



New national and regional bryophyte records, 50

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New national and regional bryophyte records, 50

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1. *Andreaea flexuosa* R.Br.bis

Contributors: R. Ochyra and N. J. M. Gremmen

Heard Island, Subantarctica: Eastern slope of Scarlet Hill, 340 m a.s.l., 53°06'18"S, 73°38'23"E, on red consolidated scoriae and lava, exposed, forming small cushions on rock, associated with *Bucklandiella pachydietyon* (Cardot) Bednarek-Ochyra & Ochyra, 27 January 2001, leg. N. J. M. Gremmen No. H-0994A (KRAM).

Andreaea flexuosa is a distinct but still poorly understood species, with an inadequately known geographical distribution. Murray (2006) provided generalised information on its range, which mainly covered the temperate regions in the southern hemisphere, including all major land masses of New Zealand, Tasmania, SE Australia, South Africa and South America, with some northward extensions to Madagascar, New Guinea, the Hawaiian Islands and Madeira in Macaronesia. The populations from the latter island

have subsequently been recognised as a separate taxon, *A. flexuosa* subsp. *luisieri* Sérgio & Sim-Sim (Sérgio & Sim-Sim, 2012). In the south-cool-temperate zone *A. flexuosa* has hitherto been recorded only from the Falkland Islands (Ellis *et al.*, 2016c) and in the Subantarctic it was reported solely from Marion Island in the Prince Edward Islands archipelago (Sérgio & Sim-Sim, 2012). The species was also expected to be found on other subantarctic islands and its present discovery on Heard Island substantiates this assumption. This highly isolated and heavily glaciated island is situated about 500 km south-east of Îles Kerguelen and is among the most remote places on the globe. For this reason it was seldom visited by biologists and its moss flora was rather poorly known. Selkirk *et al.* (2008) reported some 40 species from this island but since then 14 species have been added to the island's bryoflora (e.g. Ellis *et al.*, 2011, 2014a, 2015b, 2016b). Including the present record, the moss flora of Heard Island now consists of 55 species, which is still the lowest diversity of mosses of all the subantarctic islands.

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2. *Breutelia diffracta* Mitt.

Contributors: T. A. Hedderson and N. Wilding

La Réunion, Indian Ocean: Commune Saint-Louis, Forêt des Makes, along forest road to Camp 2000, 21.1847°S, 55.4093°E, 1550 m a.s.l., on soil bank under *Acacia* Mill. and *Cryptomeria* D. Don, 26 November 2014, *leg.* T.A. Hedderson 18784 (BOL, REU); Commune Cilaos, Cirque de Cilaos. Bras Sec area, sentier Le Bonnet de Prêtre, 21.1547°S, 55.4915°E, 1250 m a.s.l., on tops of boulders in moist, dense forest on steep slope above river, 4 December 2014, *leg.* T.A. Hedderson 18838 (BOL, REU).

Breutelia diffracta is known from a broad range across tropical Africa (O'Shea, 2006), including the nearby island of Madagascar, so its presence on Réunion is scarcely surprising. It is possible that specimens reported by de Sloover (1975) under *B. perrieri* Thér. actually belong here, and de Sloover notes that 'C'est avec beaucoup d'hésitation que je rapporte les deux récoltes de La Réunion a *B. perrieri*. Elles me semblent presque impossibles a distinguer de *B. diffracta* a l'état végétatif.'

The material that we report here is gametophytically indistinguishable from the numerous mainland African specimens of *B. diffracta* that we have examined. None of the Réunion specimens assigned to either species is fertile, so the apparently diagnostic sporophytic characters cannot be applied. Clearly the relationship between *B. diffracta* and *B. perrieri* needs to be evaluated, preferably with molecular data.

3. *Bryum pseudotriquetrum* (Hedw.) P. Gaertn., B. Mey. & Scherb.

Contributor: T. A. Hedderson

Malawi: Mulanje, Mount Mulanje, granite slabs and forest edge along river, ca 0.5 km above Mulanje Resort, 16.01516°S, 35.52119°E, 905 m a.s.l., in rock pools near river, 15 June 2010, *leg.* T.A. Hedderson 17519 (BOL).

This nearly cosmopolitan species ranges from Ethiopia to South Africa in the mountains of east and central Africa, including the East African Islands and is known from most countries adjacent to Malawi (Ochi, 1972; O'Shea, 2006).

4. *Bucklandiella crispipila* (Taylor) Bednarek-Ochyra & Ochyra

Contributor: R. Ochyra

Democratic Republic of Congo: (1) North Kivu Province, District Goma, Virunga Mountains, Mt. Karisimbi, NNW slope above Rukumi Plateau, 4250 m a.s.l., 1°30'06"S, 29°26'56"E, on steep lava rock face on a small cliff, 26 January 1972, *leg.* J. L. de Sloover 13177 (KRAM); (2) same locality, on the summit of Mt Karisimbi, 4500 m a.s.l., 1°30'21"S, 29°27'01"E, on soil between blocks of lava, 26 January 1972, *leg.* J. L. de Sloover 13193 (KRAM), also 'Herbier bryologique' No. 136 (KRAM).

Hitherto, *Bucklandiella crispipila* has been recorded in sub-Saharan Africa from Rwanda (Ochyra, 1993), Kwa Zulu-Natal in South Africa (Hodgetts *et al.*, 1999) and Uganda (O'Shea *et al.*, 2003). Now, the species is recorded for the first time from the Democratic Republic of Congo (formerly Zaire) where it was found on the north-western slope and in the summit area of Mount Karisimbi. This volcano is situated on the border of the Democratic Republic of Congo and Rwanda and in fact the first record of *B. crispipila* from Africa originated from the Rwandan part of this mountain.

Bucklandiella crispipila is an oreophyte having its main centre of occurrence in the American Cordillera where it ranges from Mexico in North America (Frisvoll, 1988) through the Central American isthmus (Allen, 2002) to Bolivia and south-eastern Brazil (Bednarek-Ochyra *et al.*, 1999). The reports of this species from the temperate zone of southern South America (Deguchi, 1984; Frisvoll, 1988) are based on the incorrect conspecificity of this species with *B. striatipila* (Cardot) Bednarek-Ochyra & Ochyra (Bednarek-Ochyra & Ochyra, 2010). Apart from Africa, *B. crispipila* was also reported from Papua New Guinea (Blockeel *et al.*, 2007) but this record proved to be erroneous. Consequently, the phytogeographical status of *B. crispipila* has to be redefined and along with over 80 other species of moss (e.g. Allen & Crosby, 1986; Ochyra *et al.*, 1992; Wilbraham & Matcham, 2010; Ellis *et al.*, 2012b; Atwood, 2015) it must be considered to be an amphiatlantic Afro-American species.

5. *Bucklandiella lamprocarpa* (Müll. Hal.) Bednarek-Ochyra & Ochyra

Contributors: R. Ochyra and V. Plášek

Chile: XI Región Aysén del General Carlos Ibáñez del Campo, Provincia de General Carrera; Los Alamos south of Lago Negro at the southernmost end of Lago General Carrera, between Puerto Bertrand and Puerto Guadal at Carretera Austral — Ruta 7, 46°54'36"S, 72°47'24"W, 345 m a.s.l., on submerged or exposed stones in a small stream flowing into Lago Bertrand, associated with *Vittia pachyloma* (Mont.) Ochyra, 16 January 2015, *leg.* H. Bednarek-Ochyra, R. Ochyra & V. Plášek 565/15 (KRAM, SGO).

