*Rhododendron campanulatum* forest; on vertical calcareous schist rock outcrop, 1 May 1992, *leg*. D. G. Long *22243* (E00145997); East Region, Sankhuwasabha District, Pemathang Kharka, south side of Barun Khola, 27° 44′N, 87°12′E, *ca* 3525 m a.s.l., ravine in dense *Rhododendron*/*Betula*/*Abies* forest; seepage areas on wet overhanging rock face shaded by *Betula* and bamboo, 29 September 1991, *leg*. D. G. Long *20759* (E00145992); Nehe Kharka, south side of Barun Khola, 27°45′N, 87°10′E, *ca* 3740 m a.s.l., steep calcareous gully under huge cliffs; in fissure lines on wet rock face, 30 September 1991, *leg*. D. G. Long *20796* (E00145993); Nehe Kharka, south side of Barun Khola, 27°45′N, 87°10′E, *ca* 3740 m a.s.l., steep calcareous gully under cliffs; in calcareous rock crevices, 30 September 1991, *leg*. D. G. Long *20827* (E00145987); near Repu Kharka, north side of Barun Khola, 27°46′N, 87°09′E, *ca* 3935 m a.s.l., south-facing basic cliffs on side of valley; on loose wet rocks on side of gully, 1 October 1991, *leg*. D. G. Long *20838* (E00145988); Upper Barun Khola valley; cliffs on south side of Lower Barun Glacier opposite Mera, 27°48′N, 87°07′E, *ca* 4405 m a.s.l., rocky calcareous slopes below cliffs; on damp shady rock face, 3 October 1991, *leg*. D. G. Long *20910* (E00145990); upper Barun Khola valley, north bank of Barun Khola at foot of Lower Barun Glacier, 27° 47′N, 87°08′E, *ca* 4410 m a.s.l., calcareous SW-facing cliffs; on shady crumbling rock ledges, 7 October 1991, *leg*. D. G. Long *20988* (E00145986); north bank of Barun Khola above Pemathang Kharka, 27°45′N, 87°11′E, *ca* 3510 m a.s.l., margin of *Abies*/*Rhododendron* forest; on boulder, 8 October 1991, *leg*. D. G. Long *21029* (E00145998).

Following its first description by Crundwell & Hill (1977) from Great Britain and Ireland, the range of *Molendoa warburgii* (formerly *Anoectangium warburgii* Crundw. & M.O.Hill) in Europe has been extended to include the Faroe Islands (Averis & Averis, 1991), Norway (Birks, 1992), Iceland (Jóhannsson, 2003) and Sweden by Hodgetts, Lönnel, Hallingbäck and Lüth (Ellis *et al*., 2017a). Since first finding it new to Asia in Yunnan in October 1990 on the Chungtien/Lijiang/Dali Expedition, I have looked for it in the Sino-Himalaya wherever I have encountered calcareous metamorphic schist or limestone rocks at high altitude. Many of the Sino-Himalayan mountains are composed of acid granitic rocks with a predominately calcifuge bryoflora, where calcicoles rarely occur. This accounts for the isolated occurrences of this moss and many other calcicoles in these regions. Identification of most of these specimens has been confirmed by Philip Sollman.

The habitats of the moss in Asia show strong similarities with those in Europe; it often grows in small yellowish patches in crevices along moist cracks on calcareous, often metamorphic, rock walls. However, in Asia the habitats are naturally at much higher elevations, from 2922 m in Yunnan and up to 4410 m in East Nepal. At the lower end of this range the habitats are in *Abies*/ *Rhododendron* forest extending to well above the tree line, for example close to the Lower Barun Glacier in the Makalu-Barun National Park in East Nepal. Bryophytes closely associated with *M. warburgii* include the mosses *Blindia acuta* (Hedw.) Bruch & Schimp., *Bryoerythrophyllum wallichii* (Mitt.) P.C.Chen, *Cratoneuron filicinum* (Hedw.) Spruce, *Didymodon tophaceus* (Brid.) Lisa, *Distichium capillaceum* (Hedw.) Bruch & Schimp., *Encalypta ciliata* Hedw., *Flowersia sinensis* (Broth.) D.G.Griffin & W.R.Buck, *Hymenostylium recurvirostrum* (Hedw.) Dixon, *Oreas martiana* (Hoppe & Hornsch.) Brid., *Orthothecium intricatum* (Hartm.) Schimp., *Plagiopus oederianus* (Sw.) H.A.Crum & L.E.Anderson and *Reimersia diversiretis* (Broth. *ex* Hand.-Mazz.) Shevock *et al*. and the liverworts *Anthelia juratkana* (Limpr.) Trevs., *Asterella grollei* D.G.Long, *Blepharostoma trichophyllum* (L.) Dumort., *Conocephalum salebrosum* Szweyk., Buczk. & Odrzyk., *Marchantia quadrata* Scop., *Pellia endiviifolia* (Dicks.) Dumort. and *Reboulia hemisphaerica* (L.) Raddi.

25. ***Niphotrichum barbuloides*** (Cardot) Bedn.-Ochyra & Ochyra

Contributors: R. Ochyra, K.-Y. Yao and J. R. Shevock

Taiwan: Yilan County, (1) Tai-ping-shan, forest working station on right-hand side, 2000–2200 m a.s.l., on cliff, open dry slope, 29 August 1968, *leg.* Ching-chang Chuang *2224* (UBC); Taichung County, (2) trail to Snow Mountain (Huesh shan), along ridge from Mt. Snow East Peak just east of

369 Shelter (Takajin), 3100 m a.s.l., 24°24′N, 121° 15′30″E, forest of *Abies kawakamii* (Hayata) T.Ito, *Yushunia* Keng f. (bamboo), *Rhododendron* L. and *Gautheria* Kalm *ex* L., on soil and litter, 25 April 1999, *leg.* J. R. Shevock *18034* with Lin Shu-Hong & Lai Kwo-Shang (MO); (3) near Ta-yu-ling (in Hualien Co.), road-side cut, *ca* 2650 m a.s.l. (cool temperate montane forest zone = orohemiboreal zone), 22 October 1970, *leg*. T. Koponen *17966*, *17970 & 17972* (H, KRAM); Nantou County, (4) Taroko National Park, on Mt Bilu Trail along road 820 (now a trail) off a highway 8 between km marker 111 and 111.5 next to tunnel, headwaters of Bilyu River, on trail at 0.9 km marker, 24°11′16.5″N, 121°18′45.8″E, 2600 m a.s.l., mixed hardwood forest with scattered *Tsuga* (Endl.) Carrière and *Pinus* L. on metamorphic talus with soil in sun to filtered light, 16 October 2016, *leg*. J. R. Shevock *49487* with Kuei-Yu Yao and Alfons Schäfer-Verwimp (CAS, KRAM); (5) western slopes just below divide near Mt. Hohuanshan off highway 14, headwaters of Ho-huan Stream, 3025 m a.s.l., 24°08′37.5″N, 121°16′50.4″E, alpine streamside within *Yushania* grasslands over metamorphic bedrock, litter over rock in full sun, 28 September 2008, *leg.* J. R. Shevock *31954* with Eric Shiu-Hong Lin (CAS, KRAM); (6) Ren-ai village, Mt. Ho-huan Shan, 2925 m a.s.l., 24°09′N, 121°15′E, on rocks, 9 August 2002, *leg.* Si He *36209 & 36213b* (KRAM); (7) Ren-ai village, high altitude experimental station (Taiwan Endemic Species Research Institute), 3000 m a.s.l., 24°10′N, 121°16′E, on rocks, 8 August 2002, *leg.* Si He *36255* (KRAM); (8) Mount Nengkaoshan ('Mt. Nôkô'), between Noko Police Station (9437 ft. = 2880 m a.s.l.) and the Prefectural Boundary, 10200 ft. (= 3110 m a.s.l.), west of the divide, 5 October 1926, *leg.* H. H. Bartlett *6220* (UC); Hualien County, (9) Xiu-lin village, Shi-Men Shan mount, 3237 m a.s.l., 24°09′N, 121°17′E, on rocks, 9 August 2002, *leg.* Si He *36034*, *36036 & 36040* (KRAM); (10) Shyu-lin village, road sides between Ta-yu-lin and Mt. Ho-huan, *ca* 2700–3100 m a.s.l. (lower oroboreal zone), 23 October 1970, *leg.* T. Koponen *18084 & 18132* (H, KRAM); (11) Mount Notokayama, Karen-gun (24°00′N, 121° 16′E), 31 December 1940, *leg.* N. Ui *3988* (MAK B-50757); Chiayi County, (12) southern-cross Island highway, Mei-shan to Ten-chu, 18 December 1982, *leg.* T. Y. Chiang *2517* (B); Taitung County, (13) Yakou, hillside near South Cross Highway, 2750 m a.sl., 23 December 1977, *leg.* M. J. Lai *9534* (MO).

Niphotrichum Bedn.-Ochyra & Ochyra is the most distinctive and sharply delimited segregate of the traditionally conceived genus *Racomitrium* Brid. (Ochyra *et al*., 2003; Sawicki *et al*., 2015). It is well diagnosed, among other things, by its laminal cells that are strongly papillose with tall conical papillae situated over the lumina; peristome teeth that are very long and regularly divided to the base into 2–3 thread-like branches; and the angular cells that are hyaline or yellowish-hyaline, thin-walled and form prominent, convex and often decurrent auricles. *Niphotrichum* is a small genus of eight species centred around *N. canescens* (Hedw.) Bedn.-Ochyra & Ochyra, the most widespread, panholarctic species of the genus. Other species have long been neglected and often misunderstood and consequently their geographical ranges are imperfectly known.

One such species is the Asian *Niphotrichum barbuloides* which was described by Cardot (1908) from South Korean Quelpaert (now Jeju) Island from specimens collected by Urbain J. Faurie, a French botanist and missionary to Japan and China. It was subsequently rediscovered in Manchuria (now in Liaoning Province of China) and Dixon (1934) described this collection as a separate variety, *Racomitrium barbuloides* Cardot var. *brevipilum* Dixon. He considered it as a derivative from *R. canescens* (Hedw.) Brid., but very peculiar in habit and very closely resembling terrestrial forms of *Tortula ruralis* (Hedw.) P.Gaertn., B.Mey. & Scherb. This variety has actually little in common with *N. barbuloides* and it is instead identical to *Niphotrichum japonicum* (Dozy & Molk.) Bedn.-Ochyra & Ochyra (Frisvoll, 1983). Sakurai (1937) reported *N. barbuloides* from Korea and Japan and his specimens do represent this species but this author considered it as a weak species, closely related to European *R. tortuloides* Herzog, which hardly deserves recognition as a separate taxon. The latter is actually conspecific with *N. canescens* (Frisvoll 1983) and it is only distantly related to the Asian species.

Noguchi (1958) contributed much to the neglect of *Niphotrichum barbuloides* when he reduced this name to synonymy with *Racomitrium canescens* (Hedw.) Brid. var. *epilosum* H.Müll. This concept was subsequently consolidated in the revision of the genus *Racomitrium* in Japan (Noguchi, 1974) and in the moss flora of Japan (Noguchi, 1988). Frisvoll (1983) admittedly reinstated *R. barbuloides* as a distinct species and thoroughly recircumscribed it but his revolutionary reappraisal of the taxonomy of the *R. canescens* complex was only accepted with reservation by some bryologists, even in Europe and North America, and Asian bryologists mostly followed Noguchi's (1974) concept of taxa in this complex. Accordingly, Kuo & Chiang (1987) recorded *R. canescens* var. *epilosum* in their list of Taiwanese mosses, but Lin (1988) used *R. barbuloides*. A decade earlier Lai & Wang-Yang (1976) had recorded another taxon of this complex from Taiwan, namely *R. canescens* var. *ericoides* (Brid.) Hampe. However, none of these authors cited any voucher collections of this taxon from Taiwan.

Cao *et al*. (1998, 2003) reinstated *Niphotrichum barbuloides* as a species in its own right in China, although they placed it in *Racomitrium*. Yet, it appears that the species is still misunderstood and all collections determined in Chinese herbaria as *N. ericoides* (Brid.) Bedn.-Ochyra & Ochyra likely belong to *N. barbuloides*. The same situation refers also to the specimens so named from Taiwan and, additionally, most collections named *N. canescens* also represent other species of the genus, including *N. japonicum* and *N. barbuloides*; *N. canescens* is very rare in China (Ellis *et al*., 2018a). All specimens of the genus *Niphotrichum* from Taiwan which have so far been examined actually belong to *N. barbuloides* which appears to be widely distributed throughout the higher elevations of this island.

26. ***Notothylas orbicularis*** (Schwein.) Sull. *ex* A.Gray

Contributors: C. Reeb and R. L. Andriamiarisoa

Madagascar: Vatovavy-Fitovinany, Ambatofotdsy, at the entrance of the village from the south, on the driest part of a rice field after harvesting, mixed with *Ephemerum* Hampe sp., 19°04′30.04″S, 47°32′40.793″E, 1273 m a.s.l., 15 May 2016, *leg*. C. Reeb *CR16M7* (PC, TAN, MO), *det*. C. Reeb, *conf*. J.C. Villareal.

This is the first citation of the genus *Notothylas* Sull. for Madagascar (Marline *et al*., 2012). The genus is easily identified by the thallus forming small rosettes (10–15 mm diameter), the short sporophyte (less than 20 mm) which is bullet or banana shaped and develops horizontally on the thallus and remains enclosed in the involucre. It is monoicous. *Notothylas orbicularis* is characterised by two brown dehiscence lines on the sporophyte, the yellow and highly vermiculate spores, the persistence of the columella and pseudoelaters with helicoidal thickenings (Gradstein & Pineiro-Da Costa, 2003; Villareal *et al*, 2010).

Notothylas orbicularis was first cited for Africa by Stephani (1901) and then as *N. angolensis* Steph. (Stephani, 1901; Wigginton & Grolle, 1996). It is known in Africa from Uganda, Zaire (Wigginton, 2009) and Rwanda (Fischer, 2013). Here, the collection is mixed with *Ephemerum* Hampe sp., another genus newly reported for Madagascar (Reeb, pers. com.). These two new reports from a human influenced area may support the hypothesis that such open areas are under-explored in Africa (Stieperaere & Matcham, 2007) and especially in Madagascar.

