

# The Bryological Times

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Contribution from  
Inés Sastre-  
De Jesús  
Regional Editor

## Botanical exchange between Caribbean and Mesoamerican bryologists and pteridologists.

Inés Sastre DJ

A workshop and lecture series on *Phylogenetic Analysis and Monographic Studies* was held from May 19-27, 1999 at Mayagüez Campus, University of Puerto Rico.

The objectives of this workshop were to expose the participants to current methods on phylogenetic analysis, use of software and also trends in monographic studies. In the last decade biological classification has changed and moved forward with the application of cladistic methods. In Caribbean and Mesoamerican universities there are very few courses specifically design to cover those methods, except in Mexico.

The invited speakers were: Dr. Efraín De Luna (Department of Plant Systematics at Ecology Institute of Xalapa, México); Dr. Noris Salazar Allen (Botany Department at University of Panamá and Smithsonian Institute at Panama) and Dr. Iván Valdespino (Director of the Management Unit and Biodiversity Conservation at CATIE, Costa Rica). Students

and professionals from Cuba, Dominican Republic and Puerto Rico attended the workshop. Most of the participants are interested on bryophytes or ferns, although two zoologists also participated.

Before the workshop a pre-introduction on bryophytes and ferns was given to beginners. This part was team taught by Carmen Reyes (Mayagüez, Puerto Rico), Angel Motito (Santiago de Cuba), Jeannine Vélez (Mayagüez, Puerto Rico), Gary Breckon (Mayagüez, Puerto Rico) and Inés Sastre (Mayagüez, Puerto Rico). Also a series of lectures on research on progress was given before the workshop. Dr. Gary Breckon, professor and curator of the Mayagüez Herbarium (MAPR), described the status of Puerto Rico's angiosperm flora and emphasised on the high extinction rate of the flora due to human activities. Inés Sastre, associate professor and curator of Bryophytes at MAPR, talked about her research on bryophyte floristics in Puerto

Rico in the last five years. Jeannine Vélez, collections manager at MAPR and curator of ferns, summarised the knowledge on the fern flora of Puerto Rico. After the three previous lectures by the staff from Mayagüez the visitors from other Caribbean Islands and from Central America were very interested in knowing about the efforts to protect the remnant vegetation. After a discussion on conservation policies and the need to involve the communities, Noris Salazar talked on the Moss Flora of Cerro Hoya in Panamá. In this flora species distribution is studied by elevation and habitat. With Noris' talk the discussion on conservation fired up again because even though Cerro Hoya is protected there is a lot of encroachment by the immediate community. Iván Valdespino talked on the "Ecology, conservation and biosystematics of Pteridophytes their importance as biodiversity indicators." The last presentation of the pre-introduction

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was given by Efraín De Luna on "Advances in the phylogeny of pleurocarpous mosses." With his talk we made the transition into the main subject of the workshop, phylogenetic analysis.

The pre-introduction described above took three days, the next five days were spent on lectures on how to write a monograph and perform a phylogenetic analysis. The lecture on the latter was given by Efraín De Luna, and Noris Salazar and Iván Valdespino covered the subject on monographic work. Efraín used very simple and funny examples to illustrate many of the concepts, making his lectures very entertaining. For the workshop he prepared a brief guide on how to use PAUP for Macintosh. While we learned about cladistics, Efraín learned about some Puerto Rican food, which is also becoming extinct with the proliferation of fast food places in the island. In a great example of teamwork, Noris and Iván handled the discussion on strategies of how to write a monograph.

Two field days were intercalated in the program to introduce the visitors to some of the forest reserves in the island and to give students the opportunity to practice field identification. The first field trip was to "Reserva Forestal de Guajataca" a moist subtropical forest on Karst topography. Three moss families are very common in the area: Pottiaceae, Calymperaceae and Hypnaceae. The ferns we observed were: *Anemia adiantifolia*, *Blechnum occidentale* and *Adiantum tenerum*. *Psilotum nudum* is also present in the zone.

The topography in the area is a classic example of haystack hill and sinkhole, which is also present in the other Greater Antilles (Jamaica, Cuba and Hispaniola). On the second trip we visited the "Reserva Forestal de Maricao" a wet subtropical forest. Here we observed plants along the Maricao River. Hurricane damage (Hurricane Georges in September 1998) is still quite noticeable in the area. Some of the species that are found at the canopy were at ground

level on fallen branches. On rocks we found *Radula*, *Cyclodictyon*, *Semato-phyllum* and *Callicosta*. *Dumortiera* and several species of *Fissidens* were common on soil banks. For the ferns there were several species of *Cyathea*, *Trichomanes*, *Elaphoglossum* and *Thelypteris*.

The group visited a restaurant at Rincón, a region of beautiful coastal scenery, for a closing dinner. From the restaurant baranda we enjoyed the sunset and a delicious dinner.

At the end of the workshop we discussed the need to train more students to work in the Caribbean and Mesoamerica.

This activity was sponsored by grant from the University of Puerto Rico, Atlantea Program a division that promotes and funds academic exchanges of professors and researchers from the Caribbean and Mesoamerica. This program is one of the tools that the University of Puerto Rico uses to attain internationalization of its campuses.

## Bryophytes as Indicators for Global Warming?

Jan-Peter Frahm

In the period 1985-1996, sixteen bryophyte species with a mediterranean, mediterranean atlantic or atlantic distribution were found in Central Europe. Twelve were found here for the first time, the remaining four had been found before but had disappeared. These spectacular extensions of ranges of several hundred kilometres were correlated with an increase of the mean temperatures of the winter months December, January and February by 1.5°C (Frahm & Klaus 1997). Possibly bryophytes from warmer parts of Europe do not react to warmer summers but to milder winters. During this period the 3.5°C January isotherm of these months moved from Paris 400 km east and now runs through Germany.

Since the publication of this paper, eleven more species have appeared as new to Central Europe. This may be only the "peak of the iceberg", because of

the relatively low intensity of floristic studies. Thus there must be more species and more records of range expansions because of the few bryologists looking for them.

There are still a number of colleagues who argue that these species were just simply overlooked previously. This argument cannot be excluded. However, it seems unlikely that 26 species were overlooked before and have been discovered in a period of 12 years. It is more likely that these species adapted to mild climates just follow the January isotherm. Bryophytes can react very fast and easily to such climatic changes, especially changes concerning winter months. There have always been climatic changes on which plants respond, but there has apparently never been such dramatic climatic and floristic changes in such a short period of time during the

past two centuries.

The spread of bryophytes in Europe is interpreted as the reaction of organisms on a present climatic fluctuation in that region. The climatic changes are, however, not confined to Europe but can be seen worldwide. Therefore I like to put forward the question, whether such floristic changes in bryophytes can be found elsewhere in the world? Can bryophytes be used as indicators for Global Warming?

### REFERENCE

- Frahm, J.-P., Klaus, D. (1997) Moose als Indikatoren von Klimafluktuationen in Mitteleuropa. *Erdkunde* 51: 181-190.  
Jan-Peter Frahm, Botanisches Institut, Meckenheimer Allee 170, 53115 Bonn, Germany.

## Use of e-mail during trips

Many colleagues will know how to make use of e-mail away from the office, and other will be happy not to know to get rid of this business at least part of the year. However, sometimes it can be useful to get urgent information during herbarium stays or fieldtrips.

There are two possible situations. First, if you are staying at a university or research station with Internet connection it is easiest not to establish a new e-mail account, but to make use of an Internet browser such as Netscape Navigator which will already be installed. It has a mail option (version 3: Options, Mail preferences, version 4: Edit, Options) which can be set up with the profile of your e-mail connection. There is probably some confusion with the requested data to fill in, however, one only needs to fill the SMTP Server, the POP3 Server and POP3 user name, if one knows what it is. Both servers for the incoming and outgoing mail are usually identical and here is the full name of the host computer required, which manages the mail (in my case "ibm.rhrz.uni-bonn.de"). The user name is your mail name, that is the name before the @ in your mail address. Usually other e-mail programs are used so somebody else does not use the e-mail function of Netscape and thus the Netscape mail can be configured.

The other case is that one is with no chance to use the Internet connection in an institution. Then it is possible to go to one of the Internet cafes that are more and more common, e.g. there are even Internet Cafes in Cairo. For a small amount you are allowed to use Internet facilities for half an hour or longer. In this situation it could also be possible to configure Netscape mail and by this way get connected with the mailbox at home. Sometimes this function is blocked but in this case one can also send and receive mails by establishing a new mailbox from a provider, and this for free! Simply connect to [www.hotmail.com](http://www.hotmail.com) (this is nothing obscene!) or other search machines ([www.yahoo.com](http://www.yahoo.com), [lycos](http://www.lycos.com)) and establish a mailbox. The only disadvantage is that advertisements may

## Presentation slides - the \$5 and the \$6500 solution.

Perhaps you have recognised the changes during the past years in meetings, symposia and congresses. Posters are now prepared with presentation graphics programs on the computer and printed by plotters in A0 size. Transparencies are out, especially black and white ones. No one need presentation slides prepared with presentation graphics programs, and since the Microsoft Office package includes PowerPoint, most of the slides are prepared with PowerPoint, which can easily be noticed by the classical backgrounds (world map) taken from the file library or the incredibly light blue - dark blue transitions.

The official way to get the presentation graphic from the computer on a slide is to use special equipment which exposures the files on a film roll. Such machines are relatively easy in use (it has an own printer driver and thus the picture is "printed" on the film) and although it takes relatively long to exposure (three runs in the basic colours, each about 10 seconds, but it prepares many slides automatically so you can drink coffee during the process). These digitizers are also relatively expensive. I am using a medium quality Polaroid machine that costs \$ 6500. Better ones cost \$10,000 and more. However, when the machine has had to be repaired or gave bad results (as often occurs), I was forced to look for alternatives.

