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Dear bryologists,

This issue of the Bryological Times should have been sent last month, soon after the IAB World Conference, as it reports on the IAB Council meeting and as it has two excellent reports on the scientific sessions, which I received from Jessica Beever and Allison Downing. (Report on the post-conference field excursions are more than welcome!).

I would like to pay attention to two important decisions that were agreed upon by the Council. In the first place, access to the Bryological Times will be removed for those whose dues are overdue (by changing passwords). More importantly, a new award shall be established, beginning in 2009, to recognize outstanding contributions in research in bryodiversity. This award shall be called the Riclef Grolle Award for Excellence in Bryodiversity Research

Finally, during the last months I received already various contributions, so with a few extra contributions, I will be able to publish the next newsletter later this year, which makes – thanks to your support – four issues this year!

Geert Raeymaekers

IAB



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The **International Association of Bryologists (IAB)** is an organisation open for all interested in bryophytes. For membership, contact Geert Raeymaekers or Blanka Shaw. Visit the IAB web site: <http://bryology.org> for further information. The Bryological Times is issued 3 to 4 times per year.

IAB NEWS

World Conference of Bryology 2007

Report of the IAB Council Meeting

The IAB Council Meeting was held in Crystal Crown Hotel, Petaling Jaya, Malaysia, 26 July 2007 at 5:15-8:27 pm

Substitute Secretary. As Geert Raeymaekers was not present, David Long was appointed by chair as substitute secretary to record the minutes

Roll call. Present were Janice Glime, USA (chair), David G. Long, UK (substitute secretary), Uwe Drehwald, Germany, Zhang Li, China, Min Chuah-Petiot, Kenya, Tomas Hallingbäck, Sweden, Misha Ignatov, Russia, Benito C. Tan, Singapore, Patrick Dalton, Australia (proxy for Christine Cargill), Masanobu Higuchi, VP, Japan.

Awards Recipients

Richard Spruce Award: JG reported this (plaque) to be awarded to Prof. Jeffrey G. Duckett.

Hattori Award: JG reported this (certificate and \$400 US) to be awarded *in absentiam* to Bill and Nancy Malcolm for their *Mosses and other Bryophytes, an Illustrated Glossary (Second Edition)*. [Alison Downing accepted the award on their behalf.]

Student Travel Awards: JG reported that all 5 applicants had been successful and were awarded \$200 each. Money was made available from dues collections in Japan.

Treasurer's Report

As Treasurer (Blanka Shaw) was absent, JG reported as follows: That exact IAB assets are not clear as 'subscription collectors' in several countries keep these funds locally. Cao Tong (collector for China) has suggested to IAB that Chinese dues could be raised from the current equivalent of ~\$3 US, and he hopes to increase Chinese membership of IAB from 40 to 60.

On-going expenses: S.R. Gradstein has been funding the IAB website at University of Goettingen, but after this year IAB must pay c \$120 US per annum for this service. JG considered that IAB can afford this but not easily; several universities in USA run such websites free of charge; JG will make approaches; an important condition is that Uwe Drehwald (webmaster) must retain direct access. Missouri Botanical Garden to be approached by JG.

Ben Tan asked if Bryonet could host IAB website.

JG responded that this is not practical as she will retire soon.

JG proposed approval of Treasurer's Report; motion carried (unanimous).

Role of IAB Secretary

JG reported that the main task of the Secretary is to take minutes at meetings; she recommended clarification of the roles of Secretary and Treasurer since the position has been split.

Bryological Times and Tropical Bryology.

Bryological Times: In absence of Editor of BT (Geert Raemaekers) JG reported that Geert has proposed that BT should be made available to all, not just IAB members. Treasurer (BS) had objected to this on grounds that it would remove impetus to pay dues, and IAB could lose members.

JG proposed that GR's proposal be withdrawn.

IAB to investigate sponsoring Tropical Bryology

JG reported that currently TB has 2 editors; one of these (Dietmar Quandt) has suggested that IAB sponsor TB. JG suggested IAB should not be financially responsible for TB. JG requested opinions as to whether IAB should pursue the question of IAB ownership and a possible reduced subscription to TB for IAB members. BCT had gained a slightly different story from DQ, that IAB should own TB, but only with limited financial support from IAB, and increasing subscription by \$1 US. BCT felt that currently TB is breaking even on subscriptions, and proposed that IAB should take over ownership of TB. David Long commented that if IAB owned TB the editors would expect some funding. TB must maintain a printed copy to permit valid publication of new taxon names.

Tomas Hallingbäck advocated IAB support for TB. DGL commented that 'Tropical' only covers part of IAB interests. BCT replied that DQ would agree to change of name for TB if necessary, and that it already had an ISSN number and that change of name was easy. Zhang Li suggested that IAB members be grouped into different subscription categories:

Ordinary Members – access BT free

Second category (pay more) – free electronic access to both BT and TB

Third category (pay most) – get hard copies of BT and TB.

Uwe Drehwald: commented that it is important to get these subscription levels right, but that first the ownership issue should be resolved.

BCT pointed out that as TB is still owned by Jan-Peter Frahm, IAB would have to buy ownership from him. Masanobu Higuchi commented that if title changed, the role of TB would also change, and that it is important to know more details of the proposed changes before making a decision. JG asked if IAB Council should

continue the discussion and pursue more information; answer yes (unanimous).

Access to *Bryological Times*

Proposal 2007-8 (Free Access to BT) was withdrawn.

New Proposal 2007-11: Access to *Bryological Times* will be removed for those whose IAB dues are overdue by changing the password.

UD suggested changing password at beginning of each year.

Proposal 2007-11 passed with 7 for, 1 against, and 1 abstention.

Patrick Dalton suggested posting front page of each new issue of BT on IAB website. This agreed unanimously.

Back issues of *Bryological Times*.

UD requested discussion of GR's proposal to scan old issues of BT to place on IAB website. UD supported making old issues of BT available to public, possibly via Google. GR had requested a small budget to make pdf's of old issues of BT (these need to be scanned as tif or pdf file (read-only)). GR had offered to do scanning. General discussion of this – scans are needed from early 1970's (first issue) to 1993. Budget requested by GR is only for scanning, not for hardware purchase. BCT suggested we agree in principle to let JG negotiate with GR over scanning and budget for it.

MI pointed out that there is no index or reference list to back issues of BT. JG suggested compiling a searchable pdf for all tables of contents. PD suggested new tables of contents might be needed. JG summarised the discussion: that we agree to the scanning of back issues in principle, but before proceeding we get a price from GR.

Conservation Committee.

JG reported that we have a report from the Conservation Committee.

TH reported that the membership list was incomplete, with two recent changes: Ron Porley (UK) has replaced Nick Hodgetts; Norbert Schneider (Switzerland) has replaced Edi Urmi.

Sustainable Harvesting Guidelines.

A sub-committee of the Conservation Committee has developed Sustainable Harvesting Guidelines.

BCT pointed out that when the committee met the previous day the only question of principle was that acceptable guidelines could differ from country to country; *i.e.* regional guidelines could be put into an appendix; the main ones are international. JG suggested that: *Authority be delegated to Conservation Committee to develop Sustainable Harvesting Guidelines further, then place these on IAB website.*

Proposed: MC-P, seconded ZL; motion carried unanimously.

Conservation and Endangered Species Grants

Criteria, frequency, etc., will be put on IAB website

– these were not clear to IAB members. TH noted that in the past a notice was placed in BT inviting applications for the awards. JG stated that the amount was unclear. BCT pointed out a past award to China for a workshop totalled approx. \$1,000 US. TH advocated an upper limit. BCT suggested \$600 US as an upper limit, and that Dale Vitt's original idea was to provide 'seed money' to students and others for bryophyte conservation. JG: proposed the title be changed to avoid confusion with other IAB Awards. Council therefore approved re-naming 'Conservation Awards' to 'Conservation and Endangered species Grants.'

The following Guidelines were agreed after discussion:

1. Open only to IAB members.
2. Amount normally up to \$600 US per applicant.
3. Grants may be made at any time provided funds are available.
4. Grants to be announced on IAB website and BT once yearly if funds available.
5. Priority will be given to projects focusing on rare species, habitats or bryophyte hotspots in high need of conservation actions.
6. The proposal should contain: A. description of project; B. its rationale; C. activities; D. budget; E. expected outputs.

The following points should be noted: - Is the species, habitat or hotspot vulnerable, threatened or endangered? If not, does this study intend to collect data for identifying the status of a potentially endangered or threatened species, or is the study species used as a model for a threatened or endangered species, and, if so, please specify how the study will help conservation efforts. Is the species (and possible study) included in the IUCN SSC *Bryophyte Action Plan* (Hallingbäck & Hodgetts 2000)? Has the conservation significance, impact and outcome of the study been clearly identified and stated? Is there any other commentary on the nature of the threat and corrective action? Is the study, education plan, or other action proposed sound in respect to what is known about the species/ habitat/ people? Is there sound methodology in the proposal? Are there experienced project principals? Is there a training content involving local people?

7. Grant applications should be sent to the Chair of the Conservation Committee.
8. Additional information can be seen on the IAB website and Conservation Committee web pages.
9. The Conservation Committee will recommend applications it deems suitable for funding; the IAB Council will make final approval.
10. (new). A *Budget Report* and *Project Report* must be submitted within 2 years to Conservation Committee. Any resulting publications must be sanctioned by IAB.

It was also agreed that if a member of the Conservation Committee wishes to apply, that person must have no involvement in the discussions.

IAB Guidelines on Genetic Modification of Bryophytes to Be Developed

JG raised the topic for discussion, with the suggestion that IAB appoint a committee to look into the matter, and if necessary develop guidelines. She suggested Brent Mishler be approached initially, and that a population ecologist be included in the committee. JG stressed the dangers of gene transfer in bryophytes with potential dangers if modified bryophytes escape. Precautions should be drawn up. Committee agreed that JG would approach BM. [JG note: BM has agreed and will ask Tomas Hallingbäck and Ralf Reski to join the committee. Recommendations should be reported to Council at least six months before the next IAB meeting.]

Membership and subscriptions.

