



The Bryological Times



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President's Message

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Our international association serves the global community of bryologists, providing services such as bryonet - our on-line discussion forum, Bryophyte Diversity and Evolution - our own journal devote to bryophyte biology, as well as awards recognizing major accomplishments towards furthering our knowledge and enabling students to attend our biennial meetings, and grants to stimulate research on the biology or conservation of bryophytes. These services are made possible by the dedication by council members and ad hoc volunteers from our community.

Council members are elected for a four- year term, with the terms of half its members overlapping by two years with the terms of the remainder of officers. Hence, we hold elections every two years, prior to our biennial meeting. In the coming weeks we will solicit nominations, including self-nominations from our members to join the team of council members, and contribute to the enhancing of IAB

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services and resources. I encourage you to seriously consider serving our association and participate in our mission. This year the council is proposing a new by-law aimed at broadening the geographic representation of our membership at the council level, by ensuring that our membership from each continent is equally represented at the council

level, and that our two vice-presidents represent transoceanic constituencies (see entry on page 17 of this issue). In addition to holding elections in early 2021, IAB will also seek nominations and application for awards and grants, respectively (see entry on page 17 of this issue). Our awards include recognizing the achievements of bryologists over the first 25 years of his/her/their careers or the significance of his/her/their publication(s) in the last two years (2019-2020). The various adjudication committees depend on robust and comprehensive nominations. I invite you to compose strong nominations of a meritorious colleague for our prestigious awards. Finally, I would like to take this opportunity to thank Dr. Patrick Dalton for his exemplary service as editor of the Bryological Times over the last two years. His dedication to seeing the completion and publication of several issues of our newsletter is most sincerely appreciated, by the council and our entire membership. Starting with the first issue of 2021, i.e., issue 152, Dr David Meagher (Australia) and Ms. Mereia Tabua (Fiji) will lead the editorship of the Bryological Times. I sincerely thank them for accepting this role, and trust that our members will contribute to the success of their mission to publish informative and engaging issues for the two, and perhaps many, years to come.

Bernard Goffinet



Status of the combined herbaria of Diana G. Horton and David W. Jamieson

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Diana G. Horton (1949-2018), and expert on Encalyptaceae, retired from the University of Iowa and settled in Vancouver, Washington (across the Columbia River from Portland, Oregon). David W. Jamieson (1943-2018) a specialist in *Hygrohypnum* retired from Fort Lewis College, Colorado and joined her in Vancouver. They had plans during retirement to process their large backlog of bryological specimens. However, both died rather suddenly within 6 months of each other, and through their combined estates, the labeled and curated specimens were transferred to UBC where Dave received his PhD under Wilf Schofield. However, all of the undetermined and collections lacking final labels were transferred to CAS during October 2019. The size of this collection is indeed daunting with over 300 shipping boxes of material with many collections in multiple sets for eventual exchange. It is anticipated that these combined herbaria contain over 40,000 numbers to process. Jamieson collections are primarily from western North America but also collecting events to Greenland and Newfoundland, Canada. The collections obtained by Horton during her career are more geographically expansive with collections across North America with several expeditions to Alaska and the Yukon, several European countries including Finland, Switzerland, United Kingdom, and to the Russian Far East, Japan, Australia and Brazil. Currently CAS is transcribing the Jamieson field notebooks so labels can be prepared. The Horton field notebooks for many collecting events have a draft label glued directly in the field notebook to serve for a range of collection numbers. So as specimens are identified it is simply the task to prepare annotation labels, copy the collecting event label from the field notebook x times, affix

the annotation of each collection number on a copy of that label then re-photocopy x times on archival quality paper to accommodate the number of exchange available per collection number. We anticipate the curation of this collection to take many years to complete. Nonetheless, the goal is to distribute specimens yearly as specimens are processed.



CAS plans to start the first wave of distributing Jamieson and Horton duplicate collections among its specimen exchange partner institutions starting in early 2021. However, if your institution is interested in being part of this exchange distribution, or desire specimens from specific geographic regions or taxonomic groups, contact Jim Shevock at jshevock@calacademy.org. CAS will also consider requests for selected material as gift for det arrangements



The Austrian *Riccia* Morphology and Sequencing Project

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The “*Riccia* Morphology and Sequencing Project” was born in 2018 in Styria, south-eastern Austria, after an unusually rainy summer.



Figure 1: A conventionally used maize field with high coverage of *Riccia*-thalli (September 2020, South Styria)

Although thousands of beautiful *Riccia*-thalli populated the arable fields around Graz, they proved to be quite resistant to determination when put under the microscope. It is no news to bryologists that the delimitation of *Riccia* (Ricciaceae) species is often ambiguous, something especially apparent within the subgenus *Euriccia*. The diagnostic descriptions given for *Riccia*-species often contradict themselves, and frequently, the use of different determination keys can lead to different results. As a consequence, we understood that European *Riccia*-species required further detailed reassessment and decided to put ourselves to the task.

Since herbarium specimens are rarely useful for morphological studies, we focused on working with living material. Over the course of the project, we assembled a dataset consisting of over 360 *Riccia*-samples collected across 16 European countries. Beside our own collections made mostly in Austria, we received samples collected in other European countries by fellow bryologists and friends during their field trips. Many of the European *Riccia*-species (subgenus *Euriccia*) are already represented in our study. From each sample, a specimen is deposited in the herbaria of the Universalmuseum Joanneum Graz (GJO). Additionally, we established a living collection at the Botanical Garden Graz. This collection is primarily intended to produce mature spores, but also gives us an insight into the consistency of characteristics, and the development and growth

of thalli. At its peak, we had 18 species from 11 countries in our living collection at the same time. From all specimens, we measure a set of morphological parameters regarding thalli and spores and collected these in a database. Another focus of our methodology is imaging procedures. Habit photos of single thalli, light microscopic pictures of thallus cross-sections and spores were made for each sample and complemented with SEM-photos of spores. To get deeper insights into thallus development, time laps series were made by taking photo series of a thallus over several months.

In addition to morphological characters, we also carried out DNA-based molecular analyses. Using traditional sanger-sequenced chloroplast loci, we identified little variability across European *Riccia*-species. The extraction of sufficient DNA from such minute thalli is a challenge on its own, which significantly delayed our attempts to assess nuclear loci. However, the last months have seen an important step forward in this regard, and we feel confident to produce *Riccia* specific primers that allow us to soundly study their species-delimitation at a molecular level.



Figure 2: Photos of some *Riccia*-thalli collected in Styrian arable fields that bravely resist a determination

The difficulties with the genus may have objective causes. Perhaps we are dealing with a speciation process characterized by hybridization, autopolyploidisation and backcrossing. Many characteristics used for species description and species delimitation are strongly influenced by environmental factors, for example light,

indicating a low stability of *Riccia*-species in the current perception.

