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IAB Presidential Address



Dear members of IAB,

Every two years I teach a class on the biology of bryophytes, and every time I struggle with which latest advances I should integrate, and what information I must let go of as I cannot simply extend the lectures! When I give moss walks, I tell participants, that it is not about the names — not that they do not matter — but it is what is behind the names that is fascinating. No two walks share the same content, as stories are inspired by what we see or the questions I am asked, but all walks share one thing, they are too short. This is in

fact a great problem to have, as it reflects and conveys that bryology is a dynamic and vibrant field of study, with ongoing significant contributions and advances in our understanding of their ecological functions, their phylogenetic relationships, the architecture and evolution of their genomes, their taxonomic diversity, their ecological and geographic distribution, their reproductive biology, the function of their traits, their symbionts and their interactions with these, ... An undergraduate student once told me, after I took her away from her lab work to show her Splachnaceae, and talk about their reproductive biology and potential mutualistic behavior, that when she came to university, she thought we knew ($\pm$) everything, and that she would go to college to learn it all, only to realize how little we actually do know. Bryology, like any other science, is an ocean of unanswered questions, enough to intellectually feed many generations of scholars.

When I give moss walks, I equate the forest to a library, with all its inhabitants having a story (or rather many stories) to tell, but that unlike books in a traditional library, new chapters keep being added to their never-ending story of bryophytes, and other inhabitants. Your scholarly work provides the content of these chapters and inspires a new generation of students to pursue a path of bryological discovery. Your nature walks, exhibits, books, and social media posts open windows to the amazing biology of mosses, hornworts, and liverworts, thereby enhancing general awareness of components of biodiversity that were obscure or transparent to most. Whatever bryological activity you engage in, matters, and while more funding may catalyze bryological advances, developing bryological literacy is within everyone's reach, and budget!

This is my last address as the IAB president. During my eight years I have been able to count on all members of the council for their commitment to maintain the IAB on its path forward. I am especially grateful to Matt von Konrat for his exemplary and inspiring service, and his unconditional availability, to Juan Carlos Villarreal for organizing perhaps the most successful IAB conference, despite the challenges imposed by the pandemic, to Rafael Medina for maintaining our web portal active and informative, to Chris Cargill for her engagement on behalf of all women in bryology, to Kien-Thai Yong for ensuring smooth election processes, and to all council members who stepped forward to edit with Michael Stech, the two upcoming issues of our journal *Bryophyte Diversity and Evolution*. Finally, I wish to acknowledge David Meagher and Mereia Tabua for their professionalism in composing *The Bryological Times*. Following David's premature passing, Mereia has

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accepted to take on the editorship, in the interim — on behalf of all members, I sincerely thank you. I encourage all members to assist Mereia in her role and spontaneously provide her with the news items that fuel the production of the newsletter.

Soon, on the occasion of our upcoming virtual meeting (stay tuned), the new council will be inaugurated. I wish the incoming President, his/her executive committee and council an accomplished and satisfying tenure, and urge all of you, the members of our long-standing association, to engage with the council in furthering the mission of the IAB. And of course, I wish you all continuous bryological discoveries.

Sincerely,

Bernard Goffinet

Thank you, Bernard!

On behalf of the International Association of Bryologists: Deepest gratitude to outgoing president, Prof. Bernard Goffinet.

How can we* sum up in a few words the immense task carried out by Bernard Goffinet within the IAB who has been president of IAB since first being elected in 2014, and the benevolent pillar of our association? Of course we will try to express our immense gratitude to him for the work he has done and above all for the humanity he has shown in this task. It would be impossible to give an account of all the formal and informal moments during which the IAB took up all Bernard Goffinet's energy, creativity and, above all, his desire to open up the association and its possibilities to everyone.

Bernard moved from Belgium, where he completed his final thesis on epiphytic lichens and bryophytes, to Canada, where he immersed himself in phylogeny, bryophyte systematics and molecular analysis, especially dating in bryophyte systematics, until his current position at the University of Connecticut, USA. He is (co-)author of more than 100 articles and chapters and (co)edited several books, including *Bryophyte Biology*. With colleagues in Chile, including Riccardo Rozzi, they have developed tourism initiatives and opened up the world of bryology to naturalists and schoolchildren. He seeks to defend bryology inside and outside the classroom, with the same energy that he has deployed within the IAB.

As soon as he took up his post, through to the end of his tenure as president, he tried to gather the bryologists around him, or rather with him, in order to make the IAB as democratic as possible. One such example was his leadership in promoting a change to the constitution in order to increase geographical representation on the elected council. Bernard has invested countless hours into the association either directly facilitating or overseeing a breadth of roles and responsibilities. This has included an exhaustive list: chairing all council meetings and spearheading discussion; chairing the Hedwig Award adjudication committee and facilitating and coordinating the many award committees; appoints an Election Committee to conduct the election of Council; appoints two election judges; voting on issues as they come to hand; and spearheading many initiatives and developments. Since 2015, Bernard has either directly or facilitated several biannual conferences that have thrived under his leadership and guidance. Organization of conferences is a huge responsibility and effort led by amazing individuals and teams over the years, but Bernard has always offered his oversight, time, energy to help make these events successful for IAB members. These have included Puerto Williams, Chile (2015), Shenzhen, China (2017), Madrid, Spain (2019), and most recently the virtual conference in Quebec, Canada (virtual).

As President, Bernard has always been keen to open up the Association to emerging countries, their students and researchers, amateurs and professionals alike. One of his strengths has been to target the actions to be taken to develop the IAB and to gather around him the most interested and effective people for these various tasks.

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His strengths have been in targeting the actions to be taken to develop the IAB, and in gathering around him the most interested and effective people for these various tasks. One of his major achievements was the promotion of the IAB publications, Bryophyte Diversity and Evolution (BDE) and the Bryological Times.

A major project that has had significant impact has been the revitalisation of the IAB website and its presence on various social media networks, a project in which we can only associate Rafael Medina and Juan Larrain have taken on the maintenance of the social networks and the technical implementation. Bryology.org has had a long history that has its roots with from blog, created by Dietmar Quandt with the dedication and long support of Efrain de Luna. Our prior president, Dietmat Quandt, started the transition to a website, which was completed in 2018 by the tireless efforts of Bernard Goffinet and Rafael Medina who currently is the webmaster.

This has not been an easy task in the current competitive environment, but maintaining the motivation and commitment of everyone involved in these projects over time is also one of Bernard's great strengths. He has persevered and it is fair to say that he has succeeded.



Photo Credit: Gonzalo Arriagada.

Thank you Bernard! And we are delighted you will be remaining with the IAB council in your capacity as Past-President of the IAB !

Catherine Reeb, 2nd Vice President, IAB

*I would like to extend my warmest thanks to Matt von Konrat for his invaluable help in writing these words of thanks to our outgoing president.

Farewell David Meagher

In August of this year, news of David Meagher's passing shocked the international bryological community. David was the Editor of *The Bryological Times* from 2021 (volume 152) so it is only fitting to share with the IAB members anecdotes of David's life that was shared by his dear family members and friends in a moving service held at David's home, *Moss Hollow*, in Australia.



An electric etymology of curious generic names in mosses

David Meagher

School of BioSciences, The University of Melbourne, Australia.

Editorial Comment: This submission was yet to be finalized before David sadly passed. It is intentionally published in the last edition version of its draft stage.

***Alsia* Sull. 1855** — An anagram of *Lasia*, which Sullivant noted was similar in the areolation of the perichaetial leaves: ‘Habit perichaetium foliorumque areolatio Lasiae’ (Sullivant 1857: 185). Britton (1905a: 263) noted that ‘Sullivant made an anagram of *Lasia* when he described *Alsia* because of the resemblance between *Lasia trichomitrium* (Hedw.) Beauv. and *Alsia californica* Sull.’ *Lasia* is now a synonym of *Forsstroemia*.

***Aongstroemia* Bruch & Schimp. 1846** — After Johan Ångström (1813–1879), Swedish physician and bryologist: ‘Diese höchst ausgezeichnete, von uns unserem Freunde, dem eifrigen Bryologen A. Ångström zu Upsala, gewidmete Gattung umfasst bis jetzt nur eine Art’, welche zugleich auch den Typus einer eigenen Familie darstellt.’ (Bruch et al. 1836–51a: 169; fasc. 33–36: 1). The incorrect initial was no doubt a slip of the pen; Johan’s brother, the famous physicist Anders Jonas Ångström (1814–1874), was also in Uppsala; by 1846 Johan may have moved to Örnköldsvik to set up a medical practice. The name is a conserved orthographic variant of *Angstroemia* Bruch & Schimp.

***Beddomiella* Dixon 1922** — After English soldier and naturalist Richard Henry Beddome (1830–1911), who collected the type in India: ‘Hab. Nilghiri Mts., India, Beddome, No. 650. Herb. Mitten, in herb. N.Y. Bot. Garden.’ (Dixon 1922b: 104). He was an expert on the vascular flora of India and Ceylon, particularly ferns, and described over 1000 species of plants and animals. A short biography is available on Wikipedia.

***Buthelezia* Lacey, Dijk & Gordon-Gray 1975** — After Mangosuthu Gatsha Buthelezi, South African politician and traditional prime minister of the Zulu nation: ‘The genus is named for Chief Buthelezi of KwaZulu in recognition of his interest in conservation and the importance of the fossiliferous areas of KwaZulu’ (Lacey et al. 1975: 411). Various biographies of Buthelezi are available online, including an entry in Encyclopaedia Britannica.

***Buxbaumia* Hedw. 1801** — After Johann Christian Buxbaum (1693–1730), German botanist and professor in Petersburg, who in 1712 collected the type for the genus, *Buxbaumia aphylla*, on the banks of the Volga not far from Astrakhan (Greville & Arnott 1823–24: 86). Buxbaum had wanted to name the plant after his father, as Jean Marchant had done for *Marchantia*, but recalled the fox who was derided because he begged for grapes, not for himself but for his sick mother (Buxbaum 1728: 9). Instead he called it *Musculus capillaceus aphyllus*, *capitula crasso*, *bivalvi*. The name *Buxbaumia* was eventually given in honour of the younger Buxbaum by botanist and poet Albrecht von Haller in his *Enumeratio* (Haller 1742: 10), apparently thinking it was a fungus. Hedwig (1801: 166) and others attributed the name to Linnaeus, but he merely resurrected the name given by Haller after Girolamo Fabrici (Fabricius) had changed it to *Hippopodium*.

Catharinea Ehrh. ex D.Mohr 1803 — After Empress Catherine II (the Great) of Russia (1729–1796): ‘Catharinae secundae, Russorum Imperatrici, Botanices summae Promotrici, consecrata ab Ehrhart. (Ehrhart 1787c: 179). The name was not accepted by Hedwig (1801: 94), instead placing the one species under *Polytrichum*. Mohr (1803: 31) revived the name, but it was subsequently rejected against *Atrichum* P.Beauv.

Catopridium Brid. 1826 — *katoptridion* (little mirror), alluding to the reflective nature of the cells, as described by Bridel-Brideri (1826: 112): ‘Est ut videtur, naturae aquosae tenacis tamen, et instar aquae guttularum aut speculorum minimorum lucem observam repercutit’. The plant was commonly treated as an alga, but Unger (1834: 36) demonstrated that it is the protonema of *Schistostega*, which is well known for its luminescent appearance because of internal reflection of light within its cells.

Catopterum Wilson ex J.Shaw 1878 — ‘Wilson in *Herb. Hook.*, referring to Harvey’s specimens, proposes for them a new genus allied to *Cinclidium* on account of the double peristome...Wilson gives the name *Catopterum*.’ (Shaw 1878: 318). I believe Shaw misread ‘Cape specimens’ in a handwritten notation by Wilson as ‘Catopterum’. The note reads ‘Our specimens are not essentially very diff[erent] from Cape specimens of *Schizym[enium] bryoides* (Harvey) and [illegible] and in good cond[ition] exhibit traces of a double peristome (which C. Müller refers to *M. Ecklonii*).’ and is now attached to a sheet containing Tasmanian specimens of *Mielichhoferia ecklonii*, a synonym of *Schizymenium bryoides* (BM000870622, BM000870623).