JG reported that Blanka Shaw had agreed to put forward a brochure to advertise IAB, but this was not yet available. Council agreed that this was not a wise investment of money. JG reported that several volunteers had come forward to sit on a Membership Committee, which Rosa Ros Espin had agreed to chair.

Council Representation and Voting

Proposal 2007-1: A quorum of nine persons is necessary for making decisions that require voting. Newly elected members of the council shall serve as alternates for the council. Members who are unable to be present for the Council meeting may name another IAB member who will attend to serve as substitute/proxy. The President must be informed of such designee prior to the meeting. In the event that a quorum is not reached, or business cannot be completed during the meeting, the President shall complete the business through email discussion and voting. There shall be no upper limit on the number of persons allowed to vote from among this group. Business may also be conducted between meetings, when necessary, by email vote of the Council. Ample time should be provided for email discussion before a final vote.

This proposal was agreed unanimously.

5-Year Dues Discount

Proposal 2007-2: IAB dues may be paid for five years in advance with a discount of US \$7.00 from the normal dues for five years (including the conservation fee). This discount only applies if the dues are paid directly to the treasurer or to a collector who will provide such dues collections to the IAB treasurer. Proposed by BCT; seconded by MC-P; carried unanimously.

JG reported that Proposal 2007-10 ("Life" membership) had been withdrawn.

14. New Bryodiversity Award

There was discussion of Proposal 2007-3, particularly as to the nature of the award.

BCT proposed that no cash be awarded, only a plaque, and the motion was amended as follows:

Proposal 2007-3: *A new award shall be established, beginning in 2009, to recognize outstanding contributions in bryodiversity. This award shall be called the Riclef Grolle Award for Excellence in Bryodiversity Research and is intended for bryologists who work in developing countries 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. Recognition should consider such evidence as published work, outside grants and support, and establishment of facilities and collections in areas of need.*

This will provide a plaque stating the relevance of the contribution of the recipient. The evaluation committee for this award should include at least three recognized specialists designated by the IAB President with the approval of the Executive Committee, *to be appointed at least one year before each IAB meeting.* The award will be given *at most every two years at the IAB meeting if the committee feels any person is worthy of the award.* The award can be granted only once for each individual. Care should be taken to encompass all geographical areas, with emphasis on bryologists working in high diversity regions or where they are working in isolation and still producing good results. *In addition to nominations by the committee, nominations for the award should be open to all IAB members through the Bryological Times or email and must include supporting evidence for the nomination.*

Motion proposed by DGL, seconded by MC-P; 8 in favour, 1 opposed, 1 abstention, motion carried.

However, the start date for the award was not decided. [JG note: Since there is no monetary award, this can begin in 2009.]

Student presentation awards

JG reported that Proposal 2007-4 (Student Certificates of Honor) had been withdrawn.

Ties in elections

Proposal 2007-5: If a tie occurs for a position on the Council (position #5), both candidates will be considered elected council members. Both terms will expire at the same time and only one position will be considered vacant.

This amended motion proposed by BCT, seconded by MC-P, no further discussion, approved unanimously.

Elections

Amended proposal 2007-6. Election Protocol.

The election committee, which does not include the judge, shall prepare a slate of nominees, normally with at least two candidates for each position. In addition to their own nominations, the committee shall solicit nominations from the membership through the *Bryological Times* or email. The committee shall be responsible for preparing ballots and collecting the statements from the candidates. Each candidate for President shall submit a *photograph and short biographical sketch* including country and professional position, and a statement of no more than 200 words stating their contributions to IAB, their goals during presidency, and why they want to serve as president. All other candidates shall submit a *photograph and short biographical sketch* including country, professional position, contributions to IAB, and one sentence of why they want the IAB position designated. Statements from all nominees shall be included with the ballot or placed on the IAB website. If feasible, electronic passport-style pictures should be provided for each candidate. The location of these statements shall be indicated on the ballot. The judge shall notify the President as soon as election results are known and the President shall notify the

candidates and the Executive Council of the results of the election in a timely manner.

Amended motion proposed by BCT, seconded by PD, carried unanimously.

Involvement of Membership

Amended Proposal 2007-7: The membership shall be informed by email or the *Bryological Times* of the agenda and proposals to be discussed by the Executive Council at a meeting. The membership shall be informed of the decisions of Council.

Proposed by DGL, seconded by MC-P, no further discussion, carried unanimously.

Future IAB Meetings

2009 South Africa: Terry Hedderson will host the meeting near Capetown; JG will approach him for update, and Dale Vitt for update on progress with the program for that meeting. [JG note: Council has now received an email requesting approval and suggestions for the meeting.]

2011 Melbourne, Australia: PD requested advice from Council on what is expected of an organising committee, for example on accommodation, scientific program, range of excursions, etc. DGL suggested a 'leader' be nominated to organize a committee. Agreed that BCT would liaise with PD.



Some highlights from the scientific sessions

Jessica Beever and Alisson Downing both were so kind as to take notes during the sessions of the IAB conference and sent their report to the *Bryological Times*.

Report by Jessica Beever

World Conference of Bryology 2007 – some highlights from the Scientific Sessions

One hundred and twenty-nine bryologists from 29 countries – what a recipe for a talk-fest! We gathered in Kuala Lumpur, with 'Bryology in Asia in the New Millennium' as our central theme. From the outset it was a most efficiently organised conference. All participants are grateful to the organizing committee, working under the effective chairmanship of Professor Haji Mohamed, of the University of Malaya, and with

support from IAB President Janice Glime and her team.

I have been asked to comment on some of the scientific sessions – the Plenary Sessions and Series B of the parallel sessions. Series A will be covered by others (though I admit to a bit of hopping back and forth – not difficult once you learnt where the well-hidden staircase was in the Crystal Crown Hotel).

The Plenary Sessions began with a stimulating Keynote Speech from former President of IAB, the charming and enthusiastic Rob Gradstein, who addressed the somewhat neglected subject of neoteny. Examples were described of the retention of juvenile characters in an adult plant, in many cases enabling a short-cut in the life cycle and thereby taking advantage of impermanent habitats. *Metzgeriopsis* was the 'hero of the talk,' a genus in which perianths may be produced directly on an apparent protonemal thallus.

This ecological strategy is, not surprisingly, polyphyletic, and by its very nature has made the correct placement of some individual taxa difficult. Molecular data are beginning to solve such problems. I was interested to see that the neotenuous example I am most familiar with, the moss *Ephemeropsis trentepohlioides*, lies closest to *Beeveria distichophylloides*, the eponymous taxon for which I have a special affection, but was reassured by the comment that they are never-the-less quite distant from each other (no sinking seems imminent).

This was followed by a 'Special Talk' from Brent Mishler, who brought us up to date with the *Physcomitrella* Genome Project. Having watched from the side-lines for several decades the development of *Physcomitrella patens* as the *Aspergillus nidulans* of the plant world, I found it good to hear that the full genome of *Physcomitrella patens* is about to be published in 'Science.' As we knew all along, a bryophyte has numerous advantages as a model plant over the sporophyte-dominant *Arabidopsis*. The relative ease with which foreign genes can be incorporated into its genome is apparently an additional bonus. Now we are witnessing the beginnings of 'phylogenomics.' This field, combining phylogenetics and functional genomics, should enable us to pin-point genes responsible for complex characters, such as desiccation tolerance, and clarify

why 'flower' genes are present in mosses. Brent is obviously enjoying the broad collaboration across disciplines that this project brings. Such collaboration augers well for rapid progress, and in due course some better phylogenetic resolution of the difficult 'deep nodes.'

From a synthesis of systematics, ecology and phylogeny we turned to the chemistry of biologically active compounds isolated from Hepaticae. Yoshinori Asakawa, with his usual unbridled enthusiasm for his

topic, took us through the isolation and structural identification of a series of compounds with pharmacological activity. These may be small plants, but 650kg as starting point for isolation from the weedy *Marchantia polymorpha* was an impressive sight. And if anyone had dared to doze, they would have been abruptly awakened by Asakawa-san's microphone-assisted demonstration of the way Colombian Indians shoot monkeys using blowpipes, the link to liverworts being the chemical similarity of

marchantin A to the muscle relaxant curare.

A series of papers followed: Bryophyte Chemistry chaired by Yoshinori Asakawa; Bryophyte Morphology, Ultrastructure and Ontogeny chaired by Jeff Duckett; and Bryophyte Conservation and Economic Importance chaired in 2 sessions by Lena Gustafsson and Tomas Hallingbäck respectively. Jeff Duckett told us of a research project that began, appropriately, with a visit to Malaysia in 1981. He was then stimulated to study the associations of fungi with bryophytes – relationships well known between fungi and vascular plants as mycorrhizae. The study of such possible associations for bryophytes had been a neglected field until Jeff took up the challenge. Over a period of some 25 years, he and his students have shown that such associations are common in hepatics, with a wide range of fungi involved. One take-home message was that *Cryptothallus* is a parasite on its fungal associate, not a saprophyte. Molecular techniques have rendered possible the identification of the fungal symbionts, a high impossible task with earlier methods.



From left: Karen Beckmann, Janice Glime, Nancy Slack, Brent Mishler, Jessica Beever, Helen Jolley under the conference banner at University of Malaya

Interestingly, similar symbioses appear to be absent from mosses. Jeff tentatively suggested that moss rhizoids efficiently carry out the role of the 'mycorrhizae' we see in hepatics. I found this a novel suggestion, having assumed that the major role of moss rhizoids is anchorage, along with some external water conduction.