Notothylas orbicularis is also known from Japan, eastern North America, eastern Europe, tropical South America and Australia (Cargill, 2016). It can be confused with *Notothylas javanica* (Sande Lac.) Gottsche. In comparison to *N. orbicularis, N. javanica* has no elaters or valves (Cargill, 2016), as is the case in *Notothylas vitalii* Udar & Singh cited for Brazil. Notice that in the key to *Notothylas* species in Brazil (Gradstein & Pinheiro da Costa, 2003), the two species *Notothylas vitalii* Udar & Singh and *N. orbicularis* are inverted (Gradstein, pers. com.). This may have caused confusion in some publications: *e.g.* the *N. vitalii* reported for Ecuador in Benitez *et al*. (2012) is actually *N. orbicularis*.

27. ***Orthothecium intricatum*** (Hartm.) Schimp.

Contributor: D. G. Long

China: Qinghai Province, Maduo County, Zhaorigen Shan near Huashixia, 35°07′N, 98°53′E, *ca* 4280 m a.s.l., rocky limestone valley, on damp turfy bank, 3 July 1997, *leg*. D. G. Long *26818* (E-00135459).

Orthothecium intricatum is new to the Qinghai Province of China. In the Sino-Himalaya it has been reported from Nepal and India (Kashmir, NW Himalaya and Sikkim) by Redfearn & Allen (2005). In China it has been reported from Guizhow, Shandong, Shanxi, Xizang (Tibet), Zhejiang and Sichuan by Redfearn *et al*. (1996), and from Inner Mongolia and Xinjiang by Ma *et al*. (2015).

28. ***Orthothecium rufescens*** (Dicks. *ex* Brid.) Schimp.

Contributor: D. G. Long

Bhutan: Trongsa Dzongkhag, Trongsa District, near Kemla La, between Phobsikha and Black Mountain, 27°23′30.8″N, 90°18′31.4″E, *ca* 4190 m a.s.l., rocky ridge with and calcareous rock outcrops and *Rhododendron* L., on wet ledge of calcareous schist terrace, 2 October 2017, *leg*. D. G. Long *45186* (E).

China: Qinghai Province, Huzhu County, Baishuxia (Juniper) Pass, 37°00′23″N, 102°10′40″E, *ca* 3525 m a.s.l., steep slope with *Rhododendron*, *Salix* and *Potentilla* L. scrub, on mossy bank, 22 July 1997, *leg*. D. G. Long *27149* (E00135460); Yunnan Province, Yulong County, Yulong Shan, top of Gang Ho Ba Valley, *ca* 3400 m a.s.l., steep glacier valley, on vertical limestone cliffs, 4 October 1990, *leg*. D. G. Long *18851* (E00135443); Yulong Shan, head of valley above Baishui, north of Lijiang, *ca* 3240 m a.s.l., steep limestone ravine, on wet rock ledges in gully, 7 October 1990, *leg*. D. G. Long *18920* (E-00135445); Yunnan Province, Shangri La (Zhongdian) County, valley below Tian Shu Lake above Xiaozhongdian, 27°37′N, 99°38′E, *ca* 3705 m a.s.l., rocky limestone valley with open *Abies*/*Rhododendron* forest, on wet limestone cliff, 13 June 1993, *leg*. D. G. Long *24343* (E00135458).

Nepal: East Region, Sankhuwasabha District, Nehe Kharka, south side of Barun Khola, 27°45′N, 87°10′E, *ca* 3740 m a.s.l., steep calcareous gully under huge cliffs, on wet rock ledges, 30 September 1991, *leg*. D. G. Long *20788* (E00135447); Upper Barun Khola valley, cliffs on south side of Lower Barun

Glacier opposite Mera, 27°48′N, 87°07′E, *ca* 4410 m a.s.l., base-rich slopes below cliffs, in damp rock clefts, 3 October 1991, *leg*. D. G. Long *20897* (E00135451).

Orthothecium rufescens is new to the Himalaya (Nepal and Bhutan) and to Qinghai and Yunnan Provinces of China. In China it was reported previously from Sichuan, Taiwan and Xinjiang by Redfearn *et al*. (1996).

29. ***Orthotrichum pamiricum*** Plášek & Sawicki

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

Kazakhstan: foothills of the Altai Mountains, 31 km NE of Ridder town and 43 km SE of Karaguzhikha village, Kamenyuk settlement, valley of the Ulba river, 50°32′42.360″N, 83°41′39.320″E, 837 m a.s.l., on trunk of *Salix* L. sp., 27 July 2014, *leg*. L. Číhal (OSTR #B401), *det*. V. Plášek.

Kyrgyzstan: Jalal-Abad province, 20 km SSE of Sary-Chelek Biosphere Reserve, N outskirts of Kodzhaata town, along a public road, near a river, 41°41′10.400″N, 72°00′16.700″E, 1055 m a.s.l., on trunk of *Celtis caucasica* Willd., 9 June 2013, *leg*. & *det*. V. Plášek (OSTR #B153).

Until recently, the broadly conceived genus *Orthotrichum* Hedw. was under investigated both in terms of diversity and distribution in the countries of Middle Asia, which until the early 1990s were republics of the former Soviet Union. In the last decade, a number of Polish-Czech expeditions have been organised to Tajikistan, Kazakhstan and Kyrgyzstan and they yielded a number of new country records of orthotrichalean mosses. Among other records, three species were newly discovered for Tajikistan, including *O. crenulatum* Mitt., *O. moravicum* Plášek & Sawicki and *O. urnigerum* Myrin (Ellis *et al*., 2011b, 2012b, 2014a). Additionally, one species, *O. pamiricum* from the western foothills of the Pamir Mountains where it was collected at several sites on the Tajik–Afghan border, was described as new to science (Plášek *et al*., 2014). It was subsequently also found in China in the northern part of the Tian-Shan in Xinjiang province by Sulayman (Ellis *et al*., 2016b), and herein it is recorded for the first time from Kazakhstan. According to the results of the distribution modeling of potentially rare bryophyte taxa, this species should be relatively frequent in Middle Asia (Číhal *et al*., 2017).

In Kazakhstan *Orthotrichum pamiricum* was collected during the Czech expedition of 2014 on the bark of *Salix* sp. on the outskirts of the small settlement, Kamenyuk. It was found growing together with *Nyholmiella obtusifolia* (Brid.) Holmen & E.Warncke, and producing sporophytes in profusion. Hitherto, 23 species of *Orthotrichum s.l.* have been reported from Kazakhstan (Lewinsky, 1992; Ignatov *et al*., 2006; Medina *et al*., 2009; Hradílek *et al*., 2011). In Kyrgyzstan, *O. pamiricum* was first collected in 2013 by the Czech-Polish expedition. It was discovered in the western part of the country near the Sary-Chelek Biosphere Reserve. The species grew on the bark of a solitary *Celtis caucasica* along a public road; it formed cushions located on a tree trunk with an eastern exposure at 1.5 and 1.8 m above the ground. All of the populations were richly fertile. Examples of associated species include *Orthotrichum speciosum* Nees and *Nyholmiella obtusifolia*. A total of 21 taxa of *Orthotrichum s.l.* (incl. *Lewinskya* F.Lara, Garilleti & Goffinet, *Nyholmiella* Holmen & E.Warncke and *Orthotrichum*) have previously been reported from Kyrgyzstan (*cf*. Ignatov *et al*., 2006; Ellis *et al*., 2014b, 2014d, 2015a, 2015b, 2015c; Nowak *et al*., 2016).

Based on a superficial view of the cushions, *O. pamiricum* could be confused with the Asian populations of *N. obtusifolia*. Although the two species share ovate-obtuse leaves, *O. pamiricum* differs from the latter in having immersed stomata, recurved leaf margins and an endostome composed of 16 segments. *Orthotrichum pamiricum* is also similar to *O. crenulatum* in some gametophyte characters, including an obtuse and crenulate leaf apex, but it can be easily distinguished from the latter mainly by the 16 (papillate) endostome segments.

30. ***Orthotrichum stramineum*** Brid.

Contributors: Z. Skoupá, V. Plášek and M. Sulayman

China, Xinjiang Province: N part of the Province, Altai Mts, Koktokay County, 47°21′35.49″N, 89°38′50.12″E, 1412 m a.s.l., 1 August 2015, *leg.* M. Sulayman (XJU #26503), *det.* Z. Skoupá & V. Plášek.

For a long time *Orthotrichum stramineum* was considered to be a European epiphytic moss species (Lewinsky-Haapasaari & Long, 1996). Subsequently, Smith (1978) reported it from North Africa and Brassard (1984) from Newfoundland in North America. However, *O. stramineum* is also known from Asia. Firstly, it was reported by Eremina (1965) from Kazakhstan and then it was found in 1993 by D. G. Long in Yunnan Province, China (Lewinsky-Haapasaari & Long, 1996). The specimen cited above was collected in the Altai Mountains in the Xinjiang Province of China. It was found and identified in 2016 by Z. Skoupá & V. Plášek, during a revision of unidentified herbarium collections. The peristome of *Orthotrichum stramineum* is double, having eight finely papillose exostome teeth and 16 smooth segments. Among Chinese specimens of the species some variability in the peristome characters were observed. For example, in material collected in Yunnan (E #24518) mostly eight smooth segments are present and eight additional ones are indicated by small protuberances on the connecting membrane in the middle between the longer segments.

Recent detailed studies of epiphytic bryophytes in north-western China contributed several species new for Xinjiang Province, including *Lewinskya iwatsukii* (Ignatov) F.Lara, Garilleti & Goffinet, *L. vladikavkana* (Venturi) F.Lara, Garilleti & Goffinet, *Orthotrichum alpestre* Hornsch. *ex* Bruch & Schimp., *O. pamiricum* Plášek & Sawicki and *O. pumilum* Sw. (Ellis *et al*., 2016b; Skoupá *et al*., 2017).

31. ***Philonotis laii*** T.J.Kop.

Contributor: T. Koponen

Japan: Kiushu, Hiuga, Mt Osuzu, from the Shirataki (white waterfall) ground, 800 m a.s.l., 1950, *leg.* Kuwahara *54* (NY).

Philippines: Luzon, Malaya Mountains, Lepanto subprovince, November–December 1911, *leg.* F. R. Bona *149* (NY).

Philonotis laii was described by Koponen (2010). It was known earlier at the varietal level as *P. mollis* var. *flagellaris* M.Fleisch. (Fleischer, 1904) and as *P. mollis* var. *simplicicaulis* Zanten (van Zanten, 1964). It is a very small moss, and, therefore, has remained unnoticed, although it ranges widely in SE Asia from the Himalayas to Japan in the east and to New Guinea in the south (range map in Koponen, 2010). The present records were to be expected.

Natural habitats for *P. laii* are rocks and banks of streams, where it grows on shallow or eroded soil in shade or half-shade. It seems to be rather common in more open, man-made habitats such as trails, roadside banks, ditches and gardens. At the end of the growing season the stems and innovations continue growing, producing slender shoots with miniature leaves and numerous propagules. The young shoots lacking innovations can be mixed with *P. mollis* (Dozy & Molk.) Mitt. which grows in similar habitats. *Philonotis mollis* has wide, translucent leaf cells in the leaf base, with only low mammillae/papillae and long acuminate or piliferous leaves. In *P. laii*, the basal leaf cells are narrow and with distinct papilla at the distal end of leaf cells, and it has a stiffer, acute to acuminate leaf apex. The propagules in *P. mollis* are borne along the stem within the tomentum,

Another species with which *P. laii* has been confused is *P. hastata* (Duby) Wijk & Margad. In natural habitats it grows on wetter sites than *P. laii*, on wet rocks and cliffs at stream sides or even submerged, but it also thrives on similar man-made substrates as *P. laii*. Its leaf cell areolation is lax and translucent, leaf cells range from quadrate and rectangular to rhomboidal. The leaf apex ranges from nearly obtuse to shortly acute, and the costa does not reach the leaf apex or is shortly excurrent. It has propagules, but these do not concentrate on the apices of shoots as in *P. laii*.

32. ***Plagiochila ghatiensis*** Steph.

Contributors: G. Asthana and R. Bharti

India: Western Himalaya: Uttarakhand, Kumaon hills, Pithoragarh, Munsiyari, 30°04.609′N, 80° 14.394′E, *ca* 2024 m a.s.l., 19 October 2011, *leg*. G. Asthana & party *21905/11* (LWU).

Plagiochila ghatiensis is an Asiatic species reported from China, Sri Lanka and India (So, 2001; Singh *et al*., 2016). It was first described by Stephani (1918) based on Indian plants collected from Kodaikanal (Palni hills) in Tamil Nadu, south India. Subsequently, Dixit (1995) reported and described the species from Avalanche, Ootacamund (Nilgiri hills) in Tamil Nadu, and Srivastava & Verma (2004) and Verma (2005) also reported it from Dodabetta (Ootacamund), Gudulur (Naduvattam) in the Nilgiri hills. In recent studies of the bryophytes from western Himalaya this species has been identified in collections from the Kumaon Hills, Uttarakhand. The plants were collected from Munsiyari in Pithoragarh district. This is the first report of the taxon from the western Himalayas.

This species is mainly characterised by the caducous nature of the leaves, which are distantly arranged, oblong-ovate with entire dorsal and ventral margins. Usually, two large and prominent teeth are present at the leaf apex. (Sometimes a third, small tooth may occur on the ventral margin near the apex). The cells of the leaves are smooth with small trigones. Underleaves are rudimentary, ciliated and rarely present. Regenerants are commonly observed on the leaves. The present report extends the distribution of *P. ghatiensis* from the South Indian territories to the Western Himalayan region.

33. ***Plagiochila ovalifolia*** Mitt.

Contributors: G. Asthana and R. Bharti

India: Western Himalaya: Uttarakhand, Pauri Gharwal (Adwani), 30°05.388′N, 78°43.472′E, *ca* 1850 m a.s.l., 22 October 2010, *leg.* G. Asthana & party *20970/10* (LWU).

