

The Bryological Times

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Newsletter of the International Association of Bryologists

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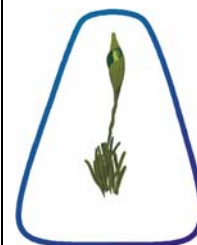
Dear bryologists,

I would like to thank all members that contribute to this issue. Please do not forget that next year (July 2007) the Faculty of Science of the University of Malaya and the International Association of Bryologists organise the next world bryological conference focusing on the theme – “**Bryology in Asia in the New Millennium.**” We plan to provide additional information of this conference in the next newsletter.

Many young bryologists of less favoured areas have been contacting us over the last year to obtain bryological literature & information. Since a few years we have a website and plan to use this to provide basic bryological information to our membership. Our president, Janice M. Glime, is forming a committee to organize this and would welcome volunteers for the committee! Please contact her at jmglime@mtu.edu.

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.

OBITUARY

Suzanne Jovet-Ast (8 February 1914, Paris -22 February 2006, Biarritz)



After her studies in Lycée Voltaire (Paris), Suzanne Ast obtained her baccalauréat in 1931-1932, and a licence des sciences naturelles in 1934. Since 1935, she moved to the Muséum national d'Histoire naturelle (Paris), and she obtained a grant for her doctorate (1937-1938). In December 1939, she married Paul Jovet (1896-1991), 'assistant' in the laboratory of Phanerogamy. After her doctorate thesis on the Annonaceae from Indochina (1943), she was named 'assistante' (1945), then 'sous-directrice' (1957) in the laboratory of Cryptogamy. In 1975, she succeeded to Roger Heim (1900-1979) as director of this laboratory, becoming the

first and the only woman as "professeur-administrateur" in the Muséum. Under his directorship and with the collaboration of Patrick Joly (1932-1997), 'directeur de recherche' (CNRS), the laboratory will become associate to the Centre National de la Recherche scientifique. Retired in 1982, she has continued to work until a few months before her death.

S. Jovet-Ast has devoted her scientific work to bryophytes, mainly in the redaction of monographs of the genera *Colura* and *Riccia*. S. Jovet-Ast published also studies on hepatics from Marocco, and from the Iberian Peninsula (with V. Allorge). S. Jovet-Ast and Helene Bischler (1932-2005) have studied the biology and ecology of the Mediterranean hepatics, enlarging the PC herbarium by her large collections.

Concerned by the diffusion of knowledge, she has published a scholarly booklet on bryophytes (1952), and she founded, with the help of P. Joly and H. Bischler, the non-lucrative "Association des amis des cryptogames" (ADAC) for editing the journal *Cryptogamie*.

Denis Lamy (Paris)

Stella K. Gambaryan

In 2000, the remarkable Russian hepaticologist Dr. Stella K. Gambaryan (VLA) passed away in Vladivostok. That significantly reduced the research on liverwort flora on a vast area in the south of the Russian Far East. It was only in the summer of 2005 that Vadim Bakalin moved to the Far East and at the moment he is the only hepaticologist in this territory. The research and the work of the liverwort herbarium, which is the largest in the Far East,

were stirred to new activity. All interested people are welcome to address the Herbarium VLA for any information and concerning exchange or loan of some liverwort specimens from the territory of the Russian Far East.

Vadim Bakalin: e-mail v_bak@list.ru.

Bust of Richard Spruce unveiled in Ecuador

On 4 March 2006 a bust of Richard Spruce (1817-1883), the British botanist and South America explorer, was unveiled at Río Verde near Baños, central Ecuador. The work of art, fashioned by the Ecuadorian sculptor Edguin Barrera and generously supported internationally by various institutions, organizations (including the IAB) and individual donors, honours the pioneering work of this great botanist on the rich Amazonian and Andean floras.

The celebration, organized by the Chamber of Tourism of the town of Baños, was attended by a large crowd, including the Vice-Mayor and other leading personalities of the region, the British Vice-Consul, and the heads of all the major herbaria of Ecuador. Speeches were given by the Vice-Mayor as well as Dr Plutarcho Naranjo, former Minister of Health of Ecuador and Dr Robbert Gradstein, member of the organizing committee. The programme also featured singing (anthems of Ecuador and Baños) and a toast by co-organizer Patricia Guevara of Baños. The unveiling was undertaken by Sophie Deeks, British Vice-Consul and Mrs Isabel Paredes, chairperson of the Río Verde community.

Following a splendid lunch in hotel Miramelinda, Río Verde, at the invitation of its owners Patricia Guevara and Manuel Chauvin, the participants spent the afternoon on leisure walks to some of the localities visited by Spruce, including the Río Verde waterfall and the Río Topo valley. It was at the latter site that Spruce experienced great difficulties when trying to cross the swollen waters of the river, and almost lost his precious collections there. Local botanist and orchid specialist Lou Jost showed some of the plant species collected by Spruce along this spectacularly beautiful river. A highlight was finding the rare liverwort *Myriocolea irrorata* Spruce, known only from the River Topo and long



considered extinct. Spruce was particularly attracted to this species, which he considered “perhaps the most interesting bryophyte that I have every found ... and the only agreeable souvenir I have preserved of this river” (Spruce 1908, *Notes of a botanist on the Amazon and the Andes*, vol. 2, p. 167).

The inauguration of the bust of Richard Spruce in Río Verde should help keeping the memory of this great explorer of the Amazon and the Andes alive in Ecuador. It should also help in promoting awareness of the rich biodiversity of the upper Pastaza and Topo Valleys which are currently threatened by plans to build three hydroelectric projects. Efforts are currently being made by the tourist and nature conservation agencies of Baños to counteract these destructive activities and ensure conservation of the area. It is hoped that such endeavours to conserve the magnificent rain forest and watercourses of the valleys, first explored by Richard Spruce, will prove successful.

S.R. Gradstein, L. Jost, M.R.D. Seaward and G.T. Prance

PERSONAL NEWS

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.

Therefore, the editor greatly welcomes such information for our newsletter.

Please do send short messages to the editor!

Kristoffer Hylander has moved from Umeå University to Stockholm University. He has got an assistant professorship for four years and will continue with his research in bryophyte ecology. More specifically he will study the role of micro-topographic heterogeneity in shaping refugia for bryophytes during stand-replacing disturbances. Moreover, he will study the role of landscape refugia (e.g. remnant forest patches) as sources for bryophyte re-colonisation of previously disturbed areas. The last question will be addressed both in

boreal forests of northern Sweden and in afro-montane forests in southwestern Ethiopia.

Webpage:

<http://www.botan.su.se/Ecology/personal.htm/hylander.html>

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I am **Itambo Malombe** and Research Scientist at the East African Herbarium of the National Museums of Kenya, Nairobi. At this moment, I prepare my Ph.D. at Koblenz University, Germany on a taxonomic revision of genus *Cheilolejeunea* (*Lejeuneaceae*) of continental Africa and on the ecological implications of this revision for the bryoflora of the Kakamega (Kenya) and Budongo (Uganda) rainforests. Additionally, the phylogeny of the genus in the relationship with the close allies such as *Leucolejeunea*, *Evansiolejeunea*, etc. complex will also be investigated. The ecological studies will mainly focus on effects of rainforest fragmentation, which is usually characterised by secondary and primary forests owing to spatial and different intensities of disturbance. *Cheilolejeunea* species, especially subgenus *Strepsilejeunea*, are known to be desiccation tolerant and their records on tree trunks may indicate open, disturbed or secondary forests.

The supervisors of my research are Prof. Dr. Eberhard Fischer, Koblenz Landau University, Germany (efischer@uni-koblenz.de), Prof. Dr. Pocs Tamas, Eger University Herbarium, Hungary (colura@chello.hu) and Dr. Siro Masinde, East African Herbarium, National Museums of Kenya (siromasinde@hotmail.com).

Preliminary results have shown high diversity of *Cheilolejeunea* species in Kakamega forest. Some

of *Cheilolejeunea* species are new to Kenya (*Ch. decursiva*, *Ch. camerunensis*) or to the floral region (*Ch. pocsii*).