The topic of Conservation of Bryophytes surfaced many times during the conference. Tomas Hallingbäck began the formal session with a big-picture view, describing the importance of the Global Plant Conservation Strategy, and the way forward for bryophytes within that framework. He showed us disturbing maps of deforestation, world-wide and closer at hand in Malaysia and Indonesia. He illustrated air and water pollution, all these being threats we have been aware of for some time, but have scarcely made inroads against. Now we can add climate change to that list of threats. The recent Intergovernmental Panel on Climate Change 4th Assessment Plan of April 2007, described by Tomas, addresses this issue. Wherever we are on the globe, the problems would seem to be much the same. D.K. Singh advised that over-collecting, as well as construction and widening of roads, particularly threatened bryophytes in India, simple activities that may occur in any country. Lars Söderström and Ana Séneca discussed the usefulness of the ecological concepts 'species richness' and the 'richness of range restricted species' for prioritizing conservation efforts, drawing on their knowledge of Malesian hepatics. Ron Porley, with co-authors Beata Papp, Lars Söderström and Tomas Hallingbäck, painted a more optimistic picture of bryophyte conservation in Europe, which now includes *ex situ* conservation in liquid nitrogen. Twenty-nine British species are currently in cryo-preservation, but he emphasized that this was not to be seen as an alternative to *in situ* preservation. Nancy Slack showed her skill by presenting, without any visual aids (but with an invitation to view her poster downstairs), a thought-provoking paper on 'Why are bryophytes rare?' An issue that came up more than once was the importance of protecting habitats, rather than focusing on threatened species alone. Nancy introduced the concept of 'mitigation,' used by developers, which sounds rather like a license to damage, perhaps on a par with the 'reduced impact logging' described by Lena Gustafsson and Robert Nasi for South East Asia. However, Nancy also commented that many areas in her part of the world (eastern United States) have become reserves even though they lack rare species. This is good news. With an official list of threatened bryophytes now established by the Department of Conservation here in New Zealand, I had perhaps naively expected this to be good ammunition for conservation. On the contrary, in a local example with which I have been involved, funding was provided for rare bryophyte surveying, none were found, and precious habitat, pristine forest

streams, were then subjected to increased human-induced degradation in the name of adventure-tourism. A stark reminder of this planet's deforestation problems came at the end of the conference, when we were told that our ever-friendly yet regal Chairman of the Conference Committee, Professor Haji Mohamed, is leaving the security of his prestigious position at the University of Malaya to put his efforts (and considerable personal skills) towards countering deforestation in SE Asia. I first knew Haji as author of the 1979 paper that helped me to recognise *Bryum billardierei* var. *platyloma*, a common moss in my area. In his career he has gone from the detail of infra-specific taxa of *Bryum* to the biggest of issues – we all wish him very well.

Back to the conference. On Thursday sessions resumed, and I attended an eclectic mix of papers in another subject area dear to my heart, Bryophyte Eco-physiology. A high-light of this session for me was the paper by Jeff Bates on 'Salinity tolerance and survival of rocky seashore Bryophytes.' Jeff reminded us that halophytes are not common amongst bryophytes. In my own southern part of the world *Tortella flavovirens*, a species also included in Jeff's British study, comes close to the sea, with only *Trichostomum eckelianum*, and the ubiquitous pioneer species *Funaria hygrometrica*, being found lower on the rocky shore. Jeff's studies, using chlorophyll fluorometry to measure the amount of light energy actually being used in photosynthesis, indicate that salt tolerance is perhaps a corollary of desiccation tolerance, which we already know many bryophytes excel at. Even the classic woodland species, *Atrichum undulatum*, withstood sea-water to a certain extent in low light conditions. In high light conditions all taxa showed a decline in photosynthesis in the presence of sea-water, even *Schistidium maritimum*, which, as its name suggests, is a littoral species that can withstand occasional wave-splash. Exhorted by Brent Mishler to think about bryophytes independently – as he has said elsewhere, "Bryophytes aren't just small tracheophytes," this study emphasised yet again how different the bryo-centered world is from the angiosperm-centric view that botanists take as the norm. Noris Salazar Allen, with co-authors Mabelle Chong and Helena Korpelainen, showed considerable technical skill in demonstrating that three species of the tiny thalloid liverwort *Cyathodium* harbour between them a total of 393 morphotypes of endophytic fungi. They made the interesting suggestion that such symbiotic associations may have an evolutionary importance in successful colonization and establishment in unstable habitats, as well as potential use in biological control of certain fungal pathogens.

Overall I was struck by the great amount of collaboration going on between bryologists in different parts of the globe. Between, for example, Uppsala and Jakarta (Lena Gustafsson and Robert Nasi, looking at

the possible role of bryophytes in developing management guidelines for tropical forestry), Edinburgh and California (David Long and James Shevock, involved in bryological exploration of the Gaoligong Shan, in Yunnan, China), and Chicago, Trondheim and Sydney (Matt von Konrat, Anders Hagborg, Lars Soderstrom and Matt Renner, developing an ambitious database of hepatics, in order to better understand global patterns of their diversity). Admittedly two of the diaspora collaborators in the last mentioned, the two young Matts, were colleagues already, from their student days with John Braggins at Auckland University. Nimal Gunatilleke of Sri Lanka, with Benito Tan and Brian O'Shea, described a very worthwhile international project supported by the National Geographic Society which will train Sri Lankan students firstly in Singapore, and then on to post-graduate work in the United Kingdom. On a personal note, Nimal and my husband Ross recognized each other after more than 30 years, from their post-graduate days together - working at the time on *Aspergillus* in David Cove's lab in Cambridge. So effective is the net-working of bryology it even brings old mycologists together. No doubt the advent of email has greatly assisted international collaboration. So often I send an email from New Zealand, go home for a night's sleep, and the response is there when I log on in the morning. Gone are the days when one expected at least a fortnight's turn-around for communication with the other side of the globe. A minor inconsequential confusion that arose in our multi-cultural gathering, was the differing conventions in the way we write our names – the committee solved this by listing participants alphabetically according to how we write them, so I found myself following the Jeffreys (Bates and Duckett).

We all know that one of the inherent pleasures of our area of research is the beauty of our subjects. Some favourite plants were shared with us. For Angie Newton it was *Pterobryon australiense*, magnificent on its old herbarium sheet, for Masa Higuchi *Pleuroziopsis ruthenica*, masquerading as a lover's heart on a tree trunk. Closer-up, many beautiful images were shown to us: the appropriately-named 'eye-ball' granules in oil-bodies of *Radula kojana* (Rui-Liang Zhu); and skilful use of SEM, and TEM, to show the development of biological soil crusts in north-west China (Zhang Yuanming). Microscopy elegantly revealed this process, from the first stage when loose sand grains were tenuously held together by polysaccharide threads produced by bacteria, through to a sward of *Tortula* species with rhizoids binding sand grains deep into the substrate.

The presentations with the most visual impact, however, had to be the 'movies.' A video presented by Nils Cronberg and Rayna Natcheva, 'Private life of silvermoss, *Bryum argenteum* Hedw.,' featured antherozoid dispersal captured in real-time, and had to be repeated due to popular demand. It was most interesting to get an intimate view of a process I suspect we all step over on the footpaths of our 29 countries. And as a bonus we got a view of mites eating 'protonemal spaghetti.' Tong Cao, from Shanghai, treated us to a short TV documentary demonstrating the use of bryophytes in monitoring metal pollution. The image that sticks in my mind is that of the (non-real-time, but never-the-less real) bryologists scurrying in and out of the herbarium, as if their lives depended on it.

We were also reminded of the vicissitudes of field work: the loss of permanent quadrats 'scrubbed clean' in face of storms on Jeff Bates' Cornwall sea-coast (but which set-back he turned to good use by assessing recolonisation); flimsy foot-bridges to traverse wild streams in the Gaoligong Shan, Yunnan, China, courtesy David Long and James Shevock; inexperienced equestrians taking on horse transport - Masa Higuchi's heart-felt advice was "When you are on horses do what horses do." Surely few of us can claim field work transport by elephant, as experienced by Atsushi Tanaka and Hiroyuki Akiyama in Myanmar, and all were impressed with the youthfulness of Annika Jagerbrand's field assistant in the mountains of Hokkaido, a field assistant who charmed us all in person at the conference, and is very economical, her mother assured us, since "she works for candy."

And as a lasting impression – all the beautiful places we bryologists get to work: the mountains of Hokkaido (Annika Jagerbrand), the coast of Cornwall (Jeff Bates) and the lava flows of oceanic Réunion Island (Claudine Ah-Peng, J. Bardat and D. Strasberg). Thomas Hallingbäck gave us Mt Kinabalu, beautifully framed by a tree-fern, as his final image, topical as the destination of one post-conference tour. For myself and Ross bryologising post-conference in the Indonesian sub-montane forest, with long-tailed Java monkeys crashing about in the canopy above us, we in the loving care of Eka Iskandar and Ho Boon Chuan (two more of that hard-working Organising Committee), was to be a wonderful experience – but that's another story.....

Jessica Beever

Report by Allison Downing

World Conference of Bryology, Petaling Jaya (Kuala Lumpur), Malaysia, 23 – 27 July 2007

The theme for the World Conference of Bryology held in Malaysia in July this year was “**Bryology in Asia in the New Millennium,**” and the contributions, papers and posters, from graduate students to experienced researchers, reflected this theme admirably. The conference was hosted by the International Association of Bryologists and the University of Malaya. Bryologists arrived in Petaling Jaya from more than 30 countries around the world for this week of seminars, workshops and discussions. Following the conference, many departed on field trips to exciting and challenging destinations, including Mount Kinabalu in Sarawak, the Cameron Highlands in Peninsula Malaysia, and to Cibodas in Indonesia.

Day 1 Opening Ceremony

At the Opening Ceremony on the first morning of the Scientific Program, Professor Haji Mohamed,

Chairman of the Organizing Committee, welcomed all participants and reminded us that this was the first time such a meeting has been held in South East Asia. Professor Amru Nasrulhaq Boyce, Dean of the Faculty of Science at University of Malaya, formally welcomed us, and expressed his hope that the conference would encourage young people to follow in the footsteps of the great botanists, including Dozy, Molkenboer, Schiffner, Fleischer and Bartram, who worked in South East Asia over 100 years ago. Professor Janice Glime, President of the International Association of Bryologists, commented on new developments and new challenges in bryology, and encouraging all members to maintain the high quality of bryological research, and to use every opportunity to educate and inform others of the importance of bryophytes. We were all delighted and charmed by the presentation of the Honourable Dato’ Seri Azmi Bin Khalid, the Minister of Natural Resources and Environment, Malaysia. Prior to his official speech, he spoke about growing up in his

home town, and how he had just learnt that bryophytes were the green things that grew in his village and that they were ‘slippery but not evil like fungus.’ Minister Dato spoke at length about the importance of tropical biological diversity in Malaysia, and of the 1100 species bryophytes that occur in Malaysia, of which 9% are endemic.