We hope to get a better understanding in species-delimitation of European *Riccia*-species at the end of the project. To move our work forward, we still need support from colleagues, friends and moss enthusiasts around Europe (and adjacent areas) by collecting *Riccia*-samples for our study. We would be very grateful for any contribution in the form of fresh *Riccia*-samples, safely packed in a hard cover. For more details you can download a methodological conspectus of our project under <https://www.researchgate.net/project/Riccia-morphology-and-sequencing-project>



Review of: Michaelis, D. The *Sphagnum* Species of the World. 2019. Bibliotheca Botanica 162: 1–435 with 219 plates, 15 figures. ISBN: 978-3-510-48033-3. € 159,00. 1st English Edition. Schweizerbart Science Publishers, Stuttgart, Germany.

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This volume by Dierk Michaelis purports to be an identification guide to *Sphagnum* species worldwide. It does in fact provide morphological descriptions and additional notes for all the species the author thinks are valid, and provides illustrations for them, mostly reproduced with minor modifications from other publications. As a one-stop source for such illustrations the book is quite valuable and can save the user large amounts of time going back to original species descriptions. However, if the user is looking for an authoritative assessment of the species and their relationships, this book falls far short.

This reviewer finds himself in the awkward position of critiquing a work that is highly and repeatedly critical of many if not most of his

taxonomic and phylogenetic conclusions made during research over the last two decades. It is left to the reader to evaluate whether this critique represents fair criticism or a reciprocal response to criticism from Michaelis, without solid basis. Suffice it to say that this writer has consistently encouraged work by others on the genus *Sphagnum* and has actively promoted such work through the provision of research materials, unpublished data, and encouragement. *Sphagnum* has enough research problems and issues for all of us to engage, and this author will continue to encourage research whether the conclusions agree with his own or not!

Weaknesses of this book include the author's naïve understanding of phylogenetic biology, and his willingness to draw conclusions about individual species based on apparently incomplete or non-existent field (or herbarium?) experience and understanding. Considering that the author makes taxonomic conclusions about European species that he might have seen in the field, it is noteworthy that this reviewer was not able to document a single collection made by the author in any European herbarium data base. Michaelis makes taxonomic judgements about non-European taxa for which he seems to have no knowledge whatsoever aside from studying descriptions and diagnoses made by other authors. Nevertheless, viewed as a literature compilation, *Sphagnum Species of the World* has value.

The Introductory sections of *Sphagnum Species of the World* provide overviews of *Sphagnum* morphology, ecology, and evolution. The first part, labelled **Introduction**, provides descriptions and explanations of *Sphagnum* morphology and reproduction. Most of this is straightforward, but some comments are more speculative. On page 10, for example, the author discusses the phenomenon of isophylly, where stem leaves take on the morphology of branch leaves, and suggests that isophylly can reflect developmental variation. He goes on to say that "It also occurs as an environmental adaptation". It is hard to know what the author means by that, what evidence the claim is based on, or how isophyllous stem leaves might impact the fitness of plants. On page 11, Michaelis suggests that "In numerous species, one of the branches grows into a stem, creating a false bifurcation. This occurs at regular intervals, often

once per year". That is an interesting suggestion, but based on hundreds of hours of studying *Sphagnum* in the field and herbarium, I cannot confirm this form of "false bifurcation". Branches are normally determinate in their growth and usually have more or less species-specific patterns of length variation. Stems, in contrast, can continue to grow for years, decades, even centuries. Plant organs that typically have determinate growth rarely become indeterminate. This surprising observation needs to be photographically documented.

A section on "**Research History**" provides a tabulated comparison of various generic and infra-generic classifications that have been proposed over the last 130 years for peat mosses (*Sphagnum* and related genera in the Sphagnopsida). This is followed by a summary of some fossil Sphagnopsida in a section labelled **Evolutionary History**. Michaelis provides a photographic comparison of putative branch and stem leaves from a Jurassic fossil with a stem leaf from modern *S. papillosum*. While the Jurassic stem leaf could belong to subg. *Sphagnum*, the branch leaf bears little resemblance to any species in that subgenus, and the photograph of the *S. papillosum* stem leaf is of extremely low contrast. This is one of the few illustrations in the book that was prepared by the author (totaling fewer than 10 out of 219). Another illustration (Fig. 15, p. 25 of the book), also one of the instances where the author presents his own illustrative work, is of similarly low quality. To most people these would not be considered publication-quality illustrations, and it's hard to imagine most peer-reviewed journals finding them acceptable.

The rest of the section on **Evolutionary History** reveals the author's extremely naïve understanding of phylogenetic biology. He states on Page 19 that "There are a number of isolated, probably basal, species: *Sphagnum sericeum*, *S. lapazense*, *S. rigescens*, and *S. novo-caledoniae*. Their relationships to each other and to the other species in the genera *Sphagnum* and *Ambuchanania* have been variously charted and re-charted in a number of studies...and it seems fair to say that they are as yet insufficiently understood." He concludes that "While all of these species show both ancestral and derived traits, they do not bear morphological

resemblance and occur in geographically disparate areas.” Michaelis (p. 19) goes on to say that “*S. sericeum* closely approximates the hypothesized ancestral state. However, it remains to be shown conclusively that the hyaline cells of *S. sericeum* primarily lack fibrils.”

What does it mean to say phylogenetic relationships have been “charted and recharted”? What does a “basal position” mean? If a genus (*Ambuchanania* for example) is the sister group to *Sphagnum*, is one “basal” to the other? If they are derived from a common ancestor, can one be older than the other? (presumably this is what Michaelis means by basal.) How do we make inferences about ancestral versus derived traits? The discussion by Michaelis about such traits reveals that he still makes judgements in this arena according to preconceived, subjective notions of what might indicate ancestral versus derived states. The field of phylogenetic biology has progressed in the last 40 years and there are well-established, rigorous, and objective methods for making inferences (i.e., hypotheses) about the polarity of trait evolution! It is sad to think that young students of *Sphagnum* biology might get the impression that this is the current state of making phylogenetic interpretations, when in fact the approach taken by Michaelis reflects a mid-twentieth century view at best; indeed, it reflects more of a 19th century approach to phylogenetics as story-telling.

What about the actual conclusions regarding phylogenetic relationships within the Sphagnopsida? Michaelis rightly points out that my own papers (Shaw et al. 2000, 2003, 2010, 2016) show different and sometimes conflicting relationships between *Sphagnum* and the other Sphagnopsida genera (*Ambuchanania*, *Eosphagnum*, *Flatbergium*) based on different sampling and data sets. I like to think that this is how science works; we presented revised inferences as molecular and analytical methods developed over a 20-year period. It is nevertheless fully acknowledged that changing inferences mean that substantial uncertainty about precise sister-group relationships in the Sphagnopsida remains. Michaelis cannot therefore be faulted for expressing healthy scepticism. However, in spite of uncertainty in some relationships, Michaelis failed to recognize

one consistent inference, that the species we reclassified as *Ambuchanania*, *Eosphagnum*, and *Flatbergium* **do not fall within the *Sphagnum* clade**. That is, we may not know exactly how they are related to one other in terms of precise ancestor-descendant relationships, but they should not be included within *Sphagnum* s. str.! It is noteworthy that in the most extensive analysis of moss relationships to-date, based on 150 nuclear genes, 40 mitochondrial genes, and 83 plastid genes, Liu et al. (2019) confirmed that those segregate genera fall outside *Sphagnum* and with very strong support indicate that a clade containing *Ambuchanania* and *Eosphagnum* (as sister groups within that clade), is sister to a grade leading to *Flatbergium* and then *Sphagnum*. Although the word “proof” is no more appropriate in phylogenetic biology than in any other area of science, this pattern is solid; that the segregate genera are outside *Sphagnum* s. str. is a very strongly supported hypothesis at this point. This is unlikely to change.