Chameleion L.T.Ellis & A.Eddy 1990 — An anagram of *Heliconema*, which Alan Eddy (who, with Len Ellis, had raised the name to generic rank as *Heliconema* (Mitt) L.T.Ellis & A.Eddy in 1989) noted was a later homonym of *Heliconema* J.W.Schopf 1968 (Eddy 1990: 250). The name coined by Mitten (1869: 112), probably refers to the specific epithet of *S. helicophyllus* (although not the type of the genus) that Mitten included in his *Syrrhopodon* sect. *Heliconema*. That epithet refers to the spirally arranged leaves when dry: ‘Folia...sicca autem singula in spiram rectam pulchra contorta, directione tamen patente immutata.’ (Mitten 1869: 119).

Dorcadion Adans. exc Lindb. 1878 — Diminutive of *dorkas* (a gazelle, so named because of its bright eyes). The name was published without a description and is therefore invalid. Lindberg (1878: 6, 35) merely noted ‘*Dorcadion* Adans.’ and ‘*Dorcadion* (*Orthotrichum* p.p.)’. Adanson (1763: 485) did not explain the etymology and ascribed the name to Dioscorides, but I cannot find it in *De Materia Medica*, although the name *dorkidion* is mentioned as a synonym of *diktamnon*, commonly taken to mean Dittany of Crete, a medicinal plant. Plášek et al. (2016: 195) suggested that the name referred to ‘a species of gazelle with distinctive dark and white bands running along the sides of the animal...a reference to the longitudinal ridges and colourful bands on the capsule typical of many species’. That seems highly unlikely, since the banding on the flanks of gazelles (which are present in three species, only one of which would have been familiar to Dioscorides) bear no resemblance to the ridging and colouring on a capsule. It seems more likely that the name refers to the peristome teeth, resembling the horns of a gazelle. It is noteworthy that the name also exists in zoology for a genus of longhorn beetles.

Eriopus Brid. 1827 — *erios* (wool) + *pous* (foot), alluding to the woolly appearance of the seta, caused by spine-like papillae: ‘pedunculo filamentoso-hirto, sporangio ampullaceo pendulo e pedunculo hirto’ (Brideri 1827: 339). Brideri initially coined the name for a subgenus of *Chaetophora* Brid., a later homonym of the algal genus *Chaetophora* Schrank 1783 and therefore illegitimate. But in the index of the same work, perhaps by then recognising this problem, he listed *Eriopus* as a genus (Brideri 1827: 783, 788). Agardh (1822: 109) and Desvaux (1825: 226) had, however, already replaced *Chaetophora* Brid. — the former with *Eulophia* Agardh (a later homonym of *Eulophia* R.Br. 1821: Orchidaceae) and the latter with *Calypstrochaeta* Desv.

Fabronia Raddi 1808 — After Florentine administrator Giovanni Valentino Mattia Fabbroni (also Fabroni), a founder of the Museum of Natural History in Florence and at one time director of the Tuscany mint: ‘In honores Fabroni monetæ excudendæ Praefecti Florentini nomen conditum.’ (Müller 1851: 31). Lindberg (1879: 37) rendered the name as *Fabbronia* because he believed that Fabroni’s name should be spelt Fabbroni: ‘*Fabbroniae* (non *Fabroniae*, nomen etenim e *G. Fabbroni!!*)’. Lindberg was probably correct, although spellings of surnames were often fluid, and Fabroni’s name was often spelt with a single *b* by his contemporaries. According to Crum & Anderson (1981) the name was chosen partly as a derivation from the Latin *faber*, meaning ingenious, but I cannot find any evidence for that idea. Raddi later named the liverwort genus *Pellia* after Fabbroni’s son Leopoldo Pelli Fabbroni, a lawyer (Raddi 1818: 50).

Felipponea Broth. 1925 — After Florentino Felippone (1852–1939), medical doctor, chemist and biologist in Uruguay: ‘Je me permis de dédier ce genre nouveau à M. le Docteur F. Felippone l’explorateur infatigable, de la Flore bryologique de l’Uruguay.’ (Brotherus in Felippone 1912: 15). Brotherus unfortunately did not give a generic description, making the name invalid. By the time he validly published the genus in 1925, the type species had been used by Max Fleischer to create another genus, *Pterogoniadelphus* M.Fleisch., so *Felipponea* Broth. 1925 is illegitimate by the inclusion of the type of a previously described genus (Ochyra and Zijlstra 2004). Although best known in bryology for his two-volume *Contribution à la flore bryologique de l’Uruguay*, Felippone had wide-ranging interests in natural history, including ornithology, lichenology and malacology. A shellfish, *Potamolithus filipponei* von Iher., was named in his honour. A short biography is available in Wikipedia.

Funaria Hedw. 1801 — Presumably from Latin *funis* (rope, cord) + *aris* (resembling, provided with), alluding to the twisted, cord-like seta of *F. hygrometrica*: ‘Nomen Schreberianum a fune desumptum, quod pedunculus in *F. hygrometrica* humiditate funis instar contorquetur.’ (Bridel-Brideri 1827: 50). Bridel-Brideri (1827: 50) cited the German names Drehmoos and Griffelmoos given by Röhl, the French names Cordette and Stréphédie given by Palisot de Beauvois, and the English name Cord-moss. However, Johann Schreber, who first coined the name *Funaria* in the 8th edition of *Genera Plantarum* (Schreber 1791: 760), gave no explanation of the etymology, nor did Hedwig (1801). It is noteworthy that Palisot de Beauvois (1804: 320) proposed to replace *Funaria* with *Strephidium* because, he said, the former was constructed from a personal name, a practice he disliked. However, he might have assumed this because Hedwig included *Funaria* among other genera that were certainly derived from personal names — *Bartramia*, *Buxbaumia*, *Webera*, *Pohlia*, *Meesia* and *Timmia*.

Hedwig had earlier coined the name *Koelreutera* for the same plant, but that was a later homonym of *Koelreutera* J.A.Murray (Aizoaceae).

***Gagea* Raddi 1819** — After Thomas Gage (1781–1820), English baronet and botanist: ‘Genus a me institutum in honorem Cl. Thomas Gage Hiberni, Botanici peritissimi, et praesertim in Lichenum cognitione versatissimi.’ (Raddi 1819: 361). The name is illegitimate as a later homonym of *Gagea* Salisb. 1806 (Liliaceae), named for the same person. Although described as Irish by Raddi (perhaps because of the family’s Irish lineage), Gage was English and lived at Hengrave Hall in Suffolk (Burke 1839: 434).

***Gammiella* Broth. 1908** — After George Alexander Gammie (1864–1935), British botanist in India, who collected in Sikkim in the early 1890s: ‘Ich erlaube mir diese schöne Gattung dem hochverdienten Erforscher der Moosfloa von Sikkim, Herrn G. A. Gammie zu widmen.’ (Brotherus 1905–09: 1067). A short obituary for Gammie was published in 1936 (A.T.G. 1936). Fleischer (1914a: 121) rendered the name as *Gamiella*, possibly thinking the root was *gamos* (wedding). He later repeated the error (Fleischer 1923: 1172) but, perhaps by then being made aware of the correct etymology, corrected it in the errata (p. 1675) in the same volume.

***Harrisonia* Adans. ex Spreng. 1827** — After Harrison, an unknown person. Adanson (1763: 491) included the name in a list of genera, with no indication of the etymology. Sprengel (1827: 135) suggested that Harrison was a London friend of Adanson: ‘Diese Laubmoosgattung widmete Adanson seinem Freunde dem Herrn Harrison in London?’ Sprengel also published the name without any details or description, so the name is invalid, and in any case it is illegitimate as a later homonym of *Harrisonia* R.Br. ex A.Juss. 1825 (Rutaceae). Hooker (1833: 281) remarked, in relation to another of Adanson’s names, ‘Name of uncertain origin, as is the case with many of Adanson’s Genera.’

***Helmsia* Bosw. 1894** — After Richard Helms (1842–1914), German-born naturalist in Australia and New Zealand, who collected the type: ‘Paparoa Ranges, New Zealand. Legit R. Helms circa 1888; misit T. Kirk, 1893.’ (Boswell 1894: 82). Boswell thought that nothing was known of ‘this mysterious stranger’ and believed him to be dead, but Helms was very well known in Australia and New Zealand and lived until 1914.

***Hippopodium* Fabr. ex Röhl. 1813** — *hippos* (horse) + *podion* (little foot), alluding to the supposed resemblance of the capsule to an inverted horse’s hoof: ‘ungulam scilicet equinam inversam aliquo modo repraesentantia’ (Fabricius 1743: 31). Röhl (1813: 120) resurrected the name (coined before the starting point for non-*Sphagnum* moss nomenclature) to supplant *Buxbaumia*.

***Homomallium* (Schimp.) Loeske 1907** — *homoios* (similar, uniform) + *mallos* (more, very much), alluding to the leaves being all similarly curved to one side of the stem: ‘foliis laxius dispositis leniter uno sensu sursum curvatis (unde nomen)’ (Schimper 1860: 616). The second root is not from *mallos* (fleece), as often claimed.

***Hypnum* Hedw. 1801** — *hypnon*, an ancient name for an unidentified plant, probably a moss. Scott (1988: 12) noted that the name seems to have originated with Aetius of Amida, a 6th century Greek physician, who gave

no hint of an earlier origin. Scott also noted that, in 1666, Ambrosinus suggested that the name derived from *hypnos* (sleep) because ‘wine made with muscus terrestris induces a deep sleep’. I thus suspect that Ambrosinus’s concept of ‘muscus terrestris’ related to a fungus than to a moss, since many fungi having psychotic properties. The common claim that the name comes from *hypnos* because of a supposed use for stuffing pillows or mattresses has no basis in fact. Arnott (1825: 306) strangely attributed the name to Smith.

***Jonesiobryum* Bizot & Pócs ex B.H.Allen & Pursell 1991** — *Jonesia* + *bryon* (moss), a replacement for *Jonesiobryum* Bizot & Pócs 1974. The name honours E.J. Jones, who collected the original material of the type species in northern Nigeria in 1958 (Bizot et al. 1974: 25). The complex history of the name was described by Allen and Pursell (1991). In brief, the genus was first described as *Jonesia* Bizot, Pierrot & Pócs in 1974, but that was a later homonym of *Jonesia* Roxburgh 1795 (Fabaceae). It was therefore replaced soon after by *Jonesiobryum* Bizot & Pócs, but a holotype was not cited so that name was invalid. A further attempt to replace *Jonesia* with *Jonesiobryum* Bizot 1976 was also invalid for the same reason. Allen and Pursell finally laid the 17-year-old bryological muddle to rest by validly publishing the name.

***Juratzkaa* Lorentz 1866** — After Austrian–Hungarian bryologist Jakob Juratzka (1821–1878), a friend of Paul Lorentz: ‘einer neuen Gattung, die ich zu Ehren meines verehrten Freundes Juratzka benenne, einen der verdientesten und scharfsichtigsten unter den jungeren Bryologen, der nun auch seine Kräfte den exotischen Moosen zuwendet’ (Lorentz 1866: 188). Lorentz spelled the genus *Juratzkaa*, and there is no evidence that this was anything other than deliberate. Because the original spelling has not been emended under the *Code*, and altering the terminating *a* to *ea* (thus producing *Juratzkaea*) is only a recommendation under the *Code*, I believe the original spelling should be retained. See OBL (2020) for a brief biography of Juratzka.

***Kaurinia* Lindb. in Bryhn 1892** — After Norwegian botanist Christian Kaurin (1831–1898): Bryhn (1892: 124) noted that Lindberg had wanted to honour Kaurin with this genus, but his death in 1889 had prevented him from doing so. ‘Amicus Lindberg dixit saepius...et hoc genus novum voluit in honorem Kaurini bryologi Norvegiae acutissimi denominare. Mors tamen praematura negavit eum hoc in publicum edere.’ Unfortunately I could not find a tribute or obituary for Kaurin. It is noteworthy that in the same year Kaurin named the genus *Bryhnia*.

***Leratia* Broth. & Paris in Broth. 1909** — After Louise Le Rat (née Duplain) (1868–1953) and Auguste-Joseph (Auguste) Le Rat (1872–1910), French botanical collectors in New Caledonia from 1900 to 1910: ‘Genre dédié à M. A. Le Rat et Madame Louise Le Rat, les explorateurs zélés de l’île inéressante où ils demeurent.’ (Brotherus 1909: 14). Letacq (1912) wrote a detailed biography of Auguste; a brief biography is also available online at JSTOR Global Plants. See also Le Cornec (2021) for a discussion of their collections held in the Musée des Beaux-Arts and Dentelle d’Alençon, including detailed biographical information on both Auguste and Louise.