Plagiochila ovalifolia is an Asiatic species reported from China, Japan, Korea, Philippines, Taiwan and India (So, 2001; Singh & Singh, 2006, 2007; Singh *et al*., 2016). In India, it has been reported from Himachal Pradesh in the Western Himalayas (Singh & Singh, 2006, 2007), from Kerala in south India (Nair & Madhusoodanan, 2006) and from Meghalaya in the Eastern Himalaya (Singh & Nath, 2007 as *P. asplenioides* subsp. *ovalifolia* (Mitt.) Inoue). *Plagiochila ovalifolia* has now been identified in a study of the bryophytes from Uttarakhand in the Western Himalayas. The plants were collected from the forest near Adwani in the Pauri Garhwal region, which shows an extension of distribution for this species in Western Himalaya from Himachal Pradesh to Uttarakhand.

Plagiochila ovalifolia is mainly characterised by oblong-ovate to broadly ovate, contiguous to loosely

imbricate, spinose leaves with a recurved dorsal margin, and a moderately decurrent base. The marginal spinose teeth number 13–20, are 1–4 cells long and 2–4 cells wide. Leaf cells are smooth with medium to large trigones. Underleaves are rudimentary.

34. ***Pohlia otaruensis*** (Cardot) Ochi

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

Republic of Korea: Jeollanam-do, Gurye-gun, Sandong-myeon, Mt Jiri National Park, near the third peak on way to Mt Manbokdae, 35°18′39.8″N, 127°30′41.8″E, 1061 m a.s.l.; on shaded boulder by the trail, 28 October 2105, *leg.* B. C. Tan *2015-717* (UC, JNU).

This is a small species of *Pohlia* Hedw. with a short stem 4–5 mm high. The leaves are ovate-lanceolate near the base of the stem and linear-lanceolate to sublinear towards its apex. Our collection consists of sterile plants with plenty of short, caducous leafy shoots occurring in several leaf axils. Aside from the presence of brood branches, the species can also be identified by the markedly serrate leaf margin in the upper half of the leaves.

According to Noguchi (1988), *Pohlia otaruensis* is endemic to Japan, but is treated at times as a subspecies of *P. nutans* (Hedw.) Lindb. Here, we follow Noguchi (1988) in accepting it as a species in recognition of its production of leafy, branch-like propagules in its leaf axils. The other species of gemmiferous *Pohlia* produce either non-leafy, slender propagules or undifferentiated, round gemmae in their leaf axils.

Pohlia otaruensis is a new species record for the Korean moss flora and its presence in mainland China can be expected.

35. ***Pseudocephalozia quadriloba*** (Steph.) R.M.Schust.

Contributors: S. R. Gradstein and F. Osorio

Northern Chile: Atacama region, Copiapó province, Tierra Amarilla, 27°28′56″S, 70°15′12″W, 3270 m a.s.l., alpine bog (‘bofedal’) dominated by *Oxychloë andina* Phil., submerged in shallow pool (20 cm deep), in stagnant water, 12 September 2017, *leg.* F. Osorio *7101*, ster. (SGO-168438, SGO-168439).

Peudocephalozia R.M.Schust. (Lepidoziaceae) is a small, mainly southern-hemisphere genus of six species: three in Australasia (subg. *Pseudocephalozia*) and three in South America (subg. *Lobulatae* (R.M.Schust.) R.M.Schust.) (Schuster, 2000). *Pseudocephalozia quadriloba* is the most widespread species in the genus and has a rather disjunct South American distribution, occurring in southern and central Chile from Tierra del Fuego to southern Valdivia (region de los Ríos), in the northern Andes from Peru to Venezuela, and in Costa Rica (Schuster & Engel, 1974 [map]; Gradstein *et al*., 2001; Hässel de Menendez & Rubies, 2009). In addition, the species is known from Inaccesible Island and Gough Island (Tristan da Cunha group) (Váňa & Engel, 2013). *Pseudocephalozia quadriloba* is very characteristic of *Sphagnum* L. bogs where it may grow in large, pure patches; it has also been found on peaty soil along streams, among boulders and on the rim of craters. In the Andes and Costa Rica the species occurs between 2600 and 4100 m a.s.l., in temperate southern South America at much lower elevation, from sea level to about 700 m a.s.l. The Chilean locality reported here constitutes the first record of *P. quadriloba* from northern Chile and the southern Andes, and is 1500 km to the north of the northernmost locality known in Chile. The plants were found submerged in a pool in an alpine bog (‘bofedal’) at 3270 m a.s.l., dominated by *Oxychloë andina*, and were sterile. Characteristic of *P. quadriloba* are its somewhat swollen, pale-green to brownish plants with shallowly 3–4-lobed, transversely inserted, concave leaves, and underleaves that may be several layers of cells thick in the lower half. The leafy shoots arise from long, creeping stolons and the underleaves are about half the size of the leaves or smaller.

36. ***Pseudotaxiphyllum elegans*** (Brid.) Z.Iwats.

Contributors: G. J. Wolski and B. Bambe

Latvia: eastern part of Latvia, Varakļāni district, Murmastiene rural municipality, Teiči nature reserve, 56°38′N, 26°34′E, in mesotrophic drained forest on peat soil, on base of *Picea abies* (L.) H.Karst., 16 August 1995, *leg*. B. Bambe *s.n*., *det*. G. J. Wolski.

Pseudotaxiphyllum elegans was found during a revision of the *Plagiothecium* Schimp. specimens deposited at the Herbarium Latvian State Forest Research Institute ‘Silava’. Currently his specimens are deposited in Herbaria LOD and Herbaria Silava (specimens 30057).

This is the first report of *P. elegans* from Latvia. Until now, it has not been recorded from this or the neighbouring countries (Ignatov *et al*., 2006). It is one of two species of *Pseudotaxiphyllum* Z.Iwats. occurring in Europe (Hill *et al*., 2006). This species is known from more or less the whole Holarctic region, northern Africa, Macaronesia and Oceania (Hawaii). Preferring considerably acidic to subneutral habitats, in moderately wet to moderately dry conditions, *P. elegans* flourishes in shade, but also grows on moderately illuminated habitats. It occurs on loamy soil in woodlands and on sheltered banks, on humus over rocks, occasionally on rotting logs and base of tree trunks (Dierßen, 2001).

37. ***Rhytidiadelphus subpinnatus*** (Lindb.) T.J.Kop.

Contributor: S. V. O’Leary

Andorra: Parc Natural de la Vall de Sorteny, 42° 37′05″N, 1°34′02″E, *ca* 2100 m a.s.l., by side of marked path in Pleta del Llomar, en route to Estany

de l'Estanyo, in coniferous woodland, 26 May 2015, *leg. & det.* S. V. O'Leary *s.n., conf.* A. Ederra, (E–E00844893).

This is the first record of *Rhytidiadelphus subpinnatus* from the Iberian Peninsula and it was not included in the recent bryophyte checklist for Andorra (Sotiaux & Vanderpoorten, 2017). Its distribution is Circumpolar boreal-montane, largely a forest species, found in northern and central Europe, widespread in northern and Central Asia and North America (Blockeel *et al*., 2014). It is closely related to *R. squarrosus* and was indeed formerly treated as *R. squarrosus var. calvescens* (Lindb.) Warnst. (Smith, 2004). Molecular evidence does, however, support the separate status of *R. subpinnatus* (Vanderpoorten *et al*., 2003; Korpelainen *et al*., 2008). The rather fine distinction between the two species described in many texts (eg. Smith, 2004), is slightly misleading when searching in the field, as the shoots of *R. subpinnatus* rather resemble *Loeskeobryum brevirostre* (Brid.) M.Fleisch. at first sight. Examination with a hand-lens, however, reveals the absence of paraphyllia on the stems and branches of the *Rhytidiadelphus* (Limpr.) Warnst. Nonetheless, the species can easily be overlooked, as recent records from the British Isles may indicate (Bosanquet & Motley, 2009).

38. ***Schistidium dupretii*** (Thér.) W.A.Weber

Contributors: C. A. Garcia, C. Sérgio, A. Martins, A. S. B. Rodrigues and M. Sim-Sim

Portugal: Beira Alta, Covilhã, Cortes do Meio, Tapada, Natural Park of Serra da Estrela, on a granitic wall, 29TPE2461, 1285 m a.s.l., 22 April 2015, *leg et det*. C. A Garcia *conf.* C. Sérgio (LISU266463).

Schistidium dupretii was collected in the Natural Park of Serra da Estrela, during an environmental impact study for a new dam supported by the City Council of Covilhã. The plant was found on an artificial granitic wall associated with *Bryum argenteum* Hedw., *Bryum capillare* Hedw., *Grimmia decipiens* (Schultz) Lindb., *Orthotrichum lyellii* Hook. & Taylor, *O. rupestre* Schleich. *ex* Schwägr., *Grimmia lisae* De Not., *G. montana* Bruch & Schimp., *G. pulvinata* (Hedw.) Sm. and *Syntrichia ruralis* (Hedw.) F.Weber & D.Mohr. On tree trunks (mainly *Betula pubescens* Ehrh. subsp. *celtiberica* (Rothman & Vasc.) Rivas Mart.), the dominant bryophyte species were *Orthotrichum affine* Schrad. *ex* Brid., *O. ibericum* F.Lara & Mazimpaka and *O. striatum* Hedw.

The Natural Park of Serra da Estrela is located in a mountainous region ranging from 300 to 1993 m a.s.l. The Serra da Estrela region is under Oceanic and Mediterranean influences, and the climatic diversity is expressed by the mosaic of several biotopes joining mainly Mediterranean and Atlantic, but also continental, alpine and boreal phytogeographic elements (Jansen & Sequeira, 1999). Three hundred and eighty-three taxa (*ca* 284 mosses and 99 hepatics) are reported from the area, which is also the only area for 37 taxa in Portugal (Garcia *et al*., 2008).

In Portugal, nine species of *Schistidium* Brid. have been reported, four of them with very high conservation status, *S. brunnescens* Limpr. (CR), *S. elegantulum* H.H.Blom subsp. *wilsonii* H.H.Blom (CR), *S. flaccidum* (De Not.) Ochyra (EN) and *S. crassipilum* H.H.Blom (VU) Sérgio *et al*. (2013).

Schistidium dupretii is considered a rare species in the Iberian Peninsula, only recorded in Vizcaya, Gerona, Lérida and León provinces at high altitude (1200–4000 m) (Suarez & Muñoz, 2015).

39. ***Schistidium lancifolium*** (Kindb.) H.H.Blom

Contributors: E. A. Ignatova and A. P. Seregin

Azerbaijan: Quba District, Tyulyakeran, on limestone along road in forest, 24 September 1937, *leg. sin. coll. s.n., det.* E. Ignatova (MW9017895 *ex* KW).

Schistidium lancifolium is a holarctic species that has been found in North America, Japan, China, and some localities throughout Russia, the Caucasus and Europe. This shade-tolerant species lives generally on siliceous rocks and is quite common in deciduous forests in the lowlands (Blom, 1996; Pokorny *et al.* in Blockeel *et al*., 2004).

The species was reported from the neighbouring Russian part of the Caucasus, Georgia and Iran (Ignatov *et al*., 2006; Ignatova *et al*., 2009). Also, the species was mentioned for Turkey by Pokorny *et al.* (in Blockeel *et al*., 2004), but this record was missed by Ros *et al*. (2013).

40. ***Schistidium pruinosum*** (Wilson) G.Roth

Contributors: E. A. Ignatova, A. I. Maksimov and T. A. Maksimova

Russia: Republic of Karelia, (1) Pitkyarantsky District, Ladoga Lake, Island Mantsinsaari, 61.331457°N, 31.592655°E, *ca* 21 m a.s.l., on dry shaded cliff near a meadow, 11 June 2016, *leg.* Maksimov *L-16/19-79* (PTZ, MW); (2) Sortavalsky District, Ladoga Lake, Island Rzhanoy, 61.375848° N, 30.872628°E, *ca* 12 m a.s.l., rocky outcrops on SW-facing bank, 13 June 2016, *leg.* Maksimov *L-16/27-102(6)* & *L-16/27-72(1)* (PTZ, MW).

Schistidium pruinosum is a predominantly European species. It occurs from Great Britain and Scandinavia down to southern France and the mountains of Central Europe. In Russia it was recently reported from the Caucasus (Republics Adygea, Kabardino-Balkaria, Karachay-Cherkessia and Dagestan), the South Urals and Khabarovsk Territory (Ignatova & Blom, 2017). The newly reported localities are the first for the Republic of Karelia.

41. ***Sphagnum cuspidatum*** Ehrh. *ex* Hoffm.

Contributor: M. Boiko

Ukraine: Steppe Zone, Kherson oblast, Holoprystan district, village of Burkuty, National Natural Park

'Oleshkivski pisky', Burkutsky department of the National Park, associated with *Sphagnum* L. tussocks in oligotrophic areas of small bogs with Dnieper birch (*Betula borysthenica* Klok.), Black alder (*Alnus glutinisa* (L.) Gaertn. and Basket willow (*Salix viminalis* L.) 46.233256°N, 32.484807°E, 19 August 2017, *leg.* M. Zakharova *s.n.*, *det*. M. F. Boiko (KHER); 28 December 2017, *leg*. and *det.* M. F. Boiko s.n. (KHER).

Sphagnum cuspidatum occurs in oligotrophic *Sphagnum* bogs, or in the oligotrophic sections of mesotrophic bogs in the Arctic, subarctic, boreal and nemoral zones of Europe, North Asia, Japan, North America, Australia, New Zealand, as well as in the mountainous regions of the Alps and the Caucasus. In the Ukraine it grows in Polissia (a zone of mixed coniferous-deciduous forests) and in Opilia (zone of nemoral forests).

This record is the first for the steppe zone in the Ukraine. The habitats of this species are associated with *Sphagnum* tussocks in oligotrophic areas of the mesotrophic bogs with *Betula borysthenica*, *Alnus glutinosaa* and willow-cane coenoses of *Salix viminalis* and the southern reed (*Phragmites australis* (Cav.) Trin. *ex* Steud.). The moss grows amongst rotting leaves of trees and remnants of herbaceous plants. It occurs in small birch, alder and willow bogs in lowered waters among psamophytic steppes—sandy massifs of the Nizhnodniprovski (Oleshkivski) sand in the lower reaches of the Dnipro river. The Burkut plavni are located in the south of the steppe zone, only 20 km from the shore of the Dzharilgatsky Bay of the Black Sea. This location of *Sphagnum* is the southernmost in the Ukraine. Three other species of *Sphagnum* (*S. fimbriatum* Wils, *S. fallax* (Klinggr.) Klinggr. and *S. squarrosum* Crome), were already known from this area (Boiko, 1986, 1992, 2009). *Sphagnum* is a good indicator of both natural and anthropogenic changes in vegetation, especially of intrazonal types of vegetation, such as small bogs among steppe pseudophytic coenoses. They can be used in phytomonitoring (Il'nickyi *et al*., 2005).