One alternative is to take a picture directly from the computer screen. This is the \$5 solution, the cost for a film roll, since a camera is usually available. One

be mailed with your mail. However, you may send mails and also receive mails, today in Los Angeles, tomorrow in Tokyo, under this new address. Such Internet facilities with a web browser are not only available in Internet cafes but also sometimes in public libraries or university libraries.

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needs only a tripod and a single eye reflex camera. Exposures should be 1/25 sec. and below, because every TV picture is composed of 25 single pictures per second. Also it is necessary to have a high-resolution computer. The higher the resolution, the smaller the pixels and the sharper the slide.

The other alternative is to make a printout of the graphic on an ink printer on glossy paper, with the highest possible resolution, and to take a picture of it, preferably on a repro stand. This is the \$300 solution (for the printer, which is, however, usually at hand, or the repro stand).

When I compared the slides taken by all three methods, I was surprised: The lowest quality had the pictures taken from the screen, although they were quite usable. They were taken at a resolution of 600 x 800 pixels and thus could be enhanced with a better screen resolution. The best results were obtained from the photographs from the printouts! The reason is simply that the printer resolution (1440 dpi) is much higher as the resolution of the digitizer, which can easily be seen when comparing curves, which have a low but visible scale-like structure in the digitized slides but not in the slides taken from the printout.

Conclusion: do not buy a film exposure, save \$6500 or even more and photograph your slides from printouts and get better quality and low cost. The intelligent reader will now ask why such expensive digitizers are on the market if they give lower quality than photographed printouts. The reason is simply that they were already developed and on the market before ink printers with such high resolutions were available and they are sold mainly for companies and universities, who are said to have much money, and not for the common user, which explains why they are so expensive.

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# IAB Business

## Minutes for Council meeting in St. Louis August 3, 1999

Present: T. Cao, C. Delgadillo M., L. Söderström, D. Vitt, P. Geissler, B. Crandall-Stotler, R. Longton (Chair), H. Deguchi, S. R. Gradstein, N. Miller, W. Buck, E DeLuna.

Non-present: T. Koponen, J. Glime, Z. Iwatsuki, J.-P. Frahm, W. Schofield, M. Ignatov, R. Seppelt, H. Ando.

Agenda attached

– Minutes from 1997, Beijing meeting:  
Read and accepted as written.

### REPORTS

– Membership: Report attached: Membership up 13% since 1997.

– Treasurer/Secretary: Report attached: Balance as of June 30, 1999 was \$54,312.67 (CAN).

– Awards:

– The Hattori Prize for best bryological publication during the past two years by an IAB member: **W. R. Buck** for publication entitled: 'Pleurocarpous Mosses of the West Indies'

– The Hedwig Medal for outstanding contribution to bryology: **Riclef Grolle**

– Stanley Greene Research Awards: **Dennis Gignac; Bernard Goffinet and Richard Zander; Irene Bisang**

– Editor of Bryological Times: The editors were re-appointed for two years by the council. Number 100 due out in January will be a special issue.

– 1999 election results: Rene Belland, Election Judge, reported the following election results:

– President: S. R. Gradstein

– Vice-President: Z. Iwatsuki

– Secretary-Treasurer: D. H. Vitt

– Councillors: B. Crandall-Stotler, H. Deguchi, E. DeLuna, J. Glime, R. Longton.

– Endangered species committee (Minutes attached).

### OLD BUSINESS

– Advances in Bryology: Discussion of whether IAB should continue to

publish this series. A committee was appointed to investigate possibilities;

– Future Meetings: Discussion of the Lucknow meeting concluded that the meeting should be held in January of 2002 due to climatic controls and northern hemisphere teaching commitments. The theme was suggested to be: World Conference in Bryology. The 2005 meeting will be in Vienna, Austria.

### NEW BUSINESS

– A strategic planning meeting was agreed upon in order to produce a Strategic Plan for the Association. The new President appointed a four member committee to meet in December, in Edmonton to produce such a document for Council approval. Committee: S. R. Gradstein, D. Vitt, W. Buck, L. Söderström.

– A proposal was ratified to announce the availability of research funds within Eastern Europe. The proposal is attached.

Meeting adjourned.

## The IAB Fund for Rare species Research and Bryophyte Conservation.

The IAB announce the **Bryophyte Conservation Fund**. The fund is created by the \$1.00 surcharge on each IAB membership since 1996.

All members of IAB are welcome to apply for a grant. The maximum sum is US\$500.00.

Subject field: priority will be given to projects or publications focusing on rare species, habitats or bryophyte hotspots in high need of conservation actions. Also seed money to get a project under way which can include travel monies to meeting and activities encouraging lo-

cal/regional bryophyte conservation organizations

Proposal should be submitted to Dale H. Vitt, Director, Devonian Botanic Garden, University of Alberta, Edmonton, AB T6G 2E1, by latest December 1, 1999.

The proposal should contain 1. description of the project, 2. its rationale, 3. activities, 4. budget and 5. outputs. The progress of the project will be announced in the Bryological Times.

For further information contact Tomas Hallingback email: [tomas.hallingback@dha.slu.se](mailto:tomas.hallingback@dha.slu.se)

*Tomas Hallingback*



# IUCN-IAB Conservation Specialist Group (Bryophytes)

Meeting Minutes, 5 August 1999, St. Louis, Missouri, USA

Attendees: R. J. Belland, P. Geissler, T. Hallingbäck, T. Pócs, C. Sérgio, L. Söderström, B. Tan

## 1. Welcome by T. Hallingbäck

## 2. Brief reports

T. Pócs – Red book for Hungarian bryophytes is at the press and will be published this year.

R. Belland – Report on the rare mosses of Canada was published in fall of 1998. René will have copies sent to all committee members.

L. Söderström – 1) A conference on rare bryophytes was held in Trondheim last summer. The proceedings will be published in early 2000, in Lindbergia.

2) European Red Data Book is currently being revised. 3) The ECCB is now represented on Planta Europea Network, and has been invited to the Council of Europe (Bern Convention Plant Experts' group).

B. Tan – 1) The Japanese are completing a Red Data Book that will be in press by December. 2) The Chinese are also starting a Red Data Book under the direction of P.C. Wu.

C. Sérgio – 1) Cryptogamie meeting will be held in Madrid in December. 2) The Iberian Peninsula flora will be started in 2000, although the bibliographic references for this work will be completed this year.

P. Geissler – Distribution maps of bryophytes in Switzerland are beginning to be published.

T. Hallingbäck – 1) Work is progressing toward publishing the 'Action Plan'. Expected publication by the end of 1999. 2) The Red Data Book of Sweden has been published. The book is available upon demand. 3) The latest version of "2000 IUCN World Red List of Bryophytes" is available on the internet <http://www.dha.slu.se/guest/WorldBryo.htm> as well as [http://www.science.nus.edu.sg/Departments/DBS/public\\_html/Labs/cryptolab/about.html](http://www.science.nus.edu.sg/Departments/DBS/public_html/Labs/cryptolab/about.html). The list is also included in the appendix of the 'Action Plan'.

## 3. Future Plans and Projects

3.1. T. Hallingbäck suggested publish-

ing a brochure and constructing a web site that promotes the conservation of bryophytes. T. Hallingbäck will write the first draft of the brochure and circulate to committee members for discussion and comments.

It was suggested that the internet site should be accessed via a link on the IUCN home page and should be greatly expanded from the brochure. René has offered the University of Alberta server to host the site. Details to be discussed with T. Hallingbäck at later date.

## 3.2. Bryophyte Geographical Database

It was agreed that an internet accessible database that provides distributional information for bryophytes would be a valuable resource for bryologists. L. Söderström noted several criteria/features that should be included in this database: 1) nomenclature, 2) distributional information for different scales, 3) mapping, 4) source references. With respect to #3, the database should be hierarchical, i.e., the user can obtain data for different geographical scales (country, province, continent), in a 'drill-down' fashion.

It was decided that a single database on an Internet server would be preferable to the alternative of a web page with links to several databases in existence. The latter would be encouraged, and the IAB database would run alongside these.

L. Söderström and R. Belland volunteered set up a draft database structure, and also a test site.

3.3. It was decided that more hot spots need to be assessed, and that information on these would be solicited from the membership via a questionnaire.

3.4. Discussion of recruitment of additional members to the committee was deferred to a later date. Nevertheless, ideas from the general membership are invited.

3.5. 1) It was decided that the IUCN-IAB conservation specialist group develops closer ties with the ABLIS Conservation Committee. Ties could be developed by, 1) sharing minutes of meetings, 2) by inviting member from the ABLIS membership to sit on the IUCN-IAB conservation specialist group. R. Belland will approach the ABLIS Conservation Committee chairperson about this possibility.

3.6.2) B. Tan to ask Japanese group to share information on their activities with the IUCN-IAB conservation specialist group.

3.7. The IUCN has requested information on Red List bryophytes to include in their SIS (Species Information System).

3.8. Species 2000 will soon include bryophytes (<http://alnus.uel.ac.uk/default.html>).

3.9. B. Tan suggested that the IUCN-IAB conservation specialist group send letters to conservation agencies or political officials informing them of hot spots in their countries. It was agreed that this action should be included in the "Hot Spot" program.

## 4. Other Business

4.1. IAB collects US\$1.00 from each member for conservation. Since the money collected is now available for conservation research, there was discussion of how the money should be used. Two possibilities were suggested: 1) as seed money to encourage the establishment of local/regional conservation organizations, 2) to be used for conservation projects of bryophytes. It was agreed that the availability of the funds should be announced in the next Bryological Times, and that maximum US\$500.00 would be available.

