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Bryological Notes

New national and regional bryophyte records, 44

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

Contributor: R. Ochyra

Tristan da Cunha: (1) small patches in tuft of moss above Nellie's Hump, alt. 4500 ft (=1375 m a.s.l.), 18 October 1955, *leg.* N. M. Wace *T. 539* (BM); (2) alpine desert, above 5000 ft (=1525 m a.s.l.) [associated with *Bucklandiella membranacea* (Mitt.) Bednarek-Ochyra & Ochyra], 18 October 1955, *leg.* N. M. Wace *T. 529 & T. 530* (BM).

Situated in the cool-temperate zone in the middle of the South Atlantic Ocean, the small archipelago of Tristan da Cunha is an important outpost for many austral cool-adapted species of moss. They usually exhibit an amphiatlantic distribution pattern, occurring in southern South America and then re-appearing after a dramatic oceanic disjunction on subantarctic islands in the Kerguelen Biogeographical Province in the South Indian Ocean. The most typical examples of such ranges are *Ditrichum conicum* (Mont.) Mitt. (Ochyra & Lewis Smith, 1998; Blockeel *et al.*, 2010; Ochyra & Bednarek-Ochyra, 2013), *Philonotis polymorpha* (Müll.Hal.) Broth. (Ellis *et al.*, 2013b; Bednarek-Ochyra, 2014a), *Bucklandiella membranacea* (Ellis *et al.*, 2013c), *B. lamprocarpa* (Müll.Hal.) Bednarek-Ochyra & Ochyra (Ochyra *et al.*, 1988; Bednarek-Ochyra & Ochyra, 1998, 2012a; Blockeel *et al.*, 2007a, 2009a; Bednarek-Ochyra, 2014b), *B. orthotrichacea* (Müll.Hal.) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2012b; Bednarek-Ochyra, 2014c), *B. striatipila* (Cardot) Bednarek-Ochyra & Ochyra (Blockeel *et al.*, 2009c; Bednarek-Ochyra & Ochyra, 2010a, 2013; Ellis *et al.*, 2013a), *Hygrodicranum falklandicum* Cardot (Blockeel *et al.*, 2007b), and *Bryum orbiculatidolium* Cardot & Broth. (Blockeel *et al.*, 2008). This group is now increased by one distinct species, *Bucklandiella pachydictyon*. So far, it has been known to be widely distributed in southern South America where it is relatively frequent along

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the western coast of the continent, ranging from the Argentinean Neuquén and Chilean Cautin Provinces to Tierra de Fuego and extending to the northern maritime Antarctic (Deception Island) and subantarctic South Georgia (Bell, 1974; Ochyra *et al.*, 2008a,b). The species subsequently recurs on the Prince Edward Islands and Îles Crozet (Blockeel *et al.*, 2008), Îles Kerguelen (Cardot, 1916) and Heard Island (Ellis *et al.*, 2015b), as well as on the Île Amsterdam in the warm-south-temperate zone (Ellis *et al.*, 2015a). The present discovery of *B. pachydictyon* on Tristan da Cunha fills an obvious gap in the range of this species and confirms its phytogeographical status as an amphiatlantic south-temperate species.

2. ***Bucklandiella pacifica*** (Ireland & J.R.Spence) Bednarek-Ochyra & Ochyra

Contributor: R. Ochyra

United States of America. Idaho: Clearwater County, on rocks along Weitas Creek, 46°45′30″N 116°03′50″W, *ca* 860 m a.s.l., in patch of *Bucklandiella heterosticha* (Hedw.) Bednarek-Ochyra & Ochyra, 17 September 1950, *leg*. M. Nelson & K. Wilson *815A* (ID).

Bucklandiella pacifica is one of the most distinctive North American species of the genus *Bucklandiella* Roiv.; it is characterised by its entirely unistratose laminal cells, the lack of basal marginal border, differentiated alar cells forming auriculate decurrencies, long-cylindrical capsule and prominently flaring peristome teeth. Moreover, it is the only species of the genus in this continent having consistently muticous leaves always lacking a hyaline hair point. The species was regarded as a narrow endemic of the Pacific coast of North America, ranging from southern Vancouver Island in British Columbia in the north, to central California in the south (Ochyra & Bednarek-Ochyra, 2007a). It is widely distributed in the Pacific Coast Ranges within a relatively narrow zone, up to 200 km inland from the coast. Herein, the species is recorded for the first time from Idaho, where it occurs at a highly disjunct site situated about 600 km inland from the main part of its range in the Cascade Mountains. This is a well-known glacial refugium, usually designated as the "Clearwater Refugium" in which many relictual mesic-adapted vascular plants (Daubenmire, 1975; Johnson & Steele, 1978; Gavin, 2009) and mosses occur, including *Bucklandiella obesa* (Frisvoll) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2014b), *Codriophorus norrisii* (Bednarek-Ochyra & Ochyra) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2000), *Frisvollia varia* (Mitt.) Sawicki, Szczecińska, Bednarek-Ochyra & Ochyra (Bednarek-Ochyra, 2006; Sawicki *et al.*, 2015), as well as *Dendroalsia abietina* (Hook.) E.Britton, *Homalothecium fulgescens* (Müll.Hal.) A.Jaeger, *Kindbergia oregana* (Sull.) Ochyra, *Leucolepis menziesii* (Hook.) Steere, *Neckera douglasii* Hook., *Oligotrichum aligerum* Mitt., *Plagiomnium venustum* (Mitt.) T.J.Kop., *Pseudobraunia californica* (Lesq.) Broth. *Rhizomnium glabrescens* (Kindb.) T.J.Kop., and *Scleropodium obtusifolium* (Mitt.) Kindb. (Schofield, 1980; Vitt *et al.*, 1988).

3. ***Campylopus purpureocaulis*** Dusén

Contributors: R. Ochyra and M. Lebouvier

Îles Kerguelen: Grande Terre, Presqu'île Bouquet de la Grye: 1.5 km north-west of the cemetery at Port Couvreux and 2 km west of Mont de la Vigie, 49°16′12.125″S 69°40′04.578″E, *ca* 150 m a.s.l.; peatland with *Juncus scheuchzerioides* Gaudich., in the spring area of a stream running down to Port Couvreux, 20 November 2006, *leg. et det*. R. Ochyra *709/06* (with Ch. Brumbt) (KRAM).