***Mesotus* Mitt. in Hook.f. 1867** — *mesotes* (middle or central position). Allen (1987a: 445) suggested that the name referred to the presumed intermediate systematic position of the genus: ‘Mitten says it has the structure

of leaf of *Symblepharis*, creeping stem of *Macromitrium* and teeth of *Grimmia*' (J.D. Hooker 1867, cited in Allen 1987a). He also noted that it might be taken from the type locality, Middle Island (i.e. modern-day South Island of New Zealand) or that it might be a reference to the lateral position of the capsule. However, none of Mitten's other generic names allude to a locality, and Mitten himself considered the perichaetia to be terminal (Allen 1987a: 441), so I think Allen's first suggestion is very likely correct.

Morinia* Cardot 1910** — After French priest and botanist François Morin (fl. 1880s), professor of sciences at the Collège des Cordeliers in Dinan: 'ce nouveau genre — que je dédie à la mémoire de l'abbé Morin, auteur d'une remarquable thèse sur l'histologie de la nervure des Mousses' (Cardot 1910b: 124). The thesis mentioned by Cardot was presented by Morin to the Faculty of Sciences at the Rennes Academy in 1893 for the degree of Doctor of Natural Sciences (Morin 1893). Unfortunately I could not find any further information about Morin, other than that he was still alive in 1889 and was mentioned by Camus (1900), *Muscinées des Côtes-du-Nord*, Bull. Soc. Sci. Nat. l'Ouest France v.10, 1900 Recognising that the name was illegitimate as a later homonym of the fungal genus *Morinia* Berl. & Bres., Zander (1993: 112) replaced it with an anagram, *Mironia* R.H.Zander.

***Myrinia* Schimp. 1860** — After Swedish bryologist Claes Gustav Myrin (1803–1835): 'Genus paradoxum...clar. Claud. Gust. Myrin Sueciae Muscorum indagatori acutissimo sancitum.' (Schimper 1860: 483). Myrin tragically died from rheumatic fever at the age of 31, shortly after completing his seminal work, *Corollarium florum Upsaliensis*, written as a supplement to Wahlenberg's 1820 *Flora Upsaliensis* (Wikström & Beilschmied 1843 : 231).

***Nauia* Borkh. 1809** — After Bernhard Sebastian von Nau (1766–1845), German botanist in Moguntia (Mainz): 'In honorem Dn. Nau, professoris Moguntiae, plantarum observatoris diligentissimi, florum moguntinae edendae auctoris.' (Borkhausen 1809: 151). A short biography of von Nau is available in Wikipedia. The name, which seems to have forgotten in botany, might be considered an earlier homonym of *Navia* Schult.f. 1830 (Bromeliaceae), which would thus be illegitimate.

***Nogopterium* Crosby & W.R.Buck 2011** — An anagram of *Pterogonium*: 'Pterogonium Sw. (Leucodontaceae), a long-used, illegitimate name...is replaced with an anagram.' (Crosby and Buck 2011: 424).

***Osculatia* De Not. 1859** — After Italian naturalist Gaetano Osculati (1808–1894), who collected the type material in Columbia: 'Titulo anteposito, muscorum a clarissimo Oculati ad flumen Napo in Columbiae meridionalis regionibus prorsus ignotis collectorum descriptionem praebeo' (De Notaris 1859: 437). Osculati spent two years exploring the Napo and Amazon rivers and wrote a popular account of his travels for magazines and journals, later published in book form (Osculati 1854).

Ozobryum G.L.Merr. 1992 — ‘The genus name *Ozobryum* is derived from “bryum” moss and from the fictional Land of Oz, the creation of American author L. Frank Baum, now popularly associated with the

Kansas plains.’ (Merrill 1992a: 257). The type locality is in Decatur County, Kansas. The danger, etymologically speaking, is that the prefix might be taken to be derived from *ozos* (branch or twig), thus suggesting an arboreal rather than terrestrial habitat.

Parisia Broth. 1906 — After French soldier and bryologist Édouard Gabriel Narcisse Paris (1827–1911), best known as the author of the *Index Bryologicus*: ‘Je me permis de dédier ce genre très curieux à mon très estimé ami, M. le Général E. G. Paris, l’auteur savant de l’Index bryologicus et le promoteur infatigable de toutes les efforts, qui tendent à l’étude des mousses exotiques.’ (Brotherus 1906b: 5–6). A short biography is available online at JSTOR Global Plants. ‘Herb. Paris’ refers to Paris’s personal herbarium, now held in Genève, but is sometimes mistaken for the Paris Herbarium.

Phantomia S.He & W.R.Buck 2018 — After Bruce Hampton Allen, US bryologist at the Missouri Botanical Garden: ‘The generic name commemorates Bruce Hampton (i.e., Phantom as anagram) Allen...in honor of his work in bryology and especially in Dicranaceae.’ (He and Buck 2018: 10).

Pharomitrium Schimp. 1860 — *pharos* (cloth, web, mantle) + *mitrion* (small hood or cap), referring to the calyptra: ‘Calyptra obliquata pluriloba, unde nomen graecae compositionis φάρος lobus, μίτριον calyptra.’ (Schimper 1860: 120). Schimper’s *pharos* to mean ‘lobe’ seems to be an error for *pharsos* (part or division).

Phascum Hedw. 1801 — *phaskon*, an ancient name mentioned by Theophrastus as an epiphyte on oak trees (Scott 1988: 4). Hedwig (1801: 19) applied the name to mosses lacking an operculum. Scott (1988: 5) argued cogently that *phaskon* was the epiphytic lichen genus *Evernia*, used in perfumery for its scent and as a scent fixative, noting that the name largely disappeared from use until revived by Linnaeus in the first edition of *Genera Plantarum* (Linnaeus 1737).

Pleuridium Brid. 1819 — Diminutive of *pleura* (side, flank), referring to the seemingly lateral position of the capsule: ‘A graecâ voce *πλευρά* latus ob capsulam lateralam nomen confeci.’ (Bridel 1819: 10). Mitten (1851a: 306) noted that the name was ‘neither founded on a true idea of their mode of fruiting nor applicable to the species’, and pointed out that Bridel himself was not completely satisfied that it was appropriate.

Pohlia Hedw. 1801 — After Johann Ehrenfried Pohl (1747–1800), professor of botany at Leipzig University where Hedwig was professor of medicine until 1789. In that year Pohl moved to Dresden and Hedwig was awarded his position, which included directorship of the botanical garden (Florschütz 1960). Hedwig first coined the name in 1789 (Hedwig 1801). The name has been mistakenly identified with a number of other Pohls, such as Johann Emanuele Pohl (1782–1837), German botanist in South America.

Polytrichum Hedw. 1801 — The name *polytrichon*, probably meaning ‘many-haired’ from *polys* (many) + *trichos* (hair), was in use in ancient times for a plant, but had no bryological meaning until resurrected by

Dillenius (1719: 221), presumably based on an illustration by Fuchs (1542) that appears to show two species of *Polytrichum*, called by Fuchs ‘Major Polytrichum Apuleii’ and ‘Minus Polytrichum Apuleii’ (Scott 1988:10). A hairy calyptra (‘Calyptra villosa’) was the major character of the mosses to which Dillenius gave the name *Polytrichum*.

Pringleella Cardot 1909 — After US botanist Cyrus Guernsey Pringle (1838–1911) of Burlington, Vermont: ‘Un botaniste américain très connu, M. le Dr C.-G. Pringle de Burlington, qui chaque année fait un voyage botanique au Mexique, m’a confié la détermination des Mousses récoltées par lui dans ce pays... Ce genre nouveau, que je suis heureux de dédier à M. Pringle, doit prendre place entre les *Garckea* et les *Eccremidium*.’ (Cardot 1909b: 68). See Davis (1936) for a wonderful biography of an extraordinary botanist.

Pulchrinodus B.H.Allen 1987 — Latin *pulchre* (beautifully) + *nodus* (a knotty problem). ‘The name is given in reference to the striking beauty of this moss and the puzzling systematic problem it presents.’ (Allen 1987b: 340). Bruce Allen was referring in the second instance to the doubtful placement of the genus in the Pterobryaceae.

Quathlamba Magill 1987 — ‘*Quathlamba*, barrier of uppointed spears, is the Zulu name for the Drakensberg, habitat of the genus.’ (Magill 1987: 421).

Rhacocarpus Lindb. 1863 — *rhakos* (frayed) + *karpos* (fruit), although Lindberg (1863: 607) thought that *rhakos* meant furrowed (‘*ῥακος* sulcus, et *καρπος* fructus’), clearly intending the name to refer to the capsule, which is furrowed when dry. Magill (1993: 10) provided a neat summary of the intrigue surrounding the conservation of this name.

Saelania Lindb. 1878 — No doubt after Anders Thiodolf Saelan (1834–1921), Finnish psychiatrist and botanist in Helsingfors (Helsinki), although Lindberg (1878: 35) did not indicate the etymology. For a short time Saelan was an assistant at the museum in Helsinki and worked with William Nylander on the botanical collections of the museum. For most of his life he devoted himself to psychiatric medicine but compiled (with Elia Lönnrot) the first flora of Finland written in Finnish, as well a complete bibliography of Finnish botanical literature (Westrin et al. 1926: 157–158).

Sematophyllum Mitt. 1865 — *semato* (marked) + *phyllon* (leaf), alluding to the distinctive alar cells that distinguish the genus: ‘*Folia* cellulis alaribus ut plurimum utrinque tribus distinctis signata.’ (Mitten 1865: 5). The genus is often referred to as ‘signal mosses’, from a misunderstanding of the meaning of *semato*.

Sorapilla Spruce & Mitt. 1869 — From the word for ‘moss’ as spoken by the people (‘Indos Maynenses’) of the foothills of the eastern Andes: ‘Apud Indos Maynenses, in radicibus Andium orientalibus, *Sorapilla* nomen genericum est quod “Muscum” vult dicere. — *Spruce*.’ (Mitten 1869: 603).

Sphagnum L. 1753 — *sphagnos*, an ancient name in use by the 4th century BC for an ingredient in a medication prescribed by Diokles of Caryostos (Scott 1988: 11). It is unlikely to have referred to any kind of moss until Dillenius (1741: 240) used it in that sense. Linnaeus (1753: 1106) limited the genus to two species of various mosses called ‘sphagnum’ by Dillenius, but one of those (*Sphagnum alpinum* L.) is now a synonym of *Campylopus flexuosus* (Hedw.) Brid.

Stokesiella (Kindb.) H. Rob. 1967 — Ultimately after Irish physician, professor and plant collector Whitley Stokes (1763–1845). The name was created by Kindberg (1897: 94), based on the specific epithet of *Eurhynchium stokesii* (Turner) Schimp. (erroneously cited as *E. stokesii* Turner by Kindberg), with the diminutive suffix *ella*. Turner (1804: vi) mentioned Stokes in his preface (‘W. Stokes, M. D. Sacro-Sanctae Trinitatis Collegi Socio, Hisotirae Naturlais cultori indefesso’) and as the collector of the type: ‘In ruibus prope lacum, *Lough-Bray* dictum, detexit D. Stokes, cujus nomine insignitur.’ (Turner 1804: 160). Robinson (1967: 39) raised Kindberg’s subgenus of *Eurhynchium* to genus rank but few bryologists followed, perhaps aware of Abel Grout’s warning: ‘Considering the well-known quality of Kindberg’s work, the species may well be ignored unless the type can be examined by a competent authority.’ (Grout 1925: 8).

Taxiphyllum M.Fleisch. 1923 — apparently from Latin *taxus* (yew) + *phyllon* (leaf), derived downwards from section *Taxicaulis* of *Hypnum* erected by Müller (1851: 277). Müller coined *Taxicaulis* seemingly in contrast to section *Cupressina*, a name clearly derived from *Cupressus* on account of the cypress-like habit, noting ‘Caulis tenellus plumulose foliosus...a *Cupressinae* congeneribus foliis oblique acuminatus (ut rami) vix falcata’ (Müller loc. cit.). Mitten’s name *Stereodon (Taxiphyllum) taxirameum* further reflects this presumed etymology. It seems coincidental that the leaves in *Taxiphyllum* are more or less two-ranked, but some have therefore claimed that the first stem is *taxis* (rank). However, the more instructive (and available) *Ditaxiphyllum* would have been a logical choice of name had that been the intention.