Being based in Kenya, I want to address the need for access to scientific literature as most African institutions have limited library resources, a situation which is even worsened as also bryological expertise is lacking in the region. I therefore treasure any assistance to provide me with literature on bryophytes, in particular with liverwort-related publications. This may include also recent publications such as *Bryophyte Biology* (ed. J. Shaw and B. Goffinet), *Advances in Bryology*, bryological journals, etc. as the East African Herbarium library has a very limited bryological literature collection and no subscription to bryology journals!

Also, up-to-date information on bryology activities: workshops, expeditions and training could dearly help me build further bryology experience and to encourage fellow Kenyan scientists to major in the same.

Itambo Malombe, Research Scientist, East African Herbarium, National Museums of Kenya, P.O. Box 45166 00100, Nairobi, Kenya

Email: malombe2002@yahoo.com

RESEARCH NEWS

Initiation of Search for Fossil Traits in the Genome

At the Missouri Botanical Garden, Richard Zander is continuing experiments in developmental phylogenetics pioneered by Dominick Basile and Margaret Basile (e.g., Basile & Basile 1984) in the 1970's and 80's. Developmental phylogenetics seeks to uncover ancient morphological traits by application of various chemicals known to force expression (by opening the DNA chromatin structure) of silenced genes. Epigenetic silencing of genes is associated with DNA cytosine methylation and histone deacetylation (the Basiles used hydroxyproline in their studies). If traits appear in cultivation with these chemicals that are not known for the species, and are not clearly teratological or new mutations, then they may tentatively be assumed to be characters of recent or ancient ancestors, that is, genomic fossils of potential value in phylogenetic analysis. Demonstration of unexpressed genetic potential may be interpretively important, whether any new traits prove juvenile, neotenic, or atavistic, or whether the traits or clusters of traits are largely shared only with other, related taxa (i.e., are phylogenetically informative), or are cases of deep homologies (homoiologous traits).

Fragments of mosses from recent herbarium collections are grown at the Missouri Botanical Garden in small bottles on perlite with four treatments: water, 5-aza-2'-deoxycytidine (a demethylation agent at micromole concentrations), sodium butyrate (a histone deacetylase inhibitor at millimole concentrations), and the last two together for their known synergistic property. The chemicals are not known mutagens, though the aza-deoxycytidine is quite poisonous. To reduce contaminant growth, no nutrient solution is added, and included fragments of substrate and older stem parts should provide micronutrients necessary for growth of new branches. Given the experimental set-up, sterile conditions and axenic culture are unnecessary, and, with success, such genomic studies could be done at any institution. There are, as yet, no actual results.

Proof-of-concept, however, is at hand and involves previous similar cultivation studies in nutrient solution (Zander 1979) in which *Tortella fragilis* shoots extracted from herbarium specimens produced new, many-leaved branches nearly identical to those of *T. tortuosa* (see image). The implication is that *T. fragilis* hosts silenced fossil traits of an ancestor similar to *T. tortuosa*. Additional data from other species could more

directly reveal the tree-like or networked evolutionary past than does standard phylogenetic analysis that uses presumably evolutionarily neutral (I.I.D.) non-coding and non-regulatory DNA, or synonymous codons to create nested sets of events of inferred genetic isolation following the Biological Species Concept.



Illustration: Tortella fragilis producing *T. tortuosa*-type branches in cultivation on nutrient solution

Gene silencing and reactivation is an important feature of developmental processes, and phylogenetically significant reactivation of ancient genes (contravening Dollo's Law against re-evolution of complex traits) has been demonstrated in many fields. One may cite apparent re-evolution of wings in stick insects; molar teeth in *Lynx*; coiling of mollusk shells; eyes in cave fish; modes of vulva formation in nematodes; ancestral features of the lateral lines, muscles and gill rakers of cichlid fishes; monocular eye type in brine shrimp; multiple brain size increases in hominids, and eyes re-evolved in eyeless copepods, even though some "deep homologies" are apparently not developmentally homologous, such as reduced hips in snakes and cetaceans (studies reviewed by Zander, submitted). In mosses, for example, the complex pottiaceous peristome apparently re-evolved up to 4 times from an ancient ancestor similar to *Timmiella* (Zander, submitted). Although silenced genes are thought to survive expected gradual DNA degradation for less than 6 (rarely to 10) million years, there is evidence that some process like DNA repair may act to preserve these

genes much longer (Fryer 1999), perhaps 20--100 million years (Collin & Cipriani 2003).

It is to be lamented that cultivation experiments, offering such promise in the 1970's and 80's, have, with a few notable exceptions, been abandoned in favor of molecular systematics as a field of investigative endeavor. Perhaps with the insurgence of evolutionary development (evo-devo) as a new field, this may change.

Basile, D. V. & M. R. Basile. 1984. Probing the evolutionary history of bryophytes experimentally. *J. Hattori Bot. Lab.* 55: 173-185.

Collin, R. & R. Cipriani. 2003. Dollo's law and the re-evolution of shell coiling. *Proc. R. Soc. Lond. B* 270: 2551--2555.

Fryer, G. 1999. Opinion: The case of the one-eyed brine shrimp: are ancient atavisms possible? *J. Natural History* 33: 791--798.

Zander, R. H. 1979. Regenerated herbarium material for biosystematics and cytology. *Bryologist* 82: 323.

Richard H. Zander, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299 USA. Email: richard.zander@mobot.org

Analysis of genetic diversity in the genus *Physcomitrella*

Ages ago, likely in the Paleozoic, some even talk about the Proterozoic, a gentle wave of fresh water left a little green alga stranded on dry land. Surprisingly that brave alga decided to survive and a short while after (in other words some tens of millions of years) the common ancestors of today's seed plants and mosses separated into two independent phylogenetic lineages. Since that time at least 450 million years passed by and the two stranded clades adapted to their rough environment coping with their own weight, drought, a burning sun and all the other unfriendlinesses for former underwater residents. Though they started this journey through time as close relatives with a similar set of genes and though they underwent it side by side, when we look at their today's progenies, we strikingly see two fully different results: Extremely diversified higher plants with trees, flowers and grasses and on the other hand these small scrubby doormat-like plant pads dragging their wretched existence in the shadow of a large and shining relative. In other words, the power of evolution shaped two totally differing concepts of life and moved the clades into obviously deviating directions.

Not only since Mendel and Darwin man wants to learn more about the secrets behind those kinds of wondrous stories life tells us. We aim to understand how the blueprints of life, the genomes, are organised and transduced into function, how they are kept through generations and how evolution branded all living creatures. Not surprisingly, when we look at the plant kingdom, the so called 'lower plants' can teach us a whole lot about this. When we bend our knees and take a closer look at these seemingly inconspicuous plants we find a diverse and beautiful world, which is localized in a phylogenetic key position between the green algae and the seed plants. Mosses share a large amount of characteristics with higher plants, for example

multicellularity, evolution of the diploid sporophyte and drought tolerance, as well as they contain a large part of deviating properties, e. g. predominance of the haploid gametophyte, simplicity of cells and tissues. This is well mirrored by the fact that mosses share about half of their genes with seed plants but furthermore retained a large number of ancient genes, which have been lost during evolution of the seed plants.

Fortunately in the last decades life sciences made fast-paced progress in knowledge mainly based on sophisticated and powerful molecular techniques. Whereas formerly single genes and their function have been analysed, today the entirety of all genes of an organism (genomics) and their function (functional genomics) can be studied. Unfortunately, when we look at the area of plant science such work so far concentrated on seed plants such as *Arabidopsis*, rice or poplar. In order to understand the evolution of land plants and to benefit from the entire biodiversity of plants, the analysis of so called 'lower plants' remains crucial.