42. ***Timmiella flexiseta*** (Bruch) Limpr.

Contributors: M. Brugués, E. Ruiz and C. Sérgio

Spain: Cáceres, Río Ibor, 39°35′15″N, 5°25′8″W, 870 m a.s.l., in a cork oak forest, 14 June 1980, *leg*. M. C. Viera *s.n.* (MA 5152).

The genus *Timmiella* (De Not.) Limpr. is recognised by its very wide costa, bistratose lamina and laminal cells bulging adaxially but flat abaxially; sporophyte characters are absolutely necessary to separate the different species. *Timmiella flexiseta* is distinguishable by the flexuose seta, inflated and revoluble annulus and straight peristome teeth. It has rarely been reported in Europe, according to Ros *et al*. (2013), only from the Canary Islands, Italy, Portugal, Sardinia and Sicily. Blockeel (2016) reported this species from Ikaria (Greece) but did not accept the record from Italy as it was sterile.

During a study on *Timmiella anomala*, we verified that a specimen in MA, collected in Cáceres (western Spain), corresponded to *T. flexiseta*, being the only report from the Spanish Peninsula. The nearest reports of this species are in the south and centre of Portugal where it seems to be a rather rare species and always occurs in small populations.

Timmiella flexiseta was not included for Spain in *Flora Briofítica Ibérica* (Soria *et al*., 2006) since the known reports (Elías Rivas *et al*., 1994), were erroneous or indeterminable.

43. ***Tortula lingulata*** Lindb.

Contributors: G. Dihoru and S. Ştefănuţ

Romania: Mureş County: Răstolița, on sandstone, 46°58′N, 24°59′E, 600 m a.s.l., 1989, *leg*. R. Wallfisch *s.n.*, *det*. G. Dihoru, *conf.* S. Ştefănuţ (BUCA *B7220*).

This is the first report of *Tortula lingulata* in Romania (Ştefănuţ & Goia, 2012).

Tortula lingulata has low growing, slightly branched plants, with oblong to oblong-lanceolate, obtuse, or shortly apiculate leaves. The leaf margins are recurved, and bordered to the leaf apex. The costa widens in the upper third of the leaf, ending below the leaf apex, and when dry, the seta twists differently at the base relative to the apex.

In Europe *T. lingulata* has been reported from Estonia, Latvia, the Czech Republic, Germany, Russia, the Ukraine (Hodgetts, 2015) and Romania. The species reported from Montenegro as *T. lingulata* var. *montenegrina* (Breidl. & Szyszyl.) Podp. (*Barbula montenegrina* Breidl. & Szyszyl.) was considered identical to *Tortula muralis* Hedw. subsp. *obtusifolia* (Schwägr.) Culm. (Košnar & Kučera 2010).

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References

Afonina, O.M., Mamontov, Yu.S. & Czernyadjeva, I.V. 2013. New and rare liverwort and moss species from Transbaikal Territory. *Botanicheskiy Zhurnal*, 98(11): 1427–40.

Akhani, H. & Kürschner, H. 2004. An annotated and updated checklist of the Iranian bryoflora. *Cryptogamie, Bryologie*, 25: 315–47.

Alegro, A., Šegota, V. & Samardžić, I. 2015. Beech forest with peat moss in the Papuk Mt—unique in the vegetation of Croatia. *Book of Abstracts of Eastern Alpine and Dinaric Society for Vegetation Ecology* (17–20 June), Osijek, p. 13.

Allen, B.H. & Crosby, M.R. 1986. Revision of the genus *Squamidium* (Musci: Meteoriaceae). *Journal of the Hatttori Botanical Laboratory*, 61: 423–76.

Atwood, J.J. 2015. Taxonomic revision of the moss genus *Lepidopilidium* (Pilotrichaceae). *Annals of the Missouri Botanical Garden*, 100(4): 364–92.

Averis, A.B.G. & Averis, A.M. 1991. *Acrobolbus wilsonii* and *Anoectangium warburgii* new to the Faroe Islands. *Journal of Bryology*, 16: 641–2.

Bakalin, V.A., Cherdantseva, V.YA., Ignatov, M.S., Ignatova, E.A. & Nyushko, T.I. 2009. Bryophyte flora of the south Kuril Islands (East Asia). *Arctoa*, 18: 69–114.

Batan, N., Jia, Y., Özdemir, T. & Alataş, M. 2016. *Brotherella* and *Encalypta* species new to Turkey, Mediterranean and southwest Asia. *Plant Biosystems*, 150(3): 436–41.

Bednarek-Ochyra, H. 2004. *Codriophorus corrugatus* (Bryopsida, Grimmiaceae), a new species from East Asia and southern Alaska. *Bryologist*, 107: 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. 2014a. Nomenclatural entanglements associated with *Racomitrium chlorocarpum* (Grimmiaceae). *Phytotaxa*, 188(3): 153–61.

Bednarek-Ochyra, H. 2014b. A taxonomic assessment of *Racomitrium steerei* (Grimmiaceae, Musci) from Venezuela. *Herzogia*, 27: 141–6.

Bednarek-Ochyra, H. 2014c. On the identities of some neglected species of Grimmiaceae from Îles Kerguelen. *Journal of Bryology*, 36(4): 300–5.

Bednarek-Ochyra, H. 2014d. Taxonomic status of two subantarctic species of *Philonotis* (Bartramiaceae, Musci). *Cryptogamie, Bryologie*, 35: 387–95.

Bednarek-Ochyra, H. 2015. *Bucklandiella lamprocarpa* (Musci, Grimmiaceae) in central and northern Andes. *Cryptogamie, Bryologie*, 36(1): 81–90.

Bednarek-Ochyra, H. & Ochyra, R. 1994. *Racomitrium lamprocarpum* (Musci, Grimmiaceae) in southern South America. *Fragmenta Floristica et Geobotanica*, 39(2): 361–7.

Bednarek-Ochyra, H. & Ochyra, R. 1998. *Racomitrium lamprocarpum* (Müll. Hal.) Jaeg.—an addition to the moss flora of Îles

Kerguelen and the Subantarctic. *Journal of Bryology*, 20(2): 525–8.

Bednarek-Ochyra, H. & Ochyra, R. 2010. *Bucklandiella allanfifei* (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. 2012a. Antipodal mosses: XVII. *Bucklandiella longtonii* (Bryopsida, Grimmiaceae), a new species with caducous leaf apices from subantarctic South Georgia. *Nova Hedwigia*, 94: 373–84.

Bednarek-Ochyra, H. & Ochyra, R. 2012b. The taxonomic status of *Racomitrium capense* (Bryophyta, Grimmiaceae) from South Africa. *Cryptogamie, Bryologie*, 33(2): 97–106.

Bednarek-Ochyra, H. & Ochyra, R. 2012c. A consideration of *Bucklandiella* (Bryophyta, Grimmiaceae) in South America, with a taxonomic re-assessment of *Racomitrium looseri*. *Nova Hedwigia*, 95(1–2): 153–63.

Bednarek-Ochyra, H. & Ochyra, R. 2013a. Taxonomic status of *Grimmia procumbens* (Bryophyta, Grimmiaceae) from Australia. *Journal of Bryology*, 35(2): 149–52.

Bednarek-Ochyra, H. & Ochyra, R. 2013b. Diversity of Grimmiaceae subfam. Racomitrioideae in sub-Saharan Africa, including an addition of *Bucklandiella striatipila* to the moss flora of the continent. *Cryptogamie, Bryologie*, 34 (1): 3–12.

Bednarek-Ochyra, H. & Váňa, J. 2014. Discovery of sporophytes in *Ochyraea tatrensis* (Bryopsida, Amblystegiaceae). *Nova Hedwigia*, 99: 119–27.

Bednarek-Ochyra, H., Matteri, C.M. & Ochyra, R. 1996. A major range extension of *Racomitrium lamprocarpum* (Musci, Grimmiaceae) in South America. *Fragmenta Floristica et Geobotanica*, 41(2): 995–1000.

Bednarek-Ochyra, H., Ochyra, R. & Buck, W.R. 1999. The genus *Racomitrium* (Grimmiaceae) in Brazil, with the first report of *R. subsecundum* in South America. *Brittonia*, 51 (1): 93–105.

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(4): 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: 1214–28.

Benitez, A., Gradstein, R., Prieto, M., Aragón, G., León-Yánez, S., Moscoso, A. & Burghardt, M. 2012. Additions to the bryophyte flora of Ecuador 2 [Adiciones a la Flora de Briofitas del Ecuador 2]. *Tropical Bryology*, 34: 99–106.

Berg, C. 1999. *Europäische Verantwortung für den Schutz der Moosflora—European responsibility for the conservation of bryophytes*. Stuttgart: Stuttgarter Beiträge zur Naturkunde Serie A (Biologie), Staatliches Museum für Naturkunde.

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: 7–13.

Birks, H.J.B. 1992. *Anoectangium warburgii* in western Norway. *Lindbergia*, 17: 67–8.

Blockeel, T.L. 2013. *Encalypta pilifera* Funck reinstated to the British flora. *Journal of Bryology*, 35(4): 309–13.

Blockeel, T.L. 2016. The mosses *Aschisma carniolicum, Campylostelium strictum* and *Timmiella flexiseta* on the Eastern Aegean Islands, new to Greece, and a second locality for *Syntrichia latifolia*. *Herzogia*, 29: 52–8.

Blockeel, T.L., Bergamini, A., Brusa, G., Ertz, D., Sérgio, C., García, 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, Duckett, J.G., Fernández, M.C., Hébrard, J.-P., Matcham, H.W., Porley, R.D., Ochyra, R., Bednarek-Ochyra, H., Soldán, Z. & Townsend, C.C. 2002. New national and regional bryophyte records, 5. *Journal of Bryology*, 24(1): 88–91.

Blockeel, T.L, Abay, G., Çetin, B., Bednarek-Ochyra, H., Ochyra, R., Lewis Smith, R.I., Matteri, C.M., Farias, R.M., Novotný, I., Rao, P., Enroth, J., van Rooy, J., Schiavone, M.M. & Váňa, J. 2003. New national and regional bryophyte records, 7. *Journal of Bryology*, 25(2): 141–4.

Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Çetin, B., Keçeli, T., Lara, F., Mazimpaka, V., Pokorny, L., Matteri, C.M., O'Shea, B.J., Schiavone, M.M., Stefanul, S. & Uyar, G. 2004. New national and regional bryophyte records, 9. *Journal of Bryology*, 26(1): 63–6.

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(2): 163–8.

Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Düzenli, A., Erdağ, A., Erzberger, P., Ezer, T., Hespanhol, H., Kara, R., Matteri, C.M., Müller, F., Séneca, A., Sérgio, C. & Váňa, J. 2007a. New national and regional bryophyte records, 15. *Journal of Bryology*, 29(2): 139–42.

Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Garilleti, R., Glime, J.M., Lara, F., Mazimpaka, V., Rusińska, A., Schäfer-Verwimp, A., Shabbara, H.M., Söderström, L., Stebel, A., Townsend, C.C., Váňa, J., Yayintaş, Ö.T. & Żarnowiec, J. 2007b. New national and regional bryophyte records, 17. *Journal of Bryology*, 29(4): 277–83.

Blockeel, T.L., Bednarek-Ochyra, H., Ochyra, R., Duckett, J.G., Erzberger, P., Hedenäs, L., Hugonnot, V., Maier, E., Marková, I., Matcham, H.W., Plášek, V., Pócs, T., Seppelt, R.D., Szűcs, P., Thouvenot, L. & van Zanten, B.O. 2008a. New national and regional bryophyte records, 18. *Journal of Bryology*, 30(2): 161–7.

Blockeel, T.L., Abay, G., Bakalin, V.A., Bednarek-Ochyra, H., Ochyra, R., Çetin, B., Cykowska, B., Fuertes, E., Hespanhol, H., Holyoak, D.T., Hradílek, Z., Keçeli, T., Kürschner, H., Larraín, J., Long, D.G., Parolly, G., Piątek, J., Piątek, M., Rams, S., Ros, R.M., Séneca, A., Sérgio, C., Soldán, Z., Ştefănuţ, S., Uyar, G., Váňa, J. & Yayintaş, Ö.T. 2008b. New national and regional bryophyte records, 19. *Journal of Bryology*, 30(3): 231–7.

Blockeel, T.L., Bakalin, V.A., Bednarek-Ochyra, H., Ochyra, R., Buck, W.R., Choi, S., Cykowska, B., Erdağ, A., Erzberger, P., Kirmaci, M., Kürschner, H., Lebouvier, M., Papp, B., Sabovljević, M., Sabovljević, A., Schröder, W., Singh, S.M., Sun, B.-Y., Townsend, C.C., Váňa, J. & Yayintaş, Ö.T. 2009. New national and regional bryophyte records, 20. *Journal of Bryology*, 31(1): 54–62.

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, p. 560.

Blom, H.H. 1996. A revision of the *Schistidium apocarpum* complex in Norway and Sweden. *Bryophytorum Bibliotheca*, 49: 1–333.

Boiko, M.F. 1986. Znakhidka sfagnovikh mokhiv na Khersonshchyni. [Occurrence of *Sphagnum* mosses in the Kherson Territory]. *Ukrainskiy Botanichniy Zhurnal*, 63(2): 68. (in Ukrainian, with English summary).

Boiko, M.F. 1992. Brioflora stepnoi zony Vostochno-Evropeiskoi ravniny i Predkavkazia—*Diss …. dokt. biol. nauk.– K.*– 351 p. (in Russian).

Boiko, M.F. 2009. *Bryobionta of the steppe zone of Ukraine*. Kherson: Ailant, (in Ukrainian).

Boros, Á. 1925. *Funaria hungarica*, nov. spec. *Magyar Botanikai Lapok*, 23: 73–5.

Bosanquet, S.D.S. & Motley, G.S. 2009. *Rhytidiadelphus subpinnatus* in Wales. *Field Bryology*, 98: 8–13.

Brassard, G.R. 1984. *Orthotrichum stramineum* new to North America. *Bryologist*, 87(2): 168.