Tetracocinodon R.Br.bis. 1896 — *tetra* (four) + *koskinon* (sieve) + *-odon* from *odous* (tooth), alluding to the supposedly four-toothed peristome: ‘the interesting point about this moss is its peristome, which has four triangular irregularly-perforated teeth, the perforations covered by an extremely thin transparent membrane...I have named the new genus *Tetracocinodon*, in reference to its peristome’ (Brown 1896: 532). The peristome in fact has 16 teeth but they are often joined together in groups, giving the appearance of four divided teeth (Zander 1993: 105). Brown’s name *Tatracocinodon* is often altered to *Tetracoscinodon* because the spelling is clearly contrary to the orthography. However, Brown’s original spelling was used consistently in the original publication and thus must be assumed to be a deliberate choice rather than a typographic error. The *Code* does not allow a generic name to be altered merely because it is inappropriate or disagreeable (Article 51).

Tetraphis Hedw. 1801 — *tetra* (four) + *raphis* (needle), alluding to the four long, narrow peristome teeth of the type species, *T. pellucida* Hedw.: ‘Peristomium simplex, dentibus quatuor pyramidalibus.’ (Hedwig 1801: 45). The first two letters of *raphis* are naturally elided to avoid repetition. The root of the suffix is sometimes

said to mean ‘divided’ from Greek *phis* (which does not have that meaning) or Graecified Latin *-fid* (which is untenable).

***Thuidium* Schimp. in Bruch, Schimp. & Gumbel 1852** — Diminutive of *Thuja* (a genus of conifers) alluding to the resemblance of the feathery, branched fronds to the foliage of those trees: ‘Die Gattung *Thuidium*, so genannt wegen der Thuia-ähnlichen Tracht der in diesebe gehörigen pflanzen *Thuia*’ (Bruch et al. 1851–55a: 157). The etymology is reinforced by the use of the spelling *Thujidium* in the accompanying illustrations (Bruch et al. 1851–55a: 481–486). It is possible that this was the originally intended spelling, changed later in the text but too late to change in the lithographed illustrations. *Thuja* is probably a corruption of the *thya* of Theophrastus, from the Greek verb *thyō* (I perfume), alluding to the use of cedar wood as incense (Phillips 1823: 51).

***Toloxis* W.R.Buck 1994** — An anagram of *Loxotis*, coined to replaced the illegitimate *Loxotis* W.R.Buck (Buck 1994a: 436).

***Trismegistia* (Müll.Hal.) Müll.Hal. 1896** — Presumably from Hermes Trismegistus (‘thrice greatest’), an incarnation of the Egyptian god Thoth and divine bringer of knowledge; otherwise the only other etymology that seems possible is Latin *tris megistanes* (three grandees, perhaps referring to the three wise men of the bible). The name was first given by Müller (1874: 89) to a section of *Hypnum* in 1874, without any indication of the etymology.

***Unclejackia* Ignatov, T.J. Kop. & D.H. Norris 1999** — After US bryologist Aaron Sharp (1904–1997): ‘The name *Unclejackia* commemorates the late Dr. Aaron John (Jack) Sharp known affectionately to all his friends as Uncle Jack.’ (Ignatov et al. 1999: 37). See Delgadillo-Moya (1986) for a fine biography of Sharp, written many years before his death, and McFarland et al. (1998) for a wonderful tribute after his death.

***Wardia* Harv. & Hook. 1837** — After English doctor Nathaniel Bagshaw Ward (1791–1868): ‘I am permitted to join its discoverer in dedicating to N. B. Ward, Esq., an ardent promoter of botany in all its departments’ (Hooker 1837: 2). Ward is best known for inventing the Wardian case, a hermetically sealed, glass-panelled case for transporting plants. A short biography of Ward is available in Wikipedia.

***Weissia* Hedw. 1801** — After Friederich Wilhelm Weiss (1744–1826), German botanist in Göttingen (Hedwig 1801: 64). Hedwig accepted the name first coined by Friedrich Ehrhart, before the starting date for most moss nomenclature: ‘Die Verdienste des Herrn Doctor Weiss in Göttingen um die Cryptogamie, besonders der dortigen Gegend, sind einem jeden aus dessen davon geschriebenen Buche schon so bekannt, dass es unnütz sein würde, folche hier anzuführen. Ich werde also auch nicht nöthig haben, meinen Lesern zu sagen, warum ich zum Andenken dieses fleissigen Gelehrten jetzt eine Pflanze mit dessen Namen belege’ Ehrhart (1787b: 33). Weiss’s first name was Friederich on his birth certificate but Friedrich on his death certificate, and his surname was Weiß (= Weiss) in German but Weis in the Latinised form used in his doctoral dissertation, and

presumably subsequently in his professional career (Grummann 1962). *Weissia* is based on his German name, but *Dicranoweisia* is based on his Latinised name. See also *Weisia* Hedw. ex Sprengl.

***Weneriobryum* Herzog 1909** — After German collector Eugen Werner (d. ?1916), an employee of the Deutsche Neuguinea-Kompagnie, who collected the type on Mt Gelu in German New Guinea (modern-day Papua New Guinea): ‘Auf dem Gipfel des Gelu (Finisterregebirge), ca. 1700 m; August 1907, leg. Dr. E. Werner.’ (Herzog 1909: 123). The addition of the moss suffix *bryum* suggests that Herzog was aware that the name *Werneria* was already in use for a genus of Asteraceae, although named for a different person. Eugen Werner is better known for his collections of amphibians and invertebrates, and for his book on the people and natural history of the forests of New Guinea (Werner 1911).

IUCN SSC Bryophyte Specialist Group reconstituted.

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The Bryophyte Specialist Group ([BSG](#)) is part of the network of more than 10,500 volunteer experts in 175 countries that constitute the International Union for Conservation of Nature's (IUCN) Species Survival Commission (SSC). These experts, organised in over 160 groups, work jointly for nature conservation, and to prevent the loss and support the recovery of biological diversity on earth. All SSC groups, including the BSG, have been reconstituted for the current quadrennial (four-year cycle), which started in 2021 and will run until 2025.

The mission of the BSG is to work for the exploration of bryological diversity and its long-term conservation across all geographic scales. The reconstituted BSG consists of 37 members representing 26 countries distributed over all continents (except Antarctica; Fig. 1). We are very pleased to welcome as many as 18 new members to the group. Some replace or complement bryologists from countries that are already represented, while we are also expanding the geographic coverage considerably. We now have also members based in Brazil, Fiji, Indonesia, Madagascar, Republic of Korea, Vietnam and Germany; countries that had not been previously represented. Sadly, we have recently lost an engaged member who suddenly passed away. It is obvious, that our members are not evenly distributed over the globe. Currently, the West European region is the best represented (Fig. 1), and we call for enthusiastic bryologists from other regions who would like to work concertedly with us for bryophyte conservation.

BSG members contribute to several important commissions and projects of IUCN that work with general aspects of biodiversity conservation, such as ex-situ conservation, conservation planning, ecological restoration and sustainable use. Additionally, we maintain a close link to the International Association of Bryologists ([IAB](#)) through several BSG members who are also members of the IAB council. On behalf of the IAB, we evaluate and recommend for funding, proposals for the IAB 'Conservation and Endangered Species Grants'.

Assessment of the extinction risk of bryophyte species, employing IUCN Red-Listing criteria (IUCN 2012), is high on the agenda of the BSG for this quadrennial. The current global bryophyte Red-List (IUCN 2022) includes 329 species of which more than 60% are endemics of Europe (Fig. 2, for an example). These were evaluated in the scope of the European bryophyte Red List project (Hodgetts et al 2019). Another 50 species are endemic bryophytes of Columbia whose extinction risks and Red List status were recently assessed in a dedicated project on Columbian endemic species. Most of the assessments of the extra-European species, however, are in urgent need of a revision, using the up-to-date IUCN criteria (IUCN 2012).

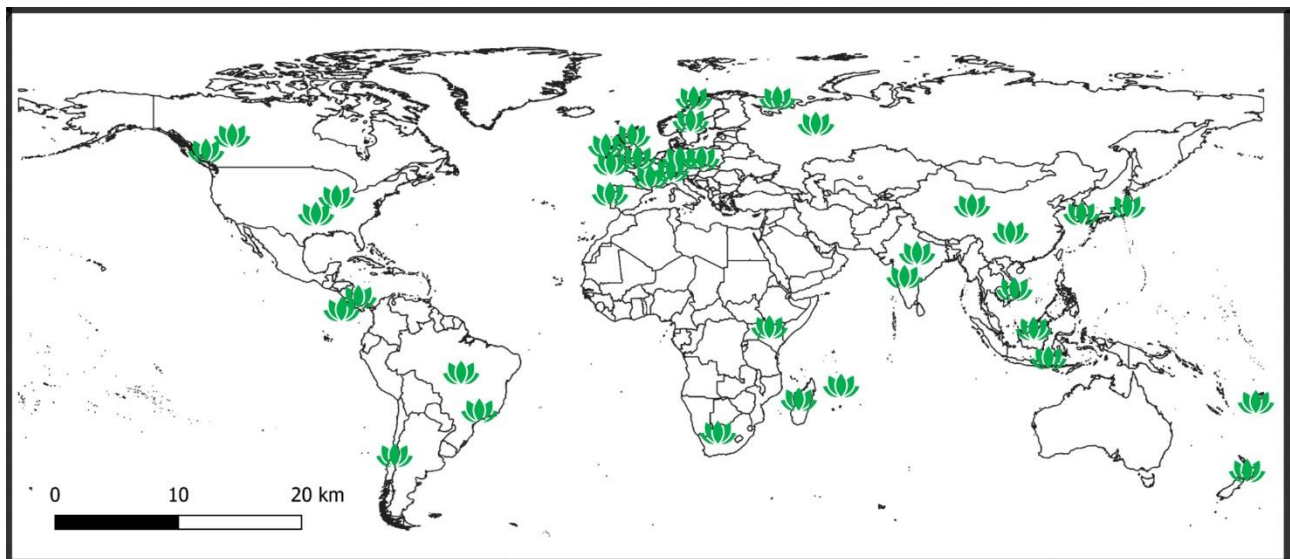


Figure 1. Distribution of the 37 members of the IUCN SSC Bryophytes Specialist Group across 26 countries.

In the spring this year, we gathered the majority of the members of the reconstituted BSG for an online meeting where we presented the work and current goals of the group, the present status of the global bryophyte Red List and how bryologists can contribute to the advancement of the latter. There are several ways forward how one can participate in global red-listing, for example, by revising outdated assessments. Another good starting point would be to identify the 10 most threatened species on each (sub)continent and to assess these by using the IUCN Red List criteria, as envisaged for the “Top 10” project (Van Rooy et al. 2019). Bryologists may also want to deal with a favourite genus, species group or region, or start with species that are endemic to one’s study region.

We encourage all IAB members and other bryologists to get in touch with us if they would like to contribute to red-listing bryophytes, either along the lines described above, or in another way. We have [uploaded a list of bryophyte species](#) on the current global IUCN Red List that need to be re-assessed. Please visit this spreadsheet and indicate which species you are interested in. And don't be afraid of red-listing. Although it may seem complicated on first sight, it is a fairly straightforward process. It is amazing that valuable Red List assessments are possible even with data that are far from complete. Please do not hesitate to contact us for this, if you would like to join BSG, or if you think we can provide support or advice on your bryophyte conservation projects.



Figure 2. *The Cornish Path-moss* (*Ditrichum cornubicum*) a species known only from a small area of Cornwall, England, is Critically Endangered (CR). Photo: Des Callaghan.