The next section, **Ecology of peat mosses**, contains a useful overview of *Sphagnum* habitats. Michaelis notes that habitats range from roadside ditches and forests to bogs, fens, and lakes, and that some species, for example, *S. magellanicum* Brid., range widely across habitats. Had Michaelis any field experience with tropical or Southern Hemisphere taxa, he would have realized that the habitats of *Sphagnum* in those regions encompass an even broader range of microsites. On page 23 he takes exception to the suggestion by Shaw et al. (2010) that peatmosses evolved at high latitudes and secondarily colonized the tropics. He notes fossils from tropical habitats, and then discusses that the range of habitats peat mosses occupy is comparable in temperate/boreal vs. tropical ecosystems. The temperate latitudes harbor more species that occur exclusively in mires. As interesting as these observations are, their relevance to the question of the ancestral range for *Sphagnum* is obscure, and Michaelis does not explain. Shaw et al. (2018) published a more detailed and analytically rigorous study (than our 2010 publication) of this question and concluded, based on formal and explicit analyses, that the major peat-forming subgenera of *Sphagnum* (*Acutifolia*, *Cuspidata*, and *Subsecunda*) originated at northern latitudes

and subsequently expanded into tropical and Southern Hemisphere regions; the ancestral area for subg. *Sphagnum* was ambiguous.

The last of these sections, **Notes on Identification**, provides a brief overview of the rest of the book, which mainly consists of descriptions and illustrations for individual species. It also includes at some length, the rationale and sources for geographic information. These are useful references to have in one place. Michaelis notes that ecological information about tropical taxa is limited; indeed, the high diversity of *Sphagnum* in some tropical areas, especially South America, warrants much additional taxonomic, biogeographic, and ecological research.

Subsequent sections of *Sphagnum Species of the World* provide keys to taxonomic sections (2.1, pp. 27–28), short diagnoses for those sections (2.2, pp. 28–32), and keys to species organized by region (3.1, pp. 33–66). In his sectional classification for *Sphagnum*, Michaelis ignores strongly supported molecular phylogenetic inferences and instead utilizes a completely subjective approach. Aside from including species that unambiguously fall outside *Sphagnum* (as noted above; *Eosphagnum*, *Flatbergium*) he recognizes separate sections for *S. aongstroemii* C. Hartm., *S. macrophyllum* Brid., *S. pylaesii* Brid. and *S. tenellum* (Brid.) Bory despite strong and replicated evidence that these taxa fall into the subgenera *Acutifolia*, *Subsecunda*, *Subsecunda*, and *Cuspidata*, respectively. He seems to simply reject the field of phylogenetic biology altogether! The section summarizing this positively misleading infrageneric classification for *Sphagnum* is followed by regional species lists (3.2, pp. 66–71). Notwithstanding that the keys and lists reflect Michaelis's decisions about what species to recognize, and competent taxonomists can agree to disagree about such decisions, these resources provide a useful summary of species that might be encountered by collectors in different regions.

The bulk of the book is taken up by the next section, **Species Descriptions**. Here Michaelis provides well-organized entries for each species, including nomenclature, morphology (“Habitus”), miscellaneous notes, habitat descriptions, and geographic distributions. The

species are organized by section, and alphabetically within section. I will not dwell on the taxonomic treatment presented in the book because *Sphagnum* is difficult and there is plenty of room for disagreement. Unfortunately, the taxonomic conclusions presented by Michaelis appear to be based almost solely on the study of previous publications rather than on personal experience and careful study of variation patterns himself. There is nothing to indicate that he has studied material of virtually any of the species, possibly aside from common European taxa. I would agree with his scepticism about some species; for example, *S. andersonianum* R. E. Andrus, *S. bartlettianum* Warnst. and *S. subtile* (Russ.) Warnst., but in some cases his conclusions are difficult to defend. For example, he includes *S. perfoliatum* L.I. Savicz in the synonymy of *S. orientale* L.I. Savicz, apparently unaware of or unimpressed by the fact that the former is an allopolyploid whereas the latter is haploid. Rather, Michaelis cites conflicting morphological observations in previous publications, and makes taxonomic decisions based on his reading of their views. I would argue that variation patterns in *Sphagnum* are sufficiently complex that the field has gone as far as it can go without additional types of information such as molecular data and/or experimental studies; we certainly are beyond the point of benefitting from the publication of taxonomic conclusions based on literature reviews rather than careful study of the plants!

Sphagnum Species of the World includes 219 illustration plates. Credits for those plates are provided on pp. 421–423, with a note stating that “All figures indicated as orig. are made by the author.” Fewer than 10 of the plates are cited as “orig”, with the remaining 280+ taken from previous publications by others, including especially the original descriptions for the species. Michaelis rearranged the position of at least one line-drawing in each original plate. This was done for almost all the plates. On that basis the plate sources were cited as “after” so and so, rather than “from” so and so. One wonders why the author of this book took the time and effort to make these trivial modifications to each plate rather than seeking permission to use the originals. Moreover, in contrast to standard

practice, the plate citations are provided as a separate section of the book rather than in the legend of each plate. These peculiarities make it easy for the reader to get the false impression that the bulk of the descriptions and illustrations are the original work of the author of *Sphagnum Species of the World*.

In summary, some aspects of this book make it very useful as a reference. Having the illustrations, along with notes, for so many species can save a huge amount of time, since many of the illustrations are taken more or less directly from the original publications. It is useful to have previous infra-generic classifications for *Sphagnum* summarized in one place. The bottom line: would I purchase this book? No. It is quite expensive, and much of the information in it is naively presented and even inaccurate. The taxonomic conclusions appear to be based on little or no experience with the species in question and instead rely on the published observations of others. I am troubled that virtually all the illustrations were taken from the careful and often tedious work of other authors, with insufficient acknowledgement of those efforts made possible by digitally modifying those previously published figures, and I am disappointed that the publisher supported that egregious approach.

Literature cited

- Liu, Y., M. G. Johnson, C. J. Cox, R. Medina, N. Devos, A. Vanderpoorten, L. Hedenäs, N. E. Bell, J. R. Shevock, B. Aguero, D. Quandt, N. J. Wickett, A. J. Shaw, and B. Goffinet. 2019. Resolution of the ordinal phylogeny of mosses using targeted exons from organellar and nuclear genomes. *Nature Communications* 10:1485 | <https://doi.org/10.1038/s41467-019-09454-w>
- Shaw, A. J. 2000. Phylogeny of the Sphagnopsida based on nuclear and chloroplast DNA sequences. *Bryologist* 103:277-306.
- Shaw, A. J., C. J. Cox, & S. B. Boles. 2003. Polarity of peatmoss (*Sphagnum*) evolution: who says mosses have no roots? *American Journal of Botany* 90:1777–1787.
- Shaw, A., J., N. Devos, C. J. Cox, S. B. Boles, B.