Cao, T., Gao, Ch. & Wu, Y.-H. 1998. A synopsis of Chinese *Racomitrium* (Bryopsida: Grimmiaceae). *Journal of the Hattori Botanical Laboratory*, 84: 11–9.

Cao, T., Gao, C. & Horton, D.G. 2001. Encalyptaceae. In: X.-J. Li & M.R. Crosby, eds. *Moss flora of China*. English version. Vol. 2. Fissidentaceae–Ptychomitriaceae. Beijing: Science Press & St-Louis: Missouri Botanical Garden, pp. 103–13.

Cao, T., He, S. & Vitt, D.H. 2003. Grimmiaceae. In: M.R. Crosby Ch. Gao & S. He, eds. *Moss Flora of China*. English version. Vol. 3. Grimmiaceae−Tetraphidaceae. Beijing and New York: Science Press and St. Louis: Missouri Botanical Garden Press, pp. 3−76.

Cardot, J. 1908. Mousses nouvelles du Japon et de Corée. *Bulletin de l'Herbier Boissier, Série 2*, 8: 331–6.

Cardot, J. 1914. *Philibertiella* Card., genre nouveau de la tribu Ditrichées. *Revue Bryologique*, 41: 37–8.

Cardot, J. & Brotherus, V.F. 1923. Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerlande 1907–1909. X. Les mousses. *Kongliga Svenska Vetenskapsakademiens Handlingar*, 63(10): 1–74+pls. 1–4.

Cargill, C. 2016. Rare and peculiar hornworts: *Notothylas orgicularis* and *N. javanica* (Notothyladaceae), new genus and species records for Australia. *Phytotaxa*, 275(1): 1–13.

Castelli, L. 1966. *Molendoa calvuligera* n. sp. *Revue Bryologique et Lichenologique*, *Nouvelle Série*, 34: 715–9.

Castelli, L. 1968. A propos de *Molendoa calvuligera*. *Revue Bryologique et Lichenologique*, *Nouvelle Série*, 36: 130–1.

Chavoutier, L. & Hugonnot, V. 2013. *Mousses, hépatiques et anthocérotes du département de la Savoie (France)*. Saint-Genis-Laval: Féderation Mycologique et Botanique Dauphiné-Savoie.

Číhal, L., Kaláb, O. & Plášek, V. 2017. Modeling the distribution of rare and interesting moss species of the family Orthotrichaceae (Bryophyta) in Tajikistan and Kyrgyzstan. *Acta Societatis Botanicorum Poloniae*, 86(2): 35–43.

Clark, L. & Svihla, R.D. 1949. *Frullania acuminata*. *Bryologist*, 52: 131–4.

Crum, H. & Anderson, L.E. 1981. *Mosses of eastern North America*. New York: Columbia University Press.

Crundwell, A.C. & Hill, M.O. 1977. *Anoectangium warburgii*, a new species of moss from the British Isles. *Journal of Bryology*, 9: 435–40.

Czernyadjeva, I.V., Afonina, O.M. & Ignatova, E.A. 2015. The genus *Anomobryum* (Bryaceae, Musci) in Russia. *Arctoa*, 24: 459–70.

Dauphin, G. 2005. Catalogue of Costa Rican Hepaticae and Anthocerotae. *Tropical Bryology*, 26: 141–218.

Desplanques, A. & Hébrard, J.-P. 1972. Complement a l'étude des muscinées récoltées aux Iles Kerguelen et Crozet (campagne d'été des T.A.A.F. 1969) et notes pédologiques. *Riviera Scientifique*, 3: 59–76.

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

Dixit, R. 1995. *The genus* Plagiochila *(Dum.) Dum. in south India*. Ph.D. thesis, Department of Botany, University of Lucknow.

Dixon, H.N. 1934. Manchurian mosses. *Revue Bryologique et Lichénologique*, *Nouvelle Série*, 7: 105–16.

ECCB. **1995**. *Red data book of European bryophytes*. Trondheim: European Committee for the Conservation of Bryophytes.

Elias Rivas, M.J., Casas i Sicart, C., Brugués Domenech, M., Cros Matas, R.M., Oliva Alonso, R., Granzow de la Cerda, I., Munoz Fuente, J., Ederra Indurain, A. & Rupidera Giraldo, J.L. 1994. Aportaciones al conocimiento de la flora briológica Española. Notula IX.: Musgos, Hepáticas y Antocerotas de Las Arribes del Duero (NW de Salamanca). *Studia Botanica*, 13: 163–73.

Ellis, L.T., Asthana, A.K., Sahu, V., Srivastava, A., Bednarek-Ochyra, H., Ochyra, R., Chlachula, J., Colotti, M.T., Schiavone, M.M., Hradilek, Z., Jimenez, M.S., Klama, H., Lebouvier, M., Natcheva, R., Pócs, T., Porley, R.D., Sérgio, C., Sim-Sim, M., Smith, V.R., Söderström, L., Ştefănuţ, S., Suárez, G.M. & Váňa, J. 2011a. New national and regional bryophyte records, 28. *Journal of Bryology*, 33(3): 237–47.

Ellis, L.T., Akhoondi Darzikolaei, S., Shirzadian, S., Bakalin, V.A., Bednarek-Ochyra, H., Ochyra, R., Claro, D., Dulin, M.V., Eckel, P.M., Erzberger, P., Eziz, R., Sulayman, M., Garcia, C., Sérgio, C., Stow, S, Hedderson, T., Hedenäs, L., Kürschner, H., Li, W., Nebel, M., Nieuwkoop, J., Philippov, D.A., Plášek, V., Sawicki, J., Schäfer-Verwimp, A., Ştefănuţ, S. & Váňa, J. 2011b. New national and regional bryophyte records, 29. *Journal of Bryology*, 33(4): 316–23.

Ellis, L.T., Alegro, A., Bednarek-Ochyra, H., Ochyra, R., Bergamini, A., Cogoni, A., Erzberger, P., Górski, P., Gremmen, N., Hespanhol, H., Vieira, C., Kurbatova, L.E., Lebouvier, M., Martinčič, A., Asthana, A.K., Gupta, R., Nath, V., Natcheva, R., Ganeva, A., Özdemir, T., Batan, N., Plášek, V., Porley, R.D., Randić, M., Sawicki, J., Schroder, W., Sérgio, C., Smith, V.R., Sollman, P., Ştefănuţ, S., Stevenson, C.R., Suárez, G.M., Surina, B., Uyar, G. & Modrić Surina, Z. 2012a. New national and regional bryophyte records, 31. *Journal of Bryology*, 34(2): 123–34.

Ellis, L.T., Alegro, A., Bansal, P., Nath, V., Cykowska, B., Bednarek-Ochyra, H., Ochyra, R., Dulin, M.V., Erzberger, P., Garcia, C., Sérgio, C., Claro, D., Stow, S., Hedderson, T.A., Hodgetts, N.G., Hugonnot, V., Kučera, J., Lara, F., Pertierra, L., Lebouvier, M., Liepina, L., Mežaka, A., Strazdiņa, L., Madžule, L., Rēriha, I., Mazooji, A., Natcheva, R., Phephu, N., Philippov, D.A., Plášek, V., Číhal, L., Pócs, T., Porley, R.D., Sabovljević, M., Salimpour, F., Behroozmand Motlagh, M., Sharifnia, F., Akhoondi Darzikolaei, S., Schäfer-Verwimp, A., Šegota, V., Shaw, A.J., Sim-Sim, M., Sollman, P., Spitale, D., Hölzer, A., Stebel, A., Váňa, J., van Rooy, J. & Vončina, G. 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., Kırmacı, M., Agcagil, E., Kurbatova, L.E., Lebouvier, M., Papp, B., Szurdoki, E., Philippov, D.A., Plášek, V., Pócs, T., Sabovljević, M., Sawicki, J., Sim-Sim, M., Szűcs, P., Bidló, A., Váňa, J., Vigalondo, B., Lara, F., Draper, I., Virchenko, V.M. & Wolski, G.J. 2012c. New national and regional bryophyte records, 33. *Journal of Bryology*, 34(4): 281–91.

Ellis, L.T., Bakalin, V.A., Baisheva, E., Bednarek-Ochyra, H., Ochyra, R., Borovichev, E.A., Choi, S.S., Sun, B.-Y., Erzberger, P., Fedosov, V.E., Garilleti, R., Albertos, B., Górski, P., Hájková, P., Hodgetts, N.G., Ignatov, M., Koczur, A., Kurbatova, L.E., Lebouvier, M., Mežaka, A., Miravet, J., Pawlikowski, P., Porley, R.D., Rosselló, J.A., Sabovljević, M.S., Pantović, J., Sabovljević, A., Schröder, W., Ştefănuţ, S., Suárez, G.M., Schiavone, M., Yayintaş, Ö.T. & Váňa, J. 2013. New national and regional bryophyte records, 36. *Journal of Bryology*, 35(3): 228–38.

Ellis, L.T., Bayliss, J., Bruggeman-Nannenga, M.A., Cykowska, B., Ochyra, R., Gremmen, N.J.M., Frahm, J.-P., Hedderson, T.A., Heras, P., Infante, M.V., Hugonnot, V., Mogro, F., Plášek, V., Číhal, L., Sawicki, J., Schäfer-Verwimp, A., Stebel, A., Ştefănuţ, S., Váňa, J., Yang, J.-D. & Lin, S.-H. 2014a. New national and regional bryophyte records, 38. *Journal of Bryology*, 36(1): 61–72.

Ellis, L.T., Afonina, O.M., Asthana, A.K., Gupta, R., Sahu, V., Nath, V., Batan, N., Bednarek-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., Číhal, L., Sawicki, J., Sérgio, C., Ministro, P., Garcia, C.A., Smith, V.R., Ştefănuţ, S., Stow, S., Suárez, G.M., Flores, J.R., Thouvenot, L., Váňa, J., van Rooy, J. & Zander, R.H. 2014b. New national and regional bryophyte records, 39. *Journal of Bryology*, 36(2): 134–51.

Ellis, L.T., Aleffi, M., Asthana, A.K., Srivastava, A., Bakalin, V.A., Batan, N., Özdemir, T., Bednarek-Ochyra, H., Borovichev, E.A., Brugués, M., Cano, M.J., Choi, S.S., De Beer, D., Eckstein, J., Erzberger, P., Fedosov, V.E., Ganeva, A., Natcheva, R., Garcia C.A., Sérgio, C., Garilleti, R., Albertos, B., Puche, F., Gücel, S., Higuchi, M., Hugonnot, V., Hylander, K., Kırmacı, M., Aslan, G., Koponen, T., Lara, F., Mazimpaka, V., van Melick, H., Müller, F., Özenoglu Kiremit, H., Papp, B., Szurdoki, E., Plášek, V., Číhal, L., van der Pluijm, A., Poponessi, S., Mariotti, M.G., Reyniers, J., Sabovljević, M.S., Sawicki, J., Smith, V.R., Stebel, A., Ştefănuţ, S., Sun, B.-Y., Váňa, J. & Venanzoni, R. 2014c. New national and regional bryophyte records, 40. *Journal of Bryology*, 36(3): 223–44.

Ellis, L.T., Aleffi, M., Tacchi, R., Alegro, A., Alonso, M., Asthana, A.K., Sahu, V., Biasuso, A.B., Callaghan, D.A., Ezer, T., Kara, R., Seyli, T., Garilleti, R., Gil-López, M.J., Gwynne-Evans, D., Hedderson, T.A., 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., Číhal, 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., Ştefănuţ, S., Szűcs, P., Bidló, A., Papp, B., Szurdoki, E., Tan, B.C., Váňa, J., Vigalondo, B., Draper, I., Lara, F., Yoon, Y.-J., Sun, B.-Y. & Nishimura, N. 2014d. New national and regional bryophyte records, 41. *Journal of Bryology*, 36(4): 306–24.

**Ellis, L.T., Aleffi, M., Bakalin, V.A., Bednarek-Ochyra, H., Bergamini, A., Beveridge, P., Choi, S.S., Fedosov, V.E., Gabriel, R., Gallego, M.T., Grdović, S., Gupta, R., Nath, V., Asthana, A.K., Jennings, L., Kürschner, H., Lebouvier, M., Nair, M.C., Manjula, K.M., Rajesh, K.P., Nobis, M., Nowak, A., Park, S.J., Sun, B.-Y., Plášek, V., Číhal, L., Poponessi, S., Mariotti, M.G., Sabovljević, A., Sabovljević, M.S., Sawicki, J., Schnyder, N., Schumacker, R., Sim-Sim, M., Singh, D.K.,

Singh, D., Majumdar, S., Singh Deo, S., Ştefănuţ, S., Suleiman, M., Seng, C.M., Chua, M.S., Váňa, J., Venanzoni, R., Bricchi, E. & Wigginton, M.J. 2015a. New national and regional bryophyte records, 42. *Journal of Bryology*, 37(1): 68–85.

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., Kırmacı, M., Koczur, A., Kürschner, H., Lara, F., Mazimpaka, V., Larraín, 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., Číhal, L., Ristow, R., Sawicki, J., Schäfer-Verwimp, A., Smith, V.R., Stebel, A., Ştefănuţ, S., Subkaitė, M., Sun, B.-Y., Uselienė, A., Uyar, G., Váňa, J., Yoon, Y.-J. & Park, S.J. 2015b. New national and regional bryophyte records, 43. *Journal of Bryology*, 37(2): 128–46.

Ellis, L.T., Alegro, A., Šegota, V., Bakalin, V.A., Barone, R., Borovichev, E.A., Hugonnot, V., Lebouvier, M., Nobis, M., Nowak, A., Ochyra, R., Papp, B., Szurdoki, E., Piwowarczyk, R., Plášek, V., Číhal, L., Ren, Z.-J., Sabovljević, M.S., Sérgio, C., Garcia, C.A., Melo, I., Sawicki, J., Stebel, A., Ştefănuţ, 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., Alataş, M., Asthana, A.K., Rawat, K.K., Sahu, V., Srivastava, A., Bakalin, V.A., Batan, N., Bednarek-Ochyra, H., Bester, S.P., Borovichev, E.A., De Beer, D., Enroth, J., Erzberger, P., Fedosov, V.E., Feuillet-Hurtado, C., Gradstein, S.R., Gremmen, N.J.M., Hedenäs, L., Katagiri, T., Yamaguchi, T., Lebouvier, M., Maity, D., Mesterházy, A., Müller, F., Natcheva, R., Németh, Cs., Opisso, J., Özdemir, T., Erata, H., Parnikoza, I., Plášek, V., Sabovljević, S., Sabovljević, A.D., Saha, P., Md Nehal Aziz, Schröder, W., Váňa, J., van Rooy, J., Wang, J., Yoon, Y.-J. & Kim, J.H. 2016a. New national and regional bryophyte records, 47. *Journal of Bryology*, 38(2): 151–67.