Campylopus purpureocaulis is a wetland moss, which grows in large, compact tufts and owes its Latin name to its stems that are densely tomentose with reddish rhizoids. It is a south-temperate species with a highly disjunct geographical range that covers the North and South Islands of New Zealand (Bartlett & Frahm, 1983), Tierra del Fuego and Western Patagonia (Frahm, 1976; Greene, 1986) and some subantarctic islands in the Kerguelen Biogeographical Province in the South Indian Ocean (Frahm, 1985, 1988). In the latter region, *C. purpureocaulis* has so far been recorded only from the Prince Edward Islands (van Zanten, 1971 as *C. arboricola* Cardot & Dixon; Ochyra & Hertel, 1990 [1991]) and Îles Crozet (Ellis *et al.*, 2013c). Hence, its discovery on the Îles Kerguelen, the largest and the oldest archipelago in this province was to be expected. It has the richest moss flora of all subantarctic islands, consisting of about 135 species, many of which have been discovered during recent field studies (e.g. Blockeel *et al.*, 2009b,c; Ellis *et al.*, 2012a,b).

4. ***Cephaloziella varians*** (Gottsche) Steph.

Contributors: S. Ştefănuţ, R. Ion and A. Manole

Romania: Southern Carpathians: Bucegi Mountains, Şaua Cerbului, Dâmboviţa County, 45°26′15″ N, 25°27′08″E, 2300 m a.s.l., on rocks, 14 June 2014, *leg*. R. Ion & A. Manole *s.n.*, *det*. S. Ştefănuţ (BUCA B4709).

Cephaloziella varians was collected from the alpine zone of the Bucegi Mountains, Ialomiţa Glacial Ring. The plants were growing with other bryophytes such as *Clevea hyalina* (Sommerf.) Lindb., *Plagiochila porelloides* (Torrey *ex* Nees) Lindenb., *Scapania gymnostomophila* Kaal., *Distichium inclinatum* (Hedw.) Bruch & Schimp., *Ditrichum gracile* (Mitt.) Kuntze, *Oncophorus virens* (Hedw.) Brid., *Syntrichia norvegica* F.Weber and *Tortula schimperi* M.J.Cano, O.Werner & J.Guerra.

This is the first report of *Cephaloziella varians* for Romania and the south-eastern Carpathians (Ştefănuţ, 2008; Ştefănuţ & Goia, 2012). The nearest other locality for this species is in Hungary (Ellis *et al.*, 2014a). The conservation status of *C. varians* in Romania is Critically Endangered – CR B1ab(ii,iii)+2ab(ii,iii).

In Europe, *C. varians* has been reported from Svalbard, Iceland, Faroe Islands, Norway, Sweden, Finland, France, Switzerland, Austria, Italy, Novaya Zemlya, Franz Josef Island, Russia North (Söderström *et al.*, 2002), Hungary (Ellis *et al.*, 2014a) and now, Romania.

5. ***Codriophorus corrugatus*** Bednarek-Ochyra

Contributors: R. Ochyra, Z.-J. Ren and Z.-T. Zhao

China, Gansu Province: Die-bu County, Hu-Tou Shan (= tiger head mountain), 3500 m a.s.l., lat. 34°00′N 103°15′E, on soil, 25 July 2006, *leg.* Zuntian Zhao *200630246* (KRAM, SDNU).

Codriophorus corrugatus is readily recognised by its slender, long-acuminate leaves with a characteristic serpentine, corrugated and usually extremely wavy leaf acumen, which is acute to filiform, concolorous or subhyaline and cristate to papillose-crenulate at the apex, and short costae that extend to about mid-leaf. Despite its distinctness, it was only recently described as a species in its own right (Bednarek-Ochyra, 2004a, 2006). It is a boreal-temperate oreophyte, penetrating weakly into the Arctic. It has a wide, typical circum-North Pacific distribution pattern, which is frequently observed in mosses and liverworts (Bednarek-Ochyra *et al.*, 2010). The species has maximum occurrence in Japan, whilst in mainland Asia it is widely scattered, ranging from Kamchatka and Yakutia, through southern Siberia to central China. In North America, *C. corrugatus* is exceedingly rare and so far it has been recorded only from Alaska. In China, this species has hitherto been known from Quinghai, Shaanxi and Sichuan Provinces (Bednarek-Ochyra, 2006). Herein, it is reported from Gansu Province and this discovery extends its geographical range in central China. The material was initially named by the second contributor, with a question mark, *Racomitrium anomodontoides* Cardot [≡ *Codriophorus anomodontoides* (Cardot) Bednarek-Ochyra & Ochyra] which is actually closely related to *C. corrugatus* (Bednarek-Ochyra, 2006). However, it was subsequently renamed *Racomitrium elongatum* Frisvoll [≡ *Niphotrichum elongatum* (Frisvoll) Bednarek-Ochyra & Ochyra] (Liu *et al.*, 2011), although *Codriophorus* P.Beauv. and *Niphotrichum* Bednarek-Ochyra & Ochyra are very distinctive segregates of the traditionally conceived *Racomitrium* Brid. (Sawicki *et al.*, 2015). It was the first and the only report of *N. elongatum* from China and Asia, but now this record has to be deleted. Accordingly, it must still be considered a Euro-North American species (Frisvoll, 1983), which was only recently discovered in the South Island of New Zealand, where it is apparently introduced (Malcolm & Shevock, 2012). In the moss flora of China, 22 species of the traditionally interpreted genus *Racomitrium* are recorded (Cao *et al.*, 2003), but since then four taxa have been added, including *Niphotrichum canescens* (Hedw.) Bednarek-Ochyra & Ochyra subsp. *latifolium* (C.E.O.Jensen) Bednarek-Ochyra & Ochyra (Ellis *et al.*, 2010), *Bucklandiella shevockii* Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2010b), as well as the aforementioned *Niphotrichum elongatum* and *Codriophorus corrugatus*. However, the former is here excluded from the flora of China and the report of *C. acicularis* (Hedw.) P.Beauv. proved to be erroneous as, correctly, the voucher material represents *C. japonicus* (Dozy & Molk.) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra, 2004b). Thus, at present in China, the subfamily Racomitrioideae consists of 24 species and one subspecies.