Shaw, A. M. Buchanan, L. Cave, & R. Seppelt. 2010. Peatmoss (*Sphagnum*) diversification associated with Miocene Northern Hemisphere climatic cooling? *Molecular Phylogenetics and Evolution* 55: 1139–1145.

Shaw, A. J., N. Devos, C. J. Cox, & B. Shaw. 2016. Organellar phylogenomics of an emerging model system: *Sphagnum* (peatmoss). *Annals of Botany* 118: 185–196.

Shaw, A. J., B. E. Carter, B. Aguero, Denise P. da Costa, & A. Crowl. 2018. Range change evolution of peat mosses (*Sphagnum*) within and between climate zones. *Global Change Biology* 2018: 1–13.



Australian Bryology in Challenging Times-Coronavirus Pandemic – 2020

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Australian bryologists are few and far between but for all that, we are fortunate to enjoy an excellent camaraderie, and in many ways, remarkable in our support of each other. This year, 2020, the Coronavirus pandemic has been a challenge. Country and State border closures together with lockdowns and social distancing have impacted on the way in which we have been

able to work in herbaria, in universities and in the field. The biennial Australian Bryological Workshop planned this year for the Bogong High Plains in Victoria, and the John Child Bryophyte and Lichen Workshop in Rotorua, New Zealand, have both been cancelled.

However, these restrictions have opened up other opportunities, in particular, to have virtual meetings. So far, our first two meetings using ZOOM have worked well, allowing us to at least see colleagues and to get an understanding of the many ways Australian bryologists have been able to optimise their work during Covid. We include a summary of works in progress that have been managed in spite of limitations.

Our southernmost state, Tasmania, closed its borders early. Lyn Cave, Registration Officer at the Tasmanian Herbarium (HO), tells us that the Herbarium has remained open throughout, though with reduced on-site staffing between April and mid-June, when normal activities resumed. They have continued to service loans, though few requests were received. Whilst collecting trips were limited time afforded was well-spent in identifying backlog specimens.

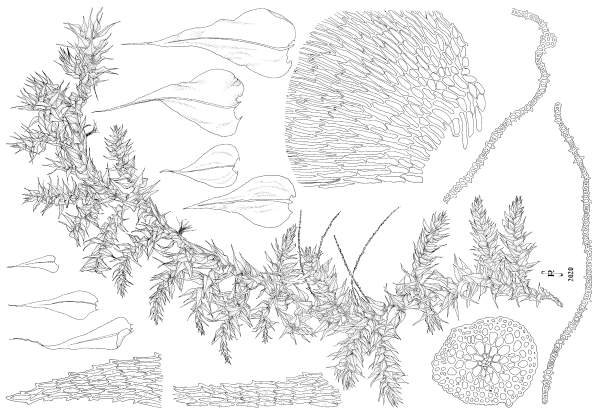
Andrew Thornhill started in March 2019 as Curator of Bryophytes at the State Herbarium of South Australia (AD) in Adelaide which has an extensive bryophyte collection, around 40000 collections of which 30000 are properly curated into envelopes with some kind of identification. A full report of the plan will be available in the forthcoming Australasian Bryological Newsletter. Meanwhile Sarah Harvey from University of Adelaide is to be commended for her continuing role as editor of the Australasian Bryological Newsletter

Queensland borders closed early leaving bryologists free to do field work within the State but preventing access to those from other States. We were delighted with the recent appointment of Andrew Franks as Collections Manager at the Queensland Herbarium (BRI) in Brisbane, even though he was thrown in at the deep end and having to take responsibility for operations during the pandemic. Andrew advised that the Queensland Herbarium responded rapidly to the escalating threat associated with the Covid-19 pandemic by having the majority of the workforce transition to a working from home environment

and only a small core of essential staff remained on site. Their loans program, both international and domestic, has been put into a hiatus for the foreseeable future and this generated an increase in requests for high-resolution images of specimens. Many planned field trips were postponed although now the herbarium is slowly evolving to working in a Covid-19 world and herbarium staff are now allowed to head back into the field.

In Far North Queensland, Covid-19 has really created difficulties for Andi Cairns in Townsville, and David Meagher who has been in lock down in Melbourne Victoria, as they have been working together on the bryophytes of the Wet Tropics. However, in spite of the challenges and obstacles presented by Covid-19, they have continued to be remarkably productive. A complete revision and update of *W. D. Reese & I. G. Stone, Australian Mosses Online. 13. Calymperaceae. (2012).* is currently being revised by Andi Cairns, Andrew Franks and David Meagher. This will include new keys for the expanded family, new keys to the species within the genera, revised and expanded and updated descriptions to species and a few new names to be considered, Illustrations of all taxa and distribution maps from databases collections have been done. They have also been working with Tamás Pócs in Hungary on a joint publication on new records of epiphyllous Lejeuneaceae from Paluma, north-west of Townsville. A long-term project, a guide to the mosses of the Wet Tropics, continues to be a work in progress.

Rod Seppelt continues his extraordinary output of scientific illustrations. Rod has been illustrating many species of the North Queensland Wet Tropics, including completion of drawings of all but one Calymperaceae. The following illustration of *Meteroriopsis undulata* a species from the wet tropics, is an example of his contribution to David and Andi's studies of bryophytes of the wet tropics.



Rod also continues to work on Tasmanian mosses and has completed all the illustrations for Fascicle 3 of *Tasmanian Mosses*. In the process, he tells us *Dicranoloma* and *Campylopus* have been turned on their respective heads. In the last two years, he has illustrated more than 100 species of Tasmanian mosses and has recently received a grant to offset some of the cost of scanning and annotating drawings. Jean Jarman (HO) has been working with Rod to prepare the drawings for publication

From Canberra, our National Capital, Chris Cargill advised that the CANB cryptogam collections, housed separately from the angiosperm collections at the Australian National Botanic Gardens (ANBG), was closed temporarily. Chris continued to work from home and juggled online meetings, administration and research. CANB was able to continue offering a loans service but this was minimal as many herbaria were neither sending nor receiving loans due to COVID-19 restrictions. On a very positive note, Chris did receive some good news, obtaining a 3-year grant to revise the Australian species of *Riccia* but unfortunately, thanks to Covid, planned field work has been postponed until next year. Fortunately, Chris has been receiving collections from colleagues, mainly *Riccia* but also some *Fossombronia*, *Asterella* and hornworts from northern NSW, the ACT and areas close to the ACT which have been invaluable to her work. She has also received collections from Andrew Franks, Judith Curnow, Heino Lepp and Cath Busby. Fieldwork has not been deemed *an essential task* for herbarium staff during the COVID restrictions, so it has been wonderful having these people send collections to Chris.