4.2. It was agreed that the minutes of the IUCN-IAB conservation committee should be published in the Bryological Times.

5. Next meeting – to be held in Lucknow, India (early 2002?).

## New Products

### COMPUTERIZED CLIMATE STATION

After the announcement of the Tiny Talk dataloggers (Bryol. Times 91:3), which were very successfully used in Germany as well as for studies of the canopy climate of a elfin-forest in Ecuador, and which will now be used for the same purpose in Venezuela, I would like to introduce another useful equipment, a computerised climate station. It consists of a small plastic box, which can (as the dataloggers) be connected to a computer. This small box records temperature, humidity, wind direction, wind speed, air pressure and light intensity. Modules for radioactivity and a rain meter can be added. The climate station can be directly connected by cable with a computer or (at extra cost) can transfer the data wireless from the station to the computer! If an extra memory module is added, it can store 2300 records in a memory chip, which can be downloaded to the computer. The station is powered by 12 V (car battery, battery pack, solar energy, 12V transformator). Thus this station can do everything that a big climate station in a climate hut does. However, the data can be stored in a computer and be displayed as graphs and exported to spreadsheet programs e.g. Excel.

The last sensation is the price: the climate station costs DM 498 (about \$300) inclusive the measuring modules described above, the connecting cable and the Windows software, the memory modules and the radioactivity modul cost each DM 49 (\$30), the rainmeter DM 99 (\$60), the wireless version costs DM 698 or \$ 450).

The climate station is ideal for obtaining data in study areas in the tropics, where no climatic data are available. The unit is successfully installed in a study area of the Universidad Catolica Quito in the Andes of Ecuador.

The station is available from Conrad Electronics in Germany.

### THE MOST CRAZY TRAVELLING MICROSCOPE

During longer field trips it makes sense

to use a microscope in the field. This is especially valuable in regions in which one is not familiar with the bryophyte flora. A microscope and literature helps to identify at first the most common species, and every time one has used the microscope after a collecting trip, more and more species can be named and attention can be paid to the remaining species.

However, during overseas trips it is almost impossible to take a normal microscope in the field because of its weight but also because of its size. Zeiss offered "Field microscopes" in the past, but these were modifications of regular microscopes with a somewhat smaller stand. Czech manufacturers built a special smaller microscope for travelling. It was sold in a dome shaped sturdy metal cover, and which was quite robust in the field but had still a good weight and – so far as I know – no built-in illumination. Nikon once built the extreme travelling microscope, but only to the end of the seventies. It had a unique appearance with the size and format of a Leica camera, built in illumination, even 100x oil immersion and an incredible quality. I am proud to have two copies, which are often used during expeditions, but they can no more be purchased. Another field microscope in the same style but more simple and made from plastics was once sold by the British Bryological Society.

Recently I found the most unusual travelling microscope in a catalogue of a German mail order company for photography equipment: The "Lensman" looks like a round cream box, is 10 cm in diameter and 2.7 cm high and a weight of 250 g. It has a magnification of 80x and 200x and a built-in illumination, but can also be used with sun light. With this size and weight it can be taken everywhere. And also the price is reasonable. It is sold at 199 Marks in Germany (appr. \$ 105). The Lensman is made in Britain by Vector Services Ltd., 13 Denington Road, Wellingborough, Northants NN8 2RL, UK, and imported to Germany by Brenner Foto Versand, Mooslohstr. 60, D 92637 Weiden. The

handling is a bit unusual at first but matter of experience, and the quality, especially of the 200x lens, is not overwhelming, but it can be used for bryophyte identification with good success. Both available magnifications (80x and 200x) are ideal for bryophytes. With regard to its extremely small size and weight it is a useful equipment for bryologists.

### DIGITAL CAMERA FOR CLOSE UPS

Digital Cameras are more and more common. The bulk of models are, however, snapshot cameras with accordingly relatively low quality. Professional cameras start with \$ 5,000, e.g. a modified Minolta single lens reflex camera (with which all the Minolta equipment like bellows, macro flash, macro objectives or microscope mounts) can be used. Most of those cameras cost between 10.000–20.000 \$, e.g. digital magazine for the Hasselblad.

Digital snapshot cameras are usually relatively useless for the biologists, however, with one exception, the Ricoh cameras, which allow close up photographs from 1 cm (!) distance (without any additional lenses or extension tubes), even with autofocus. It is easy to make bryophyte close ups in the field, even at low light intensity. The picture can be controlled on a LCD monitor. There are several models with different resolution, zoom lens, built in flash and changeable memory card. The built in memory has 2 MB and can store between 20 and 40 pictures depending on the resolution. The memory card has up to 40MB and can store up to 500 pictures, ideal for fieldtrips and expeditions, also because of the light weight of 270g.

These cameras have a highest resolution of 410.000 pixels (768x524). It allows to print high quality pictures of about 9 x 13 cm. Any larger prints have lower quality, but on the other hand the pictures can be directly used for homepages.

So if a bryologist considers to buy a digital camera to make use of the advantages (low cost per picture, pictures can be stored in memory, printed immediately

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in colour or b/w, again deleted or stored on memory cards or transferred to the computer on hard disk, direct useable for Internet purposes) and can live with the disadvantages (relatively small size of high quality prints), then consider the Ricoh models with ist incredible close up facilities. The first simple model in this series started two years ago in Germany at \$ 900, but present models are now down to less than \$ 300 (including flash and zoom lens).

### NEW DATALOGGER

Since the demonstration of the "Squirrel" datalogger during the Bryological Workshop held at Mainz in 1987, I used a "Squirrel" in ecology courses and also during fieldwork in Zaire. However, I was never satisfied with these black boxes. After having not used a squirrel for a year, I had to learn again the (sometimes simultaneous) use of three buttons for installation, the software stored the data

in Supercalc format (a program originally written for Commodore 64) and also Lotus format, although we lived already in the Windows age. The graphics output of the data also made serious problems, at least for me, converting data forth and back, until Excel 4.0 finally imported the format without problems and made nice graphs. Sometimes the display showed only a row of eights (I don't know why), and recently it gave up working in Venezuela, maybe for humidity reasons, but operated again when it was switched on at home.

Students drew my attention on a totally new generation of dataloggers, which are apparently available since about two years ago, the Orion Tinytalks. These dataloggers are tiny, indeed. In contrast to the "Squirrel", which has the size of about a cigar box, these dataloggers consist of separate units for measuring temperature and air humidity, each one logging its own data. The standard logger come packed in 35 mm

plastic film tins. The waterproof versions (for water depth until 16 m) is slightly larger and has a weight of 135 g. These small boxes are positioned in the field, where they are hardly visible because of their size, and can store 1800 data over a period of a year. It is not only the size but also the price and the installations, which can make one enthusiastic. The loggers are fully operated by a computer. They are linked with a cable to a serial port and are set up (e.g. date, intervals) by Windows software. Downloading of the data is as easy, and the resulting curves are automatically plotted within a second. The price for the waterproof version (and this is the only alternative for the field) is about \$150 in Germany each (humidity loggers being a bit more expensive than temperature loggers), while the software costs \$50, the cable \$10.

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### The use of video-digitizers

Digitizer boards for computers, which load a picture from a video source (video recorder, camcorder) into the computer, seem to be a interesting tool for bryologists. Connect a video camera with the computer, connect the cable with the board in the computer and soon one will get a picture of a microscopic slide in the computer. This may be a method to avoid circumstantial drawings of slides since one can just catch the picture, sharpen it, raise the contrast, convert to black and white and print it for publication.

However, the reality is different. It is also conspicuous that hardly any of such possible digitized images have been published so far. But why?

First of all, the resolution of the video signal is relatively poor. The video 8 system produces pictures of about 290.000 pixels, the Hi-8 system about 480.000 pixels. So if you have a video card with a screen resolution of for instance 1472 x 1132 pixels, the computer screen is able to show 1.666.304 pixels but receives only 480.000. This calculation shows that a high resolution of the

digitizer card is even not necessary for the video-input, except if one has a high-resolution microscope camera.

Next, the picture is in colour, but can be converted for black & white for publication, however in grey scales. The printer gives a dithered printout, which would theoretically be ready for publication. However, the quality is quite poor. It has about 15 dots per millimetre and thus hardly newspaper quality. A conversion to a black & white graphics seems to be the solution to get a line drawing, however, weak parts of the picture will get totally white and dark parts (for instance cell contents) will get totally black, and thus one will never get the line drawing one expects. And finally such a picture takes about 5 MB in memory.

Any alternative? Yes.

First solution, connect a video printer to the camera. The quality cannot be better since it depends on the resolution of the camera, but since the printout is relatively small, the quality is sufficient. As the prints are inexpensive, this method is a good alternative to Polaroid pictures, which are better but cost a lot more. Furthermore, this methods works

without computer.

Second solution: make a picture of the slide with a camera connected to the microscope, make a print and put the printout on a scanner. The quality of the photograph is much better than the digitized picture and the scanner is able to keep much of the quality when the picture is going to be loaded into the computer. However, one can publish the photographs and thus there is no need for computer pictures.

Third solution: Connect a digital camera to the microscope. However, digital single lens reflex cameras with removable objectives, which can be mounted on a microscope, cost from \$5.000 on (Minolta RD 175). It has a resolution of 1.75 Mio pixels.

In conclusion, pictures of microscopic slides received through video boards may be good enough for publication of pictures in the internet or in newsletters, but not for publication. Again, as in the case of diapositive digitizer, the more expensive solution is not always also the better solution.

