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# New national and regional bryophyte records, 26

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1. *Aneura mirabilis* (Malmb.) Wickett & Goffinet (*Cryptothallus mirabilis* Malmb.)

**Contributor:** Michail V. Dulin

**Russian Federation:** Nenets Autonomous Area, the right bank of Bol'shaja Rogovaja River between outlets of the Mikitju and Plnik U rivers, 67°01'09.9"N, 61°38'10.5"E, ca 50 m a.s.l., in the ecotone between the coastal herb-moss birch-spruce forest (*Betula pubescens* Ehrh., *Picea obovata* Ledeb.) and the complex flat hilly bog, the swampy *Calamagrostis-Eriophorum-Sphagnum* spruce light forest with *Betula nana* L., *Betula pubescens* and *Duschekia fruticosa* (Rupr.) Pouzar, near young birch and small stumps, among decomposing *Sphagnum fimbriatum* Wilson, in *Sphagnum* hummocks and under patches of other liverworts such as *Cephalozia bicuspidata* (L.) Dumort., *Schljakovia kunzeana* (Huebener) Konstant.

& Vilnet, *Scapania paludicola* Loeske & Müll.Frib., 7 August 2010, *leg.* M.V. Dulin 875mvd (SYKO).

This is the first report of *Aneura mirabilis* from the Nenets Autonomous Area. It is a globally rare northern oceanic, non-chlorophyllose, subterranean myco-heterotrophic liverwort included in the Red Data Book of the Russian Federation (Bardunov & Novikov, 2008). The species is known in Europe from Ireland, Great Britain, Portugal, France, Germany, Austria, Denmark, Finland, Norway, and Sweden. It is also known from W Greenland (Damsholt, 2002; Schumaker & Vána, 2005). Previous records from Russia include the Murmansk Region (Konstantinova, 2003), the Leningrad Region (Potemkin, 1992; Potemkin & Andrejeva, 1999) and the Karelia Republic (Bakalin, 1999).

2. *Bryum dichotomum* Hedw.

**Contributor:** J. van Rooy

**Lesotho:** North of Butha Buthe, opposite site of large construction of Highlands Water Scheme, 28°37'30"S, 28°22'30"E, vertical seep at roadside, on basalt, mixed with *Bryum argenteum* Hedw., 26 April 1997, *leg.* S. M. Perold & M. Koekemoer 3743 (PRE).

It is hardly surprising to find *Bryum dichotomum* in Lesotho as it is known from adjacent countries (van Rooy, 2003, 2006). In Africa this sub-cosmopolitan

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species has previously been reported from South Africa, Botswana, Namibia, Zimbabwe, Madagascar, Tanzania, Kenya, Chad, and Socotra (O'Shea, 2006). In southern Africa this species was previously known as *Bryum bicolor* Dicks. and is usually found on soil of disturbed habitats (Magill, 1987).

3. *Bucklandiella elegans* (Müll.Hal.) Bednarek-Ochyra & Ochyra

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

**South America, Chile:** XI Región, Prov. Aisén, Pto. Puyuhuapi between Chaitén and Coyhaique, lat. 44°19'S, long. 72°34'W, Muggelbach, 15 October 1939, *leg.* Schwabe 8d (JE-Herzog).