Scientific program, Day 1.

The **Conference Keynote Speech, ‘Neotenic Bryophytes’** was presented by **Robbert Gradstein.**

This fascinating lecture discussed neoteny, the retention of juvenile characters in the adult organism, allowing for rapid growth to maturity in unstable habitats. And of course, included in the examples of neotenic bryophytes was *Ephemeropsis tjobodensis*, a tiny epiphyll, and the iconic symbol of this conference.

In the early afternoon, **Brent Mishler** gave a Special Talk on **‘The Uses of Phylogenetics in Comparative**

Genomics, with Special Reference to the *Physcomitrella* Genome Project. Brent discussed the importance of the new field of ‘phylogenomics’, a synthesis of phylogenetics and genomics, and also of the importance of *Physcomitrella* for modern phylogenetic studies.

The afternoon concluded with a series of papers on Bryophyte Chemistry, including the Plenary Lecture presented by Professor Yoshinori Asakawa on ***Hepaticae, A Good Source of Biologically Active Compounds.***

Day 2:

The second day of the conference included two parallel sessions. The theme for the first session was Molecular Phylogeny and Evolution of Bryophytes, with the Plenary Lecture ***Reconstructing Phylogenetic Trees: Models, Algorithms, Problems*** presented by Kai Müller.



From left: Yoshinori Asakawa, Zen Iwatsuki, and Tong Cao

Jeffrey Duckett presented the Plenary Lecture, ***Fungal Associations in Bryophytes***, of the second session, Bryophyte Morphology, Ultrastructure and Ontogeny. This fascinating lecture gave a new insight into bryophyte/fungal associations. Jeff's work has shown that endophytic fungi have never been found in mosses, although saprophytic and parasitic fungi are often present. However, there is a great diversity of endophytic fungi (not saprophytic or parasitic fungi) that have been found associated with both liverwort and hornwort taxa, and associations of endophytic fungi and bryophytes mirror the associations found between mycorrhizae and tracheophytes.

In contrast to the many presentations on tropical bryology, Zhang YuanMing brought to our attention a different world when he spoke of his work on biological soil crusts in the Gurbantüngüt Desert in far north-western China. Here, rainfall is in the vicinity of 150-200 mm per year and evaporation 3000 mm or more per year. In spite of the presence of relatively few species, the binding characteristics of the cyanobacteria, lichens and bryophytes of the soil crust provide essential protection from erosion by wind and water.

Thomas Hallingbäck gave the Plenary Lecture, ***Bryophytes and the Global Plant Conservation Strategy***, in the session, Bryophytes: Conservation and Economic Importance. This was followed by a series of papers giving valuable information on the identification of threatened species and management techniques for conserving bryophyte biodiversity.

Day 3: City Tour

Knowing that many of us had never previously visited Kuala Lumpur, our hosts organised a great day of touring. In smaller groups, and guided by staff members, we toured the Rimba Ilmu Botanic Garden, formerly part of the original rubber plantation on which University of Malaya was built. Many of us were delighted to see *Gnetum* trees which we had previously known only from text books. We had a delicious, and very spicy, Malaysian lunch at the Botanic Gardens, before we were whisked away again to visit Independence Square and the National Mosque. And of course, our hosts were kind enough to allow us time to shop for Malaysian handcrafts at the Central Markets and for fresh fruit and all manner of things in China Town!

Conference Banquet

In the evening, we were very honoured to have as guests at the Conference Banquet, Datuk Rafiah Salim, Vice-Chancellor of University of Malaya, Tan Sri Datuk Arshad Ayub, Chairman of the Board of Directors of University of Malaya. As we enjoyed our banquet, we were treated to some wonderful performances of song and dance, presented by

talented students from the 9th Residential College of the University of Malaya. For the last performance of the evening, the students invited conference delegates to join them on the stage. May I be so bold as to suggest that Professor Asakawa and Professor Gradstein were the most imaginative and creative dancers of all conference delegates?

Day 4:

On Thursday, Ben Tan introduced the session on Taxonomy, Biodiversity and Biogeography of Asian Bryophytes. We were treated to excellent papers from many parts of Asia, Thailand to Indonesia, the Western Himalaya of India to Japan and the Philippines in the Pacific, Siberia and Mongolia in the north to China's tropical Hainan Island. Our chairman kept us laughing with comments, such as "Hiroyuki Akiyama is an outstanding bryologist. Why? Because he is the tallest of all the Japanese bryologists."

We were able to watch a video clip that had played on satellite television world wide, featuring Cao Tong and his students, looking for evidence of pollution in Shanghai's mosses. Although brief, this television excerpt is an excellent example of ways in which the significance and uses of bryophytes can be brought to the attention of the community at large.

Janice Glime chaired the parallel session, Bryophyte eco-physiology and this was followed by Bryophyte Morphology, Ultrastructure and Ontogeny. We were very disappointed that Karen Renzaglia was not able to attend the conference. Fortunately, after a great deal of international phoning, emailing, and international express post delivery, Jeff Duckett, a co-author of the paper, was able to present the paper on Karen's behalf. Jeff gave us a fascinating and entertaining insight into the ***Evolution of the hornwort chloroplast unveiled***.

Day 5:

On Friday morning, we enjoyed more presentations on Asian bryophytes and marvelled at the tenacity of bryologists who ventured into spectacularly beautiful but extraordinarily inaccessible, regions of Myanmar and south-western China. Believe it or not, it took three years of contact with the Myanmar Government for Atsushi Tanaka and Hiroyuki Akiyama to obtain permission to work in Myanmar!!

Poster Session

For most of the week we had been able to view posters at our leisure, but early on Friday afternoon we had a good opportunity to chat with authors. The posters included a vast range of subjects relating to bryophytes, including taxonomy, morphology, heavy metals, soil fauna, forest epiphytes, genetics, invasive species, ecology and bryophyte illustration.

Closing ceremony.

Benito Tan chaired the Closing Ceremony of the conference. At the commencement of the session, by special request, Nils Cronberg's exquisite video: **Private Life of Silver Moss, *Bryum argenteum***, was screened again.

Janice Glime then announced the IAB awards, including two **Stanley Greene** awards, one to Juan Bernardo Larrain Benoit for "Bryological exploration in scarcely explored areas in Central and South Chile, the other to Juan Carlos Villarreal for "Cryptic speciation and phylogenetic affinities in the hornwort *Megaceros vincentianus*." The **Hattori Award** for best paper or book went to Bill and Nancy Malcolm, for their exquisitely illustrated book, "Mosses and other Bryophytes, an Illustrated Glossary (Second Edition)" and the **Spruce Award** was presented to Jeff Duckett. The **Conservation Award** was presented to Santiago Yandon for work on the distribution, ecology and conservation of the endangered *Myriocolea irrorata* in Ecuador.

Student Travel Awards were presented to Claudine Ah-Peng (University of Réunion, France), Ying Chang (University of British Columbia, Canada), Helen Jolley (Royal Botanic Gardens, Melbourne, Australia), Anna Mezaka (University of Latvia, Latvia) and Rui-Ping Shi (East China Normal University, China). Ho Boon Chuan, Mihoko Uzawa and Masanobu Higuchi, and V. Hutsemekers, C. Dopagne and A. Vanderpoorten won the three awards **for best posters**.

Janice also announced the establishment of a new award – the **Riclef Grolle** award for excellence in bryodiversity research, particularly in under-explored areas of the world.

Janice formally thanked the University of Malaya, in particular Professor Haji Mohamed in his role as Chair of the Organising Committee. Janice also thanked faculty members, staff, students and members of the finance Committee. Janice made special mention of the work of Mr Yong Kien Thai, Ms Ng Swee Yee and Mr Patrick Lee. Speaking personally, for someone who had never previously visited Kuala Lumpur, the regular and informative emails received from Mr Yong and Ms Ng Swee Yee were most helpful and much appreciated. We must also congratulate the University

of Malaya for the choice of the beautiful and elegant cloth & woven green pandan conference satchels.

I would also like to pass a special vote of thanks to Ben Tan. For a long time Ben has been encouraging his friends and colleagues, world-wide, to come to Kuala Lumpur for this conference. We know that he has been working incredibly hard behind the scenes to smooth the way on so many issues. We also thank you Ben, for keeping us laughing throughout the conference.

The choice of the Crystal Crown Hotel was excellent and we thank them for their hospitality. The hotel was comfortable and affordable, close to the university and public transport, meaning that there was much more time for discussion amongst all participants. We particularly enjoyed the opportunity to sample the wide selection of colourful, traditional Malaysian dessert treats, featuring coconut, palm sugar and sticky rice.

University of Malaya and IAB must also be congratulated in the excellent press coverage of the conference, for example in Kuala Lumpur in the English language newspaper, **The Star**. The field trip to Cibodas was also covered in the **Jakarta Post**. These articles play an important role in promoting bryology to a wide audience.

Conclusion:

Professor Haji Mohamed summed up the conference very appropriately when he commented that in such uncertain times, if bryophytes can bring people together from around the world, to work together productively and in harmony, then there is hope.

I really enjoyed and appreciated the warm welcome extended to us by our Malaysian colleagues. I do think that one of the most exciting elements of the conference was the very large number of dynamic and capable young bryologists (as Ben Tan regularly and joyfully reminded us, "below 45 years of age!") who contributed papers and posters. And I think it is really noteworthy that so many of these young bryologists are from south-east Asian nations.

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OBITUARY

Carmela Cortini Pedrotti (1931 – 2007)

Carmela Cortini Pedrotti was born in Caltanissetta (Sicily) on 18 October 1931, she was one of the greatest Italian bryologists, and died after a debilitating illness on 29 April 2007 in Matelica (Macerata). She was an outstanding botanist, her interests varied during her long career from plant cytology and embryology, to plant vegetation and cartography, to floristics, and to bryology. She was for many years director of the Department of Botany and Ecology of the University of Camerino (1991-1997; 2001-2005), a member of the Italian Botanical Society, and a member of the Italian Academy of Forestry. She published recently a Moss Flora of Italy in two volumes.