Bucklandiella lamprocarpa is an aquatic moss ranging southwards from the middle of Chile to Tierra del Fuego. In the XI Región de Aysén it has so far been recorded from three provinces, Provincia de Aysén, Provincia de Coyhaique (Müller, 2009) and Provincia de Capitán Prat (Ellis *et al.*, 2016b). Herein, it is reported from the fourth province of this region, namely Provincia de General Carrera. Like elsewhere, the species grew submerged or temporarily exposed on stones and boulders in a stream with

rapidly flowing water, in association with *Vittia pachyloma*, with which it shares some morphological adaptations to rheophytic habitats. These adaptations are also known in other unrelated moss taxa and are excellent examples of convergent evolution. They include fleshy, polystratose marginal thickenings (Ochyra, 1987), multistratose laminal cells (Ochyra, 1985a; Ochyra & Vanderpoorten, 1999) and salient costae that are usually confluent at the leaf apices with marginal limbidia (Ochyra, 1985b; Ochyra & Bednarek-Ochyra, 2011).

Although *B. lamprocarpa* has a wide panholantarctic range, it has its main centre of occurrence in southern South America (Bednarek-Ochyra *et al.*, 1996) with frequent extensions to the central and northern Andes, where it occurs at high elevations (Blockeel *et al.*, 2002; Bednarek-Ochyra, 2014a, 2015). Outside South America, *B. lamprocarpa* occurs in the Cape region in South Africa (Bednarek-Ochyra & Ochyra, 2012c; Ochyra & van Rooy, 2013) and penetrates to the mountains of eastern African (Ochyra *et al.*, 1988), as well as to some subantarctic islands (Bednarek-Ochyra & Ochyra, 1998; Ochyra *et al.*, 2015).

6. *Bucklandiella subcrispipila* (Müll.Hal.) Bednarek-Ochyra & Ochyra

Contributor: R. Ochyra

Deception Island, South Shetland Islands, Antarctica: south end of Fumarole Bay, north of lagoon, ca 125 m a.s.l., 62°58'S, 60°42'W, summit of ridge with fumaroles, buried in soil in association with *Schistidium amblyophyllum* (Müll.Hal.) Ochyra & Hertel, 11 February 2002, *leg.* R. I. Lewis Smith 11287 (AAS, KRAM).

Bucklandiella subcrispipila is one of the most neglected and poorly known species of its genus. The type of *Grimmia subcrispipila* Müll.Hal., the basionym of this species, had long been unavailable and this precluded its taxonomic assessment. However, Müller (1862) in his original diagnosis of the species stressed the presence of leaves with long hyaline hair-points, and this feature, coupled with the place of origin ('in montibus chilensibus'), suggested that *B. subcrispipila* could be identical to *B. striatipila* (Cardot) Bednarek-Ochyra & Ochyra, an amphiatlantic species commonly occurring in southern South America (Bednarek-Ochyra & Ochyra, 2010, 2013; Ellis *et al.*, 2012a). As a result, Bednarek-Ochyra and Ochyra (2011) neotypified *B. subcrispipila* with a specimen from southern Chile, which perfectly matched the concept of *B. striatipila* and this decision made these two names synonymous, the former having priority. Soon afterwards, original material of *Grimmia subcrispipila* was located in BM and PC, and its examination revealed that, despite some similarities, this species was distinct from *B. striatipila*. The two species share a broad and

strongly flattened costa with 6–10 enlarged adaxial guide cells in the lower part and unistratose laminal cells but they have a different basal marginal border. In *B. striatipila* it is composed of up to 25(–30) elongate, pellucid and thin- and straight-walled cells, whilst in *B. subcrispipila* the basal marginal border is lacking or short, consisting of up to 5(–10) quadrate to short-rectangular cells with thick and straight, or often slightly sinuose walls. Furthermore, it proved that the type of *B. subcrispipila* perfectly matched the specimen collected on Antarctic Deception Island that was named *B. subsecunda* (Harv.) Bednarek-Ochyra & Ochyra (Ochyra *et al.*, 2008a, 2008b). As the Antarctic plants were sterile, their correct assignation to species proved difficult. The combination of some gametophyte characters, including a poorly developed or absent basal marginal border to the leaves, elongate laminal cells and a very broad and flattened costa, seemed to be unique and unknown in any austral species. After a long deliberation the plants were named *B. subsecunda* but it was as much from desperation as from conviction. The specific distinctness of the Antarctic plants has been confirmed by molecular analyses. They are congruent in some positions of ITS, *rps4*, *trnL-F* with *B. striatipila* and in another with *B. subsecunda*, but there exist positions where they are incongruent with both these species. This clearly shows that the specimen from Deception Island represents a distinct species (Stryjak-Bogacka *et al.*, 2016), which correctly, should be named *B. subcrispipila*.

The exact geographical range of *B. subcrispipila* is unknown at present. It is apparently a South American species; so far known only from the type locality, which itself was not precisely designated. It is very likely that a revision of large South American collections of Racomitrialean mosses, which are usually given the collective species name *B. crispula* (Hook.f. & Wilson) Bednarek-Ochyra & Ochyra, will result in the discovery of additional localities of this otherwise rare species. The vegetation of Deception Island underwent catastrophic changes during recent volcanic eruptions between 1967 and 1970, being buried beneath several metres of mudflow (Lewis Smith, 2005). After these dramatic events many rare species were discovered in geothermal sites on the island, and these were evidently newcomers that had arrived by long distance dispersal (Ochyra & Lewis Smith, 1998; Ochyra *et al.*, 2008a, 2008b; Ellis *et al.*, 2013a, 2013b). *Bucklandiella subcrispipila* clearly belongs to this group of recent colonisers, and mainland South America appears to be the main source of these newcomers to the Antarctic, and subantarctic South Georgia (Birkenmajer *et al.*, 1985; Van der Putten *et al.*, 2004, 2009, 2010).

Hitherto, five species of *Bucklandiella* were known in the Antarctic (Ochyra *et al.*, 2008a, 2008b; Ellis

et al., 2013a) and this number remains unchanged, as the misnamed *B. subsecunda* is herein replaced by *B. subcrispipila*. On the other hand, resurrection of the latter species from obsolescence implies that in South America, including subantarctic South Georgia, *Bucklandiella* currently consists of 19 species (Ochyra *et al.*, 2002; Bednarek-Ochyra & Ochyra, 2012a, 2012b).

7. *Calymperes couguiense* Besch.

Contributor: L. T. Ellis

Philippines: Luzon, Batangas Province. On the trail around the upper slopes of Mt Malarayat above the community of Lipa City. 13°57.898'N, 121°13.906'E, 800 m a.s.l. Secondary hardwood tropical forest. On hardwood trunk in filtered light. 10 May 2011, *leg.* J.R. Shevock 37847 (with I. Lambio) (BM, BM001103123).

Calymperes couguiense is one of several species in the Calymperaceae showing extreme leaf dimorphism. Its shoots possess lingulate vegetative leaves that are over-topped by erect, linear, gemmae-bearing leaves. In the latter, fusiform gemmae are produced in a crown-like group from the apex of the costa, and perhaps uniquely within the family, the crown of gemmae is nested within a dense fringe of sterile, unicellular finger-like processes (Ellis, 2002).