In New South Wales, we were all delighted to hear the news from Matt Renner, that his son, Douglas Byron Renner, was born on 4th September, 2020, weighing 8 pounds and 7 ounces, and both baby and mother, Lindsey Gray, are doing well. Matt Renner, at the National Herbarium of New South Wales in Sydney (NSW), continues to astonish us with his output. In addition to his ongoing commitment to his initiative the *National Liverwort and Hornwort Species List*, he continues to work with Lejeuneaceae and Orchidaceae. In yet another initiative to link bryologists, he is currently setting up a bryological webinar series

Victorian bryologists have really borne the brunt of Covid-19. Firstly, the initial lock downs, but then, following a deadly second wave, have had to cope with extreme restrictions including a nightly curfew. Perhaps the most telling, this note from Nimal Karunajeewa from the National Herbarium of Victoria in Melbourne (MEL) *in Victoria we've had the best season for cryptogamic collecting that I have seen, due to exceptional rainfall in autumn and some in winter, and it has gone largely to waste as we were under stay at home orders for most of it*. So, sadly, a lost opportunity to collect and add vouchers to our herbarium collection. Pina Milne, Collections Manager at MELU advised that Field trips were not permitted, and also commented that given the exceptionally *bryophyte friendly* season, it may be that unusual or rare species have been missed that have not been recorded for some time. Pina also advised that the imposed restrictions resulted in the National Herbarium of Victoria closing its loans, donation and exchange program; this decision was made because of the unreliability of local and international mail system during this time and uncertainties because of the changing situations nationally and internationally. Also, since the Royal Botanic Gardens Victoria were closed, for part of stage three restrictions and currently for the duration of stage 4 restrictions, staffing levels have been reduced and volunteers and visitors not permitted on site. This has meant that researchers with research grants, ARBS, for example, have been unable to access bryophyte collections or request loans, and staff and volunteers have been unable to continue with the curation of the cryptogamic

collections. Pina herself has been flat out managing staff, planning and organising work that could be completed at home.

In Melbourne, Niels Klazenga has been working on data management of the *Atlas of Living Australia*. Matt Dell has been contributing to Victoria's Bushfire Emergency: Biodiversity Response and Recovery. Bryophytes were not assessed for associated impacts in DELWP's preliminary impact assessment report. Subsequently Matt and Marianne Worley coordinated a comparable review which has now been adopted as part of further work to identify the conservation needs of bryophytes (and freshwater algae). Kent Bennett continues his work with VicForests and as a member of the Australian Bryological Network.

David Meagher, President of the Australian Bryological Network, is also based in Melbourne, and Covid-19 has resulted in the postponement of the annual general meeting for the Network. It is now to be held as a Zoom meeting later in November. Covid-19 has well and truly impacted on his research. David is currently revising the Pterobryaceae, and Rhabdodontaceae (with Patrick Dalton at University of Tasmania) for the Flora of Australia. He has been unable to access herbarium material either at MEL or at University of Melbourne (MELU), or indeed, request loans which has slowed his progress.

Covid 19 has created many difficulties and challenges, but surprisingly, has resulted in many positive outcomes as well. We can keep in touch using a myriad of devices and software - mobile phones, email, computers, Zoom, Skype, TeamViewer and Microsoft Teams for example. Zoom has turned out to be a blessing, and most of us have had to learn it in a hurry. It has turned out to be an exceptionally useful tool, particularly in a country like Australia, where there are such great distances between bryologists. Long term, we would hope that Australian bryologists will continue to link up regularly, with Zoom or any other appropriate software, enabling us to see each other, rather than interrupt our relative isolation with just one bryological workshop every two years.



Miniature Forests: A Moss Garden at the Cibodas Botanical Garden, West Java, Indonesia

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Bryophytes play an important ecological role as well as contain interesting biochemical compounds that have significant biological properties. Bryophytes refer to three independent plant lineages, of which approximately 8-12,000 are the Bryophyta (mosses), 6-9000 are Marchantiophyta (liverworts), and ca. 200 are Anthocerotophyta (hornworts). Indonesia has more than 2,700 species of bryophytes which are scattered in the major islands such as Sumatra, Java, Borneo, and Celebes (Retnowati & Rugayah 2019). Nowadays, due to climate change, pollution, the loss and deterioration of natural habitats, as well as invasive alien species, bryophytes face serious threats (Hallingbäck & Tan, 2010), including in biodiversity hotspots such as Indonesia.

Botanical gardens play a vital role as an ex-situ conservation institution and are a living repository of plant diversity in the world. There are 3,686 botanical institutions in the GardenSearch database of Botanic Gardens Conservation International (BGCI 2020). Mounce *et al.* (2017) reported 75% of embryophyte plant families and 93% of tracheophyte plant families have been conserved in over 3,269 botanical institutions, yet only 2.6% of threatened bryophyte species are documented in the global botanic garden network. Cibodas Botanical Garden/*Bergtuin te Tjibodas* (CBG) is an institution under the management and supervision of the Indonesian Institute of Sciences/Lembaga Ilmu Pengetahuan Indonesia (LIPI), plays an important role as an ex-situ conservation especially for humid tropical highland flora. CBG was established on April 11th, 1852 by Johannes Elias Teijsmann. The gardens covering about 84,99 hectares, is situated on the northeastern slope of twin mountain Gede - Pangrango, Cianjur, West Java, Indonesia. It is

about 100 km south of the capital city Jakarta and 40 km from Bogor. Approximately one million visitors per year visit CBG, both from Indonesia and abroad (Suryana and Widyatmoko 2019). CBG activities including prevention of plant degradation, increase public awareness toward the value and importance of plant diversity and promoting sustainable use of natural resources. More than 2000 plant species are conserved in CBG either in the main area or thematic gardens such as rhododendrons, ferns, cherry blossoms, and the moss garden.



Twin Mountain Gede – Pangrango (Photo credit: Ikhsan Noviady)

Aside from being the representative of early land plants, the moss garden in a particular area has an important function to provide a refuge for animals, primarily arthropods (Wynne & Shear 2016). It is well-known that moss gardens have been successfully established by Japanese for centuries. The most popular moss garden in Japan is Saihoji Temple/*kokedera* (*koke* means moss; *dera* means temple). Moss gardens have become increasingly common in other parts of the world. It is noteworthy that the bryophyte section of botanical gardens usually exists in many botanical institutions as part of the Japanese garden, yet only a few declared them as part of specific moss collection (Glime 2017; Gross 2018; BGCI 2020). The moss garden at CBG was developed and built in 2004 and opened publicly on the 154th Anniversary of CBG on April 11th, 2006. The garden is located in Section 1 of CBG, west of the fern garden, and close to the Titan Arum (*Amorphophallus titanum*) collection. It is about a 15-minute walk from the main gate. This moss

garden became the first and largest outdoor bryophyte garden in Indonesia (Suryana and Widyatmoko 2019). The primary function of the moss garden is to help conserve bryophytes of Indonesia; however, this garden also provides beautiful sights for recreation and a convenient environment for education and research.

The moss garden covers about 1500 m² and was designed like the small-scale of Gede - Pangrango Mountains and their adjacent locations. The area was also designed so as to represent as closely as possible to the natural habitat of bryophytes to maintain their growth. Hundreds of bryophyte species, including mosses, liverworts, and hornworts are established and growing successfully in this garden. Some of them cover large landscapes, grow on several substrates, and others were planted on pots. 80% of the species were from CBG and its adjacent location while 20% were collected from field exploration in West Java, Central Java, Jambi, and Borneo (Damayanti 2006).



The design resembles habitats that can be found at Mt. Gede and Mt. Pangrango and their adjacent areas.