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., Damsholt, K., Enroth, J., Erzberger, P., Fedosov, V.E., Fuertes, E., Gradstein, S.R., Gremmen, N.J.M., Hallingbäck, T., Jukonienė, I., Kiebacher, T., Larraín, J., Lebouvier, M., Lüth, M., Mamontov, Yu.S., Potemkin, A.D., Nemeth, Cs., 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., Ştefănuţ, S., Stončius, D., Virchenko, V.M., Węgrzyn, M. & Wietrzyk, P. 2016b. New national and regional bryophyte records, 48. *Journal of Bryology*, 38(3): 235–59.

Ellis, L.T., Agcagil, E., Kırmacı, M., Aleffi, M., Bakalin, V.A., Bednarek-Ochyra, H., Cykowska-Marzencka, B., Stryjak-Bogacka, M., Bojaca, G.F.P., Fantacelle, L.B., Araújo, C.A.T., Maciel-Silva, A.S., Bruno Silva, J., Calleja, J.A., Cano, M.J., Castillo Diaz, J., Gabriel, R., Dias dos Santos, N., Enroth, J., Erzberger, P., Garilleti, R., Hájek, M., Hedenäs, L., Heras, P., Infante, M., Kiebacher, T., Koczur, A., Krawczyk, R., Kučera, J., Lebouvier, M., Lüth, M., Mazimpaka, V., Vigalondo, B., Lara, F., Nagy, J., Németh, Cs., Kovács, A., Nobis, M., Węgrzyn, M., Wietrzyk, P., Norhazrina, N., Vanderpoorten, A., Nowak, A., Poponessi, S., Gigante, D., Venanzoni, R., Plášek, V., Rangel Germano, S., Schäfer-Verwimp, A., Sérgio, C., Claro, D., Garcia, C.A., Shirzadian, S., Akhoondi Darzikolaei, A., Stebel, A., Suleiman, M., Yong, K.-T., Virchenko, V.M., Vončina, G., Yoon, Y.-J., Choi, H.-G. & Kim, J.H. 2016c. New national and regional bryophyte records, 49. *Journal of Bryology*, 38(4): 327–47.

Ellis, L.T., Aleffi, M., Bednarek-Ochyra, H., Bakalin, V.A., Boiko, M., Calleja, J.A., Fedosov, V.E., Ignatov, M.S., Ignatova, E.A., Garilleti, R., Hallingbäck, T., Lönnell, N., Hodgetts, N., Kiebacher, T., Larraín, J., Lebouvier, M., Lüth, M., Mazimpaka, V., Vigalondo, B., Lara, F., Natcheva, R., Nobis, M., Nowak, A., Orgaz, J.D., Guerra, J., Pantović, J., Nikolić, N., Sabovljević, M.S., Sabovljević, A.D., Pisarenko, O.Yu., Plášek, V., Skoupá, Z., Poponessi, S., Privitera, M., Puglisi, M., Skudnik, M. & Wang, Q.H. 2017a. New national and regional bryophyte records, 51. *Journal of Bryology*, 39(2): 177–90.

Ellis, L.T., Alataş, 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., Czernyadjeva, 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., Ştefănuţ, S., Uyar, G., Vončina, G., Wigginton, M.J., Yong, K.-T., Chan, M.S. & Yoon Y.-J. 2017b. 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., Provenzano, F., Eckstein, J., Enroth, J., Erzberger, P., Ezer, T., Gargano, M.L., Ginzburg, E., Górski, P., Gradstein, S.R., Reeb, C., Hannoire, C., Infante, M., Jukonienė, I., Kushnevskaya, 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., Venturella, G., Węgrzyn, M., Wietrzyk, P., Yoon, Y.-J., Kim, J.H. & Yücel, E. 2017c. New national and regional bryophyte records, 53. *Journal of Bryology*, 39(4): 368–87.

Ellis, L.T., Wilbraham, J., Aleffi, M, Asthana, A.K., Rawat, K.K., Gupta, D., Sahu, V., Katiyar, P., Asthana, G., Srivastava, A., Baráth, K., Bednarek-Ochyra, H., Bruno Silva, J., Emanuely de Araújo Farias, C., Rangel Germano, S., Czernyadjeva, I.V., Doroshina, G.Ya., Delgadillo Moya, C., Peña Retes, P., Erzberger, P., Fuertes, E., Garcia-Avila, D., Garilleti, R., Hedderson, T.A., West, A., Hugonnot, V., Kürschner, H., Lagrandie, J., Lara, F., Draper, I., Lebouvier, M., Lönnell, N., Hallingbäck, T., Mesterházy, A., Muñoz, J., Németh, C.S., Park, S.J., Sun, B.-Y., Pérez, G., Plášek, V., Poponessi, S., Vernanzoni, R., Gigante, D., Philippe, M., Porley, R.D., Sérgio, C., Ministro, P., Ştefănuţ, S., Suárez, G.M., Flores, J.R., Sulayman, M., Wilding, N. & Yoon, Y.-J. 2018a. New national and regional bryophyte records, 54. *Journal of Bryology*, 40(1): 74–97.

Ellis, L.T., Afonina, O.M., Aleffi, M., Andriamiarisoa, R.L., Bačkor, M., Goga, M., Bednarek-Ochyra, H., Callaghan, D.A., Campisi, P., Dia, M.G., Marino, M.L., Enroth, J., Erzberger, P., Hugonnot, V., Ignatova, E.A., Kiebacher, T., Kučera, J., Lebouvier, M., Maria, G.M., Ştefănuţ, S., Nagy, J., Pócs, T., Poponessi, S., Venanzoni, R., Gigante, D., Prosser, F., Reeb, C., Sabovljević, M.S., Shevock, J.R., Shirzadian, S., Akhoondi Darzikolaei, S., Souza, E.R.F., Silva Pinto, A., Silva, J.B., Lopes, S.F., Torzewski, K. & Kazienko, A. 2018b. New national and regional bryophyte records, 55. *Journal of Bryology*, 40(2): 173–87.

Eremina, N.Ch. 1965. Notulae ad floram [muscorum] acrocarprum Alatau Transiliensis. *Botanicheskye Materialy Gerbariya Instituta Botaniki Akadademiy Nauk Kazakhskoy SSR*, 3: 115–25. (In Russian)

Erzberger, P., Németh, Cs., 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. 2012. *Encalypta* sect. *Rhabdotheca* in Russia. *Arctoa*, 21: 101–12.

Fedosov, V.E. & Zolotov, V.I. 2008. New moss records from Taimyrsky Municipal District. 3. *Arctoa*, 17: 212–5.

Fischer, E. 2013. Liverworts and hornworts from Rwanda. *ABC Taxa*, 14: 1–552.

Fleischer, M. 1904. *Die Musci der Flora von Buitenzorg (zugleich Laubmoosflora von Java). 2. Bryales (Arthrodontei [Diplolepideae i.p.])*. Leiden: E.J. Brill, i–xviii, pp. 381–643.

Frahm, J.-P., Klöcker, T., Schmidt, R. & Schöter, Ch. 2000. Revision der Gattung *Amphidium* (Musci, Dicranaceae). *Tropical Bryology*, 18: 171–84.

Frisvoll, A.A. 1983. A taxonomic revision of the *Racomitrium canescens* group (Bryophyta, Grimmiales). *Gunneria*, 41: 1–181.

Frisvoll, A.A. 1986. Southern hemisphere synonyms of *Racomitrium sudeticum* (Funck) Bruch & Schimp. *Journal of Bryology*, 14(2): 339–46.

Frisvoll, A.A. 1988. A taxonomic revision of the *Racomitrium heterostichum* group (Bryophyta, Grimmiaceae) in N. and C. America, Europe and Asia. *Gunneria*, 59: 1–289.

Froehlich, J. 1955. Bryophyten aus Iran. *Annalen des Naturhistorischen Museum in Wien*, 57: 37–41.

Fulford, M.H. 1968. Manual of the leafy Hepaticae of Latin America—Part III. *Memoirs of the New York Botanical Garden*, 11(3): 277–392.

Gao, C., Vitt, D.H. & He, S. 1999. Dicranaceae. In: C. Gao, M.R. Crosby and S. He, eds. *Moss flora of China*, English Version. Vol. 1. Sphagnaceae–Leucobryaceae. Beijing & New York: Science Press & St Louis, MO: Missouri Botanical Garden Press, pp. 90–241.

Garcia, C., Sergio, C. & Jansen, J., 2008. The bryophyte flora of the natural park of Serra da Estrela (Portugal): conservation and biogeographical approaches. *Cryptogamie, Bryologie*, 29, 49–73.

Gasimov, T. & Novruzov, V. 2017. Species of family Orthotrichaceae Arn. (Bryopsida) in bryophyte flora of Azerbaijan. In: *The 3rd International Symposium on EuroAsian Biodiversity* (5–8 July). Minsk, p. 266.

Gradstein, S.R. & Pinheiro da Costa, D. 2003. The Hepaticae and Anthocerotae of Brazil. *Memoirs of the Missouri Botanical Garden*, 88, 1–316.

Gradstein, S.R. & Weber, W.A. 1982. The bryogeography of the Galapagos Islands. *Journal of the Hattori Botanical Laboratory*, 52: 127–52.

Gradstein, S.R., Pócs, T. & Váňa, J. 1983. Disjunct Hepaticae in tropical America and Africa. *Acta Botanica Hungarica*, 29: 127–71.

Gradstein, S.R., Churchill, S.P. & Salazar Allen, N. 2001. Guide to the bryophytes of tropical America. *Memoirs of the New York Botanical Garden*, 86: 1–577.

Graham, A.G.C., Fretwell, P.T., Larter, R.D., Hodgson, D.A., Wilson, C.K., Tate, A.J. & Morris, P. 2008. A new bathymetric compilation highlighting extensive paleo-ice sheet drainage on the continental shelf, South Georgia, sub-Antarctica. *Geochemistry Geophysics Geosystems*, 9: 1–21.

Grims, F. & Köckinger, H. 1999. Rote Liste gefährdeter Laubmoose (Musci) Österreich. 2. Fassung. In: H. Niklfeld, ed. *Rote Listen gefährdeter Pflanzen Österreichs*. Graz: Austria medien service, pp. 157–71.

Hässel de Menendez, G.G. & Rubies, M.F. 2009. Catalogue of Marchantiophyta and Anthocerotophyta of southern South America. *Beihefte zur Nova Hedwigia*, 134: 1–672.

Hébrard, J.P. 1970. Muscinées récoltées aux Iles Kerguelen and Crozet pendant la campagne d'été des Terres Australes et Antarctiques Françaises (1969). *Revue Bryologique et Lichénologique, Nouvelle Série*, 37: 135–62.

Herzog, T. 1943. *Molendoa taeniatifolia* Herz. nov. spec: Eine neue Laubmoosart der Alpen. *Flora oder Allgemeine Botanische Zeitung*, 137(1–2): 57–60.

Hill, M.O. & Preston, C.D. 1998. The geographical relationships of British and Irish bryophytes. *Journal of Bryology*, 20: 127–226.

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.

Hodgetts, N.G. 2015. Checklist and country status of European bryophytes—towards a new Red List for Europe. *Irish Wildlife Manuals*, No. 84. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

Hodgson, D.A., Graham, A.G.C., Roberts, S.J., Bentley, M.J., Cofaigh, C.Ó., Verleyen, E., Vyverman, W., Jomelli, V., Favier, V., Brunstein, D., Verfaillie, D., Colhoun, E.A., Saunders, K.M., Selkirk, P.M., Mackintosh, A., Hedding, D.W., Nel, W., Hall, K., McGlone, M.S., Van der Putten, N., Dickens, W.A. & Smith, J.A. 2014. Terrestrial and submarine evidence for the extent and timing of the Last Glacial Maximum and the onset of deglaciation on the maritime-Antarctic and sub-Antarctic islands. *Quanternary Science Reviews*, 100: 137–58.

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.

Horton, D.G. 1983. A revision of the Encalyptaceae (Musci), with particular reference to the North American taxa (Part II). *Journal of the Hattori Botanical Laboratory*, 54: 353–532.

Hradílek, Z., Chlachula, J. & Nesterova, S.G. 2011. New bryophyte records from Kazakhstan. *Thaiszia*, 21: 29–36.

Ignatov, M.S. & Zander, R.H. 1993. *Barbula amplexifolia* from Altai Mountains of Russia. *Bryologist*, 96(4): 638–9.

Ignatov, M.S., Afonina, O.M. & Ignatova, E.A. 2006. Check-list of mosses of East Europe and North Asia. *Arctoa*, 15: 1–130.

Ignatov, M.S., Fedosov, V.E., Ignatova, E.A., Doroshina, G.Y. & Zolotov, V.I. 2010. Moss flora of Gunib area in Dagestan, the eastern Caucasus. *Arctoa*, 19: 87–96.

Ignatova, E.A. & Blom, H.H. 2017. *Schistidium*. In: M.S. Ignatov, ed. *Moss flora of Russia. Volume 2: Oedipodiales—Grimmiales*. Moscow: KMK Scientific Press Ltd, pp. 438–550. (In Russian and English).

Ignatova, E. & Muñoz, J. 2004. The genus *Grimmia* Hedw. (Musci, Grimmiaceae) in Russia. *Arctoa*, 13: 101–82.

Ignatova, E.A., Blom, H.H., Goryunov, D.V. & Milyutina, I.A. 2009. On the genus *Schistidium* (Grimmiaceae, Musci) in Russia. *Arctoa*, 19: 195–233.

Ignatova, E.A., Kučera, J., Kuznetsova, O.I. & Ignatov, M.S. 2013. First record of *Hydrogonium gregarium* (Pottiaceae, Bryophyta) in Russia, an interesting extension of the species' distribution to the heart of the permafrost zone. *Polish Botanical Journal*, 58(2): 565–72.