With respect to this, an increasing number of international research groups successfully investigate a moss species named *Physcomitrella patens* as a model organism [1]. With its simple body plan, the ease of culture and transfection (planting of foreign DNA) and the dominating haploid gametophyte, *Physcomitrella* is an ideal system to study molecular, biochemical, physiological and developmental questions. In 1997 Swiss researchers discovered, that *Physcomitrella* furthermore provides a unique and spectacular feature among all plants: *Physcomitrella* integrates foreign DNA with an exceptionally high rate by a mechanism called 'homologous recombination.' What does that mean? Living organisms can repair their DNA by either patching up strands of non-homologous DNA or by exactly joining together

homologous stretches of DNA. In genetic engineering, when foreign recombinant DNA is transfected into plant cells; usually its integration occurs randomly via non homologous recombination somewhere in the plant genome. In *Physcomitrella*, when the foreign DNA contains stretches of homology to a certain genomic region of the plant genome it is integrated effectively via homologous recombination, thereby replacing the natural genomic locus. This enables the straightforward functional analysis of plant genes by reverse genetics, i. e. by targeted gene knock-outs or allelic replacement. As a consequence of the phylogenetic key position and the technical advantages of *Physcomitrella patens*, its genome is currently being sequenced at the Joint Genome Institute (USA) [2].

Virtually all previous studies of *Physcomitrella patens*, generating a wealth of biological data and cognitions, are based on selfed or clonal plantlets from a single spore collected in 1962 near Cambridge (UK) named 'Gransden' and derivations thereof. Thus, little is known about the natural genetic variability and the underlying evolutionary history in the genus which was firstly proposed by Bruch, Schimper and Guempel in 1849.

We currently investigate the genetic diversity of the genus by comparing microsatellite loci, internal transcribed spacer sequences, selected gene sequences and evaluated genome sizes. We aim at an understanding of how evolution and ecology are shaping the genetic structure in *Physcomitrella*. Since 2003 we are establishing an axenic *in vitro* collection of worldwide *Physcomitrella* accessions and related *Funariaceae*. In our International Moss Stock Center all accessions are furthermore stored in cryo conservation (liquid nitrogen). Currently the collection includes over 50 accessions including African, European, Asian, Australian and North American contributions [3]. The collection is available upon request [4].

We encourage finders of *Physcomitrella patens* or related *Funariaceae* to provide us with plant material. We appreciate mature spore capsules in a more or less intact shape or as a second option living plant material. We need as precise data as available on the collection including the origin, the habitat, the micro-climate, the date and the collector.

Mark von Stackelberg

[1] www.plant-biotech.net

[2] www.jgi.doe.gov/sequencing/why/CSP2005/physcomitrella.html

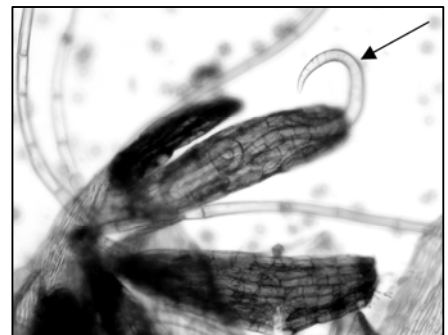
[3] www.cosmoss.org/ecomap.html

[4] Dr. Mark von Stackelberg, University of Freiburg, Plant Biotechnology, Schaezlestr. 1, D-79104 Freiburg, Phone: +49 (0)761-203-6943
Email: mark.stackelberg@biologie.uni-freiburg.de

An antheridium-'inhabiting' nematode

When examining a male specimen of *Homalothecium lutescens* from France (G. Een, S; reg. no. B108986), I came across a number of old perigonia with nematodes inside. In one perigonium there was even a nematode that had entered an old antheridium. Although this was a surprising observation to me, my guess is that the nematode had entered the antheridium by accident. Or has someone else observed this kind of nematode behaviour?

Lars Hedenäs, Swedish Museum of Natural History, Dept. of Cryptogamic Botany, Box 50007, SE-104 05 Stockholm, Sweden; e-mail: lars.hedenas@nrm.se



RESEARCH OPPORTUNITIES

Elizabeth E. Bascom Fellowships in Botany for Latin American Women

The Missouri Botanical Garden announces the eighth annual competition for the Elizabeth E. Bascom Fellowships in botany for Latin American women. The fellowship will cover the cost of a round-trip air ticket to St. Louis, lodging in the Garden apartment, and a small stipend for food and miscellaneous expenses in St. Louis for a period of one to three months. The competition is open to young Latin American women who work in the field of botany or are botanists at universities or other governmental or non-governmental scientific

institutions in Mexico, Central America, and South America. Applicants must have an undergraduate degree from a university. The fields of investigation are limited to systematic botany, ecology, or conservation. The deadline will be 1 July 2006. All interested applicants should visit the website below (in Spanish) to obtain a list of application materials, or contact Alina Freire-Fierro, e-mail: alina.freire-fierro@mobot.org, P.O. Box 299, St. Louis, MO 63166-0299, USA; phone: 314-577-9535; fax: 314-577-0830.

Information in Spanish about the Fellowship:

<http://www.mobot.org/MOBOT/Research/bascom/bascom.shtml>

<http://www.mobot.org/MOBOT/Research/bascom/pdf/Bascom06.pdf>

Additional information about the Research Division of the Missouri Botanical Garden, is published in News from MO, available upon request, or online at <http://www.mobot.org/MOBOT/webmo/2005/NewsfromMO05.pdf>.

Alina Freire Fierro, email: alina.freire-fierro@mobot.org

Positions at the University of Alberta

Graduate Research Positions Available for Canadian Arctic Research for a Masters Degree (MSc, 2.5 yr program) and Doctoral Degree (PhD, 4yr program) are available and Interested students are encouraged to apply.

See the University of Alberta's Graduate Studies Program, which includes information on courses, current students, programs, research interest groups at

<http://www.biology.ualberta.ca/programs/graduate/>

The University of Alberta is known for its expertise in Northern Research and has a strong program in Systematics and Evolution.. The Department houses the 3rd largest collection of bryophytes in Canada, which provides a vital resource to a diversity of potential research projects. MBSU - molecular research facility - is a key attribute of the department, where micro-array and sequencing facilities are efficiently set up for use.

Research for Interested Graduate Students include (a) Bryophyte Systematics, Global Perspective included: Bryophyte Evolution with emphasis on basal & major lineages of mosses - (cpDNA); Evolution and diversification of mosses: (e.g., Dicranidae); Speciation - inter and intra population variation; Molecular and morphological variation. (b) Clonal versus sexual reproduction: Dispersal factors; Development & evolution of sex in mosses, Phylogeography. (c) Evolution of Arctic Flora: Beringia and High Arctic Refugia hypotheses; Climate change indicators; Floristics, monitoring; Paleoecology – macrofossils, paleoenvironmental reconstruction; DNA fingerprints of evolution.

Submit a statement of research interests and CV to Dr. C. La Farge, Curator and Director, Cryptogamic Herbarium (ALTA), Dept. Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9

Catherine La Farge: clafarge@ualberta.ca

Ph. D. Fellowship at the University of Freiburg, Germany

The International Graduate School "Signal systems in plant model organisms" offers research opportunities in cellular, molecular, developmental, physiological, evolutionary genetics and genomics, mathematical modelling and systems biology in

plant model organisms (*Arabidopsis thaliana*, *Oryza sativa*, *Populus*, *Physcomitrella patens* and Cyanobacteria). Students carry out a Ph.D. research project in one of the participating groups.

Decoding and modelling the molecular mechanisms that steer plant development, cell differentiation and the underlying differential regulation of gene expression is a central task of modern plant research and a pre-condition for the efficient application of biotechnology in the future. In the graduate school "Signal Systems in Plant Model Organisms" scientists from the Faculties of Biology, Forest and Environmental Sciences, Mathematics and Physics closely collaborate to solve fundamental problems in this field of research. In addition to the scientists from Freiburg, research groups from Hungary, Holland, South Africa, and the U.S. are directly affiliated to the graduate school with the common goal of examining the effect of signals on the physiology, cell differentiation and organogenesis of selected model systems from different perspectives.

The joint research program is characterized by a state-of-the-art system-oriented training plan for our graduate students.

COUNTRY REPORTS

Bryological News from Bulgaria

Bryology in Bulgaria has progressed considerably slower than other fields in botany. The main reason was the lack of bryological team. After the publication of the first list of Bulgarian bryophytes in 1902 by Josef Velenovsky, the floristic studies were carried out by foreign scientists and Bulgarian bryologists Nikola Arnaudov and Slavcho Petrov. Now there are two bryologists in the country: Anna Ganeva and Rayna Natcheva. They work in the Institute of Botany of Bulgarian Academy of Sciences in Sofia. Anna Ganeva is an associate professor in the Department of Phytocoenology and Plant Ecology, with research interests in the field of bryophyte chorology, conservation and monitoring. Rayna Natcheva is an assistant professor in the same institute. During the last 4 years she works on a PhD thesis in Lund University. Her studies concern genetic specificities of *Sphagnum capillifolium* populations.