*Jan-Peter Frahm, Botanisches Institut, Meckenheimer Allee 170, D 53115 Bonn, Germany*

## The 17<sup>th</sup> bryological meeting of the Sociedad Española de Briología (SEB) in Mallorca (Balearic Islands)

The Balearic Islands, and especially Mallorca, have received visits from many botanists and bryologists during the present century, due to their extreme biogeographical interest. However, the first bryological data available from the Islands are those reported by local renowned botanists and naturalists in the 19<sup>th</sup> century, since the study of biological organisms showed an intense activity, not except from polemics, at that time. Two noteworthy and classical contributions are the general floristic work of J. Cambessedes in 1827 and, especially, the first catalogue of Balearic mosses published by J.J. Rodríguez Femenías in 1875. After that, some explorations, basically centred in Mallorca, were conducted by European bryologists, from the work of W.E. Nicholson (1907) to the more recent studies by F. Koppe (1965), J.L. de Sloover (1967), A.G. Andersen (1976), D.F. Boesen (1976) and T.L. Blockeel & A.C. Crundwell (1987). Systematic explorations carried out by Spanish botanists or bryologists began in the 50's with the work of P. Montserrat in Menorca (1953) and continued with several studies by C. Casas (1956, 1958). Scattered contributions were made in the two following decades (Casas, 1966 and 1979), although a remarkable checklist was set up by the late J. Vives Codina in 1976. However, the most productive years were 1982-1987, when papers by R.M. Cros, C. Casas, M. Brugués and, especially, J.A. Rosselló, were published. After this effervescence, bryological work in the Balearic Islands virtually stopped until the recent appearance of a note by Llorenç Sáez, Pere Fraga and Josep A. Rosselló (*Journal of Bryology* 20, 506-508, 1998). Also, a forthcoming checklist by Sáez and Rosselló is expected.

This situation led the SEB to propose the organization of a bryological field meeting to be held in Mallorca in 1999, only one year after the last one in

Aracena (Huelva, SW Spain) in February 1998 (see *The Bryological Times* 95, 3). The field meeting in Mallorca was the 17<sup>th</sup> organized by Spanish bryologists (the first one was held in 1968).

Nine enthusiastic bryologists from the Universities of La Rioja, Murcia, Navarra and Autónoma of Madrid attended the field meeting, held between 12 and 16 April 1999. Fewer people were present than in previous meetings, probably because of the price of the journey and the date, within the second term of the academic year. The attendance of three Ph.D. students and the low average age of the participants (around 30) can be emphasised as positive facts that reveal a good future perspective for Spanish bryology. Josep Rosselló (University of Valencia), an expert in Balearic flora and ecology, acted as the chief guide for the field trips. This help was extremely valuable in such an extensive (3640 km<sup>2</sup>) and diverse island as Mallorca. The "Hotel Brisas" at Puerto de Sóller, a small coastal village in the NW of the island, was chosen as the meeting headquarters. The weather was very changeable, with hot and sunny days mingled with cloudy and rainy ones.

The first expedition was undertaken on 13<sup>th</sup> April, in order to collect Pottiaceae in the southern part of the island (localities of S'Estanyol and Cabo Blanco). Visits were made to Mediterranean shrublands with *Cistus monspeliensis*, coastal shrublands with *Lycium intricatum* and *Asparagus horridus* close to the cliffs, and seasonal pools. The annual rainfall of these places is less than 400 mm. A great number of samples of *Aloina*, *Crossidium*, *Pterygoneurum*, *Pottia*, *Didymodon*, *Phascum*, *Weissia*, etc., were collected. Maurici Mus and Joan Rita (University of Islas Baleares) acted as local guides.

The following day, irrigation channels built on limestone were explored in the Valle de Sóller and some aquatic bryo-

phytes were collected. In the afternoon, we drove to the base of Puig Major, the highest mountain in Mallorca (1445 m), located in the middle of the Sierra de Tramuntana. Its summit, of remarkable botanical and bryological interest, is under military jurisdiction and cannot be visited without official permission. A *Quercus ilex* woodland growing on limestone was sampled, looking especially for *Orthotrichum*. At dusk, we visited the curious and admirable Botanical Garden of Sóller. Situated in the outskirts of the town of Sóller, the Garden covers such diverse plant sections as the endemic flora of Balearic Islands, the flora of other Mediterranean islands, the Canarian flora, autochthonous agricultural crops, and a beautiful section of ornamental flora. The Botanical Garden also has a herbarium and a germoplasm bank. We would like to thank the staff members (headmaster, Josep Lluís Gradañe; curator, Magdalena Vicens Fornés) for their kindness and facilities, and strongly recommend a visit to the Garden by every person, professional or amateur, who loves plants.

On April 15<sup>th</sup>, the karstic system in the Nudo de la Corbata (road to Sa Calobra, at 700 m altitude) was visited. The vegetation, a stony shrubland-grassland, is dominated by *Ampelodesmos mauritanica*, *Smilax aspera* subsp. *balearica* and *Erica arborea*. The rare *Polytrichum juniperinum* grows on acidified soils, together with some *Acaulon* and *Pleuridium*. Afterwards, we descended towards the typical coastal place of Sa Calobra, where there were plenty of tourists even despite the unpleasant weather. Samples were taken only from some sandy soils under *Vitex agnus-castus*, at the lower limit of the spectacular canyon of Torrente de Pareis. In the afternoon, the area around the village of Fornalutx (near Sóller), and some walls and banks inside the village, were ex-

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plored. *Crossidium squamiferum*, *Enthostodon curvisetus* and, probably, *Jungermannia atrovirens* (the last one from a dry stream bed), were some interesting findings. At dusk we reached the Botanical Garden of Sóller again, where the scientific discussions took place. These presentations, whose aim was to enrich the scientific content of the field meetings, were presented by María Teresa Gallego-Morales ("Advances on the genus *Syntrichia* in Spain"), Dr. Ricardo Garilleti ("Some Atlantic bryophytes in Central Spain"), Dr. Javier Martínez-Abaigar ("Mineral nutrition of aquatic bryophytes: an ecophysiological perspective") and María del Carmen Sánchez-Moya ("The association *Tortulo subulatae-Syntrichietum ruralis* ass. nov."). In the evening, the SEB offered a dinner in the local guides' honour, followed by an exciting table-football championship.

The last day was dedicated to the search for epiphytes in a *Quercus ilex* woodland on the northern slopes of the Sierra de Tramuntana, where some species of *Orthotrichum*, *Frullania*, *Radula*, *Metzgeria*, and *Leptodon smithii*, were found. The scarcity of *Orthotrichum* was surprising, probably due to the excessively humid environment. The limestone of a stream and the stream banks were also sampled, and some luxuriant thalloid liverworts, such as *Conocephalum conicum* and *Pellia endiviifolia*, were found.

As a consequence of our brief visit, it could be concluded that Mallorca is a relatively well-known territory. In fact, the forthcoming check-list of the Balearic Islands by Llorenç Sáez and Josep Rosselló will probably include around 60 liverworts and more than 200 mosses, among which almost 70 are Pottiaceae. However, the intense examination of underexplored areas should add new discoveries, and we hope some of the new findings will be derived of this meeting.

On April 16<sup>th</sup> we left Mallorca, but we took care to supply our luggage with typical products, such as "sobrasada",

## Obituary

# ROMAN NIKOLAEVICH SCHLJAKOV

(1912–1999)

It is with deep sorrow that I announce the death of the well-known Russian bryologist Roman N. Schljakov on 27th March 1999.

Schljakov was the only person in Russia who was equally familiar with mosses, hepatics and vascular plants. He was the best expert in Russia on the poorly known hepatics and on the most difficult genera of mosses (*Bryum* Hedw., *Drepanocladus* s. lat. etc.) and vascular plants (*Salix* L., *Hieracium* L. etc.). A number of his papers address the taxonomy of these groups. He described 9 species of Bryophytes, some dozen species of *Hieracium*, and a number of infra- and supraspecific taxa. His five volumes "Hepaticae and Anthocerotae of the North of the USSR" were for many years the only updated and available handbook on Hepatics in the former USSR and Russia.

Schljakov was the founder of the Bryophyte Herbarium of the Polar-Alpine Botanical Garden of the Kola SCI

Center, Russian Academy of SCI, where he worked for 35 years. He collected thousands of specimens of Bryophytes and vascular plants, which are stored partly in the Bryological Herbarium of Komarov Botanical Institute and partly in the Herbarium of Polar-Alpine Botanical Garden.

Schljakov was a taxonomist by vocation. He was a broad-minded scientist who greatly contributed to both bryology and the taxonomy of vascular plants. His publications will be useful for many years. Everybody who knew Roman Nikolaevich will remember him as high qualified specialist, as well as an enthusiastic and kind person.

A tribute to his great bryological studies will appear in the next issue of *Arctoa*.

Nadya Konstantinova, Polar-Alpine Botanical Garden, Kola SCI center, Russian Acad. of SCI, Kirovsk-6, Murmansk Region, 184236 RUSSIA

"ensaimada", and medicinal-herb spir-its.

Additional information on the SEB and applications for membership can be obtained from the Secretary (Dr. Ricardo Garilleti, Universidad Europea de Madrid, Departamento de Medio Ambiente, Villaviciosa de Odón, 28670 Madrid; e-mail: ricardo.garilleti@amb.cie.uem.es).

Javier Martínez-Abaigar, Vice-president of the SEB, Universidad de La Rioja, Avenida de la Paz 105, 26004 Logroño (La Rioja), Spain. E-mail: javier.martinez@daa.unirioja.es

## CYRUS McQUEEN

Cyrus McQueen died on the 12 April, 1999, after a 6 month struggle with mesothelioma.