The distribution of *C. couguiense* extends from north-eastern Australia across much of Oceania, with records from Queensland, the Bismarck Archipelago, the Mariana Islands, New Caledonia, Samoa, the Tuamotu Archipelago and the Society Islands (Ellis, 2002). Most of the previous records and accounts of the species that placed it in the Malesian floristic region (e.g. Reese *et al.*, 1986; Eddy, 1990) were based on misidentified collections, notably of *C. porrectum* Mitt. (Ellis, 2002). Further westward, in the Indian Ocean, collections originally identified as *C. couguiense* from Mauritius (Reese & Stone, 1987) and the Seychelles (Orbán, 1995; O'Shea *et al.*, 1996), were found to represent the local species *C. hispidum* Renaud & Cardot (Ellis, 2002; Wilbraham & Ellis, 2010). Consequently, this present record for *C. couguiense*, new to the Philippines, appears to sit at the north-western edge of the species' geographical range.

8. *Dicranella cerviculata* (Hedw.) Schimp.

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

Italy: Boschi di Ferretto — Bagnolo Umbria Region, Province of Perugia. A Site of Community Importance (SCI) IT5210020, 43°9.933'N, 11°59.638'E, ca 274 m a.s.l., very localised, on acidic flat soil between heath, 15 April 2015, *leg.* S. Poponessi *s.n.*, *det.* S. Poponessi and M. Aleffi (PERU).

The investigations revealing this record focused on a system of Mediterranean temporary ponds categorised as a priority habitat under the EU Directive 92/43/EEC and listed in Annexe I with the code 3170*.

Dicranella cerviculata is herein newly reported in Umbria. Aleffi and Schumacker (1995) considered the species in Italy as Threatened (E). Indeed, it is very rare, previously recorded in Trentino-Alto Adige and Piedmont, and according to Aleffi *et al.* (2008), its presence in Lombardy was based on old records. More recently, the species has also been recorded for Abruzzo (Puglisi *et al.*, 2011). The present record, together with the Abruzzo report, represents the southern limit of the Italian range of this species. *Dicranella cerviculata* is a Boreo-Subtropical-Arctic species, widely distributed in Europe (Dierßen, 2001). Its range in the Mediterranean area includes France, Macedonia, Serbia and Slovenia (Ros *et al.*, 2013). The species has also been found in the Faeroes, Iceland, Siberia, Japan, North America and Greenland (Smith, 2004).

9. *Dicranella staphylina* H.Whitehouse

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

Italy: Boschi di Ferretto — Bagnolo Umbria Region, Province of Perugia. A Site of Community Importance (SCI) IT5210020, 43°10'24.26"N, 12°00'02.13"E, ca 272 m a.s.l., on acidic flat soil, 15 April 2015, *leg.* S. Poponessi *s.n.*, *det.* S. Poponessi (PERU).

The investigations revealing this record focused on a system of Mediterranean temporary ponds categorised as a priority habitat under the EU Directive 92/43/EEC and listed in Annexe I with the code 3170*.

This species has been assigned to the European Temperate geographic element (Smith, 2004). In Italy it is very rare and has been reported only in three regions: Aosta Valley, Piedmont and Veneto (Aleffi *et al.*, 2008). The present discovery is the first record, not only for Umbria, but for the whole of central Italy. It represents the southern limit of the Italian range for this species. *Dicranella staphylina* occurs in Spain, France, Bulgaria, Serbia, Montenegro (although based on few records), Great Britain, Northern and Central Europe, Finland, the Faeroes, Tenerife and Canada (Smith, 2004; Ros *et al.*, 2013).

10. *Diplasiolejeunea grolleana* Reyes Montoya

Contributor: A. Schäfer-Verwimp

South America, Venezuela: Estado Araguá, Henri Pittier National Park, ca 10°18'N, 67°37'W, epiphyllous in rain forest along road from Maracay to Choróni, scarce, 1500 m a.s.l., 23 January 1990, *leg.* Schäfer-Verwimp & Verwimp 12363/B (JE).

Diplasiolejeunea grolleana was described from Cuba (Reyes, 1983), and subsequently reported from Costa

Rica (Eggers *et al.*, 2001) and Jamaica (Schäfer-Verwimp & Van Melick, 2016). This is the first record for South America. In Costa Rica and Venezuela the species is only known from single epiphyllous collections. From Cuba it is reported from four epiphyllous collections in rain forest (Mustelier Martínez, 2012). In Jamaica it was found several times at different localities always growing epiphytically on the bark of solitary trees and on branches of shrubs in environments with a high frequency of fog. The species is best recognised by its rounded to obtuse underleaf lobes (similar to those in *D. rudolphiana* Steph., *D. unidentata* (Lehm. & Lindenb.) Schiffn., *D. johnsonii* A.Evans, *D. latipensis* Tixier) and the prominent first (median) tooth which is characteristically forked at the apex (Reyes, 1983, Figure 20).

Altitudinal range: 700 m in Costa Rica, 1050 m in Cuba (Reyes, 1983), 1065–1300 m in Jamaica, and 1500 m in Venezuela.

11. *Ditrichum difficile* (Duby) M.Fleisch.

Contributors: T. A. Hedderson and C. Ah-Peng

French Polynesia, Society Islands, Tahiti: Trail from Belvedere to Aorai Peak. 17°34'55.2"S, 149°30'52.3"W, 240 m a.s.l., in rock crevices in bouldery stream ravine on steep, NW-facing slope with indigenous forest, 5 October 2013, *leg.* T. A. Hedderson 18563 (BOL). Mount Aorai. Trail on ridge between Fare Ata and Fare Mato. 17°35'35.9"S 149°30'04.1"W, 1650 m a.s.l., on soil bank in ridge forest with *Ilex* L., *Metrosideros* Banks *ex* Gaertn. and *Vaccinium* L., 9 October 2013, *leg.* T. A. Hedderson 18611, 18616 (BOL). Cloud forest along trail just below Fare Mato. 17°34'59.4"S, 149°30'32.9"W, 1250 m a.s.l., on soil banks along trail in cloud forest, 12 October 2013, *leg.* T. A. Hedderson 18693 (BOL). Mount Marau. 17°35'58.3"S, 149°33'31.6"W, 930 m a.s.l., on roadside soil bank in cloud forest, heavily invaded by *Miconia* Ruiz & Pav., just off jeep track to radio antennae, 11 October 2013, *leg.* T. A. Hedderson 18675 (BOL).

As elsewhere (e.g. Seppelt, 1980), *Ditrichum difficile* exhibits considerable variation on Tahiti, especially in length and symmetry of the capsule. In general, capsule length of the Tahitian specimens (mostly 2–3.9 mm) is on the low end of the reported range (2–7 mm) for the species, but is well matched by many other Pacific populations (Seppelt, 1980, 1982).

The species is currently an abundant component of vegetation on both natural and anthropogenic soil banks on Tahiti, forming large, conspicuous, abundantly fruiting populations. The absence of any mention of *Ditrichum* (or indeed the Ditrichaceae) in previous checklists and floras (e.g. Whittier, 1976) is therefore highly anomalous. It is conceivable that it is a recent arrival on Tahiti; a prospect made more

plausible by the somewhat weedy nature and prodigious sporophyte production of this species.

12. *Ectropothecium chenagonii* Renauld & Cardot

Contributors: T. A. Hedderson and C. Ah-Peng

La Réunion, Indian Ocean: Commune Saint Philippe, Réserve de Mare Longue, lower part of reserve, in humid, low-altitude forest. 21°21'17.1"S, 55°44'21.5"E, 220 m a.s.l., on moist, low, basalt rock face, 29 September 2011, *leg.* T. A. Hedderson 17818 (BOL), *det.* Lars Hedenäs.