The bryophyte flora of Bulgaria comprises 724 species, or ca. 63 % of the species found in South-East Europe. Mountainous areas are better investigated than lowland and hilly regions. Together with floristic reports (some of them from areas of National and Nature Parks), publications were published concerning the ecological role of bryophytes in coniferous communities, their

Several PhD fellowships are available from April 1st 2006 on. The Department of Plant Biotechnology participates in this school with projects on early signalling events in a moss, *Physcomitrella patens*, utilising proteomics as well as micro-array technologies.

We encourage excellent candidates to apply. Please find details on the school including application forms under <http://www.plant-signals.uni-freiburg.de>. You may wish to contact Wolfgang Frank, Eric Sarnighausen or Ralf Reski before sending your application. Please find contact details at <http://www.plant-biotech.net> under "Staff".

See also this newsletter page 6 "Analysis of genetic diversity in the genus *Physcomitrella*"

indicator value for estimation of air and water pollution, as well as articles on genetic diversity in populations of *Sphagnum capillifolium*.

During the last 3 years the work on the "Development of Red Lists of the Higher Plants and Fungi" project funded by the Ministry of Environment and Waters of Bulgaria opened the opportunity to include the bryophytes for the first time in the National Red Lists of Bulgaria. 226 species were evaluated as threatened. Another 23 species are Near Threatened, 37 of Data Deficient category, and 24 recently found species were listed under Not Evaluated category. *Buxbaumia viridis*, *Dicranum viride*, *Hamatocaulis vernicosus*, *Mannia triandra*, and *Meesia longisetata* were included in Annex II of the Bulgarian Biodiversity Protection Law.

Further investigations of the bryophytes in Bulgaria will be focused on the enhancement of the knowledge on species diversity, bryophyte hot spots on a national scale, habitats condition, and identifying conservation measures.

Anna Ganeva, Institute of Botany, BAS, 23, Acad. G. Bonchev Str., 1113 Sofia, BULGARIA. e-mail: animoss@bio.bas.bg

LITERATURE COLUMN

Catalogue of the Hedwig-Schwägrichen Herbarium

Price, M. J. 2005. *Catalogue of the Hedwig-Schwägrichen Herbarium (G). Part 1. Type material and a review of typifications for the Hedwig moss names.* Boissiera 61: 1–388. ISBN 2-8277-0077-8. Conservatoire et Jardin botaniques de la Ville de Genève. Price in Swiss francs (incl. package and post): Switzerland CHF 75, Europe CHF 85, elsewhere CHF 100. Orders: editions.cjb@ville-ge.ch. Web site: www.ville-ge.ch/cjb

As every moss taxonomist knows, Johannes Hedwig's *Species Muscorum Frondosum* has been adopted as the starting point of moss nomenclature, which makes Hedwig's moss herbarium especially important, in fact invaluable, for taxonomical and/or nomenclatural work. The book itself is already available on CD (see Bryological Times 112, May 2004).

The purpose of the present publication is described in the Abstract: "This catalogue is intended as a guide to the Hedwig type, or possible type, material in the Hedwig-Schwägrichen herbarium in G. It includes a listing of the current status of typification of the Hedwig moss names. It is hoped that the information provided here, and through a database on the CJB website, will facilitate the long-term conservation of this important bryophyte collection". I visited the mentioned website (everything is in French only) and tried to locate the database but failed. Perhaps it will be added there only later.

The book includes a short Introduction to Hedwig and his work, describes the arrangement and contents of the Hedwig-Schwägrichen herbarium, and discusses some important problems that have been encountered when moss names have been attempted to typify in the herbarium. These problems are partly related to the way the "specimens" (which is a notoriously wide and variable concept in many old moss herbaria) were originally treated and mounted on the sheets. Price especially emphasizes that "a common mistake associated with the annotation of specimens ... is the inclusion of an annotation label that indicates the presence of the "holotype" for the species in question, but that fails to indicate precisely on which stem or individual group of stems ... the designation was based, i.e. which specimen from amongst the material was thought to have been originally used by Hedwig (or Schwägrichen) in the description and/or illustration of the species." It is clear that one should be very careful when designating holotypes or lectotypes from such old specimens and based

on old descriptions or illustrations, which often failed to indicate a "holotype" unambiguously. This indeed is one reason books like this are so important!

The bulk of the book consists of colour photographs of the actual specimens. The names are listed alphabetically by basionyms, followed by the page numbers and plate numbers (when they exist) in the *Species Muscorum Frondosum*. Under the basionyms, the currently used name or synonym is given, based on Crosby et al. (1999) or recent revisions. The protologue is also given, as well as all information on the herbarium sheet in question. When a typification of a name has been published, the publications are cited. Finally, the typification status and location of the type specimen are given; for example, if the lectotype has been found: "LT in G". Additional information, when there is any, is given under "Notes".

Price mentions that Hedwig's writing can be very small and difficult to read, as it indeed is here and there, but most of the writing is readable from the photographs, which adds to the value of the volume.

There is nothing to object and very little to criticise in this book, apart from some rare typos (e.g, *Abientella* should be *Abietinella*, p. 129). It is indispensable when one must find out where a typification of a Hedwig-name has been published, or if it has been published in the first place. There will still be ambiguous cases; for example, according to Sastre-de Jesús (1987), the lectotype of *Neckera disticha* should be in G, but that designation is not mentioned in the book (p. 264), which only cites Florschütz (1964) and says "T in G". This case is more or less related to what is called "effective publication" – typifications should always be effectively published or no types designated at all!

My sincere opinion is that this book is a treasure for a moss taxonomist. Michelle Price says in the Abstract that the project will continue with the cataloguing of the herbarium collections of Schwägrichen. I am more than looking forward to seeing that in print and thank Dr. Price for this one!

Johannes Enroth

Reference

Crosby, M. R., R. E. Magill, B. Allen & S. He. 1999. A checklist of mosses. Missouri Bot. Garden, St. Louis.

Florschütz, P. A. 1964. Musci. In: Lanjouw, J. (ed.), Flora of Suriname 6: 1–271.

Sastre-de Jesús, I. 1987. A revision of the Neckeraceae Schimp. and the Thamnobryaceae Marg. & Dur. in the neotropics. Facsimile of a PhD-Thesis, UMI Dissertation Service, Ann Arbor.

Classical Bryology on DVD

Quite a few classical bryological books from the 18th and 19th centuries are not easily available even in the largest botanical institutions and their libraries. Thanks to modern computer technology, it is nowadays possible to distribute these works on CDs or DVDs. Much to my delight, I received from Dr. J. L. De Sloover a fine DVD with the following bryological classics as pdf-files, listed here in chronological order.

- J. Hedwig 1782: *Fundamentum Historiae Naturalis Muscorum Frondosorum*.
- O. Swartz 1799: *Dispositio Systematica Muscorum Frondosorum Sueciae*.
- J. Hedwig 1801: *Species Muscorum Frondosorum*.
- M. F. J. Palisot-Beauvois 1805: *Prodrome des Cinquième et Sixième Familles de L'Aethéogamie. Les Mousses. Les Lycopodes*.

- J. H. Cassebeer 1823: *Ueber die Entwicklung der Laubmoose*.
- J. B. J. Béheré 1826: *Muscologia Rothomagensis*.
- J. D. Hooker 1845 (pro parte): *The Cryptogamic Botany of the Antarctic Voyage of H. M. Discovery Ships Erebus and Terror in the Years 1839-1843*.

Many of these works contain line drawings, very well scanned in and reproduced in this DVD. I warmly recommend you purchase this piece of work!

The DVD is available on prepayment (30 euros, incl. postage) from J. L. De Sloover, Rue des Sorbiers 2, B-5101 Erpent, Belgium.