Although *Bucklandiella elegans* was described as a species in its own right from the South Island of New Zealand (Müller, 1898), it fell into obsolence when Dixon (1926) lumped it with *Racomitrium crispulum* (Hook.f. & Wilson) Hook.f. & Wilson. The latter has served as a convenient repository for most collections of racomitrioid mosses from the Southern Hemisphere (Clifford, 1955). *B. elegans* was recently resurrected by Bednarek-Ochyra and Ochyra (2010) who showed a number of features which warrant its status as a separate species. *Bucklandiella elegans* is widespread throughout both main islands of New Zealand, and here is reported for the first time from Chile in South America. The voucher material was originally named and published by Herzog (1954) as *Racomitrium symphyodontum* (Müll.Hal.) Wilson, but this species is actually conspecific with *Bucklandiella didyma* (Mont.) Bednarek-Ochyra & Ochyra. *Bucklandiella elegans* is easily distinguished from *B. didyma*, amongst other things, by its entirely unistratose laminal cells. The Chilean plants show a perfect correspondence in both gametophyte and sporophyte characters with material from New Zealand, except for possessing slightly longer setae (to 1.5 mm versus 1.2 mm). However, seta length is subject to considerable variation in the genus *Bucklandiella*. The discovery of *B. elegans* in Chile established it as an amphipacific disjunct species (Ochyra, 1998). However, this dramatic geographical disjunction is not exceptional in mosses and the same distribution pattern is exhibited by a number of species, for example *Racomitrium pruinosum* (Wilson) Müll.Hal. (Vitt & Marsh, 1988), *Bucklandiella ptychophylla* (Mitt.) Bednarek-Ochyra & Ochyra (Bartram, 1952) and *B. angustissima* Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2011).

4. *Bucklandiella sudetica* (Funck) Bednarek-Ochyra & Ochyra

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

**New Zealand:** North Island, Manawatu-Wanganui Region, Mount Ruapehu, Tongariro National Park, Red Crater lava flow, associated with clumps of vegetation on lava, ca 1710 m a.s.l. (=5600 ft), 26

March 1967, *leg.* K. W. Allison 9125 (CHR 577597); South Island, Canterbury Region, Ben Ohau Range, Twin Stream headwaters, alt. ca 1400 m (=4600 ft), late snow bed, January 1968, *leg.* A. C. Archer s.n. (CHR 163250).

*Bucklandiella sudetica* is a bipolar species in the strict sense, i.e. without intermediate stations in the mountains of the tropics. In the Northern Hemisphere it has a dissected boreal-montane range, weakly penetrating into the Arctic and common in the mountains in the southern regions of the Holarctic. In the Southern Hemisphere it is an uncommon species in the *Nothofagus* zone of southern South America, ranging from the Valdivian region to Tierra del Fuego, then recurring on subantarctic South Georgia and extending to the Western Antarctic where it reaches almost lat. 70°S (Ochyra *et al.* 2008). Eastward, it has so far been known from southeastern Australia (Frisvoll, 1986), and now its range is extended to New Zealand. It is occasional on the North Island and widely scattered at high elevations in the South Island, including Canterbury, Otago and regions on the western coast.

5. *Calymperes tenerum* Müll.Hal.

**Contributor:** J. van Rooy

**Mozambique:** 3 km from Xai-Xai Beach to Chongoene, 25°06'S, 33°46'E, on bark of trees, 1 September 1993, *leg.* E. B. Evenwel PRE CH13841, PRE CH13842 (PRE).

This pantropical species is common and abundant in the Indo-Malaysian region and Oceania but rare in the Americas and Africa (Reese, 1987). It is quite widespread on the islands of the western Indian Ocean (O'Shea, 2006). In South Africa and Mozambique *Calymperes tenerum* is rarely collected on bark of trees in coastal dune forests and woodlands between Sodwana Bay and Xai-Xai.

6. *Cynodontium jeneri* (Schimp.) Stirt.

**Contributors:** André Sotiaux and Alain Vanderpoorten

**Belgium:** Province de Liège, Vierset-Barse, Grand Bois de Barse, vallon sous les Grandes Trihes, UTM 31U FR6196. A single cushion on strongly acidic pudding-stone (conglomerate) under beechwood at 190 m a.s.l. with *Gymnocolea inflata*, *Ptilidium pulcherrimum*, *Scapania nemorea*, *Isoetecium myosuroides*, *Paraleucobryum longifolium*, *Grimmia trichophylla*, *Cephaloziella divaricata*, *Jamesoniella autumnalis*, *Dicranum fulvum*, *D. scoparium*, *Leucobryum glaucum*, and *Mnium hornum* (nomenclature of Hill *et al.*, 2006 for mosses and Grolle & Long, 2000 for liverworts), November 2008, *leg.* A. Vanderpoorten 2008-10-13/9 (LG); *leg.* Sotiaux 37009 (*Herb.* Sotiaux).