Some mosses have been planted in pots (In photo: *Leucobryum aduncum*)

The landscape is mainly covered by *Marchantia* spp., *Plagiomnium rhynchophorum*, *Hypnum* spp., and *Dumortiera hirsuta*. Domination of bryophytes differs between wet and dry seasons; *Plagiomnium rhynchophorum* during the wet season, and *Marchantia* spp. during the dry one. Some species grow on various substrates such as *Anthoceros laevis*, *Bryum billardieri*, *Fissidens javanicus*, *Hypnum plumaeforme*, *Hypopterygium tamarisci*, *Meteorium miquelianum*, *Neckeropsis gracilentia*, *Pallavicinia* sp., etc. Some species were planted on pots, including the mosses *Dicranoloma reflexum*, *Leucobryum aduncum*, *Leucobryum javense*, *Pogonatum flexicaule*, *Sphagnum junghuhnianum*, dendroid mosses such as *Homaliiodendron* sp., *Hypnodendron* sp., *Rhodobryum giganteum*, and liverworts such as *Heteroscyphus argutus* and *Tricocholea* sp. Constant maintenance is required to prevent the growth of tracheophytes in the moss garden (Glime 2012). Since its establishment fourteen years ago, the moss garden has been through some ups and downs. At the beginning, the bryophytes were planted on specific blocks, hoping that they

would stay separate from others. However, that does not work. The ideas of showing scientific names for specific patches soon became tedious and we called it off. After some time, we would find them growing intermixed with other species. Weeding is one of the must do's here, because seedlings from its surroundings never cease to grow. By the time we were done weeding from side to side (which take several days), those at the beginning would be in need of another cycle. Since this garden is located outdoors in a tropical highland area, the big challenges are the hard wind, thunderstorm, and drought. The large branches might be found falling on top of the bryophytes and destroying the surrounding area after a thunderstorm, and patches of brown, dry bryophytes during the dry season.

The moss garden is not perfect and might not bear hidden new animal species as described by Wynne and Shear (2016), but it serves as a starting point for conserving bryophytes. On the bright side, because it is in the botanic gardens and everything is nearby, we can easily show the different aspects of bryophytes and explain the early evolution of plants to students or public visitors. We can show them the specific characters to students which are not usually shown at school, while the public visitors were usually very surprised when they looked closer and recognized that there were different shapes of bryophytes.

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References

Botanic Gardens Conservation International (BGCI). 2020. *GardenSearch*.

https://tools.bgci.org/garden_search.php

Damayanti, L. (2006). *Koleksi Bryophyta Taman Lumut Kebun Raya Cibodas Volume II No. 4*. Jawa Barat: UPT Balai Konservasi Tumbuhan Kebun Raya Cibodas.

Glime, J. M. (2012). Gardening: Moss Garden Development and Maintenance. Chapt. 7-4. In: Glime, J. M. *Bryophyte Ecology. Volume 5. Uses*. Ebook sponsored by Michigan Technological University and the International

Association of Bryologists. Last updated 7 November 2017 and available at <http://digitalcommons.mtu.edu/bryophyte-ecology/>

Glime, J. M. (2017). Gardening: Public Gardens. Chapt. 7-5. In: Glime, J. M. *Bryophyte Ecology. Volume 5. Uses*. Ebook sponsored by Michigan Technological University and the International Association of Bryologists. Ebook last updated 10 November 2017 and available at <http://digitalcommons.mtu.edu/bryophyte-ecology/>

Gross, M. (2018, September 24). Can botanic gardens save all plants? *Current Biology* 28, R1075–R1095.

Hallingbäck, T. and Tan, B.C. (2010). Past and present activities and future strategy of bryophyte conservation. *Phytotaxa*, 9, 266–274.

Mounce, R., Smith, P., & Brockington, S. (2017). Ex situ conservation of plant diversity in the world's botanic gardens. *Nature Plants*, 3, 795–802. DOI: 10.1038/s41477-017-0019-3.

Retnowati, A. and Rugayah. (2019). Keanekaragaman tumbuhan dan jamur Indonesia, in Retnowati, A., Rugayah, Rahajoe, J.S., & Arifiani, D. (eds.). *Status keanekaragaman hayati Indonesia: Kekayaan jenis tumbuhan dan jamur Indonesia*. Jakarta: LIPI Press.

Suryana, N. and Widyatmoko, D. (2019). Tour the garden, in Sujarwo, W. (ed.). *Cibodas Botanic Gardens at A Glance (second edition)*. Jakarta: LIPI Press.

Wynne, J.J. and Shear, W.A. (2016). A new millipede, *Austrotyla awishoshola* n. sp., (Diplopoda, Chordeumatida, Conotylidae) from New Mexico, USA, and the importance of cave moss gardens as refugial habitats. *Zootaxa*, 4084, 285–292.



Obituary

LI Xing-Jiang, 1932-2020

MA Wen-Zhang & YANG Zhu-Liang



Prof. LI Xing-Jiang, the former vice-chairman of the Bryological Society in Botanical Society of China, a well-known and important Chinese scientist devoted to bryology over the last 60 years, passed away on 4th November, 2020, in Kunming, Yunnan Province.

Born in Chongqing, she graduated from the Department of Biology, Sichuan University in 1954. In the same year, she obtained a position in the Institute of Botany, Chinese Academy of Sciences as a research assistant, particularly doing plant taxonomy work.

During 1955 to 1958, LI Xing-Jiang attended a bryological training class in Nanjing Normal University, where she received professional guidance from Prof. CHEN Bang-Jie (P.C. Chen), the founder of Chinese Bryology. Ever since then, she became a bryophyte specialist, and started to accumulate bryophyte specimens in the herbarium of Institute of Botany, Chinese Academy of Sciences (PE).

LI Xing-Jiang moved to Yunnan Province in 1965 and started to build up the cryptogamic collections in the herbarium of Kunming Institute of Botany, Chinese Academy of Sciences, together with her husband, the late mycologist ZANG Mu. She traveled extensively in most provinces in China, doing field work and had obtained roughly over 20,000 bryophyte specimens, most of which are deposited in KUN

and PE. Some of her collections were preserved in NICH and H, through specimen exchange activities.

LI Xing-Jiang focused on the taxonomic and systematic work over a wide range of moss families, including Sphagnaceae, Andreaeaceae, Pottiaceae, Mniaceae and Bryaceae, with more than 50 peer-reviewed papers published. She is the chief editor of many bryological books, such as *Bryophyte Flora of Tibet*, *Flora Bryophytorum Sinicorum* (Vol. 3 & Vol. 4), *Moss Flora of China* (Vol. 2 & Vol. 4), *Flora Yunnanica* (Tomus 18 & Tomus 19).

Not content with her fundamental research, LI Xing-Jiang incorporates her bryological expertise into the arena of applied science. She collaborated with entomologist Prof. TANG Jue, and their research helped greatly increase the production of natural gallnut by selecting proper moss species as the winter host for gall-aphides in the 1980s. She was editorial member of Moss Flora of China Committee, and Cryptogamic Flora of China Committee. Due to her innovative bryological studies and significant contributions, she received a second-class prize in China's State Natural Science Award (2008), a first-class prize in Yunnan Province Natural Science Award (2002), and several other prizes.