Johannes Enroth

The bryophyte Flora of the Catalan Regions

Casas, C., M. Brugués & R. M. Cros. 2001. *Flora dels Briòfits dels Països Catalans*. Institut d'Estudis Catalans: Barcelona, Spain. 1 Molses. 278 pp

Casas, C., M. Brugués & R. M. Cros. 2004. *Flora dels Briòfits dels Països Catalans*. Institut d'Estudis Catalans: Barcelona, Spain. 2 Hepàtiques i anthocerotetes. 138 pp.

Although at present and worldwide we notice an increasing interest in "biodiversity," we also notice that training of young bryologists does not receive the appropriate attention. This is the case in Europe as well as the Iberian Peninsula. On the other hand, the training of field bryologists is also hampered as the traditional taxonomic procedures are being questioned by molecular studies, which makes the production of new floras more difficult and this in a context that we need to actualise our floras and need to produce good keys that can be used by both professional botanists and amateurs to further document the decline in "biodiversity." I personally do wish to congratulate the authors for the great enthusiasm and efforts that resulted in the publication of these important works.

These Floras concern mosses, liverworts and hornworts of the great part of the East of the Iberian

Peninsula, a small portion of South of France, Balearic Islands and Andorra (in fact the entire area in this part of Europe where Catalan is or was the common language). The area is characterized by a large diverse bryophyte vegetation, represents elements of phytogeography such as Mediterranean taxa as species of the arctic-alpine flora, and can be considered as an important hotspot of biodiversity. In fact, the number of bryophyte species (880) corresponds to more than 85% of the entire Iberian or about 52% of European taxa.

These two volumes are well-organized and taxonomic treatment is according to recent criteria. The way the identification keys in these Floras are structured is unusual, yet effective, as descriptions of the species (in smaller font size) are inserted into the identification key. The descriptions of the species are generally

adequate to describe these or distinguish them from related species.

With more than 125 plates (75 mosses, 51 liverworts and hornworts), the detailed and excellent illustrations make this flora easy to use and provide facility for a quick species identification. Species description, habitat, local distribution and rarity are provided for each taxon. Finally, the two books end with a very useful glossary of Catalans terms and an index of species.

These books will be of great interest for experts that need to identify bryophytes in Catalan countries, as well as for researchers working in the Iberian area, or for those wishing to obtain critical information concerning the present bryophyte biodiversity in this region. I am convinced that both the bryological community and field biologists will benefit greatly from this very simple and user-friendly flora.

Cecilia Sergio

The bryophyte flora of Italy

Cortini Pedrotti C. (2001) – *Flora dei muschi d'Italia. Sphagnopsida, Andeaeopsida, Bryopsida (I parte)*. A. Delfino ed., XIII + p. 1-817, fig. 1-270, paperback, ISBN 88-7287-250-2.

Cortini Pedrotti C. (2006) – *Flora dei muschi d'Italia. Bryopsida (II parte)*. A. Delfino ed., XII + p. 819-1235, fig. 271-379, paperback, ISBN 88-7287-370-3.

Five years after the publication of the first volume of the flora of Italian mosses, we have now at hand the monumental work of Prof. Carmela Cortini Pedrotti, covering some 752 species of mosses belonging to 209 genera and 57 families, in a large, extremely differentiated territory, from the Alps to Sardinia and Sicily.

After a preface, each volume starts with an introduction, followed by a taxonomical synopsis describing shortly the main characteristics of Classes, Orders and Families, with the list of Genera existing in Italy.

Both volumes contain a detailed description of the genera, with a key to the species and their illustrations in black and white, generally of good quality for the diagnostic characters.

Each volume presents a very rich bibliography and an index including numerous synonyms.

Beatrice Monacelli of the editing house, Antonio Delfino Editore, informed the editor how this book can be ordered.

To order the "Flora dei Muschi d'Italia" email commerciale@antoniodelfinoeditore.com, fax to +39-06-44231327 or mail letter to International Foreign Rights, Ufficio Editoriale Antonio Delfino Editore, Via Udine 32/40 - 00161 Roma, Italy. Payment can be by Credit Cards: Visa, Mastercard or American Express (with all credit card details) or by international bank transfer to Banca Intesa Agenzia 41 - Via Asmara - 00100 Roma, Account Number 5596445/01/74

The first volume includes also an illustrated glossary.

The second volume includes an artificial key of the genera present in Italy, written by Roberta Tacchi, inspired from Casas et al. "*Flora dels Bryofits dels paisos Catalans*", adapted for Italy.

We will not discuss here the taxonomic choices of the author, who proves to be modern but remains cautious - owing to her long experience - towards genera explosion presented by several authors although not always well supported, in particular within pleurocarp mosses, the classification of which is being completely changed on the basis of molecular studies.

This very well presented book, carefully bound, and with very few typing errors, will be of greatest interest for all Italian bryologists, but also for all European bryologists exploring these regions and those of the neighbouring Mediterranean countries for which no modern flora is available.

René Schumacker: e-mail rschumacker@ulg.ac.be

ANTONIO DELFINO EDITORE SRL
Abi 3069 Cab 5143 CIN: M

Mrs Monacelli will send the books, together with the invoice, as soon as we receive the payment.

The price is € 70,00 plus postage for volume 1 and € 55,00 plus postage for volume 2.

Beatrice Monacelli, International Foreign Rights, Ufficio Editoriale, Antonio Delfino Editore, Via Udine 32/40 - 00161 Roma, Italy, tel. +39-06-44240596 - fax +39-06-44231327, www.antoniodelfinoeditore.com

Two New Hepatic Books from the Hattori Botanical Laboratory.

M. R. Crosby and J. J. Engel (2006) Index of Hepatics 1974 - 2000. 368 pages, cloth. US\$24.- (incl. postage by surface mail).

Catalogs names at all ranks for hepatics and anthocerotates published during this 25-year period. About 3,950 new names are listed, including 1,435 new species and 1,170 new combinations for species. The Index supplements Index Hepaticarum, which will include names published through 1973. Each new name in the Index is referenced to an extensive bibliography.

K. Yamada and Z. Iwatsuki (2006) Catalog of the Hepatics of Japan (Reprinted from J. Hattori Bot. Lab. No. 99). 106 pages, paper. US\$8 (incl. postage by surface mail).

This catalog lists all names of genera and species of hepatics and anthocerotates described or reported from Japan based on literature up to the end of December 2004. The catalog comprises 612 species in 134 genera of hepatics and 17 species in 6 genera of anthocerotates. All synonyms are also listed.

Order forms are available at
<http://www7.ocn.ne.jp/~hattorib/>

COURSES AND WORKSHOPS

Bryology seminars at Humboldt Institute 2006

In support of field biologists, modern field naturalists, and students of the natural history sciences, Eagle Hill offers specialty seminars and workshops at different ecological scales for those who are interested in understanding, addressing, and solving complex ecological questions. Seminar topics range from watershed level subjects, and subjects in classical ecology, to highly specialized seminars in advanced biology, taxonomy, and ecological restoration. Eagle Hill has long been recognized as offering hard-to-find seminars and workshops, which provide important opportunities for training and meeting others who are likewise dedicated to the natural history sciences.

Eagle Hill field seminars are of special interest because they focus on the natural history of one of North America's most spectacular and pristine natural areas, the coast of eastern Maine from Acadia National Park to Petit Manan National Wildlife Refuge and beyond. Most seminars combine field studies with follow-up lab studies and a review of the literature. Additional information is provided in lectures, slide presentations, and discussions. Seminars are primarily taught for people who already have a reasonable background in a seminar program or in related subjects, or who are keenly interested in learning about a new subject. Prior discussions of personal study objectives are welcome. Syllabi are available.

Bryophytes for Naturalists

July 9 - 15, 2006

This seminar will serve as an introduction to the taxonomy and ecology of bryophytes. General goals of the class include: 1) differentiating mosses from liverworts, 2) distinguishing bryophyte genera

in the field, and 3) gaining experience with keying bryophytes to species (which entails many fun terms!). Technical skills taught during the course include getting the most from your handlens, competency with dissecting and compound scopes, dissecting a moss properly, and correct usage of terms describing bryophyte morphology. The particular emphasis of the course in terms of habitat types can be tailored to suit the interests of the students (i.e., more time desired in forest versus wetland). If no bias is desired, then equal time will be given to conifer forest, hardwood forest, bog, fen and open soil-rock habitats. As a basic framework, there will be ten focal genera each day. Reference collections of at least 50 bryophyte species will be encouraged for all students and required for those taking the course for credit.