Il'nickyi, O.A., Boiko, M.F., Fedorchuk, M.I., Derevjanko, V.M. & Shishkin, V.A. 2005. *Osnovy fitomonitoringa*. Kherson: Ailant. (In Russian).

Ingólfsson, Ó. 2004. Quaternary glacial and climate history of Antarctica. In: J. Ehlers & P.L. Gibbard, eds. *Quaternary glaciation extent and chronology. Part III. South America, Asia, Africa, Australasia, Antarctica*. Amsterdam: Elsevier, pp. 3–43.

Ivanova, E.I., Ignatova, E.A., Ignatov, M.S., Zolotov, V.I. & Krivoshapkin, K.K. 2005. Mosses. In: N.S. Danilov, ed. *Raznoobrazie rastitel'nogo mira Yakutii*. Novosibirsk: Izdatel'stvo Sibirskogo Otdelenya Rossiyskoy Akademiy Nauk, pp. 105–25. (In Russian).

Jansen, J. & Sequeira, M.M. 1999. The vegetation of shallow waters and seasonally inundated habitats (Littorelletea and Isoëto-Nanojuncetea) in the higher parts of the Serra da Estrela, Portugal. *Mitteilungen der badischer Landesvereins für Naturkunde und Naturschutz. e. V., Freiburg i. Br., N.F.*, 17(2): 449–62.

Jóhannsson, B. 2003. Íslenskir Mosar. Skrár og viðbætur. *Fjölrit Náttúrufræðistofnunar*, 44: 1–135.

Kırmacı, M., Kürschner, H., & Erdağ, A. 2012. New and noteworthy records to the bryophyte flora of Turkey and southwest Asia. *Cryptogamie, Bryologie*, 33: 267–70.

Köckinger, H. & Kučera, J. 2007. *Barbula amplexifolia* (Mitt.) A.Jaeger in Europe. *Journal of Bryology*, 29(1): 33–40.

Koponen, T. 1980. A synopsis of Mniaceae (Bryophyta). IV. Taxa in Europe, Macaronesia, NW Africa and the Near East. *Annales Botanici Fennici*, 17: 125–62.

Koponen, T. 2010. Bryophyte flora of the Hunan Province, China. 14. *Philonotis laii*, species nova (Bartramiaceae, Musci). *Acta Bryolichenologica Asiatica*, 3: 137–43.

Koponen, T., Ignatova, E.A., Kuznetsova, O.I. & Ignatov, M.S. 2012. *Philonotis* (Bartramiaceae, Bryophyta) in Russia. *Arctoa*, 21: 21–62.

Korpelainen, H., Virtanen, V., Kostamo, K. & Karttunen, H. 2008. Molecular evidence shows that the moss *Rhytidiadelphus subpinnatus* (Hylocomiaceae) is clearly distinct from *R. squarrosus*. *Molecular Phylogenetics and Evolution*, 48: 372–6.

Košnar, J. & Kučera, J. 2010. The taxonomic identity and typification of *Barbula montenegrina* Breidl. & Szyszyl. (Bryopsida, Pottiaceae). *Journal of Bryology*, 32: 275–8.

Kučera, J. & Ignatov, M.S. 2015. Revision of phylogenetic relationships of *Didymodon* sect. *Rufiduli* (Pottiaceae, Musci). *Arctoa*, 24: 79–97.

Kučera, J., Košnar, J. & Werner O. 2013. Partial generic revision of *Barbula* (Musci: Pottiaceae): re-establishment of *Hydrogonium* and *Streblotrichum*, and the genus *Gymnobarbula*. *Taxon*, 62 (1): 21–39.

Kuo, C.-M. & Chiang, T.-Y. 1987. Index of Taiwan mosses. *Taiwania*, 32: 119–207.

Kürschner, H. & Erdağ, A. 2005. Bryophytes of Turkey: an annotated reference list of the species with synonyms from the recent literature and an annotated list of Turkish bryological literature. *Turkish Journal of Botany*, 29: 95–154.

Kürschner, H. & Frey, W. 2011. Liverworts, mosses and hornworts of southwest Asia (Marchantiophyta, Bryophyta, Anthocerotophyta). *Nova Hedwigia*, Beiheft 139: 1–240.

Lai, J.-J. & Wang-Yang, J.-R. 1976. Index bryoflorae Formosesnis. *Taiwania*, 21(2): 159–203.

León-Yánez, S., Gradstein, S.R. & Wegner, C. 2006. *Hepáticas (Marchantiophyta) y Anthoceros (Anthocerotohyta) del Ecuador*. Quito: Pontificia Universidad Católica del Ecuador, Publicaciones del Herbario QCA.

Lewinsky, J. 1992. The genus *Orthotrichum* Hedw. (Orthotrichaceae, Musci) in southeast Asia. A taxonomic revision. *Journal of the Hattori Botanical Laboratory*, 72: 1–88.

Lewinsky-Haapasaari, J. & Long, D.G. 1996. *Orthotrichum straminеum* Hornsch. new to China. *Journal of Bryology*, 19(2): 350–2.

Lin, S.-H. 1988. List of mosses of Taiwan. *Yushania*, 5(4): 1–40.

Lyubarskaya, L.B. 1986. *Conspect of mosses of Azerbaijan*. Baku: Inst. Bot. Akad. Nauk Azerb. SSR, 178 pp. [in Russian].

Ma, J., Zuo, Q., Zhang, B.-Y., Wei, Q-Q. & Wang, Y.F. 2015. Notes on *Orthothecium* (Bryophyta) of China. *Guihaia*, 35: 471–5.

Magill, R.E. 2006. A new species *Encalypta* (Encalyptaceae) from west Texas. *Bryologist*, 109: 398–400.

Magill, R.E. 2007. Encalyptaceae. In: Flora of North America Editorial Committee, ed. *Flora of North America north of Mexico*, Vol. 27. Mosses, part I. New York and Oxford: Oxford University Press, pp. 170–9.

Marline, L., Andriamiarisoa, R., Bardat, J., Chuah-Petiot, M., Hedderson, T., Reeb, C., Strasberg, D., Wilding, N. & Ah-Peng, C. 2012. Checklist of the bryophytes of Madagascar, *Cryptogamie, Bryologie*, 33(3): 199–255.

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.

Menzel, M. 1985 (1984). Katalog der Lebermoose von Peru. *Willdenowia*, 14(2): 473–523.

Miller, N.G. & Mogensen, G.S. 2014. *Cyrtomnium* Holmen. 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. 219–21.

Mohamed, H., Yong, K.-T. & Damanhuri, A. 2010. Mosses of north-western Maliau Basin with notes on the phytogeographical affinities. In: I. Komoo, M. Mazlan, M.S. Ikram, A. Latiff, eds. *Maliau Basin: physical environment and biological diversity of the northern rim*. Kuala Lumpur: Akademi Sains Malaysia and Yayasan Sabah, pp. 135–56.

Nair, M.C. & Madhusoodanan, P.V. 2006. A preliminary survey of the bryophyte flora of Vellarimala in the Western Ghats of Kerala. *Indian Journal of Forestry*, 29(2): 191–6.

Noguchi, A. 1958. A review of the Japanese *Rhacomitrium*. *Miscellanea Bryologica et Lichenologica*, 1(15): 1–3 (in Japanese).

Noguchi, A. 1974. Musci Japonici. X. The genus *Racomitrium*. *Journal of the Hattori Botanical Laboratory*, 38: 337–69.

Noguchi, A. (supplemented by Z. Iwatsuki). **1987**. *Illustrated moss flora of Japan. Part 1*. Nichinan: Hattori Botanical Laboratory.

Noguchi, A. (supplemented by Z. Iwatsuki). **1988**. *Illustrated moss flora of Japan, Part 2*. Nichinan: Hattori Botanical Laboratory.

Nowak, A., Plášek, V., Nobis, M. & Nowak, S. 2016. Epiphytic communities of open habitats in the western Tian-Shan Mts (Middle Asia: Kyrgyzstan). *Cryptogamie, Bryologie*, 37(4): 415–33.

Nyholm, E. 1995. A new species of *Encalypta*. *Lindbergia*, 20: 83–4.

Ochyra, R. 1985a. *Koponenia*, a new pleurocarpous moss genus from Bolivia. *Journal of Bryology*, 13(4): 479–86.

Ochyra, R. 1985b. *Hypnobartlettia fontana* gen. et sp. nov. (Musci: Hypnobartlettiaceae fam. nov.), a unique moss from New Zealand. *Lindbergia*, 11(1): 2–8.

Ochyra, R. 1986. On the taxonomic position of *Sciaromium lacustre* Herz. & Rich. in Rich. *Journal of Bryology*, 14(1): 109–15.

Ochyra, R. 1987a. On the taxonomy and family placement of the moss genus *Limbella* (C. Muell.) Broth. *Journal of Bryology*, 14(3): 465–85.

Ochyra, R. 1987b. A revision of the moss genus *Sciaromium* (Mitt.) Mitt. II. The section *Limbidium* Dusén, with a description of *Vittia* gen. nov. (Vittiaceae fam. nov.). *Journal of the Hattori Botanical Laboratory*, 62: 387–415.

Ochyra, R. 2008. Mosses. In: S.L. Chown & P.W. Froneman, eds. *The Prince Edward Islands: land–sea interactions in a changing ecosystem*. Stellenbosch: Sun Press, pp. 383−9.

Ochyra, R. 2010. Antipodal mosses: XVI. The first record of the genus *Sematophyllum* (Sematophyllaceae) in the Subantarctic, with a description of *S. lebouvieri* sp. nov. *Cryptogamie, Bryologie*, 31(3): 223–32.

Ochyra, R. & Bednarek-Ochyra, H. 2011. *Schistidium deguchianum* (Grimmiaceae), a new Andean species from Peru. *Journal of Bryology*, 33(3): 189–94.

Ochyra, R. & Bednarek-Ochyra, H. 2013. On the identity of *Ditrichum validinervium* (Bryophyta, Ditrichaceae). *Cryptogamie, Bryologie*, 34(3): 299–306.

Ochyra, R. & Deguchi, H. 1999. *Ditrichum gemmiferum* (Musci, Ditrichaceae) in Chile. *Fragmenta Floristica et Geobotanica*, 44(2): 509–11.

Ochyra, R. & Enroth, J. 1989. *Neckeropsis touwii* (Musci, Neckeraceae), new species from Papua New Guinea, with an evaluation of sect. *Pseudoparaphysanthus* of *Neckeropsis*. *Annales Botanici Fennici*, 26(2): 127–32.

Ochyra, R. & Ireland, R.R. 2004. *Isopterygium tenerum*, newly recognized for Africa. *Bryologist*, 107(3): 363–7.

Ochyra, R. & Ireland, R.R. 2016. *Isopterygium tenerifolium* (Hypnaceae, Bryophyta)—one more Afro-American disjunct. *Herzogia*, 29(1): 72–8.

Ochyra, R. & Lewis Smith, R.I. 1998. Antarctic species in the genus *Ditrichum* (Ditrichaceae, Bryopsida), with a description of *D. gemmiferum* sp. nov. *Annales Botanici Fennici*, 35(1): 33–53.

Ochyra, R. & Poulsen, R.S. 2003. Four new moss records from Îles Kerguelen. *Journal of Bryology*, 25(2): 136–8.

Ochyra, R. & Singh, S.M. 2008. Three remarkable moss records from Dronning Maud Land, continental Antarctica. *Nova Hedwigia*, 86: 497–506.

Ochyra, R. & Vanderpoorten, A. 1999. *Platyhypnidium mutatum*, a mysterious new moss from Germany. *Journal of Bryology*, 21 (3): 183–9.

Ochyra, R. & van Rooy, J. 2013. Distribution of *Bucklandiella lamprocarpa* (Grimmiaceae, Musci) in South Africa. *Cryptogamie, Bryologie*, 34(3): 359–66.

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: Polish Academy of Sciences, Institute of Botany.

Ochyra, R., Bednarek-Ochyra, H. & Lewis Smith, R.I. 2008a. New and rare moss species from the Antarctic. *Nova Hedwigia*, 87 (3–4): 457–77.

Ochyra, R., Lewis Smith, R.I. & Bednarek-Ochyra, H. 2008b. *The illustrated moss flora of Antarctica*. Cambridge: Cambridge University Press.

Ochyra, R., Zander, R.H. & Lebouvier, M. 2014. Antipodal mosses: XVIII. *Syntrichia christophei*, a new species from subantarctic Îles Kerguelen. *Cryptogamie, Bryologie*, 35(1): 37–46.

Ochyra, R., Crabtree, D. & Tangney, R. 2015. Studies on mosses in the Falkland Islands: I. *Bucklandiella* and *Codriophorus* (Grimmiaceae). *Cryptogamie, Bryologie*, 36(3): 289–310.

Plášek, V., Sawicki, J. & Číhal, L. 2014. *Orthotrichum pamiricum* (Bryophyta), a new epiphytic moss species from Pamir Mountains in Central Asia. *Turkish Journal of Botany*, 38: 754–62.

Qasımov, T., Kürschner, H. & Parolly, G. 2016. Three new moss records from the Bozqır yaylası area of Azerbaijan. *Herzogia*, 29: 805–9.

Ramsay, H.P., Schofield, W.B. & Tan, B.C. 2004. The family Sematophyllaceae (Bryopsida) in Australia, Part 2. *Acroporium*, *Clastobryum*, *Acrohymenium*, *Meiotheciella*, *Meiothecium*, *Papillidiopsis*, *Radulina*, *Rhaphidorrhynchium*, *Trichosteleum* and *Warbugiella*. *Journal of the Hattori Botanical Laboratory*, 95: 1–69.

Redfearn, P.L. Jr. & Allen, B. 2005. A re-examination of *Orthothecium hyalopiliferum* (Hypnales). *Bryologist* 108: 406–11.

Redfearn, P.L. Jr., Tan, B.C. & He, S. 1996. A newly updated and annotated checklist of Chinese Mosses. *Journal of the Hattori Botanical Laboratory*, 79: 163–357.

Ros, R.M., Cano, M.J., Muñoz, J. & Guerra, J. 2000. Contribution to the bryophyte flora of Morocco: the Jbel Toubkal. *Journal of Bryology*, 22(4): 283–9.