6. ***Conocephalum salebrosum*** Szweykowski, Buczkowska & Odrzykoski

Contributors: A. Stebel and R. Piwowarczyk

Georgia, Adjara, Caucasus, Meskheti Range, between Kobuleti and Chakhati, north of Kokhi: Kveda Kondidi, moist rocks along the road, on the slope of the Kintrishi river valley, within the Colchis temperate-subtropical rain forest zone, 41°48′10″N 41°53′59″E, 92 m a.s.l., 5 June 2014, *leg.* R. Piwowarczyk *s.n.* (KTC, SOSN).

Conocephalum salebrosum was described relatively recently (Szweykowski *et al.*, 2005), thus its distribution is still imperfectly known. Since that time many papers have appeared, widening its range through the Caucasus and some other areas. *C. salebrosum* is known from several sites in the Russian part of the mountains (Borovichev *et al.*, 2009; Konstantinova *et al.*, 2009a, 2009a,b; Konstantinova, 2011) and its discovery in neighbouring Georgia was to be expected. The hepatic flora of the Adjara is fairly well known (Bakalin *et al.*, 2013), but until now *C. salebrosum* had not been reported either from this region or from Georgia as a whole.

7. ***Didymodon nicholsonii*** Culm.

Contributors: B. Papp, E. Szurdoki and M. S. Sabovljević

Serbia: Central Serbia, the Ibar valley between Ušće and Maglić, on the bank of the Ibar river and bark of *Salix alba* L., 43°33′27.3″N, 20°37′07.0″E, 320 m a.s.l., 26 April 2013, *leg./det*. Beáta Papp, Erzsébet Szurdoki and Marko S. Sabovljević *s.n.* (BP 188518).

Didymodon nicholsonii was recorded for the first time in Serbia, in Central Serbia in the Ibar valley

gorge between the towns of Ušće and Maglić. It is a rare species growing in small patches on rocks and exposed roots along streams and rivers, often below flood level (Smith, 2004).

According to Sabovljević *et al.* (2008), *D. nicholsonii* had not been recorded in Serbia until now. In south-eastern Europe, it was known from Greece, and was recently reported from Montenegro (Papp *et al.*, 2014). In the Mediterranean area, it has been recorded in Portugal, Spain, France, Italy, Turkey and Algeria (Ros *et al.*, 2013). This species seems to show a suboceanic-submediterranean (Düll, 1984) or suboceanic-temperate (Smith, 2004) distribution. Hence, its appearance in Serbia in the Ibar gorge, strongly influenced by the Mediterranean climate, was not a surprise.

8. ***Leptobryum pyriforme*** (Hedw.) Wilson

Contributor: R. Ochyra

Falkland Islands, **West Falkland Island**: by Pilot Stream valley, Hill Cove (TC 81/89), 51°31′08″N 60°08′37″W, *ca* 137 m a.s.l., dry clay soil on a small bank among rocks, associated with *Campylopus introflexus* (Hedw.) Brid., *Pohlia nutans* (Hedw.) Lindb., *Ceratodon purpureus* (Hedw.) Brid., *Polytrichum piliferum* Hedw. and *P. juniperinum* Hedw., 27 November 2001, *leg*. D. Broughton *11F* (KRAM).

Leptobryum pyriforme is a bipolar species with numerous intermediate occurrences on mountains in the tropics. In the cool and cold regions in the western hemisphere, it is widely scattered in western and southern Patagonia (Ochyra *et al.*, 2008b), and it is known from a single record from subantarctic South Georgia (Ochyra *et al.*, 2002) and two stations in the maritime Antarctic (Blockeel *et al.*, 2006b; Ochyra *et al.*, 2008b). Additionally, the species was once recorded in East Falkland Island (Matteri, 1986) and here its range is extended to West Falkland Island. The moss flora of the Falkland Islands is still incompletely known and consists of about 150 species. Matteri (2003) reported 146 species, two subspecies and eight varieties from this archipelago, but no fewer than three species and two varieties from her list are identical to other species and should be excluded from the flora. However, these losses are compensated for by several additional moss species (Allen & Magill, 2003; Blockeel *et al.,* 2003; Bednarek-Ochyra & Ochyra, 2003; Ochyra & Broughton, 2004; Ireland *et al.*, 2005; Ellis *et al.*, 2010, 2011b).

9. ***Leptodontium proliferum*** Herzog

Contributor: R. Ochyra

Îles Crozet, Île de la Possession: (1) south slopes of valley of Rivière du Camp, 46°25′22″S, 51°51′32″W, 75 m a.s.l., on exposed dry soil near penguin colony, 11 January 1979. *leg.* B. G. Bell 1763 (AAS, KRAM); (2) Crique du Navire, centre of La Grande Manchotiere, 46°25′32″S 51°51′40″W, 0 m a.s.l., on sides of hummocks in wallows, 24 March 1979, *leg.* B. G. Bell 3036 (AAS, KRAM); (3) south bank of Crique de Navire, near beach, 46°25′35″S 51°51′39″W, 5 m a.s.l., on side of *Poa annua* L. covered earth mound in penguin rookery, 12 February 1979. *leg.* B. G. Bell 2497 (AAS, KRAM); (4) shore at Crique de Noel, 46°27′21″S 51°50′27″W, 5 m a.s.l., on side of *Poa annua* hummock, in penguin affected zone, 26 February 1979. *leg.* B. G. Bell *2616* (AAS, KRAM); above rocky cliffs on south-side of Crique de la Chaloupe, 46°24′34″S 51°51′33″W, 50 m a.s.l., on dead *Poa* hummock, 7 January 1979. *leg.* B. G. Bell *1680*, *1682 & 1683* (AAS, KRAM).