*Cynodontium jeneri* is a Northern Hemisphere montane species disjunct between western, and eastern North America and northwestern Europe. In Europe it occurs in Germany (Meinunger &

Schröder, 2007), the UK (Atherton *et al.*, 2010), and Scandinavia (Hallingbäck *et al.*, 2006). Together with the three localities in western Germany (Schmidt & Heinrichs, 1999), the Belgian locality represents the southernmost extension of an otherwise North Atlantic range.

#### 7. *Ditrichum plumbicola* Crundw.

**Contributors:** André Sotiaux and Alain Vanderpoorten  
**Belgium:** Province de Liège, Plombières, UTM: 31U GS0924, on wet metal-contaminated soil at 150 m a.s.l. with *Cephaloziella divaricata*, *Jungermannia gracillima*, and *Pohlia nutans* (nomenclature of Hill *et al.*, 2006 for mosses and Grolle & Long, 2000 for liverworts), March 2006, *leg.* Sotiaux 33744, 36872, 36874, 36876, 36877 (Herb. Sotiaux).

*Ditrichum plumbicola* is considered as a naturally rare, but not threatened species within its range (see <http://www.bio.ntnu.no/ECCB/Red/Bryophyta/Ditrichum%20plumbicola.pdf>), which includes about 20 localities in the UK (Atherton *et al.*, 2010) and nine in Germany (Meinunger & Schröder, 2007).

The species was found to be embedded within a paraphyletic grade of *D. lineare* based on DNA analyses of a single cpDNA locus and was therefore reduced to synonymy with the latter (Frahm *et al.*, 2008). We suggest that evidence for parapatry does not necessarily provide strong evidence for combining the paraphyletic and nested species, because some speciation mechanisms lead to such patterns among recently evolved sister species. We argue that there are events of major biological importance that occur when a new divergent taxon is ‘budded off’ from within an ancestral widespread species; however, the point at which both species become reciprocally monophyletic can simply reflect the stochastic process of gene coalescence and is of no real biological significance in and of itself (Vanderpoorten & Shaw, 2010).

#### 8. *Hookeria lucens* (Hedw.) Sm.

**Contributors:** Péter Ódor and Erzsébet Szurdoki

**Hungary:** Órség Region, County of Vas, in Hegyészöllő village, 46°51'43.7"N, 16°10'9.0"E, 310 m a.s.l. on the non-calcareous soil of a stream bank, 13 June 2010, *leg.* Péter Ódor & Erzsébet Szurdoki *s.n.*, *conf.* Beáta Papp, June 2010, BP 180261 (Priv. Herb. Ódor 20100613-1).

*Hookeria lucens* represents a suboceanic-temperate element occurring in Europe, western North America, Southwest Asia, Caucasus, North Turkey, and North Africa (Krisai & Strobl, 2005). In Europe it has a sub-Atlantic-montane distribution (Düll, 1992) with its most northerly occurrence in the Faeroes. It occurs in southern Scandinavia, and is common in the Atlantic region of Europe. Eastward its distribution reaches Romania and disjunctively to Georgia, and to the south it is known from Madeira,

the Azores, Portugal, and Spain. The closest occurrences to its newly discovered locality in Hungary are in the Austrian Alps (Krisai & Strobl, 2005). *Hookeria lucens* is common in South Bavaria in Germany, Salzburg and Oberösterreich regions in Austria, but becomes rare in the eastern parts of these countries. It is also a rare element in the Dinaric Alps in Slovenia, Croatia, Bosnia-Herzegovina, and Serbia (Sabovljević *et al.*, 2008), and has sporadic occurrences in Sudetes Mountains, the Carpathians in Poland, Slovakia, Czech Republic, and Romania (Ochyra *et al.*, 1985; Dihoru, 1994; Šoltes, 2000; Kučera & Vána, 2003).