Table 1. List of current members of the IUCN SSC Bryophyte Specialist Group and their roles

Name	Country	Function in BSG
AFRICA		
AH-PENG Claudine	La Réunion	Member
MALOMBE Itambo	Kenya	Member
MARLINE Lova	Madagascar	Sustainable use (Focal Point)
VAN ROOY Jacques	South Africa	Co-chair
ASIA		
AKIYAMA Hiroyuki	Japan	Member
LUONG Thien-Tam	Vietnam	Sustainable-use (Focal Point)
MA Wen Zhang (Dennis)	China	Member
MALIK (Mohammad) Ashaq	India	Member
NADHIFAH Ainun	Indonesia	Member
SINGH Sushil Kumar	India	Member
SULEIMAN Monica	Malaysia	Member
WANG Jian	China	Member
YOON Young-Jun	Republic of Korea	Member
AUSTRALASIA/OCEANIA		
RENNER Matthew	New Zealand	Member
TABUA Mereia	Fiji	Member
NORTH AMERICA		
BRINDA John	USA	Member
CANERS Richard	Canada	Member
GOLINSKI Karen	Canada	Member
VON KONRAT Matt	USA	Member
CENTRAL & SOUTH AMERICA		
AMORIM Eduardo	Brazil	Member
CAMARA Paulo	Brazil	Member
LARRAIN Juan	Chile	Member
RODRÍGUEZ Eyvar	Panama	Member
SALAZAR ALLEN Noris	Panama	Member
EUROPE		
BELL Neil	UK	Member
BERGAMINI Ariel	Switzerland	Red List Authority coordinator
BISANG Irene	Sweden	Co-chair
GARCIA César	Portugal	Ecological Restoration (Focal Point)
HASSEL Kristian	Norway	Member
HODGETTS Nick	UK	Member
IGNATOVA Elena	European Russia	Member
KIEBACHER THOMAS	Germany	ECCB Chair
KONSTANTINOVA Nadeyda	European Russia	Member
LANDSDOWN Richard	UK	Member
PAPP Beáta	Hungary	Conservation Planning (Focal Point)
PRESSEL Silvia	UK	Ex-situ expertise (Focal Point)
ROWNTREE Jennifer	UK	Ex-situ expertise (Focal Point)

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Jamaica hornworts: Intercontinental fieldwork without a carbon footprint

Jeff Duckett & Liz Andrew

As part of their 80th anniversary celebrations the Natural History Society of Jamaica decided to organize exciting new field excursions targeting neglected groups. Prominent amongst these were hornworts: only 6 species have been recorded for certain from the Island (Scäfer-Verwimp & van Melick 2016; Söderström et al. 2010), a much lower number from neighbouring Latin American countries. But then there was a problem: no one in the Society had ever seen a hornwort and no one had a clue where to find them.

Knowing that Jeff had collected hornworts widely across 6 continents they enlisted his help. Although Jeff had never been to Jamaica but knew about the hornworts and their habitats in neighbouring Colombia and Tobago (Gradstein et al. 2016). Back in England, immediately prior to the field trip, he gave an illustrated



Phaeoceros. Woodside, Blue Mountains

zoom presentation on hornwort biology, where to find them and how to distinguish the different taxa.



Conservation ecologist, Anne Sutton, hard at work on a hornwort bank.

From the onset of the excursion the group began to find hornworts, images were immediately sent to Jeff, sitting at home in London, by Whatsapp and promptly identified. ‘It has yellow spores so it’s *Phaeoceros*, it has black spores so it’s *Anthoceros*, the horns are lying flat so it’s *Notothylas*’. Society members have now seen *Anthoceros punctatus*, plus a further *Anthoceros* species new to the Island and now awaiting identification, *Nothoceros vincentianus*, *Notothylas breutelli*, *N. orbicularis*, new to the Island; and *Phaeoceros carolinianus*.

Leiosporocero dussii and *Dendroceros crispus* remain elusive but the Jamaicans know where and what to look for. Needless to say, in

terms of climate change brownie points, this must go down as the most carbon neutral long distance field trip ever. However, this is about to be ruined as now Jeff feels a pressing need to visit Jamaica to collect the hornworts to continue global studies on their symbiotic fungi (Rimington et al. 2018, 2020). To date we have no molecular data on these fungi from Caribbean Islands.

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Notothylas. Shaw Park, Ocho Rios.

All photos by Liz Andrew.

A brief throwback: International bryology seminar 2022 in Latvia

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International Bryology seminar was organized in Study and Research Center, “Ilgas”, Daugavpils University, Latvia from August 1st to August 7th, 2022 in cooperation with Bryological and Lichenological Association for Central Europe (BLAM). The aim of the seminar was to exchange and increase the theoretical and practical knowledge in bryophyte identification, distribution, ecology and conservation. In total 32 participants took part in the seminar, from Germany, Spain, Italy, Slovakia, Croatia, Poland, Lithuania, Estonia and Latvia. Seminar participants were students and experienced bryologists (Fig. 1). The seminar consisted of daily field trips, lectures, microscopy work, discussions and masterclasses, where each participant were able to share and enrich their experience in bryology.



Figure 1. Participants of the International Bryology seminar 2022 on the second day in a transient mire near Vjazgine Lake in south-eastern Latvia.

Seminar participants visited different bryophyte-rich habitats: boreal forest, swamp forest, broad-leaved forest, slope forest, transient mires, bog and urban environments. The boreal forest was located near the Study and Research Center “Ilgas”. Nice findings included *Odontoschisma denudatum* on a dead log and also *Buxbaumia aphylla* that was growing by the roadside on open soil. The swamp forest was located in the surroundings of Lubāna mitrājs Nature Reserve located around 150 km north from “Ilgas” and there among other bryophytes we were explored the rare bryophyte *Trichocolea tomentella*. Near the swamp forest (Fig. 2) was the broad-leaved forest, where found growing in small cushions on *Tilia cordata* and *Quercus robur* was *Dicranum viride*, which in Latvia reproduces only asexually by deciduous leaf tips.

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Figure 2. Bryology field trip in a swamp forest in the vicinity of Lubāna mitrājs.

The transient mires represented a wide range of interesting bryophytes, for example, *Drepanocladus lycopodioides* (Fig. 3), *Paludella squarrosa*, *Sphagnum warnstorffii*, *Pseudocalliergon trifarium*, and *Hamatocaulis vernicosus*.

Baiba Bambe introduced the participants to the Teiči bog and its bryophytes (Fig. 4). The Teiči bog represented mostly different *Sphagnum* species, for instance, the common *S. rubellum* and *S. fuscum*; and *S. medium*. But

in the drier hummocks *Dicranum drummondii* was also found (Fig. 5). Among the mosses we also found some liverworts such as *Cladopodiella fluitans* and *Mylia anomala*.

The seminar participants also visited two slope forests which are located in Jaša Nature Reserve and in Pilskalnes Siguldiņa Nature Reserve. The highlight of Jaša Nature Reserve was *Oxystegus tenuirostris* (species in 1994 was described as ‘disappeared from Latvia’) found on a stone by Steffen Caspari. In Pilskalnes Siguldiņa Nature Reserve Uvis Suško found *Fissidens arnoldii* on a stone in a creek.



Figure 3. *Drepanocladus lycopodioides* in transient mire near Vjazgine lake.



Figure 4. Teiči bog.



Figure 5. *Dicranum drummondii* in Teiči bog.

One of the seminar highlights were records of *Anthoceros agrestis* (Fig. 6) and *Phaeoceros carolinianus* on open soil in a crop field on the way to Vjazgine Lake transient mire. These species were growing together with several *Riccia* species.

The Bryological Times



Figure 6. *Anthoceros agrestis* in a crop field.

Bryophyte samples were identified after field trips in the evenings using microscopes. Steffen Caspari gave masterclasses about particular small bryophyte species identification characters (Fig. 7). Pēteris Evarts-Bunders and Anna Mežaka introduced the seminar participants to Daugavpils University vascular plant and bryophyte herbarium that is located in “Ilgas”.

The seminar was further enriched by participant giving lectures. Steffen Caspari gave a hybrid (in-person and via Zoom) lecture about red-listed bryophytes and their conservation in Germany. Uvis Suško gave a talk about bryophytes in water habitats with a specific focus on eastern Latvia. Alexander Caspari gave a lecture about the German bryophyte atlas implementation project. Evita Oļehnoviča

gave a talk about bryophytes in black alder forests in Latvia. Agnė Mikalauskienė presented a study about *Sphagnum* diversity in Aukštumala mire in relation to anthropogenic influence in Lithuania. Manuel Tiburtini presented on Italian red-listed liverworts and facilitated open discussions about species definition. Peter Scholz also provided insight on the importance of exsiccatae database.



Figure 7. Masterclass in bryology by Steffen Caspari.

The seminar financially was supported by LIFE project LIFE FOR SPECIES “Threatened species in Latvia: improved knowledge, capacity, data and awareness” (Project Nr. LIFE19GIE/LV/000857).

Bryophytes and the Berlinale 2023

[Geert Raeymaekers](#)

The Berlinale is one of the most important international film festivals worldwide and it is a unique event when an award-winning film highlights mosses or when bryologists are mentioned in the closing credits of a movie.

This happened in 'HERE', the film by Bas Devos (Belgium), that received this February, the Best Film Award in the series Encounters of the Berlinale 2023 and also received the Fipresci Award of the International Federation of Film critics.

In 'Here' we follow Stefan, a Romanian construction worker and Shuxiu, a Belgian-Chinese bryologist. Stefan (Stefan Gota) is about to return home. Shuxiu (Liyo Gong) investigates the effect of pollution on bryophytes. Before leaving, Stefan cooks a large pot of soup with leftovers from his fridge to hand out as a parting gift to friends and family. Then he stumbles upon Shuxiu during her fieldwork in a city forest in Brussels. Her attention to mosses, the almost invisible, stops Stefan in his tracks and this scene forms a core moment in the movie.



The movie is not a documentary about mosses but will bring many viewers in contact with mosses and with bryology as a science. For Bas Devos, mindfulness is a prerequisite for love in general, and mosses are a metaphor for a movie that focuses on tiny processes of growth rather than what usually catches the eye. In mosses, Bas Devos finds an image for tenderness that 'Here' transfers into its entire form.

Bas Devos had read Robin Wall Kimmerer's book *Gathering Moss*, became interested in bryophytes (he even bought a microscope!) and contacted me two years ago to help him out with the "bryological" parts of the movie. He also had the opportunity to Skype with Dr. Janice Glime and learned about her e-book 'Bryophyte Ecology'. It all certainly impressed him. So her name is also listed in the closing credits of the many people who made the movie happen.

So, go and watch 'Here' when it is shown in a theatre near you.

Fire impacts on the subtropical bryophytes from island cloud forests.

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Fire produces changes in composition, structure and patterns of vegetation of all ecosystems around the world (Downing et al., 2020), being part of a natural process in some ecosystems (Resco de Dios, 2020). However, fire regimes have changed because of climate change and growing human populations increasing the presence of fire in systems where it was not historically present (Boer et al., 2021). Fire in non-fire ecosystems could represent an important disturbance that can lead to the loss of entire habitats or species extinction (Pausas and Keeley, 2009).

Many studies about post-fire successional processes have been done using vascular plants (e.g. Navarra et al., 2011; Gosper et al., 2015) but still there are few researches about fire effects on bryophytes in non-fire prone ecosystems, even though bryophytes are reported as bio-indicators due to their sensitivity to environmental conditions (Berdugo and Dovciak, 2019) and their strong influence on early post-fire stages of ecosystems (De Las Heras et al., 1993).



Figure 1: Landscape two months after 2012 fire. © Ángel Fernández Lopez.

In the Canary Islands natural fires only represent 0.8% of the total (Höllerma, 2000) and mainly occurs on the pine forest areas. Although Canarian laurel forests are not particularly fire prone because of their humidity and mist precipitation conditions (Nogué et al., 2013), the best-preserved areas are often surrounded by drier and disturbed stands (Del Arco et al., 2006) that are more prone to fire providing a conduit for fire to reach more preserved areas.

This study was carried out in the Garajonay National Park in La Gomera island (Figure 2), representing one of the best-preserved laurel forests of the Canary Islands. These subtropical laurel forests (code 9360 of the Habitat Directive) are restricted to the Macaronesian region being completely dependent on the humidity and fog precipitation. Five stands affected by four different fire events were studied with fires in 1960 (El Cedro), 1984 (Tajaqué), 1995 (Los Gallos) and 2012 (Los Gallos and Tajaqué). Adjacent non-burnt stands comparable to each considered forest type were also selected. Finally, three burnt and three non-burnt plots were done in each locality. Localities with two year of fires share the same control plots, like occurs in Los Gallos (1995 and 2012) and Tajaqué (1984 and 2012).

Saxicolous and terricolous species were studied using nine microplots randomly selected at each plot. For epiphytes, three individuals of each tree species were selected and then four samples were done in base, trunk, inner and outer canopy. Bryophyte species were first identified in the field and then was taken to the lab for confirmation to the species level.

Environmental (elevation, mean annual temperature, annual precipitation and mist precipitation) and forest structure variables (density of tree per hectare, herb cover, shrub cover, canopy cover, canopy height, DBH...) were recorded for each plot to correlate with composition and abundance of the bryophyte groups distinguished.