Representative publications

- Zhang D.-C., Li X.-J., Wu S.-H. 2003. Two new species of Meteoriaceae and five species new for the country. *Acta Botanica Yunnanica*, 25 (2): 192-196.
- Zhang D.-C., Li X.-J., Higuchi M. 2002. Two new species of the genus *Pohlia* (Bryaceae, Musci) from China. *Acta Phytotaxonomica Sinica* 40 (2): 176-182.
- Li X.-J. & Crosby MR (eds.) 2001. *Moss Flora of China*. Vol. 2. Science Press: Beijing, New York; Missouri Botanical Garden: St. Louis. Pp. 1-283.
- Li X.-J. (ed) 2000. *Flora Bryophytorum Sinicorum*, Vol. 4. Science Press: Beijing, pp. 1-157.
- Li X.-J. 2000. Metzgeriaceae, Sphagnaceae, Andreaeaceae, Bryoxiphiaceae, Pottiaceae, Mniaceae, Buxbaumia. In Wu PC (ed) *Bryophyte Flora of Mt. Hengduan*. Science Press: Beijing. pp166-172; pp193-214; pp229-231; pp298-355; pp411-437; pp668-671.
- Li X.-J. 2000. Bryophyte Resources. In Sun H.L.(ed) *Encyclopedia of Resources Science in China*. Encyclopedia of China Publishing House: Beijing, pp 644-647.
- Li X.-J. 1999. Sphagnaceae. In: Cao C. and M. R. Crosby (eds.): *《Moss Flora of China》*, Vol. 1. Science Press: Beijing, New York; Missouri Botanical Garden Press: St. Louis. Pp. 3-49.
- Li X.-J. & Zhang D.-C. 1998: Three new synonyms of *Pohlia* (Bryaceae) from China. *Tropical Bryology* 15: 23-27.
- Li X.-J. & Iwatsuki Z. 1997. Revision of the Genus *Anoetangium* from China. *Acta Botanica Yunnanica* 19: 243-250.
- Li X.-J. & Zhang D.-C. 1997: A revision of the genus *Pohlia* from China (International Asiatic Bryology) [Symposium Abstract]
- Li X.-J. & Zhang D.-C.. 1997. Revision of Tetraphidaceae in China. *Acta Botanica Yunnanica* 19: 43-47 (in Chinese with English abstract)
- Li X.-J. & Zhang D.-C. 1996. Pottiaceae in Gao C (ed) *Flora Bryophytorum Sinicorum*, Vol. 2. Science Press: Beijing. Pp 113-261. (in Chinese)
- Li X J & Iwatsuki Z. 1996. Studies on Chinese Pottiaceae (1): Subfamilies Timmielloideae, Chionolomoideae and Trichostomoideae. *Hikobia* 12: 25-36.
- Zhang D.-C. & Li X.-J. 1996. A new species and section of *Orthodontium*. *Acta Botanica Yunnanica*, 18: 415-418. (in Chinese with English abstract)
- Li X.-J. & Zhang D.-C. 1994. Sphagnaceae. In Gao C. (eds) *Flora Bryophytorum Sinicorum*, Vol. 1. Science Press: Beijing. Pp 2-54.
- Li X.-J. & Iwatsuki Z. 1993. A critical re-examination of three Pottiaceous taxa described by K. Sakurai from China. *Hikobia* 11: 277-279.
- Li X.-J. 1993. Notes on the taxonomic and distribution pattern of the genus *Sphagnum* from China. XV International Botanical Congress (Aug. 28-Sept. 3, 1993; Yokohama). p. 218. [Symposium abstracts]
- Li X.-J. 1993. New species and new distribution of *Sphagnum* in China. *Acta Botanica Yunnanica* 15: 257-249.

- Zang M. & Li X.-J. 1993. A preliminary discussion on the future development and collaborations between Yunnan and adjacent countries concerning biological resources development. In Xiao JQ (ed). On the Sci-Technology collaboration of biological resources. Science Press: Beijing. pp. 41-49. (in Chinese)
- Koponen T & Li X.-J. 1992. Mosses from Kunming City and its surroundings, Yunnan Province, China. *Bryobrothera* 1: 185-194.
- Enroth J, Koponen T, Li X.-J. 1992. Contributions to the bryoflora of China I. *Annales Botanici Fennici*, 29: 315-318.
- Li X.-J. 1990. Study on the winter host mosses of gall aphids from China (Aug. 12-19, 1990, Helsinki). p. 27. [Symposium abstract]
- Li X.-J. & Zang M. 1990. The bryophytic branch of cryptogamic herbarium in Kunming, as a speech at the Congress of East Asiatic Bryology (Aug. 12-19, 1990, Helsinki). p. 23. [Symposium abstract]
- Higuchi M, Iwatsuki Z, Ochyra R, Li X.-J. 1989. *Neckeropsis takahashii* (Neckeraceae, Musci), a new species from Yunnan, China. *Nova Hedwigia* 48: 431-435.
- Li X.-J., Zhang D.-C., Wang L.-S. 1988. A preliminary study on the winter host of gall-aphides. *Acta Botanica Yunnanica*, supplement I: 175-189. (in Chinese with English abstract)
- Noguchi A & Li X.-J. 1988. Some species of the Pterobryaceous mosses from SW China. *Journal of Japanese Botany* 63 (4): 7-14.
- Li X.-J. 1985. Floristic study of Pottiaceae in the Namcha Barwa region. *Mountain Research*, 3: 317-321. (in Chinese)
- Li X.-J. 1984. A new species of *Sphagnum* from Tibet, China. *Acta Botanica Yunnanica* 6: 77-78. (in Chinese with English abstract)
- Li X.-J. 1983. The relationship between Mniaceae and gallnuts production. In The 50th anniversary of Chinese Botanical Society Congress Report. Pp 685-686. (in Chinese)
- Li X.-J. & Zhang MX. 1983. New species from Mt. Qinling. *Acta Botanica Yunnanica* 5: 385-390. (in Chinese with English abstract)
- Koponen T, Li X.-J., Zang M. 1982: Miscellaneous notes on Mniaceae (Bryophyta). XIII. *Orthomnion yunnanense*, species nova. *Annales Botanici Fennici* 19: 73-74.
- Koponen T., Li X.-J., Zang M. 1982. A synopsis of *Rhodobryum* (Musci, Bryaceae) in China. *Annales Botanici Fennici* 19: 75-80.
- Li X.-J. & Yu H.-J. 1982. Bryophyte checklist of Mt. Jigong in Henan Province (China) . *Bulletin of Xinxiang Normal Collages* 2: 99-103
- Li X. J., 1981. Study on the geographical distribution and bryoflora elements of Pottiaceae from Xizang. In: *Proceedings of Symposium on Qinghai-Xizang (Tibet) Plateau* 2: 1199-1207. Science Press: Beijing and Gordon and Breach Science Publishers, Inc.: New York.
- Zang M & Li X.-J. 1981. The bryological exploration of Xizang (Tibet). *Nova Hedwigia* 71: 337-339.
- Li X.-J. 1981. New species of Pottiaceae from Tiebt, China. *Acta Botanica Yunnanica* 3: 101-112. (in Chinese with English abstract)
- Li X.-J. & Zang M. 1979. Study on Mniaceae in China. *Acta Botanica Yunnanica* 1: 32-80. (in Chinese with English abstract)
- Li X.-J. 1978. Brachytheciaceae, Entodontaceae, Plagiocheceiaceae, Sematophyllaceae. In Chen PC (ed) *Genera Muscorum Sinicorum, Pars Secunda*. Science Press: Beijing. Pp 200-250.
- Chen B.-J. & Li X.-J. 1964. Two new species of Buxbaumiaceae in China. *Acta Phytotaxonomica Sinica* 9: 277-282. (in Chinese with English abstract)
- Li X.-J. 1963. Common bryophyte species in alpine region in west Sichuan Province (China). in Chinese Academy of Forestry (ed). *A comprehensive scientific report of alpine forest in southeast China*. Forest Press: Beijing, pp361-428.
- Li X.-J. 1963. Various families. In Chen PC (ed) *Genera Muscorum Sinicorum, Pars Firsta*. Science Press: Beijing. Pp 87-304.
- Li X.-J. 1958. Bryoxiphiaceae in China. *Acta Phytotaxonomica Sinica* 7: 253-262.
- Chen B.J.& Li X.-J. 1956. A preliminary observation on genus *Sphagnum* in China. *Acta Phytotaxonomica Sinica* 5: 165-228.