For a long time *Leptodontium proliferum* was considered an altimontane neotropical species known to occur in Bolivia, Peru and Colombia in South America (Churchill *et al.*, 2000) and extending to Mexico in North America (Zander, 1994). Additionally, it was once recorded from the subantarctic Prince Edward Islands (van Zanten, 1971). This classical distribution pattern, exhibited by a number of moss species (e.g. Ochyra *et al.*, 2013; Ochyra & Bednarek-Ochyra, 2014, 2015), was disturbed as the result of a taxonomic conclusion presented by Zander (1972) who reduced *L. proliferum* to synonymy with *L. gemmascens* (Mitt.) Braithw., a western European endemic species (Porley, 2008). However, as convincingly showed by Porley & Edwards (2010), the two species are definitely distinct and *L. proliferum* is readily distinguished by its dimorphic leaves, elongated marginal cells and costa excurrent as a proboscis. In young leaves, the proboscis produces gemmae in great profusion, usually over 100 per cluster. The species was lately discovered in Lesotho in southern Africa, which established its Afro-American range, a distribution pattern exhibited by over 80 species of moss (e.g. Buck & Griffin, 1984; Ochyra *et al.*, 1992; Delgadillo, 1993; Wilbraham & Matcham, 2010). Some of the species with this distribution pattern extend to subantarctic islands in the Kerguelen Biogeographical Province in the South Indian Ocean, and *L. proliferum* is a typical example of this type of distribution. The species is widespread in the Prince Edward Islands where it is apparently a post-glacial immigrant (Van der Putten *et al.*, 2010), growing in the coastal areas at low elevations, usually in tussock grasslands dominated by *Poa cookii* (Hook.f.) Hook.f. on well drained soil on slopes with a moderate to strong influence of animals, including seals and penguins (Gremmen, 1981). Herein, the range of *L. proliferum* is extended to the Îles Crozet, a subantarctic archipelago situated about 900 km to the east of the Prince Edward Islands, where it grows in similar environmental conditions. This is a remarkable

addition to the moss flora of this archipelago, which until recently was the least studied of all subantarctic islands. As a result of intensive field studies, a good number of species have been added to the moss flora (e.g. Blockeel *et al.*, 2006a; Ellis *et al.*, 2014b), which currently consists of about 70 species.

10. ***Niphotrichum pygmaeum*** (Frisvoll) Bednarek-Ochyra & Ochyra

Contributor: R. Ochyra

U.S.A., Oregon: Clackamas County, Mt. Hood, above Timberline Lodge, *ca* 45°10′N 121°50′W, on silty slope, 17 August 1979, *leg.* W. B. Schofied & J. H. Lyford *74075* (KRAM, UBC).

Niphotrichum pygmaeum is the rarest and smallest species of the genus *Niphotrichum* Bednarek-Ochyra & Ochyra, which has hitherto only been known from a few collections in narrow coastal areas of southern British Columbia and Washington (Frisvoll, 1983; Ochyra & Bednarek-Ochyra, 2007b). Herein, its geographical range is extended to the Cascade Volcanic Arc in northern Oregon. The species is known only in the barren state, sporophytes have never been found. The Pacific coast of North America north of Mexico is a remarkable centre of species diversity for the Racomitrioideae, which consists of five genera of the traditionally broadly conceived genus *Racomitrium* Brid. (Sawicki *et al.*, 2015). Of 28 species of this subfamily now known to occur in North America (Ochyra, 2007), no fewer than ten are endemics of the western part of the continent, including five species of *Bucklandiella* Roiv., one of *Niphotrichum*, one of *Frisvollia* Sawicki, Szczecińska, Bednarek-Ochyra & Ochyra and three of *Codriophorus* P.Beauv. (Bednarek-Ochyra, 2000, 2006).

11. ***Orthotrichum vladikavkanum*** Vent.

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

Middle Asia, Kyrgyzstan: Tian-Shan Range, 66 km E from Issyk Kul lake, 42 km E of Karakol City, valley of Turgen-Aksu, on bark of *Picea schrenkiana* Fisch. & C.A.Mey. along public road (No. A364), GPS coordinates (WGS 84): 42°30′10.8″N 78°55′57.4″E, 2622 m a.s.l., 14 June 2013, *leg.* V. Plášek (OSTR # B265).

A total of 19 taxa of the genus *Orthotrichum* (incl. *Nyholmiella*) have previously been reported from Kyrgyzstan (Lazarenko, 1938; Rakhmatulina, 1970, 1990; Lewinsky-Haapasaari, 1994; Mamatkulov *et al.*, 1998; Ignatov *et al.*, 2006; Ellis *et al.*, 2014a,c, 2015a,b). The specimen cited above is an epiphytic moss new to the bryoflora of the country.

Orthotrichum vladikavkanum was first described by Venturi (1887) from the vicinity of Vladikavkaz (Republic of North Ossetia-Alania). Subsequently the species was not recorded for more than a century and was considered to have vanished. However, Ignatov & Lewinsky-Haapasaari (1994) found it in the Altai Mountains in South Siberia. Owing to intensive field research, new data regarding its occurrence have been published during the last few years. Currently, the species is known from the Caucasus (Venturi, 1887; Akatova, 2002; Akatova *et al.*, 2004; Otte, 2004), Pontic Mountains (Lara *et al.*, 2010), Altai Mountains (Ignatov & Lewinsky-Haapasaari, 1994; Hradílek *et al.*, 2011), and now also from the Tian-Shan Mountains.

In Kyrgyzstan, *Orthotrichum vladikavkanum* was first collected in 2013 by a Czech-Polish expedition. It occurred in the eastern part of the country in a montane area of the Tian-Shan Range. The species grew on the bark of a solitary *Picea schrenkiana* along a public road. The moss cushions were located at 1.5 and 2 m above the ground, with an eastern exposure. All of the populations were richly fertile. Examples of associated species include *Orthotrichum speciosum* Nees and *O. crenulatum* Mitt.

Superficially, *Orthotrichum vladikavkanum* closely resembles *O. speciosum*, but it can be easily distinguished, even in the field, by the configuration of its peristome. Although both species have an exostome formed by 8 pairs of teeth, the number of endostome segments differs; 8 in *O. speciosum* and 16 in *O. vladikavkanum*. Moreover, the endostome segments in the latter species are orange and remarkably broad (almost as wide as the teeth) while in *O. speciosum* they are thin and white.

12. ***Plagiothecium membranosulum*** Müll.Hal.

Contributor: R. Ochyra

Kenya: (1) bushland in Limuru near Nairobi, 1°06′S 36°38′E, 7000 ft [=2290 m] a.s.l., tree trunk, February 1915, *leg.* E. Dümmer *1761*, *det.* H. N. Dixon as *Plagiothecium monbuttoviae* (Müll.Hal.) A.Jaeger (BM – Hb. Dixon – BM000670409); (2) Mount Kenya, 0°09′S 37°18′E, 6500–12500 ft [=1980–3810 m] a.s.l., 1924, *leg.* A. Allan *1034* (BM – Hb. Dixon BM000670412); (3) Nyandarua County (former Central Province), Kinangop north of Nairobi, 0°36′S 36°42′E, 4000 m a.s.l., 20 February 1910, *leg.* G. Balbo *481* (BM – Hb. Dixon – BM000670410); (4) same region, Gasongori hill, Tuthu forest, 2400 m a.s.l., on trees, 26 August 1908, *leg.* G. Balbo 472 (BM – Hb. Dixon – BM000670411).