This study represents the first reported results on how fires damage bryophytes from macaronesian laurel forests. Our results support that there is not a single post-fire successional pattern being highly dependent on the ecological and phylogenetic groups considered. These functional groups show different patterns on richness and composition because of their distinct tolerance to disturbance in forest structure and variations in climatic conditions, decreasing the influence of time since fire. Terricolous species are the only ecological group with a clear community of early successional stages, firstly *Funaria hygrometrica* which was gradually replaced by *Ptychostomum* spp, *Bryum* spp, *Ceratodon purpureus*, *Geheebia siccula* and *Trichostomopsis australasiae*. However, for epiphytes and saxicolous species a more complex picture was obtained.

Mosses and liverworts showed different responses for richness and cover following opposite patterns in burnt and control plots. Surprisingly, we found no significant correlation of liverwort species richness with climatic variables (except marginally significant for precipitation) in burnt plots where TSF was more significant. In burnt plots the presence of liverwort species was highly dependent on the existence of protected microhabitats, where they can avoid, in part, less favorable post-fire conditions (higher light exposure and desiccation).

However, liverwort cover showed significant correlations with the environmental conditions, indicating that the abundance of this group depends on the humidity conditions. Thus, liverwort cover in burnt plots follow the same pattern that in control ones with high influence of both, forest structure and environmental conditions. Opposite responses between mosses and liverworts were also obtained for epiphytes, terricolous and saxicolous communities separately. Epiphytes followed the same pattern that was previously explained for all bryophytes, regardless of ecological groups. Contrary to the results obtained for liverworts, epiphyte moss richness and cover were negatively correlated with TSF. This may be interpreted as a lower diversity per sample as the forest age increases, which may be explained because of the loss of numerous pioneer/colonizer species that are widely distributed after fire.

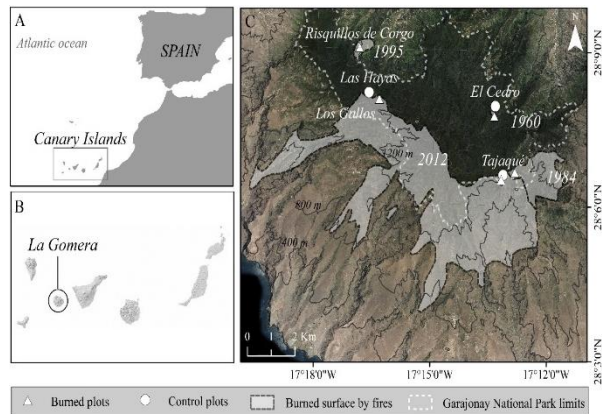


Figure 2: Location of Canary Islands (A), La Gomera (B) and Garajonay National Park (C). Extracted from: Cedrés-Perdomo et al., 2023.

Different pre-fire conditions, environmental drivers and fire severity result in significant differences between



Figure 3: Forest floor of 2012 fire area one year later with dominance of *Funaria hygrometrica*. © Juana María González Mancebo

localities, indicating the absence of a common assemblage in the early successional stage. This highlights the notable influence of colonization from the surrounding non-burnt forests and the distance to the dispersal source, even for bryophytes, a plant group with high dispersal ability. Post-fire recolonization by bryophytes is highly dependent on the phylogenetic and ecological groups considered, which determines variations in the influence of TSF and the environmental and forest structure variables.

For more information, you can access to the original article (Cedr s-Perdomo et al., 2023) in the following link <https://doi.org/10.1016/j.ppees.2022.125702>.

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Bryological news from Puerto Rico

Amelia Merced

University of Puerto Rico, Río Piedras & International Institute of Tropical Forestry

Although the bryophyte flora of Puerto Rico is relatively well described, there were not many resources for beginners to learn about local bryophytes. In 2019 I began a project to survey and identify the common bryophytes in the forests of Puerto Rico. Many of the forests of the island are moist or wet tropical. These forests are a combination of older, secondary forests and many others have regrown on abandoned agricultural fields.

This project to survey and identify common forest bryophytes is sponsored by the Forest Health program at the USDA Forest Service International Institute of Tropical Forestry in collaboration with the University of Puerto Rico. Specimens collected were deposited at the University of Puerto Rico, Río Piedras Herbarium. Bryophytes were photographed in the field and with the microscope, to prepare a series of resources for identification. We now have two rapid field guides in digital form, one for the Bryophytes of El Yunque National Forest and one for Bryophytes of Urban and Community Forest. In addition, two printed resources were made: a poster with photos that identifies the names of 20 species of bryophytes and a spiralbound guidebook that includes more detailed photographs and descriptions. Many of the resources are in Spanish, or English and Spanish.



All resources were distributed to diverse organizations around the island and are publicly available at no cost. A series of seminars and workshops, online and in-person, accompanied the dissemination of the materials for identification. The in-person field workshops were directed towards people and organizations that work in forest management, conservation, education, and ecotourism. These resources include a small part of the diversity of bryophytes of the island and are not meant to be

exhaustive. The focus is to encourage management practices that recognize bryophytes as an integral part of the ecosystem and forest health. This represents an important contribution to promote and cultivate the curiosity about the miniature world of bryophytes.

For more information, please feel free to check out the following links:

- i. Web page: BriofitasPR <https://bit.ly/3OhCFX1>
- ii. Link to resources: <https://ameliamerced.weebly.com/resources.html>

Moss flora of Russia: two steps from completion.

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Moss flora of Russia has a long history of exploration, but it is still not published completely. There is only one publication, “*Syllabus muscorum frondosorum hucusque in Imperio Rossico collectorum*” by Weinmann (1845), where each species possesses morphological description. However, this *Syllabus* includes less than 300 species, many of them being recorded from areas outside the present territory of Russia.

The data on the moss species diversity in Russia were published mainly in regional floras and checklists. The treatments for the whole country, that time for the USSR, were published for *Sphagnum* (Savicz-Lyubitskaya and Smirnova, 1968) and for acrocarpous mosses (Savicz-Lyubitskaya and Smirnova, 1970), where species distribution was given for six main subdivisions of the country, some of regions being larger than the whole Western Europe. Useful descriptive floras and identification manuals also appeared for the Russian Far East (Lazarenko, 1935), Arctic (Abramova et al., 1960), Central Siberia (Bardunov, 1969), Central and Western European part of the USSR (Melnichuk, 1975), but they were far not enough for an extensive territory of the country.

Bryophyte studies of the past decades of the 20th century brought a lot of novelties; the molecular phylogenetic studies since the year 2000 greatly accelerated moss taxonomic studies. It became exceedingly difficult to follow all the appearing data scattered in numerous publications both in bryological periodicals and in various journals devoted mostly to molecular phylogenetic studies. Getting together all the data on Russian moss flora became really necessary.

Broad cooperation with European, American, Japanese and Chinese bryologists in these years, facilitated by IAB, resulted in a number of taxonomic revisions of Russian bryophytes. This allowed us to combine treatments of Polytrichales, Grimmiaceae, Funariaceae and few smaller orders, and in 2017 publish them as the volume 2 of the Moss Flora of Russia, which was planned to be in 6 volumes.

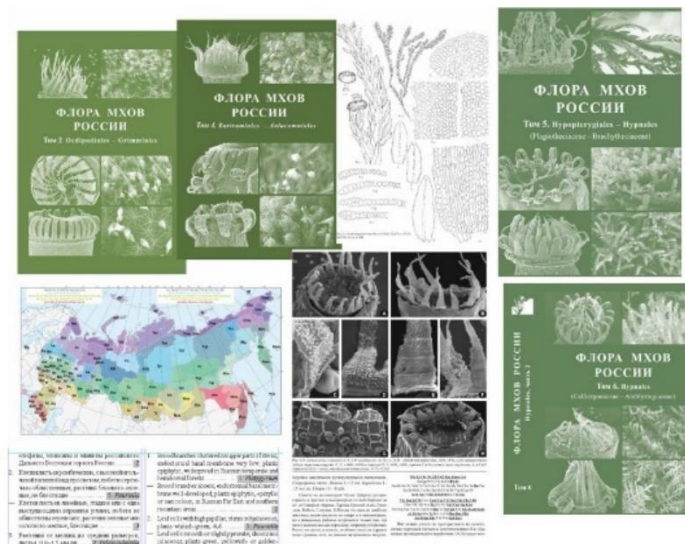
Why 2d and why 6-volumed? Six came out from the point that the Moss Flora is especially useful if all the species are well illustrated, thus in average a species needs two pages. In mid-2010s we evaluated Russian moss diversity as 1200 species, and therefore count 2400 pages as a convenient format. The evolutionary arrangements were planned as follows:

- i. Vol. 1: General, Sphagnales, Andreaeales, Andreaebryales and hopefully finally found *Takakia* that is still waiting to be discovered in Russia.
- ii. Vol. 2: Eperistomataceae, Nematodontaceae, Diploleptaceae opposite, and Haploleptaceae excepting Dicranaceae
- iii. Vol. 3: Dicranaceae (incl. Pottiaceae)

- iv. Vol. 4: Acrocarpous part of Diplolepidous alternate
- v. Vols. 5-6: Pleurocarps

The systematic order fortunately remains and we generally managed to maintain an original plan. The publishing order changed against the original plan, depending on achievements of publication of taxonomic novelties, so to keep taxonomy consistent with most recent molecular phylogenetic results.

From the beginning, we decided to publish Vol. 1 in the end, as it is better to have a general key for all taxa in all volumes. Such a key was and is impossible to build now. During the publication, already after 2017, many new genera and even families (e.g. Erpodiaceae), were discovered in Russia. No need to mention that the circumscriptions of many genera were drastically reconsidered in these years. Also, instead of 1200-1250 species expected originally, the moss flora of Russia now enumerates no less than 1340.



So where we are now? Far beyond the middle. Four books are already published in 2017 (2d vol.), 2018 (4th vol.), 2020 (5th vol.) and in 2022 (6th vol.). They include 930 species altogether. Two volumes are the two steps that remain. The next step must be the 3d volume, and it is one of the most difficult, as the Dicranales (incl. Pottiales) is the second order in number of species. With no less than 320 species in Russia, the Dicranales are the second after Hypnales, which are represented in Russia by 453 species.

However, no less than half of the 3d volume is in a form of drafts now, and illustrations are prepared and are going appear soon on-line on the Moss Flora of Russia site: <http://arctoa.ru/Flora/taxonomy-ru/taxonomy-ru.php> and <http://arctoa.ru/en/Flora-en/>. The published families and genera are fully available at this site as a parced pdfs from the Flora. The flora is a result of cooperative efforts of the bryologist from many countries: <http://arctoa.ru/en/Flora-en/general-en.php>.

The main text of the Moss Flora of Russia is in Russian. However, keys to genera/species, short descriptive comments on species, and a broad indication of species ranges/frequency within Russia are also given in English, edited by Bruce Allen. The species distribution is given for the administrative units of Russia, but some large territories and islands are given separately, according to <http://arctoa.ru/en/Flora-en/regions-en.php>. Print copies of the Moss Flora of Russia are also available from arctoa@list.ru.

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We encourage you to renew your membership and/or to invite others to consider joining and contribute to the IAB's mission of promoting the study of bryophytes and the cooperation and communication among bryologists.

Challenges to Understand the Conservation Status of the Brazilian Bryophytes — A Reflection

Eduardo Toledo de Amorim, Denilson Fernandes Peralta, Juçara Bordin, Paulo E. A. S. Câmara

Abstract

Background and Aims. Report an initiative of the Brazilian community to optimize and automate strategies to the calculation of automated criteria and species assessment conducted by groups of experts.

Methods. A list of the bryophyte species endemic with wide distribution (potentially Least Concern - LC) was prepared from the taxonomic backbone of Flora do Brasil 2020 was compared with an standardized database of occurrences for each species from the available databases (Splink, JABOT and GBIF). Each species was submitted to the rapid evaluation method and classified into two groups: potentially threatened species and potentially fewer worrying species. Afterwards, a set of data with the occurrences of the potentially less worrisome species was given to the specialists to validate its origin and to confirm its distribution. The species were then evaluated and those that met the LC criteria were kept in this category and the others were sent for evaluation in the continuous flow, which will be carried out later by CNCFlora.

Main results. From the 100 species selected, 48 were validated as Least Concern (LC) and 52 were forwarded to the more detailed ongoing flow, where they will be evaluated in the future. Those tools used are fundamental steps that should be taken in consideration when producing a red list for the Brazilian Bryophytes.