## Ten years "Tropical Bryology"

The first issue of "Tropical Bryology" was published ten years ago in 1989. It happens quite rarely that a new bryological journal is founded. It was a risk to introduce a new journal in addition to the established ones, and there are examples (e.g. *Acta Bryolichenologica Asiatica*, *Cryptogamic Botany*) that such attempts can fail. The plan to edit a new journal was based on several new ideas.

First, computer technique made it possible for the first time to produce a journal on the desktop, although a laser printer, scanner and a computer cost incredible sums as compared with today. So we were the first to accept contributions only on disk, according to the rule that nothing which has once been typed needs ever be retyped. And this procedure gets more and more common in other journals, although we were much ahead. Since not all colleagues had computers at that time, typewritten manuscripts were scanned and then fed through a text recognition program.

Next bryological work in the tropics was increasing. For a long time tropical bryology was synonymous with the occasional collecting and describing species from the tropics. Now also ecological, ecophysiological, plant geographical and phytosociological work was started in some places for the first time. In addition, many colleagues in tropical countries had difficulties to obtain literature and journal at reasonable prices,

so the 50% reduction of subscription costs for subscribers from tropical countries was introduced.

Finally, the journal was created as a non-profit journal, with the price is just covering the printing and mailing costs. However, this does not mean that the journal can get considerably cheaper than some other bryological journals published by bryological societies, because the relatively low membership fee of these journals is only possible by selling the journals at a much (!) higher price to libraries. But the price is still low as compared with all other journals and has also only slightly raised within the time from \$5 to \$6 per hundred printed pages for subscribers from Tropical countries and the double from all others. We are also probably the last journal providing 100 reprints for free.

Another new innovation was the "disk version". All text and illustrations were available from the beginning on disk, first as ASCII-Text, later on as a Windows-version provided by Brian O'Shea. However, this version was not much appreciated by the subscribers. Apparently readers want to have their journals in their bookshelves and not on the computer. Today it is possible to get Tropical Bryology as facsimile edition on CD. However, preparing the old volumes for such an edition is a much time consuming matter.

So Tropical Bryology started with sev-

eral new innovations, a computer produced, non-profit journal focussing only on tropical bryology with a considerable price reduction for subscribers from tropical countries. The fact, that Tropical Bryology survived for 10 years shows that this risky attempt was successful. During this time, 16 volumes were published (1-2 per year) with in total almost 3000 pages.

The number of subscribers was almost constant with 180-190 over the whole time but was changing much, mainly because 50-60 subscribers had to be removed from the list of subscribers because they did not pay for more than three issues but on the other hand about the same number newly subscribed the journal. A problem for all newcomer on this market is the difficulty of obtaining library subscriptions because of steadily increasing prices for journals and lowered library budgets. So about 50 copies of Tropical Bryology are ordered by libraries.

The survival of Tropical Bryology demonstrates that the concept was correct and that this journal successfully fills a certain niche amongst other journals. The original concept was only slightly modified with the inclusion of contribution on tropical lichenology from vol. 5 on. With the latest edition, we introduce another change, the regional editor, who will be managing manuscripts from his part of the world.

*The editors*

## Tropical Bryology News

From vol. 17 on, "regional editors" will be introduced for the former editorial board for bryological contributions. This is something new for scientific journals, but has the advantage that regional editors have better language facilities and better regional knowledge and will help to distribute the work among more persons. The new regional editors will be

DR. B.C. TAN, School of Biological Sciences, The National University of Singapore, Singapore 119260 (bryological

contributions concerning tropical Asia),

DR. W.R. BUCK, The New York Botanical Garden, Bronx, N.Y. 10458, U.S.A. (bryological contributions concerning the neotropics in English),

DR. C. DELGADILLO MOYA, Dept. de Botanica, Universidad Nacional, Apdo. Postal 70-233, 045190 México, D.F., México (bryological contributions concerning the neotropics in Spanish),

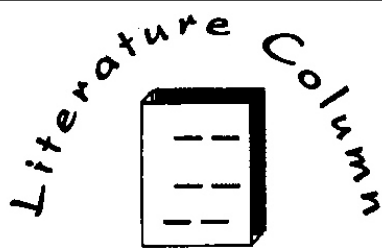
B.J. O'SHEA, 141 Fawnbrake Avenue, London SE24 OBG, UK (bryological contributions concerning tropical Af-

rica).

Please address your manuscripts to one of these colleagues.

The abstracts of the contributions published in Tropical Bryology are made available on the Internet: <http://www.uni-bonn.de/bryologie/tb.htm>. This will allow also non-subscribers to get informed about the contents of this journal. This is another initiative of Tropical Bryology that is not available from other bryological journals.

Jan-Peter Frahm, Botanisches Institut, Meckenheimer Allee 170, D 53115 Bonn, Germany



## Johannes Enroth

**Crosby, M. R.: Vade Mecum Bryologiae I. - Contr. Hedw. Soc. 2: 1-108. The Hedwigan Society 1999. Paper bound. Advertised price: U.S. \$8.00, elsewhere \$10. 00. Available from: Marshall R. Crosby, C.S.H.S., 66345 Westminster Place, University City, MO 63130-4728, U.S.A.**

This booklet is intended as an aid to bryologists writing taxonomic articles and needing to cite the original publications with bryological nova; such books and journals number over 1500. It lists, in alphabetical order and italicised, either standardised or adopted abbreviations for such publications and is, according to the Introduction "primarily a tertiary source of information" founded mainly on TL2 and its supplements, Sayre's *Cryptogamae exsiccatae*, and *Botanico-Periodicum-Huntianum* and its supplements. In addition to adopted abbreviations, also the most commonly encountered "synonymous" abbreviations are listed. The author emphasises that the coverage for mosses should be essentially complete while that for hepatics is less complete.

The author first explains the entries' formats and sources. Their arrangement and presentation is logical and consistent. Here is an example of a "complete" entry, i.e. with a note by the author:

*Fl. Hercyn.* - *Flora Hercynica*. Hampe, G. E. L. TL2:2350. There is a 1995 facsimile with extensive biographical information on Hampe by Kultusministerium [sic!] des Landes Sachsen-Anhalt. 1873.

The author does not uncritically follow his sources, such as TL2, but makes numerous corrections to their information. Also, he rejects some TL2 book numbers of "titles that only or first appeared in journal form, and they should be cited from the journal". Such entries

are clearly marked in the list. The author's critical touch is thus for the benefit of us all who need this compilation in our work.

There are some (typing) errors such as the one in the above example, but they are no serious flaws. A quick search revealed just one possibly more serious inconsistency. On page 13 we read: "*Aarbok Univ. Bergen, Mat. -Naturvitensk. Ser. - Aarbok for Universitetet i Bergen [etc.]*". However, on page 22 (and elsewhere) there is: "*Bergens Mus. Årbok - Bergens Museum Årbok*". Both publications are Norwegian, yet there is Aarbok in one entry and Årbok in the other. The latter form is the original and it should be used. *Edinburgh Journal of Botany* is missing from this listing, but it could be (and of course it should be) because no bryological nova have been published in that journal. But there are quite a few well-known Scottish bryologists...

This is definitely a useful little booklet for us bryotaxonomists and I really appreciate that Marshall Crosby has taken the trouble to compile it!

**Chien, G., Crosby, M. R. (Editors-in-Chief), He, S. (Organizing Editor): Moss Flora of China, English Version, Vol. 1, Sphagnaceae through Leucobryaceae. - 288 pp., illustrated. Hard covers. ISBN 0-915279-68-1. Advertised price: \$ 75. Published by and available from: Missouri Botanical Garden Press, 4344 Shaw Boulevard, St. Louis, MO 63110, U. S. A.**

This is the first part of an eight-volume Flora. The project was initiated in 1990 and the formal contract between Academia Sinica and Missouri Botanical Garden was signed two years later. As the Foreword says, this Flora is an offshoot, but not a direct translation, of the *Flora Bryophytarum Sinicorum*-project, two parts of which have been published in Chinese. An essential difference between the two projects is that the taxonomic treatments in the English Version are based on revisions result-

ing from international collaboration; numerous Chinese bryologists have worked and been trained in North America, Europe, and Japan, and western as well as Japanese bryologists have visited China to work with Chinese colleagues and to carry out expeditions to remote and poorly known regions in China. Currently ca. 2500 moss species are recorded from China, but many areas therein still remain insufficiently collected and poorly known.

The first volume treats eight families: Sphagnaceae (by Li Xing-jiang and Si He), Andreaeaceae (Cao Tong and Gao Chien), Archidiaceae (Gao Chien and Si He), Ditrichaceae (Cao Tong and Si He), Bryoxiphiaceae (Gao Chien), Seligeraceae (Gao Chien and Cao Tong), Dicranaceae (Gao Chien, Dale H. Vitt and Si He), and Leucobryaceae (Lin Bang-juan and Si He). The total number of species and infraspecific taxa treated is 246. Each taxon has a formal description, and the species and infraspecies also have illustration references (only Chinese endemic and East Asian taxa are illustrated), and information about habitat and distribution. Dichotomous identification keys to genera, species and infraspecific taxa are provided. The names of families, genera and species are given in Chinese and also transliterated - a nice and useful practice.