Plagiothecium membranosulum is widespread in southern Africa, including the Republic of South Africa and Lesotho (O'Shea, 2006), and is also known from Rwanda and Uganda in Central Africa (Ellis *et al.*, 2014a) and in the Kilimanjaro Mountains in Tanzania (Ellis *et al.*, 2012c) in East Africa. Additionally, the species is known from the isolated station on Réunion Island in the East

Indian Ocean (Ellis *et al.*, 2011a). Here, the East African range of *P. membranosulum* is extended to Kenya where the species was recorded in the southern and central part of the country. In Central Province, it reaches its highest elevation of 4000 m a.s.l. Like elsewhere, the moss occurred epiphytically on tree boles in the montane rain forests at low and high elevations.

13. ***Reboulia hemisphaerica*** (L.) Raddi subsp. ***australis*** R.M.Schust.

Contributors: E. A. Borovichev and V. A. Bakalin

China. Guizhou Province, Guiyaang City area, Qianling Park, 26°35′38.9″N 106°41′32.5″E, 1100 a.s.l., broadleaved (mostly evergreen) forest on steep slope to valley, moist bare clay, in part shade, in mats, with female receptacle and antheridia, 18 November 2013, *leg.* V.A. Bakalin (VBGI: China50-40-13; duplicate in KPABG).

This is the first report of *Reboulia hemisphaerica* subsp. *australis* in China. The nearest other records for the subspecies are in Krasnoyarsk Territory and Republic of Tyva (Russian Siberia) (Ellis *et al.*, 2014b). The subspecies has a disjunctive distribution; it has also been reported from eastern North America, New Zealand (Schuster, 1985), southern Europe (Schuster, 1992), northern Europe (Damsholt, 2002) and the Caucasus (Konstantinova, 2011).

14. ***Riccia atromarginata*** Levier

Contributors: C. Sérgio and I. Melo

Cape Verde: Fogo (Fogo Island), Santa Catarina do Fogo, Monte Escora, on soil associated with *Riccia crinita* Taylor, 14°51′58″N 24°20′29″W, 754 m a.s.l., 25 September 2010, *leg.* I. Melo & J. Cardoso (LISU257388).

Riccia atromarginata is here newly recorded for the bryoflora of the Cape Verde Archipelago which expands its latitudinal range to almost 14° N. In Europe, it is widely distributed in the Mediterranean area (Jovet-Ast, 1986; Bischler, 2004), but not in sub-Saharan Africa, while only *R. atromarginata* var. *jovet-astiae* Rauh & Buchloh is reported from Madagascar and Socotra (Kürschner, 2000).

In Macaronesia, *R. atromarginata* is known from the Canary Islands and Madeira (Ros *et al.,* 2007). It can be considered an amphi-atlantic species as its occurrence is also mentioned in few areas in the central part of America, in Mexico and Texas (Bischler-Causse *et al.,* 2005). *R. atromarginata* is restricted to open habitats in semi-arid and arid areas with high drought conditions.

Sporophytes were observed in the specimen, and the spores exhibited the characteristic features of the species, such as their large size, up to 125 μm diameter, and the absence of a wing.

15. ***Riccia crinita*** Taylor

Contributors: C. Sérgio and I. Melo

Cape Verde: Fogo (Fogo Island), Santa Catarina do Fogo, Monte Escora, on soil associated with *Riccia atromarginata* Levier, 14°51′58″N 24°20′29″W, 754 m a.s.l., 25 September 2010, *leg.* I. Melo & J. Cardoso (LISU257387).

This is the first report of *Riccia crinita* in Cape Verde. Jovet-Ast (2000) synonymized *Riccia trichocarpa* Howe with this name and reported it from many areas with Mediterranean and tropical influences. Elsewhere in the world, it is known from Africa (Perold, 1999), North and South America (Jovet-Ast, 1991), and Australia (Jovet-Ast, 2000). The known distribution of *R. crinita*, as recorded by Jovet-Ast (1986), Bischler (2004), Söderström *et al.* (2002) and Ros *et al.* (2007) includes: Bosnia-Herzegovina, Baleares, Canary Islands, Corsica, Crete, Algeria, Spain, France, Greece, Croatia, Italy, Lebanon, Libya, Morocco, Montenegro, Portugal, Serbia and Tunisia in the Mediterranean Region. Its distribution can therefore be regarded as sub-cosmopolitan, frequently occurring in semi-arid and arid zones, on soil crusts (e.g. Australia see Eldridge & Tozer, 1996).

16. ***Riccia macrocarpa*** Levier

Contributors: C. Sérgio and I. Melo

Cape Verde: Sto Antão Island, Porto Novo, Pico da Cruz, on exposed soil over rocks, 17°06′19″N 25°02′46″W, 1447 m a.s.l., 29 September 2010, *leg.* I. Melo & J. Cardoso (LISU257378).

Until 1992 *Riccia macrocarpa* was considered a Mediterranean species (Jovet-Ast, 1986) known to occur in the majority of countries from Portugal to Turkey, and including Madeira and the Canary Islands (Ros *et al.,* 2007).

However, Sérgio in 1992 whilst revising the type of *R. macrocarpa* and some specimens of the North American species, *Riccia campbelliana* M.Howe from its original locality (NY, MO), concluded that these species were indistinguishable and should be considered conspecific. This suggested a much broader distribution for this species, also including a record from South Africa (Perold & Volk, 1988; Perold, 1991, 1999). Wheeler (2000), in a molecular phylogenetic study of the genus *Riccia,* confirmed that the two entities were indeed conspecific and presented the distribution of the species in an interesting map. It is suggested that this liverwort may have dispersed across the land prior to the fission of Pangea.

Herein, the distribution of this *Riccia* is extended to West Africa, being found on a small Island of the Cape Verde Archipelago. The present discovery on Sto. Antão Island, fills the gap in its African and Macaronesian distribution.

R. macrocarpa is scarce in South Africa, occurring mainly in the lowlands, and is also recorded from Socotra (Kürschner, 2003; Wigginton, 2004).