This species has been recorded previously only from Madagascar, whence it was initially described, and from a single site in Uganda (Hedenäs, 2005). The genus is badly in need of revision in Africa, and it is possible that the species is recorded elsewhere under different names. Of other species recorded from the island, *E. regulare* (Brid.) A.Jaeger is perhaps the most similar as both have strongly toothed leaves that have prominently prorate cells in the upper two-thirds; at least some specimens lodged under this name are likely to represent *E. chenagonii*. Three other species (*E. occultum* Renauld & Cardot, *E. valentini* Besch. and *E. viridulum* (Brid.) A.Jaeger) have been recorded from the island. None of the specimens that we have seen filed under these names seem likely to be confused with *E. chenagonii*, but we have not had the opportunity to examine their types.

13. *Entosthodon schimperi* Brugués

Contributor: V. Hugonnot

France: Ardèche, Berrias et Casteljau, Gras de la Rouveyrolle, 170 m a.s.l., 04°12'17"E, 44°23'33"N, 2 April 2016 *leg.* V. Hugonnot *s.n.* (Herb. Conservatoire botanique national du Massif central).

Entosthodon schimperi is a rare species worldwide. It was previously considered to be a North African endemic, but the species was recently discovered in Spain (including the Balearic and Canary Islands) and Portugal (Brugués *et al.*, 2001). The new locality in Ardèche quoted herein means a northwards extension of approximately 250 km. Increasing knowledge will probably reveal more localities in the Mediterranean countries.

Entosthodon schimperi was observed in clearings of submediterranean grasslands and *Thymus vulgaris* L. calcareous garrigues. It typically colonises decalcified red soil together with *Aschisma carniolicum* (F.Weber & D.Mohr) Lindb., *Corsinia coriandrina* (Spreng.) Lindb., *Riccia ciliata* Hoffm., *R. michelii* Raddi and *Trichostomum brachydontium* Bruch. The species forms widely spaced small tufts rather than continuous colonies, and does not produce sporophytes every year, their generation depending on the rainfall during autumn and winter.

This species grows in exposed harsh habitats, which severely dry out during summer. In the southern Ardèche, Mediterranean garrigues are anthropic

vegetation resulting from traditional and ancestral grazing. Today, colonisation of these open mosaics leads to bryologically poor *Quercus pubescens* Willd. and *Buxus sempervirens* L. woodlands. Therefore, the conservation of these bryological assemblages requires attention as they are unique in southern Massif Central.

Entosthodon schimperi belongs to *Entosthodon* subgenus *Plagiodus* (Mitt.) Fife, which is characterised by a strongly asymmetric, inclined capsule coupled with an oblique mouth and sigmoid peristome. *Entosthodon schimperi* has long acuminate, toothed leaves and a plane operculum (Brugués & Ruiz, 2010), and is the only European member of the subgenus that possesses an excurrent nerve. Bosanquet (2012) previously mentioned specimens of *E. mouretii* (Corb.) Jelenc, which were difficult to place owing to the variability of diagnostic characters. Some specimens of this species appear to have leaves with a less excurrent reddish costa than that found in typical plants. The same applies to *E. schimperi*, where leaves of some individuals exhibit only a feebly excurrent nerve, being percurrent at most. It should be noted that only well developed apical leaves should be used for determination, as the lower leaves are frequently much less typical. Despite a certain amount of variability our specimens from France possess the features of *E. schimperi*.

14. *Ephemerum recurvifolium* (Dicks.) Boulay

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

Italy: Boschi di Ferretto — Bagnolo Umbria Region, Province of Perugia. A Site of Community Importance (SCI) IT5210020, 43°9.933'N, 11°59.638'E, ca 273 m a.s.l., on waterlogged soil, 2 April 2015, leg. S. Poponessi *s.n.*, det. S. Poponessi (PERU)

The investigations revealing this record focused on a system of Mediterranean temporary ponds categorised as a priority habitat under the EU Directive 92/43/EEC and listed in Annexe I with the code 3170*.

Ephemerum recurvifolium has been assigned to the European southern-temperate geographical element (Smith, 2004), and has been included in the Red Lists of many European countries (Hodgetts, 2015). In Italy it is very rare and known from Tuscany (based on old records), Piedmont, Campania, Sardinia and Sicily (Aleffi *et al.*, 2008). This is the first record for Umbria and central Italy. The range of this species includes the Iberian Peninsula, France, Germany, Poland, Hungary, Crete, Israel, Turkey, Bulgaria, Tunisia, Great Britain, Sweden and Finland (Smith, 2004; Ros *et al.*, 2013).

15. *Frullania flexicaulis* Spruce

Contributors: L. B. Fantecelle, G. F. Peñaloza-Bojacá, C. A. T. Araújo, B. A. Oliveira and A. S. Maciel-Silva

Brazil: Chapada de Canga, Catas Altas, Minas Gerais, 20°08'11"S, 43°23'41"W, 930 a.s.l. on tree bark and decaying wood, interior de capão em Canga, 24–25 November 2015, leg. Araújo, C.T.A. 81 (BHCB N° 182585), 111 (BHCB N° 182615) and 112 (BHCB N° 182616).

Frullania flexicaulis (= *Frullania paradoxa* Lehm. & Lindenb.) has a scattered distribution through tropical America, with records in Jamaica, Mexico, Colombia, Ecuador, Galapagos Islands and Brazil (Stotler, 1969). In Brazil, it occurs in the states of São Paulo and Santa Catarina (and possibly in Pernambuco), including the phytogeographic domain of Atlantic Forest (Gradstein & Costa, 2003; Silva *et al.*, 2014). During a bryophyte survey in a rocky ironstone field (locally called 'Canga') in Minas Gerais, we collected *F. flexicaulis* with many perianths and sporophytes. This is the first record of *F. flexicaulis* for the state of Minas Gerais, and extends its distribution in Brazil over 1000 km from the nearest previous record. This liverwort species is found as pendant shoots or in wefts on the bark of trees, from 100 to 1000 m a.s.l. In the study area, plants were found on tree bark of forest islands ('capões') in the rocky field. *Frullania flexicaulis* is recognised by (1) the antical segment of the first branch underleaves being unequally divided to one-half or more; (2) having obtuse leaf lobes (leaf apex rounded and not apiculate or acuminate); (3) possessing recurved underleaves that are bilobed one third to half their length, and being only slightly wider than the stem; (4) bearing male inflorescences on short branches, and terminal female inflorescences on a short lateral branch with lacinate bracts and bracteoles; (5) the perianth being sharply three-keeled (Clark & Svihla, 1949; Stotler, 1969; Gradstein & Costa, 2003). Plants were monoicous, similar to the description of *F. paradoxa* (Clark & Svihla, 1949), agreeing with the recent synonymisation of *F. flexicaulis* with *F. paradoxa* (Hentschel *et al.*, 2015).

16. *Heterocladium heteropterum* (Brid.) Schimp.

Contributors: K. Baráth and P. Erzberger

Hungary: (1) Vas County, Kőszeg Mts [8664.2] (Central European Mapping Scheme), ca 5 km west of the town of Kőszeg, ca 100 m from the border with Austria, on a steep slope of the valley of the stream Hármás-patak below Stájer-házak, in earth-filled crevice of siliceous rock in mixed forest, ca 400 m a.s.l., 47°23'13.3"N, 16°27'25.4"E, 24 July 2016, leg. K. Baráth *s.n.* (herb. Baráth, dupl. B-Erzberger *s.n.*, BP), det. K. Baráth, conf. P. Erzberger; (2) ca 515 m to the south-east of the first site (cited above), at ca 405 m a.s.l., 47°23'03.0"N, 16°27'44.5"E, 14 August 2016, leg. K. Baráth *s.n.* (herb. Baráth, dupl. BP), det. K. Baráth.