Conclusion. We would like to present some of the most relevant challenges observed during the Workshop in order to contribute to the ongoing efforts: *Collections are usually not updated; Sampling; Literature based x collection databases; Taxonomic impediment; Bad taxonomy.*

Keywords: Brazil; Bryophytes; conservation; rapidLC.

Introduction

Extinction is a natural process, and about 99% of the earth's species are already extinct (Novacek, 2001), however the growth of the human population and its consequent demand for natural resources, accelerated extinction at rates up to 1,000 times higher than the normal extinction rate observed throughout the geological history of the earth (Ceballos et al., 2015). Biodiversity loss has never been as high as in the last 50 years (Millenium Ecosystem Assessment, 2005) and the pressure on biodiversity remains or is intensifying (Secretariado da Convenção sobre Diversidade Biológica, 2010). Based on these unprecedented rates of biodiversity loss, led Barnosky et al. (2011) to consider that we live in a sixth era of mass extinction.

Plants are usually overlooked as if they encounter less threat, and neglected groups like Bryophytes are virtually forgotten. Mosses are the second largest group of land plants, second only to the Angiosperms (Mishler and Kelch, 2009), they represent an important part of most biomes but are often neglected and absent from local floras. Bryophytes have several functions within different ecosystems; they are important components of the phytomass in the different terrestrial phytophysognomies, may even be dominant, as in the polar regions (Ochyra et al. 2008); actively participate in nitrogen fixation, and therefore are considered important organisms in global biogeochemical cycles (Porada et al. 2014); they have a greater and faster

mineral absorption capacity than angiosperms and thus can be considered as biomonitors of air quality (Bates 2009); they can interact with animals, inserted in the food chain (Maciel-Silva and Santos 2011; Glime 2017), or serve as a shelter for different groups of protozoa and animals, vertebrates and invertebrates (Rodrigues et al. 2016; Câmara et al. 2021).

The GSPC (Global Strategy for Plant Conservation) aims to implement goals to be pursued by the United Nations's Convention of Biological Diversity (CBD), one of its goals is to evaluate the conservation status of all known plant species. This shall include also the poorly known Bryophytes, becoming a big challenge when considering a country like Brazil, with a megadiverse flora and huge area. Endangered species lists have been used to inform and influence conservation policies and legislation and also stimulate research and monitoring; programs for species and/or habitats; monitor the state of biodiversity; regulate the development and exploitation of natural resources; direct geographical areas to conservation planning; increase public awareness about human impacts on biodiversity; and assist in the definition of priorities for the allocation of conservation resources (Miller *et al.*, 2007). Although all stages of red list elaboration are important, it is urgent that optimization and automation strategies be employed, such as the calculation of automated criteria and species assessment conducted by groups of experts (Bachman et al., 2020).

The occurrence record validation of a species, is one of the stages of the extinction risk assessment, adopted by the *Centro Nacional de Conservação da Flora/Jardim Botânico do Rio de Janeiro* (CNCFLORA/JBRJ), the official institution responsible for risk assessment of the Brazilian flora; it is a crucial step to obtain maximum accuracy in understanding the distribution of taxa, enabling analyses of extent of occurrence and area of occupation. In this regard, several specialists in each taxonomic group are consulted, who have been constantly collaborating with the Institution, confirming the occurrence records compiled from the various databases. However, the validation and assessment capacity is still insufficient, given the almost 40,000 species of Brazilian plants by the number of people actively working. With the purpose of speeding up the validation stage, the CNCFLORA hosted a workshop "New Strategies to Achieve Goal 2 of the GSPC in Brazil". In this paper, we try to outline the main challenges and pose suggestions discussed in the meeting.

Materials and Methods

Obtaining and refining data - For the initial delimitation, a list of bryophyte species endemic to Brazil was prepared, according to the taxonomic backbone of Flora do Brasil 2020 (<https://floradobrasil.jbrj.gov.br>). Subsequently, the set of all occurrences for each species to be worked on were compiled from the available databases (Splink, JABOT and GBIF). For data refinement, the attribute fields of occurrence records, from different databases, were standardized following the Darwin Core system, according to Moura et al. (2022). In addition, following the same authors, the geographic coordinates were standardized. In the absence, the geographic coordinates were assigned according to the name of the municipality and state; finally, the standardization of the collectors according to Moura et al. (2022), aiming to remove duplicates. After pre-processing the records, the species were submitted to the rapid evaluation method, rapidLC (Bachman et al., 2020), mainly taking into account the occurrence extension value. In this way, two groups were classified:

potentially threatened species and potentially less worrying species. At this time, only endemic species with wide distribution (potentially Least Concern - LC) were worked on, aiming to increase the speed of risk assessment processes, given the greater expense to assess them.

Afterwards, a set of data with the occurrences of the potentially less worrisome species was given to the specialists. Each occurrence record was validated when its origin, to confirm its distribution. The species were then evaluated and those that met the LC criteria were kept in this category. The others were sent for evaluation in the continuous flow, which will be carried out later by CNCFlora.

Results and Discussion

The 100 species selected in the automatized process are checked by the group of specialists that signed this report and 48 were validated as Least Concern (LC) and 52 were forwarded to the more detailed ongoing flow, where they will be evaluated in the future. It is not our objective here to provide a list of species evaluated for their risk of extinction, this being a submission made directly to the IUCN, given the documentation required for this process (IUCN, 2022) and, to the Ministry of the Environment of Brazil, being thus incorporated into the official and legally protected lists. Both processes are performed by CNCFlora.

The automated output was evaluated as effective and the system friendly to the validation, but more than 50% return to be reevaluated because the information provided to the set of specialists is a mirror of the data available. Thus, we would like to present some of the most relevant challenges observed during the Workshop in order to contribute to the ongoing efforts, ensuring a more precise evaluation in the future. Those are fundamental steps that should be taken in consideration when producing a red list for the Brazilian Bryophytes.

Collections are usually not updated - The whole process of elaborating red lists relies directly on available databases. In order to be sure of data such as species range and identification, the existence of clean and updated collections are of paramount importance. One way of achieving this is that taxonomists need to visit and work on the existing thousands of collections; unfortunately, we noticed that even collections with annotated specimens usually fail to update the online data, so it is common that specimens available online (the main source of data) are outdated.

Yet another issue is that the same specimen may appear in different collections under different names, this is also due with database updates (or lack of it). It is a well-known fact that most Brazilian herbaria have few technicians and not all of them are trained on database management, this is a much worse scenario when it comes to bryophytes as those collections are often neglected.

Another problem is that when a taxonomic revision is published it is very rare that herbaria will look into those papers to update their own collections. Collection management is a big challenge and should not be taken lightly, we believe that is crucial that baseline data are kept updated and available online, as only in this way will we have a solid basis for a more accurate assessment of the geographic distribution of specie and, consequently, for the quick elaboration of a list of threatened species with more accurate and reliable data.

Sampling - We also noticed that collections continue to be made in the same locations, places with easy access like roadsides and riversides, protected areas, sites close to research institutions, very few collections are made in more difficult locations. This taxonomic insistence (Amorim et al., 2021) introduces a serious sampling bias causing precision problems in the geographical representations of species. Sampling data is also crucial for accessing the IUCN criteria. There also seems to still exist very huge gaps in collections in certain areas of the country, on the other hand it is important also to notice that some areas may even have been sampled, but the local herbaria are not digitized or available online. So it is important to both: increase the sampling and digitizing the existing collections, in particular local (and usually smaller) herbaria.

Literature based x collection databases - As mentioned above, most of the process of generating red lists is based on available data from digitized collections that are sometimes not updated or georeferenced. However we noticed that some of the missing data has already been published on taxonomy papers but the original collections were not updated accordingly. Available online systems used didn't have a tool to check the relevant literature. It seemed to us that using the literature is crucial and would render a much better quality data instead of relying solely on available databases. But again, collection managers need to keep their collections up to date.

Taxonomic impediment - We wanted to stress the importance of well-trained taxonomists to provide reliable baseline data, unfortunately the number of taxonomists in our country is still very low, especially when considering our megadiverse flora, and the situation for bryophytes is even worse. After a period of some increased interest, we are now again seeing a reducing number of Bryophyte experts as many are retiring and not being replaced with new ones. It is not possible to produce reliable red list data without good taxonomy.

Bad taxonomy - Another important point is the bad taxonomy. We have noticed a number of odd records in the available database collections and they are usually associated with identifications made by an unknown person or by a name not recognised by none of the experts present. Important decisions like compiling a red list cannot be made based on identifications made by untrained taxonomists. It is not uncommon that even undergraduate students, when still in training, start naming plants in herbaria. If on one hand it is an important exercise and on the other, it is problematic as there is a bigger chance of the name being wrong and end up feeding the databases used. According to Goodwin et al. (2015) about 60% of all tropical herbaria names are simply wrong, so we should not consider the information correct only because it is written in the specimen or available on herbarium sheets.

As final considerations we would like to bring an example that reflects some of the important points raised above. Câmara and Carvalho-Silva (2011) published a study on the moss *Taxithelium juruense* (Broth.) Broth. The type was collected by *Ernst Ule* (1854-1915) at Juruá Mirim river in the state of Acre and only later in 1971 a new collection was made from the same region. However, after that second collection, this species started to be reported more frequently from many other locations in Brazil from places as far from Acre as Rio de Janeiro and Bahia. That fact gave this species a bigger range and higher number of collections. However,

when studying the type material and virtually all specimens named as *T. juruense* in the world, Câmara & Carvalho-Silva (2011) realized that apart from two first collections from Acre, all other identifications were wrong. Furthermore, this information has already been published and was available for more than 10 years but, surprisingly, the online databases still list all the wrong locations with the wrong names and consequently still gives the impression on whoever studies this species as it is of a common and widespread plant species of the least concern (LC), when it may even be already extinct.

This emblematic case demonstrates most of the five points raised above. We believe that cases like this are much more common than we think and poses an important challenge for accessing conservation status not only from Brazilian bryophytes, but from all data from plants deposited in herbariums.

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#WomenInBryology

If you haven't already there is still time to share your story. We are grateful to all who have contributed this year to raising the profile of women in bryology by sharing their journey with the bryological community around the globe.

Biographies: Marta Alonso García · Julia Askeland · Maaïke Bader · Jessica Beever · Imen Ben Osman · Elise Biersma · Juçara Bordin · Laura Briscoe · Ida Bruggeman-Nannenga · Jessica Budke · Isabelle Charissou · Preeti Chaturvedi · Chris Cargill · Kirsten Coe · Daniella Damm · Joanne Denyer · Nivea Dias dos Santos · Isabel Draper · Alison Downing · Jenna Ekwealor · Stella Fish · Nicole Fenton · Virginia Freire · Janice Glime · Ida Haerida · Alison Haynes · Patricia Herrera-Paniagua · Helena Hespanhol · Mélanie Jean · Yelena Kosovich-Anderson · Liz Kungu · Elizabeth Lavocat Bernard · Emma Little · Aline Matos de Souza · Amelia Merced · Catalina Montoya Molina · Ariadna Ibarra-Morales · Janejaree Inuthai · Gaik Ee Lee · Annie Martin · Morgan McCool · Pina Milne · Maham Munir · Ainun Nadhifah · Manju C. Nair · Konstantinova Nadezhda · Jean Paton · Jessica Paull · Nonkululo Phephu · Martina Pörtl · Nirmala Pradhan · Aimee Pritchard · Helen Ramsay · Catherine Reeb · María Victoria Ríos Gálvez · Yoira Rivera Queralta · Kathrin Rousk · Noris Salazar Allen · Andrea Sass-Gyarmati · Patricia Selkirk · Mandy Slate · Susan Studlar · Rossarin Pollawatn · Phiangphak Sukkharak · Mereia Tabua · Obchant Thaitong · Barbara Thiers · Perpetua Turner · Cristiana Vieira · Jennie Whinam · Marianne Worley · Sun Yue

These stories can easily be accessed here: <https://bryology.org/women-in-bryology/> or search the hashtag #WomenInBryology on social media.