In summary, the species has a bicentric distribution, with one centre in the Old World, in the Mediterranean region and scattered in southern and eastern Africa, and a second centre of occurrence in North America where it has been reported from California to the Gulf of Mexico (Wheeler, 2000).

In the Mediterranean region, *R. macrocarpa* prefers acidic and dry soils (Bischler, 2004). The present collection from Sto. Antão Island was found in an area of volcanic origin, more or less exposed near 1500 m a.s.l., associated with *Exormotheca pustulosa* Mitt., *Plagiochasma rupestre* (G.Forst.) Steph., *Mannia androgyna* (L.) A.Evans, *Didymodon australasiae* (Hook. & Grev.) R.H.Zander, *Bryum canariense* Brid., *Pleurochaete squarrosa* (Brid.) Lindb., *Ptychomitrium subcrispatum* Thér. & P.de la Varde, *Bryum apiculatum* Schwägr., *Campylopus pilifer* Brid., and some lichens in the genera *Cladonia* P.Browne, *Anaptychia* L. and *Toninia* A.Massal.

17. ***Riella mediterranea*** Segarra-Moragues, Puche, Sabovljević, Infante & Heras

Contributors: I. Tziortzis and R. Barone

Cyprus: Paralimni Lake, Famagusta district 35°01′54.16″N 33°58′22.87″E, 67 m a.s.l. sediments collected on 19 September 2013, *leg*. I. Tziortzis *s.n*., *det.* R. Barone (Herbarium of Rossella Barone).

Cultures of sediments collected from the east shore of Paralimni Lake during the dry phase of the lake revealed a population of *Riella* Mont. Paralimni Lake is a slightly brackish seasonally flooded shallow body of water in the southeast part of Cyprus. The examination of the gametophytes showed that they corresponded to a dioicous species, and both male and female individuals appeared in culture. Female plants developed winged archegonial involucres which is indicative of species in the subgenus *Trabutiella* Porsild. These involucres were acuminate and showed discontinuous wings (10–12), as is characteristic of the recently described *R. mediterranea* (Segarra-Moragues *et al.*, 2014). The unreticulated spores (108–120 × 106–118 μm), showed distal spines rounded at the apex (12–16 μm) and acute proximal spines (6–10 μm). *Riella* (Montagne, 1852) has a worldwide distribution and includes about 24 taxa that commonly grow submerged in clean, shallow, fresh or brackish waters of seasonal ponds, streams, and more rarely, in permanent lakes in arid or semiarid regions. About half of these species are found growing in the Mediterranean basin (Segarra-Moragues *et al.*, 2014*). Riella mediterranea* is a dioicous liverwort belonging to the subgenus *Trabutiella* of the Riellaceae family. It has only recently been recognised as a distinct species, since previous studies repeatedly misidentified specimens as other species such as *R. helicophylla* or *R. cossoniana* (Segarra-Moragues *et al.*, 2014). According to the authors, *R. mediterranea* is found submerged in seasonal ponds of fresh to slightly brackish water in Spain (including the Balearic Islands), Malta and Israel; recently *R. mediterranea* was found in two ephemeral Moroccan lakes (Ellis *et al.*, 2014c). These conditions are also met in Paralimni Lake. This is the first record of the species for Cyprus and the second of the genus *Riella* (Ellis *et al.*, 2012a).

18. ***Scapania schljakovii*** Potemkin

Contributors: Y. Xiong and V. A. Bakalin

China: Yunnan Province, Gongshan County, east slope of Gaoligong Shan, Qi Qi trail above Dengxiaofang, 23°41′43″N 98°28′06″E, 3333 m a.s.l., outcrop above stream, 27 September 2006, *leg.* D.G. Long & J.R. Shevock *37152* (MO-6230476, duplicate in VBGI).

Scapania schljakovii was described relatively recently (Potemkin, 2001) from Sikkim in India and until now was only known from the type locality. The species was regarded as the most advanced member of *Scapania* (Dumort.) Dumort. sect. *Scapania*. It resembles *S. ornithopodioides* (With.) Waddell, but differs in several characters, including its non-decurrent leaf lobes, relatively large dorsal lobe and the shape of the trigones in its leaf cells. Another relative of *S. schljakovii* is *S. himalayica* Müll.Frib., which differs from the former in having leaf margins with fuscous borders and regularly dentate to the base, cells less thickened in mid-lobe and thickened cell walls along the leaf margin. This present observation confirms *S. schljakovii* as a distinct species and extends its known distribution. Taking in to account the close relationships between the hepatic floras of the Himalayas and Yunnan, this new record was not unexpected.

19. ***Schistidium rivulariopsis*** (R.S.Williams) Ochyra

Contributor: R. Ochyra

Colombia: Departamento Santander, vicinity of Vetas, 3100–3250 m a.s.l., open rocky hillsides, on wet rock, 16–20 January 1927, *leg.* E. P. Killip & A. C. Smith *17392* (US).

Schistidium rivulariopsis is a neglected Andean species which until recently was considered to be conspecific with *S. rivulare* (Brid.) Podp. (Deguchi, 1987). However, it has been reinstated as a species in its own right (Ochyra & Bednarek-Ochyra, 2011), and differs from *S. rivulare* in its possession of small and minutely papillose spores, 12–13 μm diam., the lack of stomata and entire margins at the leaf apex. The species has hitherto been known only from the type material from Peru, and here its range is extended to the northern Andes of Colombia. Bartram (1955) reported it from Ecuador, but his material does not belong within this species (Ochyra & Bednarek-Ochyra, 2011). *Schistidium*

rivulariopsis is a rheophytic moss growing in montane brooks, usually in swiftly flowing water or on otherwise wet rocks. Consequently, it exhibits some adaptations to this type of habitat, of which the most important is the presence of multistratose fleshy limbidia that extend from the leaf base to the apex, and strongly excurrent, multistratose costae (Ochyra, 1985, 1987).

20. ***Syntrichia calcicola*** J.J.Amann

Contributor: C. Sérgio and C.A. Garcia

Portugal: Trás-os-Montes e Alto Douro, pr. Silva, to Campo das Víboras, 29TQF1398, 650 m a.s.l., on wet slope of a crystalline limestone quarry, August 2002, *leg.* Gabriel Sérgio (LISU 257333).

In the course of studying bryophyte collections from north-eastern Portugal, some remarkable species of phytogeographical and ecological significance were identified, one of them, *Syntrichia calcicola*, being a new record for the Portuguese bryoflora.