That this book is much more than just a translation of *Flora Bryophytarum Sinicorum* is clear from the start: while the latter book recognised 37 species of *Sphagnum* for China, the number here is 46. The same trend is evident throughout the book; this is a much more critical treatment than its predecessor. I only say this to emphasise what can be achieved through well-planned international co-operation with a country such as China, where material for comparison and pertinent literature are difficult of access. What make the present volume a truly scientific Flora is the consistent, condensed yet sufficiently informative

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# Filogenia de las Plantas Verdes: Briofitas. Xalapa, México, 9-11 March 1999

*The bryophyte sub-group of the Green Plant Phylogeny Research*

Co-ordination Group met for a Symposium (def: to drink together) and pre-Congress Workshop, in Xalapa, Veracruz. This was hosted by the Instituto de Ecología, A.C., and organized by Efraín De Luna and Brent Mishler. A total of 35 researchers attended the Workshop from the United States, Mexico, Canada, England, Holland, Germany, France, Sweden, Finland, New Zealand and Japan. Early comers<sup>†</sup> enjoyed explorations of the city and its markets, and various impromptu field trips, before getting down to the serious work. Monday evening featured a preliminary mixer, initially beside the swimming pool at the headquarters hotel, the Xalapa Finca Real. After being driven inside by the expectation of rain, many resorted to the hotel bar and other local hosteleries for the first of many convivial discussions.

The Symposium on Tuesday 9th was open to the general scientific community and was well attended, with 46 researchers and students attending from many universities and research establishments in Mexico. The Symposium was inaugurated with welcoming speeches from Brent Mishler and from officials of the Institute, including Dr Miguel Zamora, the Academic Secretary, and Dr Victoria Sosa, the Co-ordinator of the Postgraduate Systematics Program. After a short break to re-organise the conference room, the first session, "Advances in the Phylogeny of Green Plants" commenced with presentations on "green algae" (Russ Chapman), land plants and "bryophytes" (Brent Mishler), tracheophytes and "pteridophytes" (Kathleen Pryer), seed plants (Susana Magallon) and angiosperms (Pam Soltis).

Lunch was provided under the trees in the Jardín Botánico Francisco J. Clavijero, adjacent to the Institute. Here, as on various occasions throughout the meeting (including the field trip), we were attended by one of two free-lance pho-

tographers, snapping all and sundry - and then coming back with prints for sale in the evening. Bill Buck is reputed to have bought most of the stock for the archives of the NYBG!

In the second session the current state of knowledge in the "hepatics" was presented, starting with an overview by Barbara Crandall-Stotler, and proceeding through the Marchantioids (Helene Bischler, M. Biosselier-Dubayle and John Wheeler), the Metzgeriidae (Barbara), Jungermanniidae (Roy Stotler) and Lejeuneaceae (Rob Gradstein). In the late afternoon session the principal moss lineages, grades and clades were discussed, with Bernard Goffinet starting with the overview of moss phylogeny. This was then followed by the Sphagnopsida (John Shaw), Polytrichales (Jaakko Hyvönen), basal arthrodonts (Bernard), Haplolepididae (Catherine La Farge), insights from protonemal characters on misplaced taxa (Jeff Duckett) and acrocarpous and pleurocarpous diplolepididae (Cymon Cox).

After a group dinner in the hotel discussions continued long into the night, in a variety of locations, and over a variety of beverages characteristic of Mexico. These included horchata (a drink based on ground rice, flavoured with pumpkin seeds, cinnamon, or vanilla), tequila and rum, and a variety of excellent Mexican beers.

On Wednesday the workshop sessions commenced in the Jardín Botánico, with a business and planning session chaired by Brent. We then split into two groups, with the hepaticologists remaining in the Jardín, and the muscologists climbing back up the hill to the top of the tallest building in the Institute. Initial discussions among the muscologists included the logistics of papers to be presented at the Congress and authorship and publication issues, especially concerning deadlines and the achievability of the proposed work. Discussions on

the moss data availability matrix concerned the categories of data to be included, the status of research in those categories, and the target audience. Of special concern was the work involved in the initiation and maintenance of the moss DAM on the website. This is now finally available, due to the greatly appreciated work of Catherine La Farge over the preceding week in Berkely. Similar discussions occurred amongst the hepaticologists, with John Wheeler deputised to take on the creation of a web version of the liverwort data availability matrix. Following lunch, again in the Jardín, muscologists were treated to a slide show of Bernard's recent adventures with balloons and rafts in the tree-tops of Gabon. Jeff Duckett then provided more insights on protonemal characters. For most of the afternoon session discussions centred on the list of exemplar taxa at different priority levels, with subgroups of authors splitting off to discuss their own lists at the lower priority levels.

After a long and often difficult day, dinner at Los Tecajetes was very welcome, and especially welcome was Brent's decision to pay the whole dinner bill. Many of the specialities of the restaurant featured cuts of meats flattened and then wrapped around various fillings, with an assortment of mexican sauces - a novel style for many of the diners, but greatly enjoyed.

Thursday morning workshop sessions provided additional time for collaborators in the different Congress contributions to get together and discuss the nuts and bolts, after which the closing plenary session was again held in the Jardín.

After lunch several participants opted to visit the renowned Xalapa Anthropological Museum, or to explore the city. Xalapa is where the Jalapeños come from, and the markets are piled high with fragrant heaps of dried peppers. Others

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joined the field trip to the woodlands around the Institute. This area, originally citrus and coffee plantations, has been reverting to natural vegetation over the 20 years since the Jardín Botánico was founded. At 1300m (4500 feet) the area is tropical lower montane, with frequent mists, drizzle and rain in the winter months, and daily afternoon rain in the summer months, providing an ideal climate for many bryophytes. The steep sided stream valleys are forested with deciduous and evergreen oaks, elms, beech and sweet-gum, together with tree ferns and "more tropical" angiosperms in the Caesalpiniaceae, Melastomataceae and Piperaceae, and with epiphytic Bromeliaceae, Cactaceae and Orchidaceae. Common bryophyte families include the Calymperaceae, Hookeriaceae, Meteoriaceae, Neckeraceae, Polytrichales, Pterobryaceae, Sematophyllaceae, Lejeuneaceae, Marchantiaceae and Anthocerotae. Careful grubbing in the right places revealed *Riccia* and *Fossombronia*, despite the recent hot dry weather.

The evening dinner at Carnes Herford in La Pergola, our last as a group, was on the other side of town and a bus was provided - however, it left somewhat early, so one group of erstwhile diners was left to scour the town in taxis in hot pursuit of a bus-load of gringos.

The principal field trip, with the remaining hard-core of participants, was held in the volcanic hills to the north-west of Xalapa, towards Naolinca. The whole area is located on the skirts of the Volcán Cofre de Perote, with volcanic soils, lava flows and old cinder cones. The first area visited, at La Concha (1000m), was a relatively recent lava flow with a malpais of tumbled rock and lava tubes, with dwarf oaks and caesalpinoid legumes. Despite the dry conditions quite a few interesting bryophytes were found, at least some of which are destined to be ground up and their DNA extracted. After a short trip in reverse, the bus set off back up the hill, to stop at Pepe's bar in La Esquilón. The hour and a half allowed here was not enough for some, who lingered at a cliff with a mixed salad of

*Monoclea* and *Dumortiera*, garnished with *Cyclodictyon*. Other highlights included several Calymperaceae, and *Homalia glabella* with sporophytes. The bus was then abandoned, and an assault made on a forested cliff down the road. This proved unassailable for many, who returned to Pepe's bar and the delights of the lower woods, and then resorted to the bar for well-earned refreshment.

Groups split up for dinner at different locations - to Arse's, which features excellent chicken in mole (chocolate) sauce, and seafood casseroles, and to the Churreria, with Tamales Rancheros, a speciality featuring leaves of *Piper auritum* as a flavouring. A very small residuum returned to the Institute for discussions that ended at midnight, bringing the workshop to a satisfactory close. Nevertheless, participants from several labs took advantage of being in Mexico to spend a few additional days in the field, collecting material for further morphological and molecular studies. Highlights included *Notothylas* collected in an otherwise un-prepossessing riverside scrub, banks dripping with *Sphagnum*, and a small volcano covered with Pterobryaceae.

Not only did this Symposium and Workshop provide an excellent opportunity for many of the world's phylogenetic moss systematists to get together and discuss their research with colleagues that they don't often meet in person, but it was also a very pleasant and enjoyable visit to a beautiful part of the world. The Institute and Jardín Botánico provided an excellent location and an atmosphere conducive to discussion. Also provided were free copies of books from the Institute's publications department, and commemorative t-shirts. The hard work of Efraín's PhD students, Deneb García, Alvaro Flores and Antonio Guerrero, both before and during the meeting, ensured that most aspects of the Symposium and Workshop ran smoothly. The support of the Institute and the GPPRCG, and the organisation by Brent Mishler and Efraín DeLuna, is greatly appreciated.

Angela Newton

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descriptions and, especially, the citations of examined Chinese specimens, with acronyms of the herbaria where the specimens are deposited. The illustrations, though not consistent in style, are informative and their quality ranges from adequate to excellent, most of them belonging in the latter category. Importantly, the specimens from which the drawings were made are cited in the figure legends, except unfortunately for Sphagnaceae.

I think there are three areas to be mildly critical of: citation of type specimens, presentation of new nomenclature, and specific discussions. The Introduction says, perhaps somewhat ambiguously, that "The synonyms given, including 13 new synonyms, were based on examination of accepted names or type specimens in consultation with opinions presented in other major publications dealing with East Asian mosses". The type specimens are cited, but it is never clear if the author has actually seen a type specimen or if the synonymization were based on "examination of accepted names" only - a practice I wouldn't recommend to my students. There are new combinations and new synonyms in the Flora; they are fairly clearly indicated in the Index, but in my opinion it is much better to indicate nomenclatural nova and changes in an Abstract, as was done by Bill Buck in his pleurocarp flora of the West Indies. My third point of criticism concerns the specific discussions, or rather, the general lack of such discussions. There are discussions under some species and infraspecies, but too few. Even if the diagnostic features of a taxon are given in identification key and formal description, it would be very reader-friendly to present short comparisons of closely similar taxa in more informal discussions. I realize, however, that in a large Flora such as this discussion would consume a lot of typographic space, and this is the only justification I can think of.