This new occurrence in Hungary (Erzberger & Papp, 2004) fits well with the known distribution of the species, and its habitat conforms with the known ecological preferences of the species.

#### 9. *Leptodontium planifolium* Herzog

**Contributors:** María T. Colotti and María M. Schiavone.

**Argentina:** Salta. Dpto. Santa Victoria, Municipio de Los Toldos, senda de San José, 22°21'26.84"S, 64°44'13.37"W, 1780 m a.s.l., en suelo, 5 julio 1998, *leg.* M.M. Schiavone 2493 (LIL).

*Leptodontium planifolium* differs from other species of the genus by its incurved, flexuous upper leaves and the presence of numerous propagula between the leaves on the stem. Another distinctive feature is the strongly coloured, thick walled cells at the base of the leaves. These are present in the type specimen of *L. planifolium* (Bolivia, Herzog 3225 (S)), although not mentioned in the protologue (Herzog, 1916). This species was first recorded in Bolivia (its type locality) and Colombia, at 3000 m a.s.l. (Zander, 1972; Churchill & Linares, 1995; Churchill *et al.*, 2009). In Argentina, it was first recorded in Salta, in the northwest of the country, where it was collected in montane ‘secondary’ forest in the Yungas, at 1700 m a.s.l. In general, secondary forests are monospecific. However, this new record was discovered along a logging road, through forest dominated by *Blepharocalyx gigantea* Lillo, *Podocarpus parlatorei* Pilg. and *Cedrela lilloi* C.D.C., among other species. It was associated with *Leptodontium viticulosoides* var. *viticulosoides* (P. Beauv.) Wijk & Margad. (common in montane forests). This area of forest is considered historically very stable owing to its high number of endemic vascular plant species not found in other forested mountain areas (Kappelle *et al.*, 2001).

#### 10. *Microbryum floerkeanum* (F. Weber & D. Mohr) Schimp.

**Contributors:** B. Papp, P. Erzberger and M. Sabovljević

**Serbia:** Vojvodina, at Trešnjevac village near Senta town, saline grassland 45°59'18.90"N, 20°0'32.20"E, 85 m, 6 April 2010. *leg. et det.* B. Papp, P. Erzberger.

180424 (BP), Erzberger 13764 (B); Velebit village near Senta town, saline grassland, 46°0'38.78"N, 19°57'9.34"E, 90 m, 6 April 2010, *leg. et det.* B. Papp, P. Erzberger 180425 (BP), Erzberger 13785, 13786 (B).

These new localities for *Microbryum floerkeanum* are situated in the northern part of Serbia near the Hungarian border. The species is a characteristic member of the bryophyte assemblages living on the saline-alkaline grasslands of the Danube-Tisza Interfluvium in Hungary, which are similar to the saline grasslands in northern Serbia. Both regions form part of a single continuum of lowlands in the Carpathian basin (Papp 2008; Papp & Rajczy, 1999; Papp & Erzberger, 2003). *M. floerkeanum* also grows on disturbed soil at the edge of arable fields or along paths. According to the Red Data Book of European Bryophytes (ECCB, 1995) it is included in the data deficient (K) category. Owing to its minute size and seasonal appearance, it is frequently overlooked. In southeastern Europe it was known only from Bulgaria, Croatia, and Romania (Sabovljevic *et al.*, 2008).

11. *Philonotis tomentella* Molendo

**Contributors:** André Sotiaux and Alain Vanderpoorten

**Belgium:** Province de Luxembourg, Libin, ancient quarries of kaolin, UTM 31U FR6437, 470 m a.s.l., on water-saturated kaolin with *Pellia neesiana*, *Sphagnum auriculatum*, *Sphagnum girgensohnii*, *Cephalozia bicuspidata*, *Gymnocolea inflata*, *Riccardia incurvata*, *Cladopodiella francisci*, and *Lophozia grandiretis* (nomenclature of Hill *et al.*, 2006 for mosses and Grolle & Long, 2000 for liverworts), October 2009, *leg.* Sotiaux 38331 (*Herb.* Sotiaux).