This species was found growing on basic rocks in a mineral-rich, very exposed calcareous habitat. It was easily recognized by the morphological characteristics of the gametophyte, with leaves ovate and not constricted in mid-leaf; leaf margins recurved almost to 2/3 of the lamina, costa without hydroids and mid-lamina cells that vary from 12 to 18 (−20) μm diam.

In the same area we found *Syntrichia princeps* (De Not.) Mitt., *S. montana* Nees, *S. ruralis* (Hedw.) F.Weber & D.Mohr, *Encalypta vulgaris* Hedw., *Grimmia pulvinata* (Hedw.) Sm. and *Schistidium helveticum* (Schkuhr) Deguchi, which grow nearby, or almost in close association.

The soil in the region was predominantly acidic. However, it is a geologically complex area, with carbonate rocks, sandstones, clays, shale, and greywacke, among other less representative rocks. The annual mean precipitation is *ca* 650 mm and the annual mean temperature is 11°C with *ca* 2600 annual hours of sunlight.

Syntrichia calcicola is a widespread species, distributed in Europe, south-western Asia and in some countries of the Mediterranean basin, from North Africa (Morocco) to Turkey, but not in Macaronesia (Gallego *et al.*, 2002; Ros *et al.*, 2013). It is relatively common in Spain and in Mallorca (Gallego, 2006; Casas *et al.*, 2006), so this new occurrence in Portugal extends the known distribution of the species into the western Iberian Peninsula. Moreover, its habitat conforms to the typical ecological preferences of this element of the family Pottiaceae.

21. ***Syntrichia minor*** (Bizot) M.T.Gallego, J.Guerra, M.J.Cano, Ros & Sánchez-Moya

Contributor: V. Hugonnot

France: Haute-Loire, Coubon, Orzilhac, Mont-Saint-Maurice, 03°56′08.5″E 45°01′02.2″N, 750 m a.s.l., 2 September 2014, *leg.* V. Hugonnot *s.n.* (Herb. Conservatoire botanique national du Massif central)

The material collected in Haute-Loire possessed features entirely matching those of *Syntrichia minor*. The leaf cells with branched, pedicellate papillae were most characteristic, leaf margins were plane or weakly recurved at the leaf base, and the costa in transverse section failed to show hydroids. *S. minor* is reported to be dioicous (Gallego, 2005), but the collected specimens were sterile, without gametangia or sporophytes.

The taxonomy of *Syntrichia minor* has been clarified in recent times (Gallego *et al.*, 2000). Following these authors, *S. minor* is best considered as a separate species and not as a subspecies of *S. virescens* (DeNot.) Ochyra as presented in Ochyra (1988) and Kramer (1980). The type of papillae adorning the leaves is most important in distinguishing *S. virescens* from *S. minor*. In *S. minor*, the lumen of each cell strongly protrudes from both sides of the leaf in a high columnar, hollow conical projection, crowned with digitiform extensions. By contrast, in *S. virescens* the cells are covered with 2-4 low papillae. Otherwise, *S. minor* shares with *S. virescens* the mostly plane leaves, constricted lamina, poor development of stereid bands and absence of hydroids. The overall appearance of the plants is very similar in the field, although *S. minor* can show a more pronounced glaucous tinge owing to its peculiar type of papillae. *S. minor* could be confused with two species that possess similar papillae, namely *S. echinata* (Schiffn.) Herrnst. & Ben-Sasson and S. *papillosissima* (Copp.) Loeske. *Syntrichia minor* differs from *S. echinata* by its lack of hydroids and from *S. papillosissima* by its mid-leaf constriction, and in the latters more numerous dorsal layers of stereids in the costa (Gallego, 2005). *Syntrichia echinata* and *S. papillosissima* are not recorded for France.

Syntrichia minor was observed in very small cushions of 10 cm^2 at the base of a basaltic cliff with a south-west aspect. Immediate associates included *Grimmia laevigata* (Brid.) Brid., *G. ovalis* (Hedw.) Lindb. and *Schistidium flaccidum* (De Not.) Ochrya. This type of bryophyte vegetation is classically referred to the association *Grimmietum commutato-campestris* v. Krus. 1945 which is a typical, and very extensive, community colonizing basaltic dry rocks in full sun. *Syntrichia minor* was previously thought of as an epiphyte (Gallego *et al.*, 2000; Gallego, 2006) but has been found in rock fissures with accumulated soil (Gallego, 2005). The present record demonstrates that the species can also grow directly on rocks. It is recorded from Cyprus on an

old juniper tree (Blockeel, 2003), a substrate which typically and frequently harbours rock-dwelling species. It was recorded on unprotected soils on limestone (Blockeel *et al.*, 2002) but the species could well prove to be rather indifferent to the nature of rock.

Syntrichia minor is predominantly a Mediterranean species, known to occur in North Africa (Morocco), southwest Asia (Lebanon), Macaronesia and Europe (Canary Islands, Cyprus, Greece, Spain; Gallego, 2005). The species had not been recorded in France, and the Auvergne locality marks a significant northward extension of its known distribution. It is apparently a rare species worldwide. Given that basaltic outcrops at comparable altitudes are very frequent and most often host a similar bryoflora, *S. minor* is almost certainly under-recorded. This type of habitat is generally totally free of human disturbance so that conservation of the associated bryoflora is not problematic.

22. ***Syntrichia norvegica*** F.Weber

Contributors: A. Alegro, V. Šegota and B. Papp

Croatia: Dinaric Alps, northern Velebit Mountains, Rožanski kukovi peaks area, bottom of deep doline, north from Novotnijev kuk peak, 44°45′56.1″N 14°59′25.4″E, 1540 m a.s.l., NE exposure, in stands of the frigoriphilous herb community *Drepanoclado uncinati-Heliospermetum pusillae,* and the adjacent low shrub community *Salicetum waldsteinianae*, 19 September 2014, *leg. et det.* A. Alegro *s.n.* (*Herb*. ZA).

Syntrichia norvegica is a circumpolar arctic-montane species (Smith, 2004), rare at lower altitudes and in southern Europe (Frey *et al.*, 2006). It is known from several south-eastern European countries (Sabovljević *et al.*, 2008) and now it is recorded for the first time in Croatia. Regarding its conservation status, *S. norvegica* is red listed in Great Britain (EN), Czech Republic (CR), Slovakia (VU), Bulgaria (NT), Hungary (DD), Romania (VU) and Estonia (VU) (Hodgetts, 2014).