She got a degree in Natural Sciences in 1954, another one in Biological Sciences in 1955, and a degree in Forestry in 1966, all of them at the University of Florence. She began her career at the University of Florence, where she taught Pharmaceutical Botany, and Genetics. In 1964 she moved to the University of Camerino, where she taught Pharmaceutical Botany, Botany, and where she became also director of the Botanical Garden of the University for more than a decade (1972-1984).

Her research interests initially centered on plant cytology and embryology (University of Florence), until she specialized in bryology under the guidance of prof. Uberto Tosco at the University of Turin. She was later appointed curator of the Italian Cryptogamic Herbarium of Florence by prof. Alberto Chiarugi. Since then her scientific interest remained focused on bryology. She had scientific contacts and cooperation with several European bryologists, among them Prof. René Schumacker (University of Liege), Prof. Alain Lecoite (University of Caen), Prof. Cecilia Sérgio (University of Lisbon), Prof. Casas Sicart (University of Barcelona), Prof. Ruprecht Düll (University of Duisburg).

In 1992 she was the promotor of a new Workgroup for Bryology within the Italian Botanical Society with the aim to coordinate the activities of all Italian bryologists as a way to increase research in all aspects of bryology. She was always very actively involved in the workgroup's activities, which, under her guidance, became an important center for bryological research and for its coordination in Italy. She was an editor in several scientific journal boards, among them, Webbia

(Florence), *Flora Mediterranea* (Palermo), and *Archivio Botanico Italiano* (Pavia), and a member of several national and international scientific associations. She published more than one hundred scientific papers covering several aspects of plant biology. Her bryological contributions dealt mainly with floristic and chorology of bryophytes from Alpine areas, the Central Appennine, and several islands (among them, several Tuscan Islands, and Sardinia). Certainly, among her main contributions to bryology an important place is reserved to her studies on bryophytes as a functional and structural component of forest ecosystems, where their important regulatory role in forests was stressed (v., for instance, ref. 2). Other important contributions were a checklist of the Mosses of Italy (1992, ref. 1, updated in 2001, ref. 4), a Red List of Italian Bryophytes (1992, ref. 3), and a series of works, which eventually led to the production of her two-volume Moss Flora of Italy "Flora dei Muschi d'Italia." Moss Flora of Italy covers all 818 moss species recorded for Italy, and has a diagnosis for each of them. Data on the ecology, distribution, as well a series of

tables with the main morphological, anatomical, and cytological characters of all species, are included too. It represents the first critical review of the whole moss flora of Italy, and also one of the few works covering a Mediterranean Country. That work may be considered, perhaps, as the main legacy of Carmela Cortini Pedrotti to Italian bryology.

Her enthusiasm for bryology and her expertise were a catalyst for all young (and less young) Italian bryologists, and she had several students coming from the Universities of Palermo, Catania, Cagliari, Napoli, Siena, and Turin. She was a role model for her peers and colleagues and a mentor to many younger colleagues; her departure bereaves Italian Bryology of one of its prominent members, and she will certainly be missed.

She is survived by her husband Franco Pedrotti.

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PERSONAL NEWS

The following is a list of new IAB-members. Some of them have been so kind as to submit a short description of their bryology interests:

Rui-ping **Shi**, new student member from China; he is a M.S. student under the guidance of Prof. Rui-Liang Zhu and studies the hepatic flora of the Diaoluoshan Nature Reserve, Hainan. Rui-Ping has a particular interest in hepatic taxonomy. His full address is: Department of Biology, East China Normal University, 3663 Zhong Shan North Road, Shanghai 200062 China. Email: 51051300018@student.ecnu.edu.cn; Fax: 86-21-62233754

Daniela **Schill**, is a new member from Edinburgh; e-mail: d.schill@rbge.org.uk. After having worked on leafy liverworts for her Masters thesis, her research focus in recent years has been on complex thalloid liverworts. In Autumn 2006, she completed her PhD on the taxonomy and phylogeny of the liverwort genus *Mannia* (University of Edinburgh and Royal Botanic Garden Edinburgh (RBGE)) under the supervision of David Long and the late Riclef Grolle. She has now started a postdoctoral research project on the taxonomy of Sphaerocarpaceae and is undertaking a world revision of *Sphaerocarpos* at RBGE. This project is funded by the Royal Botanic Garden (Sibbald) Trust, a private charitable trust. Email: d.schill@rbge.org.uk

Laurens **Sparrius** is a new member from the Netherlands, e-mail: sparrius@blwg.nl. Laurens is

project leader at the Dutch Bryological & Lichenological Society, PhD researcher at University of Amsterdam.

Keiko **Sakakibara**, of Monash University, works as Postdoctoral Research Associate on the evolution of land plants and development of bryophytes. E-mail: keiko.sakakibara@sci.monash.edu.au

Other new IAB members are:

Eric **Harris**, new student member from Berkeley, California: email: e_harris@berkeley.edu
Ping **Zhou**, new student member 2007 from Duke, NC: email: ping.zhou@duke.edu
Sarah **Stehn**, new student member from Michigan Technological University, Houghton MI: email: sestehn@mtu.edu
Caspar **Chater**, new student from Sheffield, UK; e-mail: C.Chater@sheffield.ac.uk
Isabel **Alvaro Martin**, new member from the University of Barcelona, Spain; e-mail: malvaro@ub.edu
Annika **Jaegerbrand**, new member from Hokkaido Univ. Sapporo; e-mail: annika@ees.hokudai.ac.jp
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The editor would like to thank all people that sent in information about their bryological activities. Have you taken up another position, received a grant, started a research project, moved office? The best way to inform the other IAB-members is by spreading the news through BRYONET and the Bryological Times.

Please do send your personal news to the editor!

JOB OPPORTUNITIES

Become a bryologist in Paris

The Muséum d'Histoire Naturelle de Paris (France) will be recruiting, during the next few years, several Professors of different levels in the fields of Systematics and Evolution of Plants (including Bryophytes, Pteridophytes and Phanerogams). These positions will be located at the Paris Museum with a strong link to the herbarium. No teaching will be required (although it is possible) but part of the Professors' activities will be devoted to the

management of the herbarium. As is usual in France, these positions offer direct tenure.

Any person interested should contact us as soon as possible as the process of recruitment in France is quite complex and includes an *a priori* national procedure.

Catherine Rausch (crausch@mnhn.fr)

Jean-Noel Labat labat@mnhn.fr

Pierre-Henri Gouyon <gouyon@mnhn.fr>

Postdoctoral Fellowship in Bryology, Southern Illinois University, Carbondale, IL

A 2-year postdoctoral fellowship is available, beginning January 1, 2008 to participate in studies of the developmental anatomy and morphology of liverworts as part of an NSF funded project, Assembling the Liverwort Tree of Life (LiToL). Qualifications include a Ph.D. in plant biology, with a strong interest in plant morphology, working knowledge of histological techniques and electron microscopy and experience with phylogenetic analyses. Duties of the position are to assist in the collection and analysis of morphological data and the intercalation of these data into the Liverwort AToL and/or MORPHOBANK databases. The successful candidate is also expected to help in the preparation of manuscripts for publication and

participate in appropriate scientific meetings. Additional information about the project and its research teams can be found at <http://bryophytes.plant.siu.edu/resources.html>.

Interested applicants should submit electronic copies of a curriculum vitae, a brief statement of research background and the names of two references to Dr. Barbara Crandall-Stotler, Department of Plant Biology, Mail Code 6509, Southern Illinois University, Carbondale, IL 62901-6509.

E-mail: crandall@plant.siu.edu. The review of applications will begin November 15, 2007 and will continue until the position is filled

POINT OF VIEW

The discovery of haploidy and diploidy in bryophytes

It is well known amongst bryologists that the life cycle of plants has been detected by Hofmeister (1851). Hofmeister explained that there is a regular change between a sexual and an asexual generation in bryophytes, ferns, horsetails and gymnosperms. As figured out by me (Frahm 2000), this happened in a very modest way with respect to the fundamental news. Previously all cryptogams were regarded as just a division of flowering plants. Hofmeister described and illustrated at first the anatomical facts and concluded the regularity of the life cycles in all cryptogams as well as conifers. This was done very differently from the polemic style in which scientific discussions were published by his temporary colleagues. The knowledge of the discovery that the alterations of the generations is associated with a change in the number of chromosomes and that the sexual and asexual part of the life cycle have different

numbers of chromosomes is not as well known, although not less important. [There seems to be no differentiation of both in English. The first is called Generationswechsel in German (alterations of generations) and the latter Kernphasenwechsel (alteration of nuclear phases); both need not be identical as shown in many groups of algae.] References to this discovery are - to my knowledge - not mentioned in textbooks, also not in my own (Frahm 2001), since I could not figure out to whom this can be attributed. The reason is that the citation is not as easy as in the case of Hofmeister. Over the past years I made several small attempts to figure out to whom this merit can be attributed, asked (elder) colleagues, but could never get a precise answer. By chance I found that this discovery was made in the year 1894. At this time, cytology was the eminent field of research in botany and the scientific results exploded. In 1893,

Overton described for the first time the reduction of chromosomes of phanerogams. In March 1894, Farmer published a study: "Studies in Hepaticae: On *Pallavicinia decipiens* Mitten". This article gives a broad account of the morphology and anatomy of this species, the structure of rhizoids, the thallus, the apical cells, sex organs and also the cell division. In this part he stated that the nuclei of the gametophyte of *Pallavicinia decipiens* have 4 chromosomes, those of the sporophyte 8 and that the reduction apparently happens in the spore mother cell. Farmer was apparently not aware of the importance of his discovery, else he had not mentioned these results by the way in a general study of this hepatic. He would have more outlined the importance and especially would have chosen another title. In fact, he hesitated to generalize his results with the words: "...it is best to postpone the discussion of these questions until further investigations have rendered it possible to review and compare the process in a wider range of species than can be done at the present time." In September of the same year, Strasburger (1894) published that the nuclei of the sexual generation of the fern *Osmunda regalis* have only half of the chromosomes of the asexual generation. In this publication, based on a lecture held during a meeting in August 1894 in Oxford, Strasburger then combined the results of Overton, Farmer and himself in a kind of review article and proposed as a theory that the results found in the different groups of plants are homologous. Therefore this discovery was sometimes attributed to Eduard Strasburger (1894), (e.g. Bryan 2001), but this is not

really true, especially not with regard to bryophytes. But Farmer, Assistant Professor of Biology and the Royal College of Science, South Kensington, had in fact counted the different chromosome numbers in a gametophyte and sporophyte of a bryophyte for the first time.