12. *Plagiothecium membranosulum* Müll.Hal.

**Contributor:** R. Ochrya

**Réunion:** Forest above St. Denis, zone de tamarin, 1400–1800 m a.s.l., 11 October 1962, *leg.* Gillis Een R620 (S).

So far, only one species of *Plagiothecium* Schimp. has been reported from Réunion Island in the Indian Ocean, namely *P. nitens* Broth. (Een, 1997; see also Ah-Peng & Bardat, 2005; Frahm, 2010). Examination of two voucher specimens revealed one of them to be *P. membranosulum*, a species known from South Africa and Lesotho (O'Shea, 2006). This is a variable species that is readily distinguished from other African congeners by its leaf areolation, which consists of oblong-hexagonal to hexagonal-linear cells, 12–20 µm wide and 100–240 µm long, and by the absence of thin-walled nematogen cells in the leaf apex. According to unpublished data *P. nitens* Dixon, a species described from Kenya (Dixon, 1916), falls well within the range of variation of the South African *P. membranosulum*.

13. *Plagiothecium nitidifolium* (Mitt.) A.Jaeger

**Contributor:** R. Ochrya

**Réunion:** Above St. Paul, Forêt de Benard, 1700–2100 m a.s.l., 13 October 1962, *leg.* Gillis Een R640 (S).

*Plagiothecium nitidifolium* is a distinct African endemic species which is easily distinguished by the presence of the thin-walled nematogen cells in the leaf apex, narrowly linear laminal cells, 6–11 × 100–190 µm, and a fine, narrow leaf acumen which is composed of 3–7 cells (Buck, 1993). One of the specimens reported from Réunion Island by Een (1997) as *P. nitens* perfectly fits the concept of this species. Accordingly, the geographical range of *P. nitidifolium* is markedly extended to the islands east of Africa in the Indian Ocean.

14. *Pottiopsis caespitosa* (Bruch ex Brid.) Blockeel A.J.E. Sm.

**Contributors:** André Sotiaux and Alain Vanderpoorten

**Belgium:** Province de Namur, Vaucelles, Montagne de la Carrière, UTM 31UFR2453, 210 m a.s.l., on ground of an ancient limestone quarry with *Microbryum curvicolle*, *Tortula lanceola*, *Didymodon acutus*, *Weissia brachycarpa*, and *Barbula convoluta* (nomenclature of Hill *et al.*, 2006 for mosses and Grolle & Long, 2000 for liverworts); February 2007, *leg.* Sotiaux 34963 (*Herb.* Sotiaux).

*Pottiopsis caespitosa* is a typically sub-Mediterranean species, for which the Belgian locality represents a 200-km range extension from its nearest British and German localities (Atherton *et al.*, 2010; Meinunger & Schröder, 2007). *Fossombronina caespitiformis* De Not. ex Rabenh. is another sub-Mediterranean species recently found in Belgium in similarly human-disturbed places (Sotiaux *et al.*, 2009), one interpretation of the presence of these species in Belgium is that they are recent colonizers.

15. *Pterygoneurum squamosum* Segarra & Kürschner

**Contributors:** Tülay Ezer and Recep Kara

**Turkey:** Niğde-Kayaardı Valley: 37°58'450"N, 34°39'320"E, 1246 m a.s.l., on clayey soil, 2 April 2010, *leg.* R. Kara 1567, T. Ezer 1440 (*Herb.* Niğde University).