But let me reemphasise: publication of this first part of the English Version of

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# Hedwig Symposium, Göttingen, Germany, May 1999.

Angela E. Newton

Department of Botany, Natural History Museum, Cromwell Road, London SW7 5BD, UK

To commemorate the 200<sup>th</sup> anniversary of the death of Johannes Hedwig, a Symposium was held at the University of Göttingen on the 29-30 May 1999. This occasion was also celebrated by the award of an honorary doctoral degree to Dr Riclef Grolle, in recognition of his contribution to hepaticology. Johannes Hedwig can be considered the founding father of modern bryology – not only was his 1801 work "Species Muscorum" adopted as the starting point date, but he also made enormous contributions to our understanding of the life cycle of bryophytes and the nature and role of gametangia and sporophytes.

More than 100 bryologists attended from nine European countries, from the United States and Canada, and from Singapore. Early arrivals explored the town and the historic Old Botanic Garden, were given a tour of the Herbarium, and examined specimens. Noteworthy recent bryological collections here include material from the Neotropics collected by Gradstein, Peter and Jeanne Florschütz, Cleef and others (duplicates and long-term loaned originals from Utrecht) Important historical collections include those of Ehrhart, Schrader, Schimper, etc.

Saturday began with an opportunity to examine the exhibition of the life and work of Johannes Hedwig in the foyer of the Albrecht von Haller Institute of Plant Sciences, and to meet and converse with fellow participants over coffee. After a welcoming address by Rob Gradstein and the Pro-Dekan (Dean) of the Faculty of Biology, David Robinson, the morning session addressed Johannes Hedwig's contribution to bryology. Jan-Peter Frahm (Bonn) discussed the life and work of Johannes Hedwig, from his early life in Romania (Transylvania), his student days, and his career as a physician in Chemnitz and then in Leipzig. Johannes Hedwig's 1782-83 work "*Fundamentum historiae naturales muscorum*", on the anatomy and reproduction of mosses, was the first to accurately describe the archegonia and antheridia. This work was quite controversial in that it contradicted the opinion of Linnaeus that the sporophyte represented an anther with pollen grains, but greatly stimulated interest in cryptogamic botany. The "Species Muscorum Frondosorum" was published posthumously under the editorship of C. F. Schwaegrichen. Wilfried Morawitz

(Leipzig) then gave an account of the history of botanical study and publications in Leipzig, including the period that Hedwig worked there. Other famous bryologists active in Leipzig included Schwägrichen, Stephani and Mönkmeyer. The Hedwig Herbarium has been sold several times, but eventually ended up in Geneva. It is now under the care of Patricia Geissler (Geneva), who gave us an account of the history of these collections, and of their nomenclatural significance.

Lunch was taken in various of the small restaurants in the pleasant and architecturally interesting centre of Göttingen, where one can listen to street musicians and admire the famous statue of the "Little Goose Girl".

The early afternoon session focused on the current activity in Bryology, 200 years after the life of Johannes Hedwig. Dale Vitt (Edmonton) traced the changing concepts in systematics, and the characters used to determine relationships. The early emphasis on the position of the perigonia, and then the perichaetia, was eventually replaced by increased reliance on characters of the

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Conference participants

*Continued from page 14*

peristome. However, although the broad categories of peristome types (nemato-dontous, diplolepidous opposite, diplolepidous alternate, and haplolepidous) reflect large groupings of mosses, this information alone is insufficient to resolve the relationships. Additional information, from both morphological and molecular studies, is necessary for further progress. Terry Hedderson (Reading) then discussed the role of molecular data in our current studies of bryophyte systematics. Molecular information has the advantage of supplying relatively large amounts of data that can be applied across a wide range of taxa, so allowing questions to be addressed on issues such as the relationships of mosses to other land plants, and the relationships among the major moss lineages. The application of molecular systematics to problems in hepatics was addressed by Helene Bischler-Cause (Paris). The "species" that are recognised on the basis of morphology may not equate to biological units – for example, cryptic species may not be recognisable without detailed cytological or other studies, while apparent good species may in fact represent ecotypes that individually are more closely related to other species than to each other. In these situations, use of molecular data can facilitate clarification of the relationships.

In the late afternoon, the participants moved to the magnificent Aula of the University of Göttingen for the cer-



*Timo Koponen congratulating Riclef Grolle*

emony to award Dr Riclef Grolle with an Honorary Doctorate in Natural Sciences. Under gilded pillars and the watchful eyes of portraits of past patrons, including King George-August, founder of the university, Georg III and last Emperor Wilhem II, we were regaled by the music of Couperin, Beethoven and Elgar played by bryology's own musicians, Patricia Geissler on the piano and Rob Gradstein on the cello. After introductory remarks and a greeting from the Vice-President of the University, Hans-Jurg Kuhn, Rob Gradstein gave us an account of Riclef Grolle's life and work. Grolle studied at the Friedrich-Schiller Universität in Jena, and obtained his doctorate in 1962 for a dissertation entitled "Monographie der Lebermoosgattung *Leptoscyphus* Mitt.". He has contributed over 250 publications on hepatics, covering all groups on a worldwide scale and including numerous taxonomic revisions and monographs, checklists, and treatments of little known areas. Many of his works have addressed the problems generated by Stephani in the six volume *Species Hepaticarum* (1898-1924). Dr Grolle has also studied liverworts in amber, demonstrating that many of the present-day genera, or even species, existed by at least the early Tertiary.

The Pro-Dekan of the Faculty of Biology, David Robinson, then awarded Dr Grolle with the honorary doctorate in Natural Sciences. In his response, Dr Grolle gave an amusing account of his early life and his struggles to travel to western Europe and further at a time when travel outside East Germany was severely restricted. Due to his special status as an invalid due to polio, Grolle was permitted to travel to "visit relatives" in West Germany. Once there, he was able to use a western passport to travel freely, so enabling him to visit many herbaria throughout the world. Dr Grolle also discussed the life and work of J. Proskauer, a student of the Anthocerotae, who lived and worked in Berkeley, California after escaping from a tragic family history under the Nazi regime in Germany. In memory of Dr Proskauer, Dr Grolle wished to establish



*Patricia Geissler and Rob Gradstein performing*

a memorial fund to support bryological work outside Europe, and to that end presented a cheque for 5000 DM to Dr Gradstein. It is hoped that this will provide the foundation for further development of this fund.

Dr Jeff Duckett then concluded with the plenary lecture "Whither bryophyte systematics and phylogeny", a consideration of the changes in bryology since the time of Johannes Hedwig, and of the future of bryophyte systematics. Dinner was held in the "Ratskeller", in the old beer cellars under the Town Hall.

On Sunday, a field excursion to the Harz Mountains was led by Uwe Drehwald and Monika Koperski. Despite fears that the weather might be wet and chilly, the day stayed fine until the late afternoon. The first site consisted of diabase rocks along the roadside and along the stream bank near Zorge (grid ref. 4329SE, 51°38'30" N, 10°38' W), at an elevation of 400m. Mosses seen included *Homalia trichomanoides*, *Amphidium mougeotii*, *Neckera complanata* with axillary propagules, and *Thamnobryum alopecurum*. Hepatics included *Radula complanata*, and *Porella cordeana* along the stream banks. Lunch was eaten reclining in long grasses at the edge of a meadow at Oderbrück, the beginning of the afternoon excursion (grid ref. 4229NW, 51°46'30" N, 10°30' W). The Harz Na-

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# Synopsis of the decisions on proposals to conserve or reject names of bryophytes during the Tokyo - St. Louis interbellum.

Gea Zijlstra

Herbarium, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands.

This is a synopsis of the cases that were voted upon in the period between the 1993 and 1999 International Botanical Congresses.

Recommendations referred to here are those in Committee reports 4 (Taxon 47:

859-862, 1998), 5 (Taxon 48: 563-565, 1999) and 6 (in press). In St. Louis, all recommendations from these reports were accepted.

In this survey, the numbers of the reports are added in brackets. In several

cases, the proposed entries are slightly amended. In the cases of *Atractylorcarpus*, *Gollania* and *Dawsonia superba* / *Polytrichum longifolium* a major emendation took place.

## Generic names

A. Conserve against:

- a. earlier nomenclatural synonym (=): *Cryptopodium* against *Cryptoseta* (4) and *Desmotheca* against *Cryptocarpon* (6).
- b. earlier taxonomic synonym (=): *Pottia* against *Anacalypta* and *Physedium* (5) and *Rhynchostegiella* against *Remyella* (5).

Proposals rejected: *Dicnemoloma* (4; *Sclerodontium* to be used) and *Dicranoloma* (5; typification problematical, proposal premature).

- c. earlier paronym (H): *Pylaisia* against *Pilaisaea* (6; this implies that *Pylaisiella* must be treated as an illegitimate 'substitute' name).

B. Conserve orthography: *Aongstroemia* (4), *Cinclidotus* (4) and *Homalia* (4).

Proposal rejected: *Garovaglia* (4; this spelling can be accepted without conservation).

- C. Conserve with a new type: *Dicranella* (4), *Gollania* (4), *Hylocomium* (4), *Hyophila* (4) and *Oligotrichum* (4). Proposal rejected: *Aneura* (4; the proposed type can be accepted without conservation).