Bryophytes associated with the first collection of the 24th July included: *Rhabdoweisia fugax* (Hedw.) Bruch

& Schimp., *R. crispata* (Dicks. ex With.) Lindb., *Leucobryum juniperoideum* (Brid.) Müll.Hal., *Cynodontium polycarpon* (Hedw.) Schimp., *Pseudotaxiphyllum elegans* (Brid.) Z.Iwats., *Pohlia melanodon* (Brid.) A.J.Shaw, *Hypnum cupressiforme* Hedw., *Isothecium myosuroides* Brid., *Dicranella heteromalla* (Hedw.) Schimp. and *Dicranum scoparium* Hedw. Vascular plants in the habitat included *Picea abies* (L.) H.Karst., *Pinus sylvestris* L., *Fagus sylvatica* L., *Corylus avellana* L., *Vaccinium myrtillus* L., *Polypodium vulgare* L., *Dryopteris carthusiana* (Vill.) H.P.Fuchs, *Asplenium trichomanes* L., *A. rutamuraria* L., *Cystopteris fragilis* (L.) Bernh., *Oxalis acetosella* L., *Campanula rotundifolia* L. Seven colonies of *H. heteropterum* covering an overall area of ca 1400 cm² were found at this site.

An additional population was found nearby on 14th August (collection 2, cited above). In this locality, associated bryophytes included: *Atrichum undulatum* (Hedw.) P.Beauv., *Polytrichum formosum* Hedw., *Rhizomnium punctatum* (Hedw.) T.J.Kop., *Hypnum cupressiforme*, *Leucobryum juniperoideum*, *Scapania nemorea* (L.) Grolle, *Rhabdoweisia fugax*, *R. crispata*, *Bartramia pomiformis* Hedw., *Pseudotaxiphyllum elegans*, *Lejeunea cavifolia* (Ehrh.) Lindb. Two colonies of *H. heteropterum* covering an overall area of ca 2700 cm² were present in this second site.

Heterocladium dimorphum, the only related species growing in Hungary (Papp *et al.*, 2010), differs from *H. heteropterum* by its strongly dimorphic leaves, the stem leaves reflexed, from a broad base abruptly narrowing to an acuminate point; branch leaves are erecto-patent and shortly pointed. Stem and branch leaves of *H. heteropterum* only differ in size but are similar in shape; from an ovate base they gradually narrow to a short point, and are erect-spreading.

Heterocladium heteropterum usually grows on lime-free siliceous, moist, shaded rocks, often on vertical faces and near streams. It is widespread in northern and western Europe, in the mountains of central and southern Europe up to the alpine region, and with isolated occurrences in Turkey, Lebanon, Georgia, the Caucasus and Azerbaijan (Wigginton & Blockeel, 2014).

Heterocladium heteropterum occurs in all countries surrounding Hungary (Hodgetts, 2015). Therefore it was perhaps to be expected that it might also occur in Hungary, and in particular in the Kőszeg Mountains, since there is an old report of *H. heteropterum* from the Austrian part of this mountain range (Latzel, 1930; Purger *et al.*, 1997) at a site very close to the newly discovered populations. The species does not appear in the latest Hungarian checklist (Papp *et al.*, 2010).

17. *Hymenoloma dryptodontoides* (Müll.Hal.) Ochyra

Contributors: R. Ochyra and M. Lebouvier

Îles Crozet, Île de la Possession, Subantarctica: eastern coast, Pointe Lieutard, 200 m north-west of Alfred Faure station, 46°25.893'S, 51°51.390'E, 150 m a.s.l., on bare ground between rock outcrops in the fellfield in a dry and exposed situation, associated with *Valdonia microcarpa* (Mitt.) Ochyra, *Racomitrium lanuginosum* (Hedw.) Brid., *Hymenoloma insulare* (Mitt.) Ochyra and *Ditrichum subaustrale* Broth., 22 November 2012, leg. R. Ochyra 3079/12 (KRAM).

Subantarctic islands of the Kerguelen Biogeographical Province in the African sector of the Southern Ocean are a centre for bryophyte endemism, although the actual number of endemic species is relatively low. This is correlated with the general low species diversity of the far southern regions of the globe in comparison to their northern counterparts (Ochyra *et al.*, 2008b). The presence of endemic bryophyte taxa in this region is certainly associated with the geological history of Îles Kerguelen, the central land mass of this province. It is a part of the submerged microcontinent which emerged substantially above the level of the ocean 35 million years ago and it means that since the late Eocene and early Oligocene this land was continuously available for plant colonisation. As a result some species could have evolved in this archipelago and subsequently migrated to geologically younger islands and archipelagoes in this province, including Heard Island, Îles Crozet and the Prince Edward Islands.

The Kerguelen Biogeographical Province is apparently the centre of diversity of the genus *Hymenoloma* Dusén, which is represented here by four species, three of which are endemics. One of these is *H. dryptodontoides*, a poorly known species, which until recently was known only from the type collection from Îles Kerguelen (Müller, 1883, 1889). Recent exploratory activity on all islands in this province resulted in the discovery many specimens of this species, which differs from all other congeners in having capsules emergent on short setae. So far, the species has been recorded from the Prince Edward Islands and Heard Island (Ellis *et al.*, 2016b), and the present discovery extends the range of the species to Îles Crozet, the second oldest archipelago in this province. Apart from *H. dryptodontoides*, the other two species of *Hymenoloma* endemic to the Kerguelen Biogeographical Province have recently been discovered in this archipelago, namely *H. tortifolium* (Hook.f. & Wilson) Ochyra (Ellis *et al.*, 2013b) and *H. immersum* (Mitt.) Ochyra (Ellis *et al.*, 2013c). The discovery of *H. dryptodontoides* represents a notable addition to the moss flora of Îles Crozet and confirms its close phytogeographical affiliation to

Îles Kerguelen. Until recently it was one of the least studied archipelagos in this province, but recent intensive field studies have yielded many valuable additions to its moss flora (e.g. Blockeel *et al.*, 2007; Ellis *et al.*, 2012c, 2014b, 2015a, 2016a; Ochyra & Bednarek-Ochyra, 2013; Bednarek-Ochyra, 2014b), which at present comprises over 70 species.

18. *Jaegerina formosa* Besch.

Contributors: T. A. Hedderson and N. Wilding

La Réunion, Indian Ocean: Commune Saint-Louis, Forêt des Makes, along forest road to Camp 2000, 21°11'04.9"S, 55°24'33.6"W, 1550 m a.s.l., abundant on trunk of isolated *Acacia* Mill., 26 November 2014, *leg.* T. A. Hedderson 18781 (BOL, REU).

According to Argent (1973), this species, previously considered a Mauritian endemic, is separated from the similar *J. solitaria* (Brid.) A. Jaeger, which is fairly common on La Réunion, in being more robust, with leaves mostly > 2 mm wide (rather than ≤ 1.5 mm). The specimen reported here is robust, with leaves up to 3.5 mm wide, and falls clearly into the concept of *J. formosa*. However, the number of intermediate specimens that we have seen is uncomfortable (see also comments in Allen *et al.*, 1986), and the relationship of the two species needs to be further evaluated.