It was found in the northern Velebit Mountains, in an area with the most outstanding and extreme karst relief, with steep slopes, perpendicular rocks, screes and deep dolines. The locality is situated in the *Pinus mugo* Turra belt, but owing to its position in the shaded bottom of a deep, funnel-shaped doline with slopes inclined at more than 70°, the zonal vegetation is replaced by frigoriphilous communities. The main community on the very bottom is *Drepanoclado uncinati-Heliospermetum pusillae* Surina & Vreš 2004, which encompasses many species of cold habitats characterized by long-lasting snow cover, e.g. *Saxifraga sedoides* L. subsp. *prenja* (Beck) Beck (glacial relict in the Velebit), *Heliosperma pusillum* (Waldst. & Kit.) Rchb., *Polygonum viviparum* L., *Myosotis alpestris* F.W.Schmidt, *Poa alpina* L. and *Festuca nitida* Kit. This community was spread over *ca* 250 m^2 and was bordered by low shrubs of *Salix waldsteiniana* Willd., which form another frigoriphilous community *Salicetum waldsteinianae* Beger 1922. In the moss flora, another arctic-montane species, *Cyrtomnium hymenophylloides* (Huebener) T.J.Kop., is very abundant, and this is the only known locality in Croatia (Blockeel *et al.*, 2009c). Further bryophytes that were present include *Sanionia uncinata* (Hedw.) Loeske, *Orhothecium rufescens* (Dicks. *ex* Brid.) Schimp., *Campylium protensum* (Brid.) Kindb., *Campylophyllum halleri* (Hedw.) M.Fleisch., *Sciuro-hypnum reflexum* (Starke) Ignatov & Huttunen, *Platydictya jungermannioides* (Brid.) H.A.Crum, *Hypnum bambergeri* Schimp., *Plagiopus oederianus* (Sw.) H.A.Crum & L.E.Anderson, and *Plagiochilla porelloides* (Torr. *ex* Nees) Lindenb. among others.

The population of *S. norvegica* was vigorous, forming dozens of dense patches of several dm^2 on rocks and among other bryophytes and herbs. Plants were typically developed, deep green, with long, reddish leaf points, but capsules were not found.

23. ***Tetraplodon angustatus*** (Hedw.) Bruch & Schimp.

Contributor: V. Hugonnot

France: Haute-Loire, Freycenet-la-Cuche, forêt domaniale du Mézenc, Roche du Bachat, 04°05′33.3″E, 44°55′00.6″N, 1360 m a.s.l., 5 August 2014, *leg.* V. Hugonnot *s.n.* (*Herb*. Conservatoire botanique national du Massif central)

The collected specimens possessed narrow leaves with a long subula, which were more or less distinctly serrate in their upper half, and agreed very well with the descriptions provided in Frisvoll (1978) and Crum & Anderson (1981). The size of individual shoots was very variable, with very small shoots being located at the periphery of the tufts and larger ones in the centre.

The geology consisted of phonolitic lava with a low silica content that formed impressive boulders on the flanks of Roche de Bachat. Five dense clumps of moss, bearing a profusion of sporophytes, were found on fox scats, which had been left scattered as marker points in the scree. The substrate was full of small bones, and no other bryophytes were found in admixture. Otherwise, the bryoflora of the scree was typically composed of *Gymnomitrion concinnatum* (Lightf.) Corda, *Marsupella funckii* (F.Weber & D.Mohr) Dumort. and *Racomitrium sudeticum* (Funck) Bruch & Schimp., growing on dry acidic boulders. *Tetraplodon angustatus* grows mostly on top of rocks and more exceptionally in bogs. It typically colonizes decaying animal carcasses, droppings and bird pellets

(Cykowska-Marzencka, 2013) in scree, or more exceptionally on ombrotrophic peat-bog (Stebel *et al.*, 2004). It is a common feature of known populations that it occurs in small quantities (Meinunger & Schröder, 2007).

Tetraplodon angustatus is a boreal montane species with a circumpolar range in the Holarctic. It is known in northern North America, Greenland, Asia and Europe, where it is mostly a Fennoscandian species. In central Europe, it is recorded in the Alps, Sudetes and Carpathians (Szmajda *et al.*, 1991). Its westernmost occurrences are in the Scottish Highlands, the centre of Ireland and north Wales (Rothero, 2014). The Massif Central locality of *Tetraplodon angustatus* is at the southern limit of its European range. It is not known to occur in the Pyrenees or in the mountains of the Iberian Peninsula.

The genus *Tetraplodon* is poorly represented in France, with only *T. angustatus* and *T. mnioides* (Hedw.) Bruch & Schimp. The latter was recently recorded in the Jura (Philippe, 2013). *T. angustatus* was previously observed in the Alps, on the Mont-Blanc massive (Husnot, 1884–1894; Vadam, 1976). It is more frequent and widespread in Switzerland, suggesting that it could be under recorded in the French Alps. This is unlikely to be the case in the Massif Central given the limited upper altitude and also because potential habitats are infrequent.

On the scree, *T. angustatus* is free from any direct human impact, but this is not the case in the nearby forests, which are heavily managed. This does not constitute an immediate threat since the scree is not wooded. In France, the fox is classified as a pest that can be hunted year-round and this is beyond doubt the most serious limit to the spread of *Tetraplodon,* which here is strictly restricted to fox faeces. Between 600,000 and one million foxes are killed each year, with a very significant proportion in the Auvergne. *T. angustatus* should be added to the Red Data List of Auvergne in the near future.

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Molecular circumscription and intraspecific variation in *Porella canariensis* (F.Weber) Underw. (Porellaceae, Marchantiophyta)

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The cosmopolitan genus *Porella* L. is the largest genus of Porellaceae with about 50–60 species (Schuster, 1980). Identification of *Porella* species can be difficult, due to high morphological plasticity and lack of stable morphological characters, suggesting recent and still ongoing processes of speciation (Swails, 1970; Schuster, 1980).

Porella canariensis (F.Weber) Underw. occurs in Macaronesia (Azores, Madeira, Canary Islands, Cape Verde Islands) and the Iberian Peninsula (Fontinha, 2004; Ros *et al.*, 2007; Casas *et al.*, 2009). It is characterized by imbricate leaves with

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