D. Amend entry already in App. III of the Code: *Atractylo-*

*carpus* (4; another type), *Ditrichum* (4; addition of a nom. rej., the taxonomic synonym *Trichodon*).

Proposal rejected: *Tortula* (6).

- E. Parahomonyms: *Duriaea* (Bory & Mont. 1843, Hepat.) and *Durieua* (Mérat 1829, Spermat.: Scrophulariaceae) have to be treated as homonyms (5; this implies that *Riella* is a legitimate substitute name for *Duriaea*).

## Species names

- A. Conserve with a new type: *Hypnum plumosum* (5; basionym of *Brachythecium plumosum*) and *Hypnum salebrosum* (6; basionym of *Brachythecium salebrosum*).

- B. Reject long misapplied name: *Grimmia alpicola* (4; basionym of *Schistidium alpicola*), *Jungermannia byssacea* (5; basionym of *Cephaloziella byssacea*), *Jungermannia alpestris* (5; basionym of *Lophozia alpestris*) and *Hypnum polymorphum* (5; basionym of *Campylium polymorphum*).

- C. Reject nomen ambiguum: *Jungermannia lanceolata* (4; basionym of *Solenostoma lanceolatum*).

- D. reject earliest taxonomic synonym: *Polytrichum longifolium* (6; basionym of *Dawsonia longifolia*, taxonomic synonym of *Dawsonia superba*, and also of *D. pulchra* if this is considered to be conspecific with *D. superba*).

Continued from page 15

tional Park is extremely popular, with an extensive network of walking paths through mixed spruce forest and peatlands at altitudes between 800 and 900 m. Most of the forests are relatively recent, having been felled and subsequently replaced by spruce grown to provide pit-props for nearby mining activities. However, the peatlands are some of the best and most protected in Germany, with numerous *Sphagnum* species, *Aulacomnium palustre* and *Mylia anomala*. Amongst stacked sandstone rocks *Tayloria serrata* var. *tenuis*

was found on rotting wood, *Schistostega pennata* with glowing protonema gleaming from deep crevices, and also producing sporophytes, and furthermore german rarities such as *Anastrepta orcadensis* and *Kiaeria blytii*. The trails were rather rougher and longer than expected for some members of the party, but all survived the walk, and Dr Grolle accompanied us in his wheelchair. Thunder threatened in the late afternoon, and, as rain started to fall, shelter was sought under large umbrellas in a roadside cafe. Fresh strawberry deserts and beer were consumed as participants debated the

conducting qualities of the metal umbrella supports, but fortunately the lightning didn't strike, and we returned safely to Göttingen. Dr Rob Gradstein and his colleagues and students are to be congratulated on an excellent and memorable meeting.

The Proceedings of the Symposium will be printed in Nova Hedwigia early in 2000, and will be made available as a specially bound reprint by the publisher, Schweizerbart'sche Verlagsbuchhandlung, Stuttgart. The publication will be announced in the Bryological Times when it is available

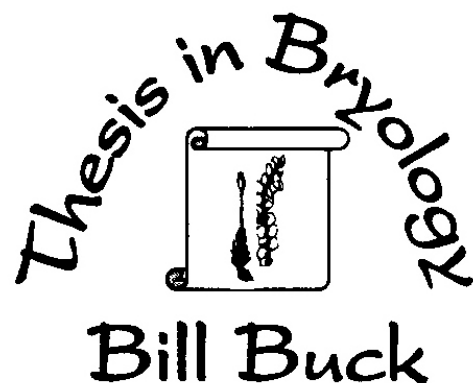
## New Column: Thesis in Bryology

There are many theses written each year, around the world, dealing with various aspects of bryology. These are submitted for university degrees at all levels. Many of these are only seen by a local audience and are never widely published. Nevertheless, much valuable information is accessible only through these degree theses. It has also been called to our attention that some universities do not permanently archive theses. In recognition of these problems, the International Association of Bryologists has authorized a new column in *The Bryological Times* in which theses would be listed, including pertinent bibliographic information, a short abstract, and how to contact the author. The editor of this column will be William R. Buck. The theses would be permanently cataloged and archived at The New York Botanical Garden, where they would be available for use on site and via inter-library loan. The library catalog at The New York Botanical Garden is completely online and available over the web at <http://librisc.nybg.org/screens/mainmenu.html>.

IAB is aware that making an extra copy of a thesis and the postage to send it could be a potential economic hardship to some individuals. Therefore, some

money is available, when absolutely necessary, to cover the costs of producing one additional copy and the postage to send it. This compensation will be treated like small grants and decided on a one by one basis. Any individual who would like to have their thesis included in *The Bryological Times* column but cannot afford to send a copy of the thesis can apply to have the costs defrayed. Only a letter is necessary, stating the title of the thesis, number of pages, primary language of the thesis, language of abstracts or summaries included in the thesis, degree for which it was written, university to which it is submitted, and an estimated cost. The language of the thesis is not a criteria for the grant or inclusion in the column. The letter requesting funds should be sent to: Dale Vitt, Department of Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9, Canada.

All students and their advisors are encouraged to send a single copy of each thesis for inclusion in the column. Bound copies of theses are strongly preferred over loose pages. However, if only loose pages are an option, they are acceptable. Please enclose an e-mail address as well as a postal address of the author or advisor in case of questions.



The column editor will generate the abstract himself, based when possible on an abstract or summary included in the thesis. When the column editor's language abilities fail, he will contact the thesis author directly for assistance in preparing an English abstract. Theses should be sent to: William R. Buck, Institute of Systematic Botany, New York Botanical Garden, Bronx, NY 10458-5126, U.S.A. E-mail: [bbuck@nybg.org](mailto:bbuck@nybg.org)

Although this column is foreseen as primarily documenting theses as they are produced, older theses will also be accepted. If advisors wish to have previous students' theses included in the column but are not prepared to send a copy, then just bibliographic information and a short abstract, as well as a library location at which the thesis is permanently deposited, will be accepted.

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the Moss Flora of China is certainly a milestone in bryology and a celebration for the international bryological community. If the forthcoming seven parts will be of the same high quality, the international project has more than achieved its aims. Even after all the eight parts are published, however, the mission can hardly be regarded as concluded. This Flora serves its purpose as a standard and reliable reference for future work on the moss flora of China - and, my dear colleagues all around the world, there is still work to be done!

*Johannes Enroth*

## Bryologist honored

It is my pleasure to announce that on Thursday, April 1st, the bryophyte herbarium at Duke University was officially named the L. E. ANDERSON BRYOPHYTE HERBARIUM in honor of Professor Lewis Anderson. Professor Anderson joined the faculty of Duke University in 1936, at which time the bryophyte collection numbered approximately 3000 specimens. During the next 60 years, the collection has grown from that modest size to some 230,000 specimens, including over 600 types.

Nine students received their Ph.Ds in bryology under Professor Anderson's direct supervision, and many others have developed an increased appreciation for these organisms because of his enthusiasm and teaching expertise. I hope you will share my congratulations to Professor Anderson for this well-deserved honor!

*Jonathan Shaw, Department of Botany, Duke University, Durham, NC 27708. Fax: 919 660-7293, Phone: 919 660-7344*

The *Bryological Times* is a newsletter published for the *International Association of Bryologists*. Items for publication are to be sent to the Editors or Regional Editors, **except** for those for the regular columns, which may go direct to the column editors

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# DIARY

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**September 23-26.** Field work for the Swiss bryophyte mapping project. Tessin, region of Gambarogno (southern Alps). Information: P. Geissler, Conservatoire botanique, CP 60, CH-1292 Chambésy ([geissler@cjb.unige.ch](mailto:geissler@cjb.unige.ch)).

**October 1-3.** Blomquist Foray at DeSoto State Park in northern Alabama. Information from Molly McMullen ([mmcm@duke.edu](mailto:mmcm@duke.edu))

**October 9.** DBLS symposium in Akkrum (North Netherlands) about bryophytes and bryophyte inventories in the north of the Netherlands. More information: Jacob Koopman (0561-616317; [j.koopman@aoc-terra.nl](mailto:j.koopman@aoc-terra.nl)).

**October 10.** DBLS excursion in the Lake Naardermeer Excursion starts at 10.00 from Railway Station Naarden-Bussum. Excursion leaders: Henk Siebel en Ad Bouman. Excursion in wet forests and reedlands.

**November 6.** DBLS excursion in de neighbourhood of Nijkerk. Start at 10.05 from Railway Station Nijkerk. Grasslands, woodland, heathland.

**November 20.** DBLS excursion in the Noordlaarderbos. Excursion leader: Ben van Zanten. Start 9.50 from Railway station Haren. A forest rich in bryophytes, especially liverworts.

**December 18.** DBLS excursion in the dunes near Katwijk and Noordwijk (leader Joop Kortselius). More information: Joop Kortselius (tel. 071-5172966, [jkortselius@hetnet.nl](mailto:jkortselius@hetnet.nl)).

**December 19-22.** XIII Symposium of Cryptogamic Botany. Universidad Complutense, Madrid. Information and pre-registration: XIII Simposio de Botánica Cryptogámica, Dept de Biología Vegetal II, Facultad de Farmacia, Univ Complutense, E-28040 Madrid, Spain. Web site <http://www.ucm.es/info/farmacia/XIIIscrip>

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### Production

Lars Söderström, Trondheim

For details regarding membership of to *International Association of Bryologists* (currently US \$ 11.- per year) write to Dale H. Vitt, Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada T6G 2E9. Email: [svitt@gpu.ualberta.ca](mailto:svitt@gpu.ualberta.ca)