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Jan-Peter Frahm

RESEARCH NEWS

Genetic diversity of a forest bryophyte : *Dicranum viride* (Sull. & Lesq.) Lindb.

Dicranum viride (Dicranaceae) is a bryophyte localized in the northeastern part of the United-States, in the eastern part of Canada, in Europe, and in central China and Japan. The species is considered as vulnerable in Europe and lives in colonies on the trunk of forest trees. Available information about *D. viride* concerns mainly its ecology. Sexual reproduction has never been observed in France. Reproduction and propagation is realised asexually via leaf apices breaking. In this work, we have sampled 142 gametophytes from 10 populations from French, Spanish, German and North American forests. ITS1, *trnL-trnF* and *rpl32-trnL* genes were sequenced in order to study the genetic variability of this species at different spatial scales: stand, forest and whole sampled area. Thirty samples of *Dicranum scoparium* Hedw.

(sexually reproducing species) were also genotyped for comparison. We have shown that (i) *D. viride* and *D. scoparium* have a low genetic diversity; (ii) this diversity is expressed mainly by singletons; (iii) the species are genetically differentiated. Hypothesis of a recent demographic expansion of both species is suggested. Work is in progress (sampling other populations, development of more variable markers such as microsatellites) to confirm this hypothesis.

Amélie Pichonet, Muséum National d'Histoire Naturelle, Paris
(Training period of Master 2)

BRYOLOGICAL TECHNIQUES

Bryological investigation of two mounting media

The perfect microscopic mounting medium for bryophytes remains elusive. To date, in spite of quite a number of possible formulations and techniques (e.g., Anderson, 1954; Bowers, 1964; Davis, 1909; Frahm, 1990; Lightowlers, 1981; Murray, 1926; Sayre, 1941; Zander, 1983), I have found (Zander, 1997) standard glycerin jelly to have the best qualities: very rapid setting, little collapsing of delicate cells, high index of refraction, retains dyes, and long life. It has some drawbacks: melting is necessary (the jelly must be pre-melted, and low heat over weeks degrades the gelatin so it does not set, so ideally must be melted just before use, or if melted on a slide, the slide must be heated gently and almost overall to prevent stress fracture); the heat if too strong may destroy delicate organs like axillary hairs; KOH color reactions are retained only a few days; and, in spite of the high boiling point of glycerin, the mounts over a period of years at least partially evaporate (though keeping slides in a closed container, perhaps with an open bowl of glycerin to counter the mount's vapor pressure by saturating the air, retards this). To avoid such problems, an ideal mounting medium would have the positive traits of glycerin jelly but be easier to work with by simply evaporating a water constituent, and would set as a non-evaporating solid (perhaps subliming only very slowly). Howard Webb [webb.howard@gmail.com] called my attention to polyvinyl alcohol with glycerol (PVAG) and polyvinyl alcohol with glycerol and borax (PVAGB) media (Dioni, 2007; Salmon, 1954; Webb, 2007). (Note that publications on the Web may be moved from the URL under which one finds them at first, but may be found if searched on their author and title.) Further search uncovered 5,5-dimethyl hydantoin formaldehyde (DMHF), discussed by Steedman (1958). These media seemed worth investigating. DMHF is difficult to obtain. I thank Guenter Giese [guenter.giese@mpimf-heidelberg.mpg.de] for directing me to Lonza AG, a chemical supply firm. The U.S. subsidiary was kind enough to send me an 8-ounce sample of 75 percent DMHF in water (it is usually sold in 525 lb. drums) of its equivalent, Danoin® 739. Although a similar chemical is used to gradually release formaldehyde, DMHF releases little or none of this carcinogen. It is a water-soluble resin generally used in cosmetics, adhesives, coatings, inks, textiles, and the like. I found the solution taken directly from the Lonza sample easy to use with tested species of *Tortula* and *Mnium* but, when hardened, resulted in somewhat collapsed laminal cells and a low index of refraction. Although DMHF would indeed make permanent mounts of bryophytes that are less collapsed than, say, acrylic solutions, the low index of refraction made it difficult to make out anatomical details such as

laminal papillae. When mixed with glycerin, visibility improved but the material would not set well.

PVA is easy to obtain. It is the major constituent in transparent glues or glue gels, with which one may experiment directly. I obtained the powdered solid from Carolina Biological Supply (www.carolina.com) and made a thick syrup by heating for a long time with water. Alone, PVA solution has the same problems of acrylic resins and DMHF in somewhat collapsing cell walls when solid and having low index of refraction. I then mixed the syrup with glycerol and glycerol-borax. With added glycerin alone, using sufficient glycerin to retain glycerin's high index of refraction, the medium managed to set fairly hard, but was cloudy.

PVA plus borax is better known as "slime" for children's science demonstrations, and is a very long-chain polymer, being a runny to firm rubbery substance caused by cross-linking PVA with borate ions. The formula (Dioni, 2007) for making PVAGB (termed "PVA-G" by him), included much water. Evaporation over time would gradually collapse the mount. I attempted to make the formula with only 50 percent water or less, but that was too solid or slimy to use easily and the resultant mount, as with PVAG, was cloudy.

Although these media initially appeared promising because they were clear and did not collapse cell walls, the results on setting were disappointing. This report is offered because others may find different formulations perfect for their use, and I hope such efforts will be shared through Bryological Times. There is a perfect mounting medium, I'm sure of it.

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Zander, R. H. 1997. On mounting delicate bryophytes in glycerol. *Bryologist* 100: 380–382.

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LITERATURE COLUMN

A monograph of *Codriophorus*

Halina Bednarek-Ochyra: A taxonomic monograph of the moss genus *Codriophorus* P. Beauv. (Grimmiaceae). W. Szafer Institute of Botany, Polish Academy of Sciences 2006. Hardback, ISBN 83-89648-40-7. Available from: W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, 31-512 Kraków, Poland; e-mail: ed-office@ib-pan.krakow.pl. Advertised price €45 + postage.

Racomitrium seemed such a familiar taxon to me, and yet the work of Halina Bednarek-Ochyra has over the years brought about numerous taxonomic surprises and novelties in the genus. The genus was earlier subdivided into four subgenera, which were raised to generic rank by Bednarek-Ochyra & Ochyra in Ochyra et al. (2003). Thus, instead of a fairly heterogeneous and large *Racomitrium s. lato* we now have the genera *Racomitrium s. str.*, *Niphotrichum*, *Bucklandiella* and *Codriophorus*, and many familiar species should be called by their new names accordingly. It remains to be seen how widely this taxonomy and nomenclature will be accepted and used – at this stage it can perhaps be said to be “oozing into our minds.” I do not have the profound knowledge that the author of this book has, but the taxonomic entities seem to be reasonably well defined; it is another question at which taxonomic level they should be recognized (see for example Allen 2005, p. 235).

Bednarek-Ochyra considers *Codriophorus* “a natural and easily distinguished genus that is primarily recognised by the presence of large, flat papillae distributed over the longitudinal cell walls and covering the major part of the lumina,” a densely papillose calyptra, costa that often ends well below the leaf apex, epilose inner perichaetial leaves, and smooth setae twisted to the right on drying. There are also some other, but apparently not as sharply demarcated differences, such as the hyaline leaf tips which are generally absent or, when present, smooth to denticulate rather than coarsely papillose.

The book has eight main chapters: 1. Introduction, 2. Historical Perspective, 3. Material and Methods, 4. Taxonomic Characters, 5. Phytogeography and Ecology, 6. Taxonomy, 7. Systematic Account of the Taxa, 8. Names with Unlocated Types and Taxa Excluded from *Codriophorus*. These are followed by a summary,

literature list, an index to Latin names, and a list of taxonomic and nomenclatural novelties (incl. new lectotypes and epitypes). The Introduction provides the necessary background and the initial motivation for undertaking such a big taxonomic study. Historical Perspective contains a detailed account of the taxonomy and circumscriptions of *Racomitrium* and its species over the centuries. In Material and Methods, under the subheading “Treatment of taxa,” the author emphasizes what differentiates a taxonomic revision or monograph from a floristic study: nomenclatural treatment. Bednarek-Ochyra has really taken the trouble to dig up all published names, most of them from the original publications, to establish the correct names of the taxa. This chapter also explains the general rationale and arrangement of the book.

Chapter 4, Taxonomic Characters, is admirably thorough and accompanied by numerous plates with SEM-micrographs of good quality, as well as by three graphical illustrations of the variability observed in some characters within and among the species.

The next chapter, Phytogeography and Ecology, is perhaps a bit oddly placed. It is customary and seems to me more logical to present this information only after the taxonomic treatment. The content of this chapter, however, is quite excellent. There is a map of the global distribution of *Codriophorus*, and the species are categorized into six geographical elements. From “General Ecology,” it becomes clear that the genus can also be partly defined and separated from *Racomitrium s. lato* by its habitat ecology.

Chapter 6, Taxonomy, first treats the systematic position of *Codriophorus* and then proceeds to elaborate the infrageneric classification, followed by a nomenclatural synopsis. After that, there is a general key to the taxa and then regional keys for Asia & Oceania; Europe, Macaronesia and North Africa; North America; and South America and South Africa. There are errors in the North American key, but they were promptly corrected in a pdf-file with a new key. I have not yet tested the keys, but they seem to be very clear and well-constructed.

Systematic Account of the Taxa is of course the core of the book. Bednarek-Ochyra recognizes 15 species in *Codriophorus*. The descriptions are as detailed as I have ever seen, especially as they are supported by

absolutely excellent illustration plates, at least three and up to eight(!) per species, plus distribution maps. The taxonomic discussions (diagnostic characters, variation, taxonomic and nomenclatural notes, etc.) under each species are extremely versatile and exhaustive. The distribution maps are based on examined specimens, cited after each species treatment. The number of examined specimens is huge; for *C. fascicularis*, for example, the list of *selected* specimens examined runs c. 11 pages long – and it is printed in petit! The nomenclatural parts leave nothing to be desired. The full synonymies, type citations etc., everything is there in an exemplary manner.