Dr. Natalie Laura Cleavitt (nlc4@cornell.edu) is currently a Research Associate at Cornell University and has studied bryophyte taxonomy in Ireland, Alberta, and the northeastern US. She has taught introductory bryology courses to students at the University of Alberta and Cornell University. She has worked most extensively with the bryophytes of neighboring New Hampshire for which she published checklists. Her current research projects with bryophytes are located in Delaware Water Gap National Recreation Area (PA, NJ), throughout New York State, Hubbard Brook Experimental Forest (northern NH), and nearby Acadia National Park (ME).

Intermediate Bryology: Floristics, Taxonomy, and Ecology

July 16 - 22, 2006

This seminar is intended for those who have had a bryophyte course at Eagle Hill or elsewhere, or have otherwise acquired a basic knowledge of this group. Participants will acquire further knowledge of bryophyte taxonomy by learning to recognize diagnostic morphological characteristics of bryophyte genera and families in order to put their knowledge of bryophytes into broader perspective. Participants will sharpen their field skills by learning helpful ways to develop "search patterns" for new species. Further practice with microscope skills will help participants to identify difficult species. Bruce Allen's new "Mosses of Maine, Volume 1" for acrocarps should be available in time for this seminar. Field trips to representative and varied habitats of coastal Maine will be taken to learn to recognize distinct bryophyte communities within each habitat. A special feature of this seminar is a class inventory of the bryophytes of one diverse natural area, directly supporting the interests of participants who have research interests or who have interests in possibly conducting bryophyte inventories in their home area. Topics of current interest in bryology will be discussed and illustrated.

Dr. Nancy G. Slack (slacknan@aol.com) is Professor of Biology at the Sage Colleges (NY), an ecological consultant, and is currently president of the American Bryological and Lichenological Society. She conducts bryophyte workshops for Natural Heritage and Nature Conservancy ecologists. She has published extensively on bryophyte ecology, species diversity, and community structure and also on old growth forests, bogs and fens, and epiphytes. She is the author of 85 Acres: A Field Guide to the Adirondack Alpine Summits and Field Guide to New England Alpine Summits (new edition, May 2006).

Taxonomy and Ecology of the Genus *Hypnum* and Similar Genera

July 23 - 29, 2006

In this seminar, participants will study the moss genus *Hypnum* and other genera that resemble it, gaining a concept of species limits and polymorphisms, especially those related to maturity, insolation and moisture. Field study will involve collection of material from whatever diversity of habitats is available and making a record of this habitat information particular to the specimen. There will be considerable study of specimens and sharing of observations, use of keys for determination, illustrations and descriptions. What are the most reliable features that distinguish each

taxon? Lectures will consider *Hypnum* as a genus, varying concepts of its circumscription, and the ecology and phytogeography. It is hoped that the participants will gain confidence in their own ability to recognize the taxa of North America, especially of the Atlantic coast, but also further species frequent elsewhere in North America.

W.B. Schofield (Wilf) (wilfs@unixg.ubc.ca) is emeritus professor of Botany at the University of British Columbia, Canada. He taught a course in elementary bryology for more than 30 years. This background resulted in a text-book, Introduction to Bryology. His Master's degree at Stanford University (1956) concerned a taxonomic study of *Hypnum* in Canada and Alaska. He has contributed the treatment of *Hypnum* for the forthcoming Bryophyte Flora of North America. He has nearly 60 years of field experience, mainly in Pacific North America, and has collected all taxa of *Hypnum* known for North America. Field work in E. Asia and Europe has also greatly contributed to his understanding of the genus. Most of his publications involve phytogeography of bryophytes, especially mosses

Also of interest:

- [Lichens and Lichen Ecology](#), May 21 - 27, 2006 with Dr. David Richardson (david.richardson@SMU.CA) and Dr. Mark Seaward (m.r.d.seaward@bradford.ac.uk). [Lichens for Naturalists](#), July 2 - 8, 2006 with Dr. Fred C. Olday (folday@panax.com);
- [Crustose Lichens: Identification Using Morphology, Anatomy, and Simple Chemistry](#), July 16 - 22, 2006 with Dr. Irwin M. Brodo (ibrodo@mus-nature.ca);
- [The Fruticose Lichen Genus Usnea in New England](#), September 3 - 9, 2006 with Dr. Philippe Clerc (philippe.clerc@cjb.ville-ge.ch);
- [Development of Electronic Natural History Identification Guides](#), October 2 - 6, 2006 with Fred SaintOurs
- (fred.saintours@comcast.net)

For more information, please contact the Humboldt Institute, PO Box 9, Steuben, ME 04680-0009. Tel.: 207-546-2821. Fax 207-546-3042

E-mail - <mailto:office@eaglehill.us>

Online registration and information - <http://www.eaglehill.us>

Crum Bryophyte Workshop

As previously announced, this year the Crum Bryophyte Workshop and the Tuckerman Lichen Workshop will meet concurrently at the Shawnee State Park Lodge in southern Ohio, on May 18-23 (Thursday to Tuesday). The bryophyte and lichen groups will take separate field trips and have separate labs, but we will be staying in the same place at the same time, so there will be opportunity for cross-fertilization if you are interested. Shawnee State Park is located on St. Rt. 125, just west of Portsmouth, and is around two hours driving time from the major airports of both Cincinnati and Columbus. The Lodge is holding 20 guest rooms, 8 cabins and 2 meeting rooms. The cabins have two bedrooms and a kitchenette. One of the bedrooms contains a double bed and the other has four bunk beds. The arrangement can sleep 6 comfortably. The rooms will be held until March 15, so you will have to get your reservations in early. The links below show the Shawnee State Park and Lodge. The cost of a room (including tax) is \$106.40 per night and a cabin is \$156.80. It would be economical for 4-6 people to share a cabin if they could arrange this on their own. When making reservations, call 1-800-282-7275 and refer to the Crum-Tuckerman Workshop.

Barb Andreas has arranged for grants from Ohio Department of Natural Resources to cover most of the cost of the meeting rooms. Materials for sack lunches will be available with the cost divided equally among participants. This will be a substantial savings over the \$8 charged by the Lodge for a box lunch.

As in past workshops, we arrive on a Thursday, have all of Friday through Monday for fieldwork and lab time, and leave on Tuesday. About half of each day is spent in the field and the other half (and into the evening) is spent in the lab. If possible, bring your own microscopes. There will be a limited number of microscopes available for those who are flying and cannot bring scopes along.

Southern Ohio has a variety of habitats and we will attempt to see as many as possible. Barb is checking out habitats for field trips and possibilities include sandstone outcrops with acidic soil and open forest habitats; dry, open forest with cedar glade openings, alkaline soil and some dolomite exposures; riparian floodplain, one of the few known locations for the very rare *Phaeophyscia leana* (see the link below for the interesting story of this lichen); dry, mixed oak forest along narrow ridge tops; and remnant prairie. Some of these areas are protected as either TNC or State Nature Preserves, so at these locations, lichen removal will have to be restricted to personal collecting. Although no group trips are planned within the Shawnee State Park we will have a permit to collect, but this will have to be done with some discretion in public areas. Barb would like to develop species lists for all the areas that we visit, and in fact, this is a condition of the collecting permit for most areas.

For those who wish to obtain Ohio publications, *The Macrolichens of Ohio* (Ray E. Showman and Don G. Flenniken, 2004), is available from the Ohio Biological Survey for \$35. OBS also has *A Catalog and Atlas of the Mosses of Ohio* by Jerry A. Snider and Barbara K. Andreas (1996) for \$15.

The best way to order these publications is to call Ohio Biological Survey at (614) 457-8787 and order with a credit card.

Shawnee Lodge - <http://www.shawneelodgeresort.com/>
Shawnee State Park:
<http://www.dnr.state.oh.us/parks/parks/shawnee.htm>
Phaeophyscia leana:
http://www.eiu.edu/~biology/posters/2002/poster_017.htm

Our local representative for this workshop is: Barb Andreas (bandreas@kent.edu). Please feel free to contact her.