Ros, R.M., Mazimpaka, V., Abou-Salama, U., Aleffi, M., Blockeel, T.L., Brugués, M., Cros, R.M., Dia, M.G., Dirkse, G., Draper, I., El-Saadawi, W., Erdağ, A., Ganeva, A., Gabriel, R.M.A., Gonzáles-Mancebo, J.M., Granger, C., Herrnstadt, I., Hugonnot, V., Khalil, K., Kürschner, H., Losada-Lima, A.,

Luís, L., Mifsud, S.D., Privitera, M., Puglisi, M., Sabovljević, M., Sérgio, C., Shabbara, H.M., Sim-Sim, M., Sotiaux, A., Tacchi, A., Vanderpoorten, A. & Werner, O. 2013. Mosses of the Mediterranean, an annotated checklist. *Cryptogamie, Bryologie*, 34: 99–283.

Sabovljević, M., Natcheva, R., Tsakiri, E., Dihoru, G., Dragićević, S., Erdağ, A. & Papp B. 2008. Check-list of the mosses of SE Europe. *Phytologia Balcanica*, 14: 207–44.

Safavi, M. & Shirzadian, S. 2011. Modelling bryophytes distribution pattern using environmental parameters of Iran in Geographical Information Systems (GIS): a case study of three genera *Tortula, Grimmia* and *Bryum* (Bryophyta). *Rostaniha*, 12: 135–51.

Sakurai, K. 1937. Beobachtungen über Japanische Moosflora. XIVb. *The Botanical Magazine (Tokyo)*, 51: 133–41.

Sawicki, J., Szczecińska, M., Bednarek-Ochyra, H. & Ochyra, R. 2015. Mitochondrial phylogenomics supports splitting the traditionally conceived genus *Racomitrium* (Bryophyta: Grimmiaceae). *Nova Hedwigia*, 100: 293–317.

Schäfer-Verwimp, A. & Pócs, T. 2009. Contributions to the hepatic flora of the Dominican Republic, West Indies. *Acta Botanica Hungarica*, 51(3–4): 367–425.

Schäfer-Verwimp, A., Lehnert, M. & Nebel, M. 2013. Contribution to the knowledge of the bryophyte flora of Ecuador. *Phytotaxa*, 128: 1–63.

Schofield, W.B. 1969. Phytogeography of northwestern North America: bryophytes and vascular plants. *Madroño*, 20: 155–207.

Schofield, W.B. 1984. Bryogeography of the Pacific coast of North America. *Journal of the Hattori Botanical Laboratory*, 55: 35–43.

Schuster, R.M. 2000. Austral Hepaticae. Part I. *Beihefte zur Nova Hedwigia*, 118: 1–524.

Schuster, R.M. 2002. Austral Hepaticae. Part II. *Beihefte zur Nova Hedwigia*, 119: 1–606.

Schuster, R.M. & Engel, J.J. 1974. A monograph of the genus *Pseudocephalozia*. *Journal of the Hattori Botanical Laboratory*, 38: 665–701.

Seppelt, R.D. 2004. *The moss flora of Macquarie Island*. Kingston: Australian Antarctic Division.

Seregin, A. 2018. *Moscow University Herbarium (MW). Version 1.11*. Lomonosov Moscow State University. Occurrence Dataset [accessed 13 January 2013]. Available at https://doi.org/10.15468/cpnhcc accessed via GBIF.org.

Sérgio, C., Muñoz, J. & Ochyra, R. 1995. *Racomitrium hespericum*, a new species from the Iberian Peninsula. *Bryologist*, 98: 112–7.

Sérgio, C., Garcia, C.A., Sim-Sim, M., Vieira, C., Hespanhol, H. & Stow, S. 2013. *Atlas e Livro Vermelho dos Briófitos ameaçados de Portugal* (Atlas and Red Data book of endangered bryophytes of Portugal). Lisboa: MUHNAC. Documenta.

Singh, A.P. & Nath, V. 2007. *Hepaticae of Khasi and Jaintia hills: Eastern Himalayas*. Dehra Dun: Bishen Singh Mahendra Pal Singh, pp. 1–382.

Singh, S.K. & Singh D.K. 2006. *Plagiochila ovalifolia* Mitt., a new record for Indian bryoflora. *Journal of Non-Timber Forest Products*, 13(1): 69–72.

Singh, S.K. & Singh, D.K. 2007. Contribution to the bryoflora of great Himalayan National Park, Kullu, Himachal Pradesh V: Genus *Plagiochila* (Dumort.) Dumort. (Plagiochilaceae). *Indian Journal of Forestry*, 30(1): 101–12.

Singh, D.K., Singh, S.K. & Singh, D. 2016. *Liverworts and hornworts of India—an annotated checklist*. Kolkata: Botanical Survey of India.

Skoupá, Z., Ochyra, R., Guo, S.-H., Sulayman, M. & Plášek, V. 2017. Distributional novelties for *Lewinskya, Nyholmiella* and *Orthotrichum* (Orthotrichaceae) in China. *Herzogia*, 30(1): 58–73.

Smith, A.J.E. 1978. *The moss flora of Britain and Ireland*. Cambridge: Cambridge University Press.

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: 76–8.

Soria, A., Gómez, D., Ron, E. & Guerra, J. 2006. *Timmiella*. In: J. Guerra, M.J. Cano, & R.M. Ros, eds. *Flora Briofítica Ibérica. Pottiales: Pottiaceae, Encalyptales: Encalyptaceae*. Vol. III. Murcia: Universidad de Murcia, Sociedad Española de Briología, pp. 20–5.

Sotiaux, A. & Vanderpoorten, A. 2017. A checklist of the bryophytes of Andorra. *Journal of Bryology*, 39(4): 353–67.

Srivastava, S.C. & Verma, P.K. 2004. Exploration of liverwort diversity on Cinchona plantation in Dodabetta, Nilgiri Hills, India. *Geophytology*, 32(1 & 2): 1–18.

Stech, M. & Frahm, J.-P. 2001. *Palustriella pluristratosa* spec. nov. (Amblystegiaceae, Bryopsida), a new aquatic moss species with pluristratose lamina from Switzerland. *Botanica Helvetica*, 111: 139–150.

Ştefănuţ, S. & Goia, I. 2012. Checklist and Red List of bryophytes of Romania. *Nova Hedwigia*, 95: 59–104.

Stephani, F. 1901. Hepatics. In: W.P. Hiern, ed. *Catalogue of African plants collected by Dr. Friedrich Welwitsch in 1853–61*. Vol. II, Part II, *Cryptogamia*. London: British Museum (Natural History), pp. 3107–21.

Stephani, F. 1909–1912. *Species Hepaticarum*, Vol. IV. Genève et Bale: Georg et C^{ie}.

Stephani, F. 1918–1925. *Species Hepaticarum*. Vol. Vl. Geneve: Imprimerie Jent, S.A.

Stephani, F. 1985. *Icones Hepaticarum*, microfiche edition. Leiden: Inter Documentation Company bv.

Stieperaere, H. & Matcham, H. 2007. *Notothylas orbicularis* (Schwein.) Sull. in D. R. Congo and Uganda, new to Africa and N. *javanica* (Sande Lac.) Gottsche new to D. R. Congo (Anthocerotophyta, Notothyladaceae). *Journal of Bryology*, 29(1): 3–6.

Suarez, G.M. & Muñoz, J. 2015. *Schistidium* Bruch & Schimp. In: M. Brugués & J. Guerra, eds., *Flora Briofítica Ibérica*. Murcia: Universidad de Murcia, Sociedad Española de Briología, pp. 290–325.

Suleiman, M., Akiyama, H. & Tan, B.C. 2006. A revised catalogue of mosses reported from Borneo. *Journal of the Hattori Botanical Laboratory*, 99: 107–83.

Suleiman, M., Masundang, D.P & Tan, B.C. 2009. A checklist of mosses from Golden Hope oil palm plantation and surrounding areas, Tawau, Sabah, East Malaysia. *Journal of Tropical Biology and Conservation*, 5: 53–60.

Tan, B.C., Koponen, T. & Norris, D.H. 2007. Bryophyte flora of the Huon Peninsula, Papua New Guinea. LXX. Sematophyllaceae (Musci) 1. *Acanthorrhynchium, Acroporium, Clastobryophillum, Pseudopiloecium, Radulina* and *Trichosteleum*. *Acta Botanica Fennica* 44: 35–78.

Taylor, T. 1846. New Hepaticae. *London Journal of Botany*, 5: 365–417.

Townsend, C.C. 2005. Mosses from the Caucasian region and eastern Turkey. *Journal of Bryology*, 27: 143–52.

Uribe-M, J. & Gradstein, S.R. 2003. Type studies on *Frullania* subgenus *Meteoriopsis* (Hepaticae). I. The lectotypification of the genus *Frullania*, *F.* subgen. *Thyopsiella* and *F.* subgen. *Meteoriopsis*, and some species transferred from subgen. *Meteoriopsis* to subgen. *Thyopsiella*. *Cryptogamie, Bryologie*, 24: 193–207.

Uyar, G. & Çetin, B. 2004. A new check-list of the mosses of Turkey, *Journal of Bryology*, 26(3): 203–20.

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.

van Zanten, B.O. 1964. Mosses of the Star Mountains expedition. *Nova Guinea*, 16: 263–368.

Váňa, J. 1988. *Cephalozia* (Dum.) Dum. in Africa, with notes on the genus. (Notes on some African hepatic genera 10). *Nova Hedwigia, Beiheft*, 90: 179–98.

Váňa, J. & Engel, J.J. 2013. The liverworts and hornworts of the Tristan da Cunha group of islands in the South Atlantic Ocean. *Memoirs of the New York Botanical Garden*, 105: 1–135.

Váňa, J. & Long, D.G. 2011. Cephaloziaceae (Marchantiophyta) of the Sino-Himalayan region. *Nova Hedwigia*, 93: 153–64.

Váňa, J., Söderström, L., Hagborg, A. & von Konrat, M. 2012. Notes on early land plants today. 20. New synonyms in *Gymnocoleopsis* (Cephaloziellaceae, Marchantiophyta). *Phytotaxa*, 76: 41–2.

Vanderpoorten, A., Hedenäs, L. & Jacquemart, A-L., 2003. Differentiation in DNA fingerprinting and morphology

among species of the pleurocarpous moss genus, *Rhytidiadelphus* (Hylocomiaceae). *Taxon*, 52: 229–36.
Verma, P.K. 2005. *Studies in the Hepaticae of Nilgiri hills with special reference to epiphytic taxa*. Ph.D. thesis, Department of Botany, University of Lucknow.
Villarreal, J., Cargill, C., Hagborg, A., Söderström, L. & Renzaglia, K. 2010. A synthesis of hornwort diversity: patterns, causes and future work, *Phytotaxa*, 9: 150–66.
Vitt, D.H. & Glime, J.M. 1984. The structural adaptations of aquatic Musci. *Lindbergia*, 10: 95–110.
Wigginton, M. 2009. Checklist and distribution of the liverworts and hornworts of sub-Saharan Africa, including the East African Islands (edition 3, January 2009). *Tropical Bryology Research Reports*, 8: 1–114.
Wigginton, M.J. & Grolle, R. 1996. Catalogue of the Hepaticae and Anthocerotae of sub-Saharan Africa. *Bryophytorum Bibliotheca*, 50: 1–267.
Zechmeister, H.G. 2004. Die Moosflora im "Natura 2000 Gebiet Neusiedler See", unter besonderer Berücksichtigung der Salzwiesen im Seewinkel. *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Österreich*, 141: 43–62.
Zomlefer, W.B. 1993. A revision of *Rigodium* (Musci: Rigodiaceae). *Bryologist*, 96: 1–72.

Metzgeria francana Steph. and *M. saccata* Mitt. (Marchantiopsida, Metzgeriaceae) are distinct species, both occurring in New Caledonia

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Metzgeria saccata Mitt. was first described and illustrated by Mitten (1887) based on material from New Zealand. He underlined the presence of saccate lobes on the thallus margins as the most distinctive character of the species. Stephani (1917) described the new species *M. francana* Steph. from New Caledonia based on the *ca* 5 mm wide thallus, the thin costa with only two rows of epidermal cells on both faces, and especially, the inflated and more or less involuted thallus wings. Detailed descriptions and illustrations of the two species were given by Kuwahara (1960, 1966). Based on their broad, involute and more or less saccately lobed thallus wings, Kuwahara (1966) placed *M. saccata* and *M. francana* in a separate genus, *Austrometzgeria* Kuwah. However, this genus was not recognised by So (2002) without justification, and this placement has not been tested with DNA sequence data. The two species were placed in *Metzgeria* by Crandall-Stotler *et al.* (2009) and Söderström *et al.* (2016). In his key to the members of *Austrometzgeria*, Kuwahara (1966) distinguished the two species by the presence of 2 ventral epidermal cell rows in *M. francana* and 3–4 in *M. saccata*. Although no further differences were mentioned in the key, the species descriptions included additional differential characters such as the much more prominently saccate thallus lobes of *M. saccata* and the presence of gemmae in *M. francana*. Whereas the latter is currently only known from New Caledonia, additional localities of the former in Ecuador and Brazil were described by Benitez & Gradstein (2011) and Costa & Dias dos Santos, respectively (Ellis *et al.*, 2016).

So (2002), in a review of the Pacific species of *Metzgeria*, was unable to distinguish between the two species and regarded *M. francana* as a synonym of *M. saccata*. As mentioned by So, only a fragmentary isotype specimen of *M. francana* was examined during her study. Due to the poor condition of the isotype and the lack of fresh material, So apparently misinterpreted the convolute young branches and thallus apices of *M. francana* as thallus lobes and overlooked the presence of gemmae in the species. As indicated below, the involute short branches and thallus tips of *M. francana* are saccate in appearance and can thus be confused with the saccate thallus lobes of *M. saccata*. However, they clearly differ from the saccate lobes of *M. saccata* by the presence of a midrib. Based on study of ample, fresh material, Thouvenot *et al.* (2011) concluded that *M. francana* is a good species, differing from *M. saccata* in several constant features such as the inrolled mature thalli without saccate lobes (only the thallus apex and young branches seem saccate), the fewer epidermal rows and the presence of gemmae (Table 1). The rehabilitation of *M. francana* (which was overlooked

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