I believe it takes another taxonomist to fully appreciate the amount and very high standard of work that has produced this monograph, prepared according to the

best Polish bryological tradition. One can always argue about taxonomic concepts – e.g. if *Codriophorus* is a “good” genus or not – but these species are now exhaustively and compellingly treated. Hats off for the author!

References

Allen, B. 2005: Maine Mosses. Sphagnaceae–Timmiaceae. – New York Bot. Garden Press.

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Johannes Enroth

COUNTRY REPORTS

Bryological activities in Bolivia

This describes the bryological activities since early 2001 when the author took up residency as the Bolivian program director for the Missouri Botanical Garden in Santa Cruz de la Sierra. Most of the activities outlined here involve collaborative efforts between four Bolivian institutions and the Missouri Botanical Garden. The four institutions (hereafter either referred to the acronym or city) include: Herbario Nacional Forestal Martín Cárdenas (BOLV), Universidad Mayor San Simón, Cochabamba; Herbario Nacional de Bolivia (LPB), Universidad Mayor San Andres, La Paz; Herbario del Oriente Boliviano (USZ), Museo de Historia Natural Noel Kempff Mercado, Universidad Autónoma Gabriel René Moreno, Santa Cruz; and Herbario Chuquisaca (HSB), Universidad Mayor Real y Pontificia de San Francisco Xavier de Chuquisaca, Sucre.

Fieldwork. General inventory of bryophytes, still an important necessity as in most neotropical countries, has been conducted in all nine of the Bolivian departments; however, the greatest efforts were directed towards the departments of Chuquisaca, Cochabamba, Santa Cruz and Tarija. Specific studies have focused on four areas involving “all plant” inventories (bryophytes and vascular plants): the Madidi region including the national parks and surrounding managed areas of Madidi and Apolobamba in the Department of La Paz; the Chapare region including a portion of Carrasco National Park, in the Department of Cochabamba; Serranía de Siberia spanning a portion of the departments of Cochabamba and Santa Cruz; and the Tucuman-Bolivian montane forest found in the departments of Santa Cruz, Chuquisaca, and Tarija. Three student thesis projects were also conducted within the last three areas (see below). Inventory projects were supported by grants from the National Science Foundation and The Taylor Fund for Ecological Research through the Missouri Botanical Garden. Nearly 10,000 bryophyte collections have been made between 2001 and 2006. This time period marks the first time that Bolivians have made significant bryophyte collections in the country, not only providing important records and distributions for Bolivia but also enhancing herbaria collections. Among those who have made substantial collections are Claudia

Aldana, Marcos Decker, Alfredo Fuentes, Ivan Linneo, Reinaldo Lozano, Fabiana Mogro, and Ninel Sanjines.

Infrastructural Development. Collaboration with Bolivian institutions, staff, and students has provided an opportunity to assist and develop bryology in Bolivia. **Collections and Herbaria:** All original collections have been deposited in one or more of the four Bolivian herbaria; when possible the second set (first duplicate set) is deposited at MO. At the beginning of 2001 only two institutions maintained bryophyte collections. La Paz (LPB) was by far the larger and most important, with an estimated 20,000 specimens. La Paz was the first herbarium to contain bryophytes in the country, largely the contribution of Marko Lewis. This was the first time that the originals were actually retained within the country. Santa Cruz (USZ) housed about 400 mostly unnamed collections, primarily made by Alfredo Fuentes. Cochabamba (BOLV) and Sucre (HSB) had no bryophyte collections. At present Santa Cruz contains more than 6000 bryophyte collections, Sucre slightly more than 2000, and Cochabamba with about 1500. La Paz will certainly exceed 20,000 (see below). **Literature:** La Paz contained a reasonably good bryological library, although lacking many recent publications. Cochabamba, Santa Cruz and Sucre had no references related to bryophytes. Nearly all books, neotropical floras (e.g., Central America, Mexico, West Indies),

revisionary studies, and various literature related to bryology in South America were provided to BOLV, HSB, LPB, USZ. Photocopies of nearly all the historical publications were also provided to the four institutions. Equipment and other items: Microscopes and herbarium cases have been purchased for La Paz, Santa Cruz, and Sucre. Computers and printers were also purchased specifically for the bryological herbaria of La Paz and Santa Cruz. The acquisition of literature and equipment was made possible from National Science Foundation grants.

Thesis Projects. Five students have undertaken thesis projects (Tesis Licenciatura) involving bryophytes. Bolivian thesis projects contributed a notable number of collections including new or rare species records, an important contribution to their individual institutions. Field work for student thesis projects has been supported by small grants from The Christensen Fund and the Liz Claiborne and Art Ortenberg Foundation.

Claudia Aldana (to be completed in mid 2007). Influencia de la composición y cobertura de briófitas en la presencia de *Cinclodes aricomae* en bosques de *Polylepis pepeii* del páramo yungueño, (ANMI Cotapata –Bolivia). Universidad Mayor San Andres, La Paz.

Marcos Decker (2004). Composición y diversidad de comunidades de musgos en tres localidades de la Siberia (Santa Cruz-Bolivia). Universidad Mayor San Simón, Cochabamba. i-ix, 1-154.

Reinaldo Lozano (2005). Diversidad y gradiente altitudinal de musgos en la zona de Nuevo Mundo, Chiquisaca. Universidad Mayor Real y Pontificia de San Francisco Xavier de Chuquisaca, Sucre. i-viii, 1-74.

Fabiana Mogro (sometime in this decade). Diversidad de musgos en un gradiente altitudinal de la zona oeste del Parque Nacional Carrasco. Universidad Mayor San Simón, Cochabamba.

Ninel N. Sanjines A. (2004). Briofitos terrestres en el páramo yungueño del Cerro Hornuni - Cotapata: Especies y comunidades. Universidad Mayor San Andres, La Paz. i-vi, 1-82.

Database. All bryophyte collections based on field work during 2001-2006 have been entered directly over the Internet from Bolivia to the Missouri Botanical Garden TROPICOS database system (<http://mobot.mobot.org/W3T/Search/most.html>). The number of bryophyte recorded for Bolivia in the year 2000 in W³MOST of TROPICOS was 1762 collections. There are now 11,840 bryophyte collections available to the scientific community over the Internet (a total of 44,323 records for the Tropical Andes, 65,596 for South America, and 96,838 for Latin America).

Web Page. The Bryophytes of Bolivia was placed on the Missouri Botanical Garden web in February 2007: http://mobot.mobot.org/W3T/Search/andes/Bolivian_Bryophyte.htm

At present this contains 6 elements:

Bolivian Ecoregions: Bryophyte Diversity and Composition. Seven ecoregions are recognized: Amazon, Chiquitano, Chaco, Yungas, Tucumano-Boliviano, Dry Inter-Andean Valleys, and Puna. This provides a general overview of each region with maps. A checklist is given, or will be, of bryophytes from each of the 7 ecoregions. This will be updated and expanded over the next few years.

Catlogo Preliminar de las Briófitas de la Region de Madidi, Bolivia. A pdf file from the 2005[2006] article that appeared in volume 40 of *Ecología en Bolivia*.

Theodor Herzog Biography. This includes a translation of Riclef Grolle's 1961 account of Herzog.

Bolivian Moss Types of Herzog. 369 taxa enumerated, ca. 163 now considered synonyms.

Bolivian Mosses of d'Orbigny. 28 species listed for which about half are considered erroneous reports, the identity still unknown.

Liverworts and Hornworts. A list of 436 species distributed among 108 genera and 35 families. Provides when known information on associated vegetation, elevation, substrate.

Mosses. A list of the Bolivian mosses will be added to the web site in late 2007.

Current Activities. At present all collections at LPB are being repackaged; this will be completed in ca. 4 months. All La Paz collections are being data based by Ninel Sanjines (full time, coordinator) and Claudia Aldana (half time). Initially data based in Excel and later those collections named to species will be downloaded to TROPICOS. At present all of the Marko Lewis collections have been data based, and the remaining collections will be completed in a few months time. In December of 2006 Marko Lewis donated literature and additional collections to LPB; these will be accessioned into the bryological library and collections in the near future. Additionally all of the Lewis field collection books have been photocopied and bound in 3 volumes; a set will be deposited with LPB and MO.

A further important collaboration involves two Spanish institutions active in neotropical bryology. Assistance with determinations, and later contributions to the taxonomic treatment for the Bolivian mosses, include from the Madrid Botanical Garden (MA) Graciela Calabrese and Jesús Muñoz for the Orthotrichaceae and Grimmiaceae respectively; and from the University of Murcia (MUB) María Jesús Cano, Juna A. Jiménez, and Mayte Gallego for the Pottiaceae.

Emphasis is now on preparing descriptions and illustrations for the Bolivian mosses. This will initially be incorporated into the "Taxonomic Treatment" of the Andean web page:

(<http://mobot.mobot.org/W3T/Search/andes/andesintro.htm>). Field work will emphasize core areas within each of the major ecoregions to better characterize each region with a focus on localities presently considered under collected or lacking any collections. Completing the

repackaging and data base at LPB, emphasis will be on naming the Lewis collections and distribution of the duplicates.

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Bolivia and Missouri Botanical Garden, 2345 Tower Grove Avenue, PO Box 299, St. Louis, Missouri 63166-0299, U.S.A. steve.churchill@mobot.org and stevechurchil831@hotmail.com

COURSES AND WORKSHOPS

4th International meeting on the biology of *Sphagnum*, Alaska 2008

The Duke Herbarium (<http://www.biology.duke.edu/herbarium>) is contributing to the organization of the Fourth International Meeting on the Biology of *Sphagnum*. The last meeting was 2002, in Sweden and Norway, and this upcoming event takes place in beautiful southern Alaska August 2 to August 11, 2008.

Southern Alaska has extensive and ecologically variable wetlands and the region is exceptionally rich in peatmoss diversity. The purpose of the meeting is to promote interdisciplinary interactions among scientists interested in peatland ecology, global change, and *Sphagnum* systematics and evolution.