19. *Leratia exigua* (Sull.) Goffinet

Contributors: Z. Skoupá, V. Plášek, R. Ochyra and S.-L. Guo

China, Shaanxi Province: Hu County in the south-eastern part of the province, Daqiaoge, Baliping, Lao Yu, 1600 m a.s.l., 9 October 1962, *leg.* Z. P. Wei *s.n.* (PE #01090290), *det.* V. Plášek, *teste* Z. Skoupá.

Leratia exigua is the only species of the genus *Leratia* Broth. & Paris known in China (Redfearn *et al.*, 1995; Guo *et al.*, 2007; Jia *et al.*, 2011; Jia & He, 2013; Xiong, 2014). According to data in the literature and a revision of the herbarium material in PE and KUN made by the first two contributors, the species was historically recorded in eight provinces in southern and south-eastern China, including Chongqing, Fujian, Guizhou, Henan, Jiangsu, Jianxi, Sichuan and Yunnan (Lewinsky, 1992; Redfearn *et al.*, 1995; Guo *et al.*, 2007; Jia *et al.*, 2011; Xiong, 2014). Herein, the species is recorded for the first time from Shaanxi Province, which is its northernmost occurrence in China. The voucher specimen was collected by Z.-P. Wei in 1962. It is housed in the Herbarium of the Institute of Botany of the Chinese Academy of Sciences in Beijing (PE) where it was located amongst unidentified herbarium specimens in 2015 during a revision of the herbarium's holdings of Orthotrichalean mosses.

Leratia exigua was traditionally placed in the broadly understood genus *Orthotrichum* Hedw. as *O. exiguum* Sull. However, recent molecular studies showed that this species was closely related to the

two monospecific genera *Bryomaltaea* Goffinet and *Leratia*. As a result, Goffinet *et al.* (2004) placed these three species within a single genus for which the oldest available name was *Leratia*. These three species also show significant morphological differences in comparison with remaining Orthotrichalean species. They exhibit a unique morphology of the peristome, which has lanceolate and hyaline endostome segments, with obtuse apices that are almost as wide as the teeth and this warrants their generic distinction (*cf.* Lewinsky, 1992).

20. *Lescuraea incurvata* (Hedw.) E. Lawton

Contributors: M. Brugués and E. Ruiz

Algeria: Djebel Tababor, 1900–2000m a.s.l., 22 June 1861, *leg.* de La Perraudière (PC0132342).

During a revision of the material of Leskeaceae deposited in the Muséum National d'Histoire Naturelle, Paris (PC) in connection with the 'Flora Briofítica Ibérica' project, we added *Pseudoleskea perraldieri* Besch. to our loan request. Although this species is not cited in our study area, we thought it would be interesting to have a look at it.

Pseudoleskea perraldieri was described by Bescherelle (1882) in his 'Catalogue des mousses observées en Algérie' from a sample collected by La Perraudière in Djebel Tababor, northern Algeria. This information was gathered by Jelenc (1955) and Ros *et al.* (1999). The species also appears in Ros *et al.* (2013), where the authors said that its identity had never been revised. Bescherelle considered *L. perraldieri* a taxon close to *P. atrovirens* (Dicks. *ex* Brid.) Schimp. (= *Lescuraea incurvata*), but with differences in some vegetative characters. After the study of the type specimen, we considered that these characters could be included within the morphological variability shown by *L. incurvata*. Therefore, a detailed investigation will likely indicate that *P. perraldieri* should be placed in synonymy with *L. incurvata*.

Lescuraea incurvata has only been reported from the north of Africa, in Morocco (Ros *et al.*, 2013), thus this additional record from Algeria extends its distribution in this area.

21. *Lophozia ventricosa* (Dicks.) Dumort. var. *ventricosa*

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

India: Arunachal Pradesh; Tawang, near Nagula lake; 27°30'47.1"N, 91°51'31.6"E, 4137 m, on soil, 15 June 2015, *leg.* K. K. Rawat *s.n.* (LWG 300166C).

Mitten (1861) reported *Jungermannia ventricosa* Dicks. (≡ *Lophozia ventricosa* (Dicks.) Dumort.) from Sikkim. Since then the species has not been reported from India (Parihar, 1961–62; Parihar *et al.*, 1994; Srivastava *et al.*, 2013). However, some authorities listed *L. ventricosa* on the basis of Mitten's original report (Singh *et al.*, 2008; Dandotiya *et al.*, 2011).

Lophozia ventricosa was recently discovered in Arunachal Pradesh, India and is reported herein. The plants were yellowish green to light green, prostrate, growing on soil, scattered among other bryophytes. Shoots in the specimen had bi-lobed leaves that were slightly longer than wide, with an oblique insertion line on the ventral surface, reaching sub-transverse on the dorsal surface. Median leaf cells were 24–32 × 24–36 µm, thin walled, and possessed concave to moderately convex trigones. Yellowish green to colourless, angular, 1–2 celled gemmae occasionally occurred at the tips of lobes in apical leaves. Antheridia were present in terminal bracts. This specimen confirms the presence of *L. ventricosa* in India and records it for the first time from Arunachal Pradesh.

22. *Meiotheciella papillosa* (Broth.) B.C.Tan, W.B.Schofield & H.P.Ramsay

Contributors: T. A. Hedderson and W. R. Buck

French Polynesia, Society Islands, Tahiti: Trail from Belvedere to Aorai Peak. Lower section of trail, on upper part of initial steep climb, 17°34'17.4"S, 149°31'28.8"W, 740 m a.s.l., on dead *Metrosideros* Banks ex Gaertn. on volcanic ridge with isolated trees, 5 October 2013, leg. T. A. Hedderson 18518 (BOL, NY).

This record represents a significant extension of range for *M. papillosa*, previously known from the SW Pacific where it ranges from northern Australia and Papua New Guinea to New Caledonia, Fiji, Java, the Philippines and the Marshall Islands (Ramsay, 2012). *Meiothecium intextum* Mitt., a common species in lowland areas of the island, is similar in leaf shape and the often caducous leaves, but it is easily recognised by having leaf cells smooth rather than with single papillae over the middle of the cells.

23. *Micromitrium tenerum* (Bruch & Schimp.) Crosby

Contributor: M. Philippe

France: Rhône-Alpes, Ain department, Saint-Nizier-le-désert, Les Rages pond, 46°4'9.7"N, 5°7'43.2"E, 279 m. a.s.l., a small group of about fifty stems, some with sporophytes, on the desiccated mud of a dry fish-pond, with *Riccia huebeneriana* Lindenb. and *Physcomitrium eurystomum* Sendtn., 23 June 2016, leg. M. Philippe s.n. (LY0006659).

This tiny pelophyte is Red-Listed as vulnerable for Europe, where it is very rare (Porley, 2013). It is considered as a suboceanic temperate element (Porley, 2013). In France it has mostly, although sporadically, been reported from the western departments, while the species is not documented from Switzerland or southern Germany. The new locality, although quite distant from oceanic influences, is about 60 km south of a nineteenth century locality (Philibert in Bizot, 1952), in the Dombes ecological area, known to be

home to some suboceanic species, e.g. *Porella pinnata* L. (Dépallière, 1913), or among vascular plants *Ranunculus hederaceus* L.

Owing to its small size it is probably somewhat overlooked. However, culturing substrates may demonstrate a wider distribution (Schmidt & Kohn, 1993).

24. *Oncophorus crispifolius* (Mitt.) Lindb.