Source Bryonet
Bill Buck, e-mail: bbuck@nybg.org

Moss 2006

This year's Moss meeting will be held from June 29th to July 1st on the campus of the University of California, Berkeley. All people interested in the biology of mosses are welcome. Topics will range across all areas of experimental bryology, from the genome to whole organism, genetics and physiology to evolution (for the two past meetings see:

<http://www.plant-biotech.net/moss2004/>
and
<http://www.biology.wustl.edu/moss/moss2005.html>

Presentations and posters are welcomed! Please indicate your intent to present a talk or a poster below. Abstracts will be due May 31st.

WEB NEWS

A Digital Library of the Royal Botanic Garden at Madrid

The Royal Botanic Garden at Madrid has created a digital library focused on rare or highly demanded literature. Regarding bryological books, they are mainly from MA, my personal library, or the Missouri Botanical Garden library; we thank this institution, especially Marshall Crosby, Bruce Allen, Bob Magill, and Douglas Holland, its Library Director, for allowing us to include in the digital library books that I have scanned in St. Louis over the last years.

Now that the library is working, our goal is to include as many bryological books as possible. Main candidates are old/rare books that are hardly present in most libraries, especially those jewels that start shivering when less than 100 meters from a Xerox machine.

The results can be browsed/seen/freely downloaded at:

<http://bibdigital.rjb.csic.es/ing/index.php>

We are eager to include books scanned by other people, and the only requirement is to send it as a pdf file. We will process and upload it in a few days, whatever its size (it takes almost the same time to prepare a book with 10 pages as one with 1000). Also "desiderata" are welcome, and if we have the book it would be done as soon as possible.

Next in line are Bridel's "Muscologia Recentiorum (complete, with supplements)," Weber & Morh's "Bot. Tasch.," Muller "Genera muscorum", etc. Please note that De Notaris' "Muscol. Ital. Spic.," "Syllab. Musc.," and "Musci Ital." are now being processed and will be available soon.

Jesús Muñoz: e-mail: jmunoz@ma-rjb.csic.es

New Checklist of Mosses from Denmark

Irina Goldberg and I made a new updated version of the Danish checklist of mosses, Andreaeas and Sphagna available on the internet. It is the 4th revised version and lists also the names in Danish. The previous version was published 6 years ago.

The checklist can be downloaded from www.botaniskmuseum.dk/BOT/DIV/danmos4.pdf

Gert Steen Mogensen: e-mail: GSM@TECHXL.DK

Krypto-S, the New Cryptogam Database at Stockholm (S)

The cryptogam database at the Swedish Museum of Natural History was recently launched under the name Krypto-S on a new modern platform. The Internet database is fully searchable and is updated twice a month. Approximately 15% of the 1.5 million cryptogam specimens in S are now data based and information regarding these can currently be searched for on-line.

Experience Krypto-S, with versions in English, Spanish, and Swedish, at the following address:

<http://www.nrm.se/inenglish/researchandcollections/botany/cryptogamicbotany/databases>

Lars Hedenäs
Swedish Museum of Natural History
Department of Cryptogamic Botany
Box 50007
SE-104 05 Stockholm
Sweden
ph: +46-(0)8-51954214

THESES IN BRYOLOGY 16

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. If the thesis is only available electronically, IAB will print and mail one copy of the thesis to NYBG library for the author, provided that the author emails a pdf file or mails CD with pdf file to the IAB treasurer. The current IAB Treasurer is Blanka Shaw (blanka@duke.edu).

Ahonen, Inkeri. 2005. Evolutionary relationships of liverworts with a special focus on the order Porellales and the family Lejeuneaceae. Ph.D. dissertation, University of Helsinki, Finland. In English. 47 pp. + 6 reprints/manuscripts (see below). Address of author: Botanical Museum, P.O. Box 7, FIN-00014 University of Helsinki, Finland. E-mail: inkeri.ahonen@helsinki.fi.

The results of this doctoral thesis confirm monophyly of the liverworts and place them as a sister group to the other land plants. Although some results indicate that *Blasia* is sister to all other hepatics, it may just be sister to the other complex thalloids. The simple thalloids appear paraphyletic, with *Metzgeria* and possibly *Noteroclada* grouping with *Pleurozia* as sister to the leafy liverworts. The traditional leafy liverworts are divided into two clades, one containing the Porellales and Radulales, suborder Lepidolaenineae, and *Ptilidium*. The other clade contains the rest of the leafy hepatics. Isophyllous liverworts seem to be more derived than anisophyllous ones. The Porellales has been recircumscribed to include the traditional Porellales plus the Lepidolaenineae, Radulineae and *Ptilidium*. The internal nodes of this clade are not well supported. However, two clades can be discerned, one containing *Jubula* and the Lejeuneaceae and the other the rest of the taxa. Consequently, *Frullania* and *Jubula* are placed in different families. There is some evidence of relationships within the Lejeuneaceae. The included reprints/manuscripts are: He-Nygrén, X., I. Ahonen, A. Juslén, D. Glenný & S. Piippo. 2004. Phylogeny of liverworts—beyond a leaf and a thallus. *Monogr. Syst. Bot. Missouri Bot. Gard.* 98: 87-118. Ahonen, I. 2004. Molecular phylogeny of the liverwort order Porellales (Marchantiophyta, Jungermanniopsida). *Monogr. Syst. Bot. Missouri Bot. Gard.* 98: 168-188. Ahonen, I., J. Muona & S. Piippo. 2003. Inferring the phylogeny of the Lejeuneaceae (Jungermanniopsida): A first approach of molecular data. *Bryologist* 106: 297-308. Ahonen, I. 2005. The taxonomical position of the genus *Nipponolejeunea* (Steph.) Hattori. *J. Hattori Bot. Lab.* 99: 319-342. Ahonen, I., A. Sass-Gyarmati & T. Pócs. 2005. Molecular, morphological, and taxonomic evaluation of the *Ptychanthus striatus*-complex. *Acta Bot.*

Hungarica 47: in press. Ahonen, I. 2004. Indels and direct optimization. 26 page manuscript.

Bigal, Keeley L. 2004. The effects of vehicle emissions on bryophytes and lichens: Responses of selected bryophyte and lichen species to exposure to pollution from motor vehicles both in the field and in controlled fumigations. Ph.D. thesis, Department of Geography and Environmental Science, University of Bradford, England. In English. xv + 347 pp. Address of author: R321a Chichester 2, Department of Biology and Environmental Science, University of Sussex, Falmer, Brighton BN1 9QG, U.K. E-mail: kb64@sussex.ac.uk.

This doctoral thesis examines the effect of motor vehicle exhaust on bryophytes and lichens. A range of bryophyte and lichen species were fumigated with diesel exhaust in solardomes at concentrations equivalent to a busy roadside environment. After four months, there was visible loss of pigment and changes in growth. Similar treatment did not affect lichens. Material of bryophytes and lichens was transplanted from a clean-air site to varying distances from a motorway. In the bryophytes, visible pigment loss, slowed growth, chlorophyll and carotenoid concentrations, nitrogen concentration, and/or membrane leakage increased near the roadway. Few responses were seen in the lichens. The results suggest that sensitive bryophyte and lichen species may be affected near to busy roads or in urban areas by motor vehicle pollution. This could have consequent impacts on the habitats with which these species are associated.

Budke, Jessica Meridith. 2005. Phylogenetic analyses of the Timmiaceae (Bryophyta; Musci) inferred from sequence data and a developmental study of the peristome-forming region of *Timmia megapolitana* (Timmiaceae). M. S. thesis, University of Connecticut, Storrs, CT, U.S.A. In English. iv + 62 pp. Address of author: Ecology and Evolutionary Biology, 75 North Eagleville Road, University of Connecticut, Storrs, CT 06269-3043, U.S.A. E-mail: Jessica.Budke@huskymail.uconn.edu.