The genus *Pterygoneurum* Jur. is widely distributed in arid and semiarid climatic regions of five continents (Cano *et al.*, 1994). In Europe, *Pterygoneurum squamosum* was first recorded from the Jávea Alicante province of Spain (Segarra *et al.*, 1998). According to recent literature (Kürschner & Erdağ, 2005; Uyar & Çetin, 2004; Tonguç Yayıntaş, 2009) only *Pterygoneurum ovatum* (Hedw.) Dixon and *P. subsessile* (Brid.) Jur. have been recorded for Turkey. *Pterygoneurum squamosum* has been widely reported on loess in Hungary (Pócs, 1999) and Romania (Pócs *et al.*, 2002). This new record of *P. squamosum* from Turkey is an important extension of range southwards, towards the Middle East, and is based on collections from Central Anatolia (Niğde-Kayaardı Valley) made in April 2010 (*Herb.* Niğde University).

It was collected on arid soil in an apple grove, associated with *Grimmia anodon* Bruch & Schimp, *Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr, *Tortula muralis* Hedw. and *Schistidium apocarpum* (Hedw.) Bruch & Schimp.

*Pterygoneurum squamosum* is easily distinguished from other species of *Pterygoneurum* by the two supracostal lamellae, which are not differentiated into photosynthetic filaments, but deeply transversely incised in 3–4 squamulose plates. It is further distinguished by its broadly ovate leaves with a very short hair-point (Segarra *et al.*, 1998). Other *Pterygoneurum* species (e.g. *Pterygoneurum crossidioides* W. Frey, Herrnst. & Kurschner, *P. compactum* Cano, J. Guerra & Ros) possess 2–3 supracostal lamellae with *Crossidium*-like photosynthetic branched filaments (Cano *et al.*, 1994; Frey *et al.*, 1990).

16. *Rhynchostegiella litorea* (De Not.) Limpr.

**Contributors:** Silvia Calvo Aranda, Rosalina Gabriel and Lars Hedenäs

**Portugal:** Azores: Ilha Terceira (Terceira Island): Angra do Heroísmo, Monte Brasil, near Caminho do Manutenção, 38°38'43"N, 27°13'22"W, ca 150 m a.s.l., on rocks, 19 October 2008, leg. Silvia Calvo Aranda *s.n.*, (AZU); Posto Santo, 38°41'0.54"N, 27°14'39"W, ca 228 m a.s.l., on rocks, 17 November 2008, leg. Silvia Calvo Aranda *s.n.* (AZU).

*Rhynchostegiella litorea* (De Not.) Limpr., a species belonging to the core clade of the genus *Rhynchostegiella* (Aigoïn *et al.*, 2009), occurs in Europe and North Africa (Smith, 2004; Hill *et al.*, 2006). It is widely distributed in the Mediterranean region and also in Macaronesia, where it occurs frequently in the Madeiran archipelago (Kürschner *et al.*, 2008; Sérgio *et al.*, 2008) and the Canary Islands (González-Mancebo *et al.*, 2008). Here it is reported for the first time from the Azores (Gabriel *et al.*, 2010). The specimens were collected in exotic forest dominated by *Pittosporum undulatum* Vent., growing on basaltic rocks in relatively shaded conditions. They were found with ripe capsules in both localities. *Rhynchostegiella litorea* grew with other interesting species, such as *Rhynchostegium confertum* (Dicks.) Schimp., *Marchesinia mackaii* (Hook.) Gray, *Tortella tortuosa* (Hedw.) Limpr. and several species of *Fissidens* and members of the family *Brachytheciaceae*.

17. *Seligeria acutifolia* Lindb.

**Contributor:** David T. Holyoak

**Portugal:** Estremadura (Leiria district), Fórnea, ca 2.5 km south of Alcaria, on part-shaded, vertical, north-facing limestone crag by cave entrance on steep north-facing slope at edge of ephemeral stream, UTM grid reference: 29S ND1664/7868, ca 368 m a.s.l., 19 July 2010, leg. & det. D.T. Holyoak 10–134 (BM, Priv. Herb. D.T. Holyoak).

*S. acutifolia* has not hitherto been recorded from Portugal (Sérgio & Carvalho, 2003), although it is the commonest species of the genus in Spain where records are from higher elevations at 590–2000 m a.s.l. (Puche, 2006). Several small patches were seen at Fórnea, some with mature (dehiscid) capsules. The specimens include numerous typical plants with perichaetial bracts much longer than the leaves, their tips reaching at least the base of the capsule.