Upcoming IAB elections

The affairs of the IAB are controlled by a council comprising the President, two Vice-Presidents, a Past-President, Secretary Treasurer and the Editors of the Bryophyte Diversity and Evolution and the Bryological Times, and 10 regular members. This coming spring, IAB will hold biennial elections to fill seats vacated by departing council members: one vice president and four regular council members. All officials are elected for a four year term, with the two vice presidents and the 10 regular members, elected over two election cycles such that every two years one vice president and half the council members are replaced. This year the council has adopted a new by-law pertaining to our elections, such that the council comprises equal representation of regular members from across all continents and that the two vice-presidential positions are held by members from distinct continents.

IAB needs members to engage in the administration of the association. All members are encouraged to consider self-nominating or nominating a colleague. Nominees will be asked to submit a personal statement in support of their nomination. In very early 2021 the online elections and the link to the ballot and the nominees will be distributed in very early 2021 and elections will be open for six weeks.

What are the roles of the Vice President? The VP is a member of the executive committee of IAB, which is composed of the President, the two Vice-Presidents, the Past-President, and the Secretary Treasurer. The VP should commit to engage in developing strategies furthering the association mission, participate in regular virtual meetings of the executive committee and attend (virtual or in person) the IAB council meeting at the biennial IAB conference.

What are the roles of regular council members? Regular council members should commit to engage in developing strategies furthering the association mission, participate in ad hoc committees, develop initiatives aimed at strengthening IAB membership and services, and

attend (virtual or in person) the IAB council meeting at the biennial IAB conference.



Upcoming IAB award and grant competitions.

IAB will call for nominations for several awards to be adjudicated by June 2021, when the association meets in Quebec:

- Richard Spruce award in recognition of important contributions to bryology by an IAB member within the first 25 years of their career (dated from their first bryological publication).
- Hattori Prize in recognition of best paper or series of papers published within the previous two years (i.e., 2019-2020) in a journal or book by a member of IAB.
- Riclef Grolle Award in recognition of Excellence in Bryodiversity Research by a bryologist: Intended for bryologists who work in developing countries (see list below) and still manage to contribute significantly to the knowledge of bryodiversity in bryophyte-rich areas such as the tropics or smaller regions therein or in bryologically unexplored areas.

We encourage you to submit strong and comprehensive nominations for the awards honoring bryologists for their significant contributions to bryology. Nominations will need to be submitted on-line starting January 15, with a deadline of February 28, 11.59 PM (Eastern Standard US Time, i.e., GMT+5).

IAB will also open competitions for two awards in support of bryological research by IAB members and details are provided at bryology.org

- Stanley Greene Award in support of general bryological research.
- Conservation and Endangered Species Grants. See http://bryology.org/get_involved/awards-grants/ for details on eligibility.

Personal Announcements

Nirmala Pradhan

The recipient of the 2018-IAB Conservation Award has accomplished with a grant the Bryological Diversity of Mai Pokhari lake area, Ilam in E. Nepal



The final report *Species Diversity, Threats and Conservation Issues of bryophytes in Unexplored Mai Pokhari Lake of Ilam District of East Nepal* was submitted to IAB in September 2020. A summary of the report as follows.

Mai Pokhari in Ilam District Province Number 1 of east Nepal was visited to explore bryophytes in September-October which was a good season for the diversity of this plant in this place located at 2150 m of elevation.

Mai Pokhari is a lake covering an area of 80 hectares and is located at 27°25' N and 87°55' E. Community forests nearby this lake have also been studied for bryophytes including other potential areas of the Ilam district where good diversity was observed. This lake was declared as Ramsar Site on October 28, 2008.

This study recorded a list of 90 species of bryophytes. Most of them in the class Musci includes 40 genera 61 species belonging to 22 families and 11 orders. The thalloid Liverworts (Marchantiales) recorded in this study included 8 genera, 11 species under 6 families. The leafy liverworts (Jungermanniales) recorded 9 genera, 12 species in 8 families. Four genera, 4 species in 3 families were recorded in the order Metzgeriales (thalloid Jungermanniales). Only one species of hornwort *Anthoceros punctatus* L. was noted in this study. This study discovered one new record

of a moss *Pseudobarbella niitakayamensis* Nog. in the family Meteoriaceae.

This lake is facing threats due to increasing activities of humans. The identified threats in this lake included spread of invasive species, unmanaged constructions and increasing human settlements growing crops on nearby wetland slopes and the impact on *Sphagnum nepalensis*, an endemic moss, by unmanaged cleaning activity of the lake water. This lake still has many species to explore therefore an extensive study in this lake and its adjacent areas is considered necessary given the present scenario.

Acknowledgements: I am grateful to IAB for the generous support to this significant work. I would like to thank Dr. Matt Von Konrat of IAB for his timely information and suggestions. This work has been completed with kind cooperation of the local community of the Mai Pokhari so I would like to extend my sincere thanks to them. I would also like to acknowledge Ms. R. Heimstad for access to her collections at the Natural History Museum for tallying this work's specimens for identification process. I am thankful to Prof. Dr. Bhaiya Khanal of Nepal Bio-heritage Forum for Resources Conservation (NBFRC) for his valuable suggestions for this work. My thank is also due to Mr. Nishant Shrestha for helping me in photography. Natural History Museum, Kathmandu is acknowledged for accepting the collected specimens of this work.

Dr. Javier Martinez Abaigar



Javier presented the opening lecture of the academic year at his university (University of La Rioja, Logroño, Spain). The title of the lecture was “Musgos: lilputienses jugando sus cartas” (“Mosses: people from Liliput playing their cards”).

The whole text (in Spanish) is available <https://dialnet.unirioja.es/servlet/libro?codigo=776538>

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