Contributor: I. V. Czernyadjeva

Russia: Southern Siberia, Zabaikalsky Territory, Kyra District, Sokhondinskiy State Biosphere Reserve, upper Agutza River, 49°48'29"N, 111°12'20"E, 1660 m a.s.l., on soil covered rocks, in mats with *Sanionia uncinata* (Hedw.) Loeske, 15 July 2013, leg. I.V. Czernyadjeva # 33-13 (LE).

This is the first report of *Oncophorus crispifolius* for Siberia. The species has a mostly subpacific eastern Asian distribution. It has been recorded from China, Japan (Honshu, Shikoku, Kyushu Islands), Korea and the Russian Far East (Primorsky Territory, Kamchatka Peninsula) (Bardunov & Cherdantseva, 1982; Gao et al., 1999; Iwatsuki, 2004; Park & Choi, 2007; Czernyadjeva, 2012; Fedosov & Kuzmina, 2012). The location of the species in the Zabaikalsky Territory represents a highly disjunctive range extension, ca 2500 km inland, and is its most continental occurrence.

In Japan *O. crispifolius* grows on rock and boulders in forests; in the Primorsky Territory it occurs on rock and on the bases of tree trunks in broad-leaved forests; in Kamchatka it is found on bare soil and on decaying wood in birch, spruce and larch forests, and in the Sokhondinskiy Reserve this species grows on rocky outcrops in larch forest.

Oncophorus crispifolius shows a close resemblance to *O. wahlenbergii* Brid., but the leaves in the latter species have very strong sheathing and clasping bases.

25. *Pterygoneurum subsessile* (Brid.) Jur.

Contributor: S. Wierzcholska

Poland: Równina Bielska (= Bielsk plain) in NE Poland, near Hryniewiczze Duże village, 52°48'31.27"N 23°12'37.56"E, 140 m a.s.l., on calcareous soil in xerothermic grassland of the *Festuco-Brometea* class, on south-facing slope (30°), 16 March 2015, leg. S. Wierzcholska s.n. (Herbarium of the Białowieża Geobotanical Station, KRAM).

Pterygoneurum subsessile is a very rare species with indeterminate threat status in Poland. This is due to a lack of recent distributional data (Żarnowiec et al., 2004) and because most of its records date from the nineteenth century (Krupa, 1877; Klinggraeff, 1893). The newly discovered population of *P. subsessile* is quite lush, growing abundantly on bare and fully exposed calcareous soil in gaps within a xerothermic grassland of the *Festuco-Brometea* class. It occurred on a south-facing slope with a 30 degree inclination, covering an area of 40 square centimetres. The moss

had produced a profusion of immersed sporophytes, which easily distinguished it from its congeners. Additionally, the species is characterised by a long, serrulate, hyaline hair-point up to twice as long as the leaf lamina, a mitrate calyptra and large spores, 35–45 µm in diameter. This is the first record of the species in NE Poland. It has not yet been recorded in Belarus (Rykovsky & Maslovsky, 2004), but is known from Lithuania (Jukonienė, 2002). *Pterygoneurum subsessile* was also reported from Mamonowo (German Heiligenbeil), in the Kaliningrad Oblast' of the Russian Federation (formerly East Prussia) (Milde, 1869; Klinggraeff, 1893; Dietzow, 1937), from northern and western Poland (Warnstorf, 1906; Koppe, 1931), while southern localities were described by Krupa (1877) in the Kraków region. In southern Poland it is widely distributed but scattered in the southern uplands (Kuc, 1964).

The new population of *P. subsessile* was first discovered in 2015 and subsequently observed during the next year. The most significant threat to this species is the decline of xerothermic grassland communities from scrub encroachment and natural afforestation resulting from the abandonment of grazing. The new locality for the species lies close to grassland in Haćki which is protected by the European law (Natura 2000, PLH200015). It was established in 2011 and plays a key role in the conservation of xerothermic grassland habitats outside their main range.

26. *Rhabdoweisia crispata* (Dicks. ex With.) Lindb.

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

Hungary: (1) Vas County, Kőszeg Mountains [8664.2] (Central European Mapping Scheme), ca 5 km west of the town of Kőszeg, ca 100 m from the border with Austria, on a steep slope of the valley of the stream Hármas-patak below Stájer-házak, in earth-filled crevice of siliceous rock in mixed forest, ca 420 m a.s.l., 47°23'04.6"N, 16°27'41.6"E, 07 July 2016, leg. A. Mesterházy, K. Baráth and P. Erzberger (B-Erzberger 21837/A, dupl. BP, herb. Sauer), det. P. Erzberger 10 July 2016, conf. M. Sauer; (2) loc. cit., 24 July 2016, leg. K. Baráth (herb. Baráth), conf. P. Erzberger; (3) ca 50 m to the East of the first site, ca 420 m a.s.l., 47°23'04.2"N, 16°27'43.8"E, 24 July 2016, leg. K. Baráth (herb. Baráth), det. K. Baráth, conf. P. Erzberger; (4) ca 500 m to the north-west of the first site, at ca 400 m a.s.l., 47°23'13.3"N, 16°27'25.4"E, 15 July 2016, leg. K. Baráth (herb. Baráth, dupl. B-Erzberger s.n.), det. K. Baráth, conf. P. Erzberger.

The first two collections (1 & 2) cited above were associated with: *Rhabdoweisia fugax* (Hedw.) Bruch & Schimp., *Dicranum scoparium* Hedw., *Leucobryum juniperoideum* (Brid.) Müll.Hal., *Polytrichum*

formosum Hedw. and *Atrichum undulatum* (Hedw.) P.Beauv. and the latter two collections (3 & 4) were associated with: *R. fugax*, *L. juniperoideum*, *Cynodontium polycarpon* (Hedw.) Schimp., *Pseudotaxiphyllum elegans* (Brid.) Z.Iwats., *Pohlia melanodon* (Brid.) A.J.Shaw, *Hypnum cupressiforme* Hedw., *Isothecium myosuroides* Brid., *Dicranella heteromalla* (Hedw.) Schimp., *Dicranum scoparium*, *Polytrichum formosum* and *Heterocladium heteropterum* (Brid.) Schimp. Within at most 0.5 m distance from the stands of *R. crispata* the following vascular plants were noted: *Carpinus betulus* L., *Picea abies* (L.) H.Karst., *Fagus sylvatica* L., *Vaccinium myrtillus* L., *Deschampsia flexuosa* (L.) Trin., *Luzula luzuloides* (Lam.) Dandy & Wilmott, *Cyclamen purpurascens* Mill., *Corylus avellana* L., *Polypodium vulgare* L. and *Pinus sylvestris* L.

Rhabdoweisia crispata differs from its only Hungarian congener, the more widespread *R. fugax*, mainly by its peristome teeth, which are persistent, more gradually narrowed and faintly striolate (fugacious, abruptly narrowed and smooth in *R. fugax*). The laminal cells are also slightly larger, ca 10–12.5 (–14) µm wide (8–12 µm in *R. fugax*), and the leaf is wider near the apex, ca 5–6 cell rows at 250 µm below the apex (3–4 rows in *R. fugax*). In addition, the leaf margin is more distinctly denticulate. The Hungarian plants were in fine fruiting condition. This species usually grows in crevices of lime-free rocks in mountain areas.