18. *Timmia bavarica* Hessel.

**Contributors:** André Sotiaux and Alain Vanderpoorten

**Belgium:** Province de Liège, Anthisnes, UTM 31U FR7699, 170 m a.s.l., deep crevices on north-facing limestone crags, under a broadleaf woodland dominated by *Acer pseudoplatanus* L., with *Pedinophyllum interruptum*, *Anomodon attenuatus*, *A. longifolius*, *A. viticulosus*, *Neckera complanata*, *Cololejeunea rosettiana*, *Metzgeria conjugata*, *Apometzgeria pubescens*, *Tortella tortuosa*, *Brachythecium tommasinii*, *Plasteurhynchium striatulum*, *Serpoleskea confervoides*, *Rhynchostegiella tenella*, *Brachythecium glareosum*, *Rhynchostegium murale*, *Bryoerythrophyllum recurvirostrum*, *Encalypta streptocarpa*, *Porella platyphylla*, *Cirriphyllum crassinervium*, *Tortula subulata*, *Plagiomnium rostratum*, *Mnium stellare*, *Taxiphyllum wissgrillii*, *Rhytidiadelphus triquetrus*, *Plagiochila por-eloides*, *Fissidens gracilifolius*, *Fissidens dubius*, *Thamnobryum alopecurum*, and *Homalothecium sericeum* (nomenclature of Hill *et al.*, 2006 for mosses and Grolle & Long, 2000 for liverworts), February 2009, leg. A. Vanderpoorten 2009/02/25–7 (LG), A. Sotiaux 37268 (Herb. Sotiaux).

*Timmia bavarica* is an Arctic-montane species found on all of the major mountains in the Northern Hemisphere (Rocky Mountains, Himalaya, Alps, Pyrénées, Caucasus, Urals) with some disjunct populations in mountain areas of North Africa, Mexico, and Hawaii [Brassard, 1984; Bednarek-Ochyra *et al.*, 1994; Bryophyte flora of North America ([http://www.efloras.org/flora\\_page.aspx?flora\\_id=50](http://www.efloras.org/flora_page.aspx?flora_id=50)). The altitude of the Belgian locality is much lower than that of most other European localities, except for those of western and central Germany (Meinunger & Schröder, 2007). Although a recent introduction by long-distance dispersal cannot be completely ruled out, the ecological context where the species was found rather points to its being a relict population and supports the idea that Belgium and neighbouring areas may have offered an array of micro-refugia for cold-adapted species.

19. *Valdonia microcarpa* (Mitt.) Ochyra

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

**Heard Island:** Gotley Glacier, edge of inner moraine, probably ice-cored, ca 200 m a.s.l., 6 November 2000, leg. P. Selkirk, M. Skotnicki & J. Whinam H655 (NSW 755176).

The monospecific genus *Valdonia* Ochyra, comprising *V. microcarpa* (Mitt.) Ochyra, is endemic to the Kerguelen Province of the Subantarctic (Ochyra, 2003). So far, it has been recorded from three main archipelagoes in this province, i.e. the Prince Edward Islands, Îles Crozet and Îles Kerguelen, where it is a frequent and locally common. It is abundant in the fellfield communities, often forming characteristic moss balls. Herein, *V. microcarpa* is recorded from the isolated and heavily glaciated Heard Island, which is the fourth largest speck of land in this subantarctic province. Originally, *V. microcarpa* was reported from this island as *Ditrichum immersum* Zanten (Selkirk *et al.*, 2008). The plants are in fine fruiting condition and the characteristic small, turbinate and immersed capsules readily separate it from all other species in this region, including *D. immersum*. The latter is generally more robust and rigid than *V. microcarpa* and its capsules are immersed in much enlarged perichaetial leaves on a very short seta, 1–2 mm long (versus 2–4 mm in *V. microcarpa*).