The Fourth International Sphagnum Meeting has been **rescheduled for summer 2008** in Alaska. The field trip portion will run the first week. The symposium portion will be in **Anchorage**. The field trip will include several days in the Anchorage area and then the **Kenai Peninsula**. The field trip portion will conclude with a group flight to **Juneau or Sitka** where we will see the

southeastern Alaska coastal mire flora. Added attractions are glaciers, active volcanoes, marine wildlife, salmon runs, and earthquake-altered ecosystems.

The meeting is being organized by Dick Andrus, Blanka & Jon Shaw, and Karen Golinski.

This is just an early announcement and no costs have been established yet. Anyone interested in receiving more information as it becomes available should email Dick Andrus and he will send you updates as they become available. Check this site periodically for updates.

<http://www.biology.duke.edu/herbarium/alaska.html>

THESES IN BRYOLOGY

Theses in bryology 19

As reported in a previous issue of The Bryological Times (99: 17. 1999), the International Association of Bryologists has decided to begin a repository of bryological theses. These theses are being housed in the Library of The New York Botanical Garden. They are available via interlibrary loan. The NYBG Library online catalog (CATALPA) may be viewed at: <http://opac.nybg.org:211/screens/opacmenu.html>. As theses arrive, bibliographic data and a brief synopsis will be published in this column (see examples below). Bryological theses for any degree, covering any aspect of bryology, in any language, will be included. Please send theses to Bill Buck at the address above. Please refer to the preliminary notice (cited above) for information on financial assistance from IAB for reproduction of theses. The current IAB Treasurer is Blanka Shaw (blanka@duke.edu).

Garcia, César Augusto Rodrigues. 2006. Briófitos epífitos de ecossistemas florestais em Portugal: biodiversidade e conservação. Ph.D. thesis, Universidade de Lisboa, Lisbon, Portugal. XXII + 415 pp. + CD. In Portuguese with English abstract. Address of author: Universidade de Lisboa, Museu Nacional de História Natural, Jardim Botânico, Centro de Ecologia e Biologia Vegetal, Rua da Escola Politécnica 58, 1250-102 Lisbon, Portugal. E-mail: cagarcia@fc.ul.pt.

The main objective of this doctoral thesis is to contribute to the knowledge and characterization of the epiphytic bryological biodiversity of forest communities in

Portugal. Quantitative surveys were performed in 46 *Quercus* woodlands, on trees both within the woodlands and isolated on the periphery. Special consideration was given to the diversity, composition and structure of the epiphytic communities, taking into account bryophytes, lichens, fungi and vascular plants, as well as functional groups in accordance with the phorophyte type and geographic position of the woodland. The chorological spectrum of the epiphytic species in each forest was analyzed and a national comparison for each chorological element was performed. The effect of fire on epiphytic communities and the process of recolonization was also studied. The threat status and

the distribution patterns of the bryophyte species were evaluated and the main threats to the maintenance of the epiphytic communities were identified. Suggestions for preservation of these communities are presented. A total of 199 bryophyte taxa were identified, including six new to Portugal (*Orthotrichum philibertii*, *O. scanicum*, *O. shawii*, *O. sprucei*, *Leptophascum leptophyllum* and *Plagiothecium laetum*). A species of *Zygodon* is proposed as new to science.

Harris, Eric Scato Jan. 2006. Ethnobotany, evolution, and chemistry of medicinal bryophytes: examples from the moss genus *Plagiomnium*. Ph.D. dissertation, University of California, Berkeley, CA, U.S.A. x + 182 pp. In English. Address of author: Department of Integrative Biology, 3060 Valley Life Sciences Building, University of California, Berkeley, CA 94720-3140, U.S.A. E-mail: e_harris@berkeley.edu.

This doctoral dissertation gives a cross-cultural overview of the traditional uses and classification of bryophytes, and focuses on the biology and chemistry of one particular genus with ethnobryological importance. A total of 136 species of bryophytes are documented that are used around the world for a variety of purposes, about half of which are medicinal. The majority of bryophyte uses are reported from China and Native American groups in Canada and the U.S. *Plagiomnium* has been used in Canada medicinally, specifically in the treatment of infections and swelling. The phylogeny and phytochemistry of *Plagiomnium* were examined in order to understand the evolution and function of putatively bioactive chemicals in this genus. The phylogeny reveals that *Plagiomnium* is paraphyletic, with *Orthomnion* nested within *P.* sect. *Rostrata*. Flavonoids have been identified as the chemicals putatively responsible for the bioactivity of the medicinal species of *Plagiomnium*.

Nöske, Nicole. 2004. Effekte anthropogener Störung auf die Diversität kryptogamischer Epiphyten (Flechten, Moose) in einem Bergregenwald in Südecuador. Doctoral dissertation, Georg-August-Universität, Göttingen, Germany. VI + 137 pp. In German, with English and Spanish summaries. Address of author: Herbarium, Botanischer Garten

und Botanisches Museum Berlin-Dahlem, Zentraleinrichtung der Freien Universität Berlin, **Königin-Luise-Straße 6-8, D-14195 Germany. E-mail: nnoeske@web.de.**

In this doctoral dissertation, the effects of deforestation and disturbance were investigated by comparing a primary rain forest, a 50-year-old disturbed one, and isolated trees in meadows, at ca. 1900 m near Loja in southern Ecuador. By comparing diversity patterns in the three habitat types, the author attempted to obtain insight into the responses of cryptogamic epiphytes to forest alteration, their ability to recover after deforestation, and their value as indicators of disturbance. Numerous biotic and abiotic factors were measured. In total, 207 species of lichens and bryophytes were recorded (70 spp. macrolichens; 61 spp. hepatics; 45 spp. microlichens; 31 spp. mosses). Unlike the results of previous studies, in this one primary and disturbed forests had very similar numbers of species and reduced diversity was only found on isolated trees in meadows. However, looking closer, bryophyte diversity decreased in disturbed forests but lichen diversity increased in that habitat. Percentage of cover by lichens was significantly higher on isolated trees than in primary forests, while that of bryophytes decreased with increased disturbance. However, rare species of both lichens and bryophytes decreased with increased disturbance. Within the forest, species richness of lichens and hepatics was significantly lower on shaded lower parts of trunks than in more open canopy habitats. Highest species richness was found on horizontal branches in mid-canopy where growth conditions were enhanced by humus accumulation. Additionally, hepatics showed high diversity on outer canopy twigs (mainly of pioneer species). Lichens preferred higher bark pH values than bryophytes. Tree age, though, correlated positively with diversity of bryophytes but not with that of lichens. This study confirmed that epiphytic lichens and bryophytes are good indicators of disturbance, with bryophytes being better than lichens because of their greater habitat specificity.

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WEB NEWS

Volumes 1 and 5 of Bryophyte Ecology completed

Dr. Glime announced that all the chapters of volume 1 of Bryophyte Ecology: Physiological Ecology, sponsored by the International Association of Bryologists and the Department of Biological Sciences, Michigan Technological University, are now online <<http://www.bryoecol.mtu.edu/>>. They are marked as new. There are also minor updates or corrections to the other chapters and the glossary

The Citation information for this volume is: Glime, Janice M. 2007. Bryophyte Ecology. Volume 1. Physiological Ecology. Ebook sponsored by Michigan Technological University and the International Association of Bryologists. Accessed on _____ (provide date you accessed it) at <<http://www.bryoecol.mtu.edu/>>.

The uses and moss gardening chapters are now complete and online as volume 5, Bryophyte Ecology: Uses, thanks to the help of many, many bryonettors who have contributed discussions and images. While Dr. Glime pulled all of this together, this volume and the ones to come are truly the product of bryologists worldwide.

MUB herbarium as GBIF data provider

We are glad to inform you all that the MUB HERBARIUM (University of Murcia, Spain) has become a new DATA PROVIDER for the Global Biodiversity Information Facility (GBIF). By now data about the "Hepaticae & Anthocerotae Collection" are available ON-LINE through the GBIF web page at:

http://www.europe.gbif.net/portal/ecat_list.jsp?taxonKey=0&countryKey=0&resourceKey=1919&nextTask=ecat_root.jsp

It is possible to get data from www.gbif.es in Spanish too at:

<http://taray.csic.es:10080/pres/PresentationServlet?action=menu&loc=http%3A%2F%2Fdir.sourceforge.net%2Fschema%2Fconceptual%2Fdarwin%2F2003%2F1.0%2Fdarwin2Infodo.xml&reqType=search>

Rosa Maria Ros and Susana Rams
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County Checklist of the Mosses of Wyoming

The "County Checklist of the Mosses of Wyoming" by P. M. Eckel is now available online at:
<http://www.mobot.org/plantscience/resbot/Bryo/WyomingCountyChecklist.htm>

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Bryological and Lichenological Working-Group of Central Europe (BLAM)

The website of the Bryological and Lichenological Working-Group of Central Europe (BLAM e.V.) is still alive: Instead of "www.blam-ev.de" (to be reanimated), please type www.blam-hp.de

Dr. Norbert Stapper
BLAM e.V., Monheim, D

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UPCOMING MEETINGS

2008

March 1: Dutch Bryological Society, "lecture day," Utrecht. See www.blwg.nl

April 3-8: BBS Spring Field Meeting, Denbeighshire, UK. Contact sarah.stille@virgin.net

May 15-18: Crum Bryological Workshop. Northeastern Vermont, USA. Info: Dorothy Allard at dallard@aol.com.

July 12-19: BBS Summer Field Meeting. Shetland isles. Contact: Paul Harvey at sbrc@zetnet.co.uk

July 13-19: ABLS Annual Meeting. Asilomar Conference Ground, Pacific Grove, CA. See www.lichenology.org

August 2-11: 4th International Meeting on the Biology of *Sphagnum*, southern Alaska

September 18-23: Tuckerman Workshop. Bruce Peninsula, Ontario, Canada. Contact Bill Buck: Bbuck@nybg.org

October 10-12: BBS Annual general Meeting and paper reading session. Preston Montford. Contact: Martin Godfrey at martinandrosie@oal.com