This master's thesis is a combination of two studies. The first is a phylogenetic study of the Timmiaceae, using all the taxa recognized in the previous revision by Brassard. Three genomic regions were sequenced, *trnL-trnF*, the spacer between *atpB* and *rbcl*, and a portion of the nuclear ribosomal 26S region. The data clearly support recognition of three sections, sect. *Timmiaurea*, sect. *Timmia* and sect. *Norvegica*. In sect. *Norvegica*, *T. sibirica* and *T. norvegica* var. *excurrens* are synonymized with *T. norvegica* var. *norvegica*. *Timmia bavarica* is recognized at the species level. A key to the four recognized species is provided. For the second part of the thesis, the peristome development of *Timmia megapolitana* is investigated. This moss shares symmetrical divisions in the IPL with peristomate taxa of the Funariales and Encalyptales, and presumably shares a relationship with those taxa.

Herrera Paniagua, Patricia. 2005. Análisis biogeográfico de los musgos del estado de Querétaro. M.S. thesis, Universidad Nacional Autónoma de México, México, D.F., Mexico. In Spanish with English abstract. [v] ii + 62 pp. Address of author: not known.

This master's thesis examined the floristic composition and the patterns of moss distribution within the Mexican state of Querétaro, located at the confluence of the Neovolcanic Belt, the Mesa Central, and the Sierra Madre Oriental. A total of 212 moss species were recorded from the state, including *Schistidium agassizii* new to Mexico. The Sierra Madre Oriental was the richest phytogeographic province, accounting for about 81% of the moss diversity. Habitat fragmentation in the Neovolcanic Belt and the Mesa Central has a negative effect on moss diversity.

Oliván Martínez, Gisela. 2005. Revisión taxonómica y fitogeográfica de algunos géneros de Amblystegiaceae s.l. (grupo *Calliergon-Drepanocladus-Scorpidium* y géneros afines) en la Península Ibérica. Tesis doctoral, Universidad Complutense de Madrid, Madrid, Spain. In Spanish with English abstract. [vi] 330 pp. Address of author: Department of Biology, Duke University, Durham, NC 27708, U.S.A. E-mail: golivan@duke.edu.

This doctoral thesis examines the species placed in *Calliergon*, *Scorpidium* and *Drepanocladus* from the Iberian Peninsula. These species are currently placed in *Calliergon*, *Calliergonella*, *Drepanocladus*, *Hamatocaulis*, *Sanionia*, *Scorpidium*, *Straminergon* and *Warnstorfia*. *Hygrohypnum* is also included. Phylogenetic analyses of the Amblystegiaceae s.l. were carried out to help clarify the relationships of the family. The phylogeny of the Calliergonaceae is reconstructed based on molecular and morphological data. The two monophyletic groups in the family are *Hamatocaulis-Scorpidium* and *Calliergon-*

Loeskypnum-Straminergon-Warnstorfia. The phylogeny of *Hygrohypnum* is also reconstructed based on molecular data. It seems that only *H. luridum* and *H. styriacum* are members of the Amblystegiaceae, whereas the remaining species of the genus are grouped in three well-supported clades. The Iberian species are treated monographically with keys, descriptions, illustrations and SEM micrographs of peristomes and spores, habitat descriptions, distribution maps, and an assessment of their conservation status.

Quandt, Dietmar. 2002. Molecular evolution and phylogenetic utility of non-coding DNA: addressing relationships among pleurocarpous mosses. Ph.D. dissertation, Rheinischen Friedrich-Wilhelms-Universität Bonn, Germany. In English. [iii] IV + 184 pp. Address of author: Plant Phylogenetics & Phylogenomics Group, Institut für Botanik, Fakultät Mathematik und Naturwissenschaften, Technische Universität Dresden, 01062 Dresden, Germany. E-mail: dietmar.quandt@tu-dresden.de.

This doctoral dissertation opens with a review of the current stage of using DNA sequences in bryophyte systematics; 15 DNA regions have been successfully employed for inferring phylogenies or to address relationships to other land plants. Detailed analyses of the molecular evolution of the tandemly arranged genes *psbT*, *psbN* and *psbH* as well as of the *trnL-F* region are performed, with an aim to a better understanding of the underlying molecular evolutionary patterns and to refine alignment construction for improved phylogenetic reconstructions. The examples presented in this study demonstrate that strong adverse effects on phylogenetic inference may result from aligning and using genomic regions without considering their potential function and molecular evolution. They also demonstrate and evaluate the homoplastic nature of the observed inversions, resulting in obscured phylogenetic signals. The second part of the thesis is devoted to phylogenetic reconstructions of pleurocarpous mosses, focusing on relationships of the Meteoriaceae and Lembophyllaceae. The Neckeraceae are identified as the closest relatives of the Lembophyllaceae.

Vaz, Thais de Freitas. 2005. A família Pilotrichaceae no estado do Rio de Janeiro. Dissertação de Mestrado, Universidad Federal do Rio de Janeiro, Brazil. In Portuguese with English abstract. xiii + 95 pp. Address of author: Rua Bernardo nº 131 casa 3C, Engenho de Dentro, 20745-270 Rio de Janeiro, RJ, Brazil. E-mail: celvaz@terra.com.br.

This master's thesis reports 64 species in 12 genera of Pilotrichaceae for the state of Rio de Janeiro, Brazil. Each species is keyed, described, discussed and illustrated. The largest genera are *Callicostella*

and *Lepidopilum*, each with seven species, followed by five species of *Thamniopsis*. 73% of the species are of Neotropical distribution, and 27% are Brazilian endemics. Of the Brazilian endemics, 14% seem to be endemic to the state of Rio de Janeiro. For the most part the plants grow in protected areas and are not under conservation threat.

Zhang, Li. 2001. Diversity and conservation of Hong Kong bryophytes. Ph.D. thesis, The University of Hong Kong. In English. ix + 303 pp. Address of author: FairyLake Botanical Garden, 160 Xianhu Road, Liantang, Shenzhen 518004, Guangdong, China. E-mail: zhangli@graduate.hku.hk.

This doctoral thesis examined the bryoflora of Hong Kong, with a land area of only 1100 km² and a long history of severe human impact. Nevertheless, the bryoflora was found to consist of 353 species in 69

families. Four families, 19 genera and 48 taxa are reported as new to Hong Kong, with a single new species, *Syrrophodon hongkongensis*. *Eccremidium brisbanicum* and *Barbella convolvens* are new to China. Bryophytes were sampled from 47 16 m² plots from throughout the region. Forest plots had the most species. The number of species per forest plot increased linearly with altitude. Fourteen phytogeographical patterns were recognized in the Hong Kong bryoflora, although overall the flora is northern marginal tropical, with good representation of East Asian and temperature elements. The bryoflora is most similar to those of Hainan, Taiwan and Japan. Mosses of conservation interest were identified, but insufficient data were available to do the same for hepatics.

Bill Buck

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UPCOMING MEETINGS

2006

June 26-27: University of California, Berkeley: hands-on workshop in conjunction with the Joint Genome Institute oriented towards annotation of the *Physcomitrella* genome (see next for info)

June 29 - July 1: Moss 2006. University of California, Berkeley. Pre-registration by 17 February. please inform Brent Mishler (please copy your to both bmishler@berkeley.edu & sonia1@berkeley.edu and include travel days.

July 1 - 13: BBS Summer field meeting. East Sutherland and Orkney. Contact Mark Lowley (East Sutherland) at m.lawley@virgin.net or Rosemary McCance (Orkney) at armccance@beeb.net

July 28 – August 3: ABLS-Meeting. Chico, California. Info at: www.abls.org

Aug 4 – 10: 5th Congress International Symbiosis Society, Vienna <http://www.isscongress2006.com>

Sept. 8 – 9: Annual general meeting and Bryological Symposium, Hatfield, Herfordshire. Contact. Drs. M.A.S. Burton at m.a.Burton@herts.ac.uk

2007

April 14-15: BBS Spring field meeting, Northhamshire (exact date to be confirmed). Contact: joan.james1@virgin.net

July 23-27 IAB meeting in Kuala Lumpur, Malaysia. See this issue of the BT (page 2). Organizers: Dr. Haji Mohamed and Dr. Amru N. Boyce, Fac. of Science, University of Malaya, Kuala Lumpur 50603

August 12-16: ABLS meeting: Xalapa, Mexico. See www.abls.org