20. *Warnstorfia exannulata* (Schimp.) Loeske

**Contributors:** R. Ochyra, J. Żarnowiec and R. D. Seppelt

**Macquarie Island:** Green Gorge, northern edge of lake, 54°37'45"S, 158°53'45"E; wet area amongst *Juncus* at edge of lake, 15 December 1984, *leg.* R. D. Seppelt 14854 (HO, KRAM).

*Warnstorfia exannulata* is a bipolar species with some intermediate stations at high elevations in tropical mountains in East Africa and South America. In the Northern Hemisphere it has a continuous range throughout much of the Holarctic, reaching maximum possible latitudes in the Canadian Arctic Archipelago and Spitsbergen. In the Southern Hemisphere *W. exannulata* is common and locally abundant in Tierra del Fuego (Ochyra & Matteri, 2001) and western Patagonia, and occasional on the Falkland Islands and subantarctic South Georgia (Ochyra *et al.* 2002). Eastwards it occurs in southeastern Australia, Tasmania and on the South Island of New Zealand. Herein, it is reported for the first time from subantarctic Macquarie Island in the Australasian sector. The material was originally reported as *Drepanocladus aduncus* (Hedw.) Warnst.(Seppelt, 2004) but proved to represent *W. exannulata*.

21. *Warnstorfia fluitans* (Hedw.) Loeske

**Contributors:** R. Ochyra, J. Żarnowiec and R. D. Seppelt

**Macquarie Island:** Skua Lake, north side, 54°37'38"S, 158°50'45"E; in boggy flat amongst *Juncus*, *Luzula* and bryophytes, 4 January 1982, *leg.* R. D. Seppelt 12345 (HO, KRAM); Tullock Lake, at edge of small pond at edge of lake, 54°34'46"S, 158°54'00"E, very wet situation, 22 March 1986, *leg.* R. D. Seppelt 15823 (HO, KRAM).

*Warnstorfia fluitans* is a bipolar species which frequently occurs in the tropics at altimontane stations in the Americas, Africa and Papua New Guinea (Ochyra *et al.* 1991). In the cool temperate regions in the Southern Hemisphere, the species is frequent in Tierra del Fuego (Ochyra & Matteri, 2001) and in southeastern Australia, Tasmania and New Zealand. Now its range in Australasia is extended to the Subantarctic where it occurs on Macquarie Island. With an addition of the two species of *Warnstorfia*, the moss flora of this subantarctic island now consists of 88 species, with a further four taxa not yet definitely named to species (Ochyra *et al.* 2008).

22. *Willia calobolax* (Müll.Hal.) Lightowlers

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

**Heard Island:** Cape Bidlingmaier, 1 November 2000, *leg.* P. Selkirk, M. Skotnicki & J. Whinam H258a (NSW 755344); Atlas Cove, site of old buildings, on timber of shower ramp support, constructed in 1949, 8 November 2000, *leg.* P. Selkirk, M. Skotnicki & J. Whinam H732b (NSW 704391).

*Willia calobolax* is a subantarctic species which has its main centre of occurrence in the Kerguelen Province where it occurs in the Prince Edward Islands and Îles Kerguelen. It is also known from the Antipodes Island near New Zealand (Lightowlers, 1985). Thus, it is an amphi-Indian Ocean subantarctic species. Herein, *W. calobolax* is recorded from subantarctic Heard Island, another island in the Kerguelen Province. It was reported from this island as *Syntrichia andersonii* (Ångstr.) R.H.Zander (Selkirk *et al.*, 2008), so apparently this species has to be deleted from the moss flora of Heard Island. *Willia calobolax* is generally considered to be saxicolous but one of the Heard Island specimens was collected on timber. It is a well known phenomenon that some species which are typically saxicolous may also be lignicolous when woody habitats are available. A number of subantarctic species are apparently considered to be strictly saxicolous only owing to the lack of suitable habitats, since subantarctic islands have no arborescent vegetation.

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