In Europe, *R. crispata* is found in the oceanic parts of the north-west and the mountains of central Europe. Among the countries surrounding Hungary, the species occurs in Austria, Slovenia, Romania, Ukraine and Slovakia (Hodgetts, 2015). It is Red-Listed or Data Deficient in many countries and a candidate for the new European Red List (Hodgetts, 2015). Outside Europe, it has been reported from East Asia, Japan, Java, Greenland, North and South America, and Hawaii (Nyholm, 1987; Smith, 2004). In Hungary it was found in an area that has some subalpine influence near the Austrian border. *R. crispata* was not included in the latest checklist for Hungary (Papp et al., 2010), and is new to the country's bryoflora.

27. *Riccia crozalsii* Levier

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

Italy: Boschi di Ferretto — Bagnolo Umbria Region, Province of Perugia. A Site of Community Importance (SCI) IT5210020, 43°10'24.28"N, 12°00'02.15"E, ca 276 m a.s.l., on waterlogged soil with *Isoetes histrix* Bory & Durieu, drying phase, 8 April 2015, leg. S. Poponessi s.n., det. S. Poponessi and M. Aleffi (PERU).

The investigations revealing this record focused on a system of Mediterranean temporary ponds categorised

as a priority habitat under the EU Directive 92/43/EEC and listed in Annexe I with the code 3170*.

Riccia crozalsii is considered Endangered (EN) in Italy both by Aleffi and Schumacker (1995) and Hodgetts (2015), despite being relatively common in other parts of Europe. The present report is the first for Umbria. In Italy, *R. crozalsii* is present in the Aosta Valley, Trentino-Alto Adige, Friuli-Venezia Giulia, Tuscany, Lazio, Campania, Sardinia and Sicily (Aleffi *et al.*, 2008). It is a common species in large parts of the Mediterranean area, extending to Macaronesia and northwards along the Atlantic coast. It is also present in Africa, SW Asia and Australasia (Lockhart *et al.*, 2012). The species is considered Nationally Scarce in Britain, Vulnerable in Switzerland, 'susceptibile' in the Netherlands and 'potentially threatened' in Austria. It is not found further north and has been assigned to an Oceanic Mediterranean-Atlantic floristic element in Europe (Lockhart *et al.*, 2012).

28. *Sphagnum tenellum* (Brid.) Brid.

Contributors: M. Kırmacı and H. Kürschner

Turkey: Province Artvin, Marsis Dağı north of Yusefeli, between Sarıgöl and Salıkvay Yayla, above Zologara Yayla, 41°04'46.1"N, 41°26'44.0"E, 2220 m a.s.l., swampy and boggy flushes beside a small runnel, 25 June 2016, *leg.* A. Erdağ, M. Kırmacı & H. Kürschner 16-111, 16-114 (AYDN).

Sphagnum tenellum is a small, delicate species, easily recognised by the loosely organised capitulum, and the ovate to ovate-lingulate, concave stem and branch leaves, both of similar shape. Although placed recently in Sect. *Cuspidata* (Lindb.) Schlieph. *ex* Schimp. on the basis of DNA sequences (Shaw, 2000; Anderson *et al.*, 2009; Hölzer, 2010), it is quite different from the rest of the species in this section, and formerly was placed by some authors in a section of its own [Sect. *Mollusca* Schlieph. *ex* Casares-Gil (Daniels & Eddy, 1990)]. It typically grows on wet heaths and bogs in high-rainfall areas, on sheltered acidic granite rock banks and mineral soils.

In Turkey, it was collected in the southern Kaçkar Dağları area (Marsis Dağı), which harbours a rich hygrophytic bryophyte flora along extended swampy and boggy meadows, flushes and small runnels (Kürschner *et al.*, 2015). Accompanying species were *Calliergonella cuspidata* (Hedw.) Loeske, *Campylium stellatum* (Hedw.) C.E.O.Jensen, *Chiloscyphus pallescens* (Ehrh. *ex* Hoffm.) Dumort., *Drepanocladus aduncus* (Hedw.) Warnst., *Palustriella commutata* (Hedw.) Ochyra, *Philonotis fontana* (Hedw.) Brid., *Ptychostomum schleicheri* (Schwägr.) J.R.Spence, *Scorpidium revolvens* (Sw.) Hedenäs, *Sphagnum fallax* (H.Klinggr.) H.Klinggr. and *S. teres* (Schimp.) Ångstr.

These bryophyte communities grow in close contact or mixed units of the *Swertio ibericae-Nardion strictae*

Vural 1996 alliance, which samples the acidophytic to subneutral, low-sedge fens of the western Caucasus and the Euxine territories. The most prominent vascular plants are species such as *Alchemilla* spp. (e.g., *A. mollis* (Buser) Rothm.), *Caltha polypetala* Hochst., *Cardamine uliginosa* M.Bieb., *Carex* spp., *Dactylorhiza euxina* (Nevski) H.Baumann & Künkele, *D. umbrosa* (Kar. & Kir.) Nevski, *Geum coccineum* Sibth. & Sm., *Nardus stricta* L., *Pedicularis comosa* L., *Pinguicula balcanica* subsp. *pontica*, *Polygonum bistorta* subsp. *carneum* Coode & Cullen, *Primula auriculata* Lam. or *Swertia iberica* Fisch. & C.A.Mey. Despite numerous different hygrophytic communities, widely distributed in the subalpine and alpine belt of the northern Turkish mountains, Sphagna and bogs dominated by *Sphagnum* species (ombrogenic bogs and fens) are still a rarity in the Black Sea mountains, and most of the species known at present have only a single or few localities (Kırmacı & Kürschner, 2013). Therefore, the new record is an outstanding and interesting addition to the Turkish *Sphagnum* flora, raising the total number of recorded and accepted species to 21.

29. *Timmiella barbuloides* (Brid.) Mönk.

Contributors: M. S. Sabovljević and A. D. Sabovljević

Montenegro: entrance to the cave Sopot near the town of Risan in the Boka Kotorska bay; shaded and wet protosoil and rocks, 42.51379°N, 18.68168°E, 24 April 2016. *leg./det.* Marko S. Sabovljević & Aneta D. Sabovljević *s.n.* (BEOU bryophyte collections s/n).

Timmiella barbuloides was not cited in Sabovljević *et al.* (2008) and Ros *et al.* (2013) as occurring in the Republic of Montenegro, and is here reported in this country for the first time. The species is known in many peri-Mediterranean countries, but seems to have been overlooked in the Balkans (recorded only in Albania and Greece). Although Cvetic and Sabovljević (2004) reported the presence of the genus *Timmiella* (De Not.) Limpr. in Montenegro, they stated that they could not confirm the identity of the species owing to the lack of sporophytes. Their material, like that of the present record, had also been found in the Boka Kotorska Bay area. The plants found for this new record bear a number of sporophytes, and the species was easily identified, owing to the absence of an annulus in the capsules. Since the collection was made in the wet season, the plants had a very robust appearance.

30. *Trachypus bicolor* Reinw. & Hornsch.

Contributors: T. A. Hedderson and E. February

Malawi: Mulanje, Mount Mulanje, granite slabs and forest edge along river, ca 0.5 km above Mulanje Resort, 16.01516°S, 35.52119°E, 905 m a.s.l., forming dense mats on trunk of large tree, 15 June 2010, *leg.* T.A. Hedderson 17516 (BOL).

The species is known in eastern Africa from Tanzania, South Africa, Réunion and Madagascar, and from São Tomé and Guinea in tropical West Africa (van Zanten, 1959; O'Shea, 2006). Of the three varieties of the species present in Africa, the specimen from Mulanje is closest to var. *viride* (Mitt.) Zanten but is, as is often the case, somewhat intermediate between this and var. *bicolor*.

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