For those of you who are keen, Dr. Chris Cargill, who is leading this project would be delighted to see you in her [inbox](#) 😊

**Calling ALL
#WomenInBryology**

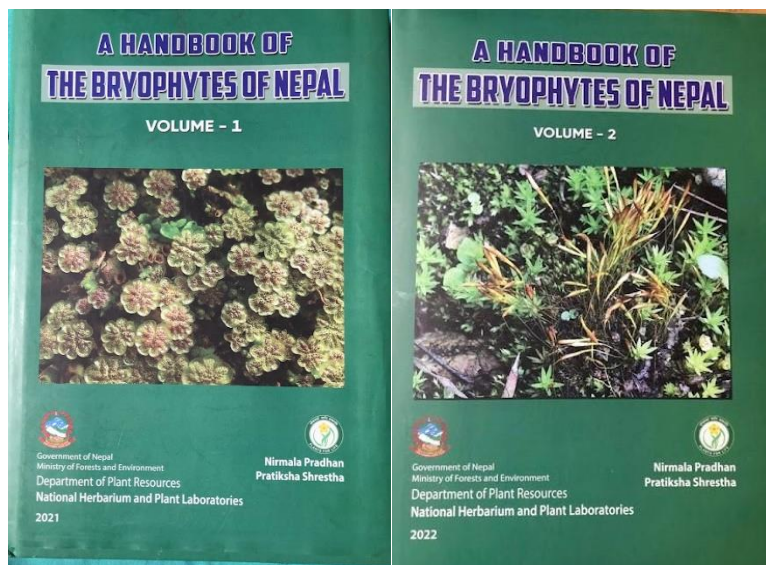
**Tell us why you
love bryophytes.**

**Scientists,
students, curators,
amateur
bryologists, etc.**

**We'd love to hear
from you!**

News from Nepal

Dr. Nirmala Pradhan, who has been a member of IAB for a longer period of time, is the author of *A Handbook of the Bryophytes of Nepal, Volume II*, published in 2022. This book includes a range of 285 species of Nepalese mosses from the family Takakiaceae to Pottiaceae, which are distributed from the lowest elevation of 62 m to 6,500 m in the Himalayas. In this book, Ms. Pratiksha Shrestha is the second author. The first book in this series, written by Dr. Nirmala and Pratiksha, was released in 2021



and included a short description of all genera of liverworts and hornworts recorded in Nepal. All mentioned species are provided with their common names, habitat types, and distribution ranges, including the author's citation and references. Altogether, 552 species of bryophytes are included in this book, of which 11 are from Anthocerotopsida. The Department of Plant Resources, National Herbarium and Plant Laboratories, Ministry of Forests and Environment of the Nepal Government published these books.

Rastriya Wanaspati Puraskaar - The National Award Given to the Distinguished personality in the field of Plant Science.



Dr. Nirmala Pradhan also received the National Botanical Award 2023 of Nepal in recognition of her forty years of study and research on bryophytes. She has authored numerous research papers on Nepalese bryoflora in addition to four books that are solely dedicated to bryophytes. She has participated to numerous bryophyte research projects sponsored by National and International organizations in Nepal. Professor Dr. Pradhan is the most senior and experienced bryologist in Nepal.

Congratulations Dr. Nirmala Pradhan 😊

Notes about some Lord Howe Island mosses

John Game

Research Associate, University of California Herbarium, Berkeley and National Tropical Botanical Garden, Kauai.

I have been fortunate to make four visits to Australia's iconic Lord Howe Island in the Tasman Sea over a period of fifty years. The island is about 780 km. northeast of Sydney, with a warm-temperate climate at latitude 31° South (Figs. 1 & 2). Botanically, it is one of the most interesting small, remote oceanic islands in the world. Back in the 1960s I made extensive botanical collections there, including bryophytes. Recently, I have focussed on photography there.



Figure 1. A view of Lord Howe Island in 2015 from Malabar Hill looking south across the settled area to Mts. Lidgbird (left) and Gower.



Figure 2. A view of Lord Howe Island looking north from the summit plateau of Mount Gower in the 1960s, prior to the building of the airstrip.

Given David Meagher's tragic passing in August this year, it seems appropriate to share some notes about Lord Howe's wonderful bryophytes, since David was the acknowledged expert on this topic. He wrote a detailed and excellent Ph. D thesis entitled *The bryophyte flora of Lord Howe Island: taxonomy, diversity and biogeography* (Meagher 2018). The island has some spectacular endemic mosses, especially those found on the small but famous cloud forest zone at the top of the two mountains. In 1915 the Rev. W. Walter Watts wrote:

"The top of Mount Gower is a veritable paradise of plant-life—one of Nature's Botanic Gardens, consisting of some 120 acres of rich scrubland. Here, on this rich plateau, may be found fern after fern, and moss after moss, that occur nowhere else in the world" (Brotherus and Watts 1915).

This is still true today, although some species that Watts considered endemic are now treated as conspecific with taxa elsewhere. Currently, fifteen bryophyte taxa are listed as endemic to Lord Howe (Meagher 2018). The two most dramatic mosses of the cloud forest are *Spiridens muelleri* Hampe [Spiridentaceae] (Fig. 3) and *Pterobryella praeinitens* (Hampe) Müll.Hal. in Besch. [Pterobryaceae] (Fig. 4). Watts described the *Spiridens* as "one of the most striking and handsome mosses in the world, especially when seen in its native state". I agree with this, but it is also true of other *Spiridens* species elsewhere. *S. muelleri* is very conspicuous on the



Figure 3. Close view of a stem of *Spiridens muelleri* in cloud forest on the Mount Gower plateau, Lord Howe Island 2013.

Gower plateau, forming large clumps of very long dark green stems mostly on the trunks of tree ferns, growing together with *Hymenophyllum* species and other epiphytic ferns. It was convincingly confirmed as a true Lord Howe endemic by Meagher and Bayly (2014). In the 1960s I brought a herbarium specimen of *S. muelleri* back to England, where I lived, and attempted to grow a couple of stems from it. To my surprise, the stems sprouted and I have been able to keep it and another *Spiridens* species in cultivation for many decades. The genus seems easy to grow in a rough mix of bark and moss in a cool-temperate terrarium with moisture and moderate light suitable for filmy ferns.

Pterobryella praenitens is also a magnificent moss with large highly branched frondose stems up 20 cm long (Fig. 4). It is less conspicuous than the *Spiridens* because it likes to grow on rock faces in more secluded recesses in mountain forest, rather than on highly visible trunks. It extends further down the mountains than *Spiridens* but is still a wet forest/cloud forest species. It is a highly distinctive endemic in a genus of about six currently recognised species, all large frondose mosses found only in the southwest Pacific.

A third large distinctive moss endemic to Lord Howe is *Euptychium robustum* Hampe [Garovagliaceae] (Fig. 5). It too is mostly confined to wet upland areas of the two mountains, where it grows on rocks and trees and has a striking dark green appearance. I have seen it just southeast of the natural rock ledge and overhang known as Goat House Cave. This is at ~428 m elevation on the northeast side of Mount Lidgbird. The trail to



Figure 5. *Euptychium robustum* Hampe photographed just southeast of Goat House Cave on Mt. Lidgbird, Lord Howe Island, April 2015.

reach Goat House is strenuous and steep but very much easier than the ascent of

Mount Gower. By clambering to the southeast end of the rock ledge adjacent to the overhang one can see a magnificent view south along the moist rugged east face of Mount Lidgbird and beyond to Mount Gower (Fig. 6), allowing for observation of some of the island's charismatic wet forest endemics without climbing Mount Gower.



Figure 4. A herbarium specimen (Game 95/9/14) of *Pterobryella praenitens* (Hampe) Müll.Hal. in Besch. collected from the Mount Gower cloud forest on Lord Howe Island in the 1960s.

These are just three of Lord Howe's 185 bryophyte taxa (Meagher 2018). Lord Howe is one of the most beautiful islands in the world and its original vegetation is well preserved. Its endemic species in almost all groups of organisms are celebrated and well known, with popular guidebooks available for flowering plants,

The Bryological Times

ferns, birds, fish and more. Appreciation of its bryophytes has lagged behind until recently, but David Meagher's work has emphasised that here too Lord Howe is a world-class site for anyone interested in bryology.



Figure 6. A view south on Lord Howe Island from near Goat House Cave, showing wet forest on the east side of Mt. Lidgbird with Mount Gower beyond, April 2015.

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News from Hattori Botanical Laboratory

[Tomoyuki KATAGIRI \(PhD\)](#)

Editor, Hattoria (published by Hattori Botanical Laboratory)

I. We are pleased to announce that Hattoria vol. 14 (2023) has been published, which is fully open access and available on J-STAGE: <https://www.jstage.jst.go.jp/browse/hattoria/-char/en>. The contents include:

1. Andreas HEMP, Giovanni BIANCO & Tamás PÓCS: Homegardens and coffee plantations on Kilimanjaro: Refugium for bryophytes in densely cultivated landscapes
2. Philip SOLLMAN: Remarks on several pottiaceous mosses mainly from the Australian continent
3. Kyouzuke AMAMOTO, Kazuki NISHIHATA, Tomio YAMAGUCHI & Yuya INOUE: Notes on *Ptilidium californicum* (Ptilidiaceae) in Japan
4. Phiangphak SUKKHARAK: The genus *Plicanthus* (Anastrophyllaceae) in Thailand
5. Phiangphak SUKKHARAK: The genus *Calypogeia* (Calypogeiaceae) in Thailand
6. Tomoyuki KATAGIRI: On the status of *Leiomitra robusta* (Trichocoleaceae) from Colombia
7. Lars SÖDERSTRÖM, Laura L. FORREST, Kristian HASSEL, David G. LONG, Ana SÉNECA & Yuya INOUE: Studies on *Aneura* (Aneuraceae): The *Aneura maxima* complex

The proposed timeline for the next issue of Hattoria, Vol. 15 (2024) is 30 April for manuscripts deadline and publication of manuscripts before end of August.

II. The following publications of Hattori Botanical Laboratory are also open to the public for free.

1. The Journal of the Hattori Botanical Laboratory No. 41-50. <https://www.jstage.jst.go.jp/browse/jhbl/-char/en>. No. 31-40 will be open in 2024, and No. 21-30 in 2025.
2. Miscellanea Bryologica et Lichenologica: Vol. 6 (No. 1-10). <https://www.jstage.jst.go.jp/browse/mbl/-char/en>. Vol. 5 will be open in 2024, and Vol. 4 in 2025.

III. We renewed our webpage of Type Specimen Database (NICH). You can search for information on more than 4,300 type specimens (including bryophytes and lichens) kept in Hattori Botanical Laboratory (NICH) with their label images <https://hattorilab.org/database/>.

Back in time with the BT

In January 1985, *The Bryological Times* [volume 30](#) was published with Hiroshi Inoue sharing his thoughts on the IAB in his capacity as the third President of the IAB. In his foreword he reflects on why the IAB was established, briefly stating,



"In August 1966, at the time of the 11th Pacific Science Congress, in a small room of the National Science Museum, Tokyo, there assembled some 15 bryologists and lichenologists (including Dr. W.C. Steere, Dr. S.W. Greene and others) to discuss the possibility of establishing "An International Association of Bryologists and Lichenologists". This informal discussion resulted in the establishment of an organizing committee to promote the ideas expressed at the meeting and bore fruit at the XIth International Botanical Congress in Seattle in 1969 with the formal creation of our present association as "The International Association of Bryologists". The objective of the Association is "to promote international co-operation and communication among bryologists, whether amateur or professional"."

Bryological Treasure Trove

The name Dr. Des Callaghan is easily associated with bryophyte photography and rightly so as he has quite the knack for capturing stunning field images of bryophytes. He very generously allows his images to be utilized by anyone for any purpose including books, papers, presentations, interpretation panels, exhibitions, or anything else. Images can be accessed for free here: <https://bryophytes.myportfolio.com/>.



Asterella marginata. South Africa. © Des Callaghan



The International Association of Bryologists was established in 1969 to promote international cooperation and communication among all persons interested in the biology of bryophytes. This is achieved through sponsorship and arrangement of meetings and symposia that relate to the various aspects of bryology, and by IAB-sponsored publications including *The Bryological Times* and *Bryophyte Diversity and Evolution*. The Association also supports the publication of reviews, lists, software, and compendia.

Website: www.bryology.org

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The Bryological Times is published twice yearly.

Contributions can be emailed to the Associate Editor, [Mereia Tabua](#).

Articles should be less than 1500 words in files no larger than 15 MB.

Images should be at least 2 MB each and may be emailed separately.

The deadline for submissions for the next issue is 31 March 2024.

Cover photo by David Meagher: *Dendroceros crispatus* (Hook.) Nees