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Contents

Bryophytes of hot water carbonated sulphur springs of Kumaon Himalaya

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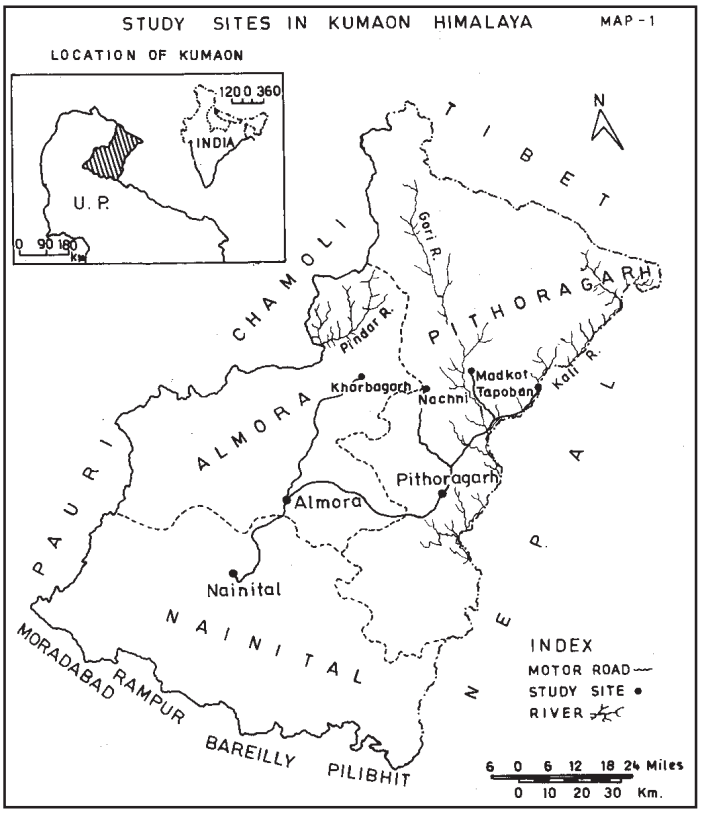

Fig. 1. Study sites in Kumaon Himalaya

In the Kumaon region, North-West Himalaya, hot water sulphur springs are common along the banks of the Gori and Kali rivers in the Pithoragarh district. Along these rivers, the majority of sulphurous springs are located in inaccessible sites, where the springs emanate directly into river waters. A few sulphurous springs are also found along the Pindar Valley in Almora district. During the course of various field surveys, four hot water carbonated sulphur springs at Madkot (1300 m), Nachni (1200 m) and Tapoban (1100 m) in Pithoragarh, and at Kharbagargh (1300 m) in Almora (Fig. 1) were explored for associated bryophyte species. At all sites, the thermal spring water temperature was found to be high (80-85°C), the pH to be basic (7.9-8.5), and calcium contents were estimated to be 2.2%.

Except for the cyanobacterium *Phormidium* sp. no other plants could be located on/over the areas receiving the direct thermal water emanating from the springs. However, a few bryophyte species have colonized the spring areas where the water has cooled to lukewarm. Taxa found bordering the edges of hot springs are *Marchantia palmata* Nees, *Hydrogonium consanguineum* (Thwait & Mitt.) Hilp., *H. gracilentum* (Mitt.) Schen, *Philonotis fontana* (Hedw.) Brid., *Pohlia* sp. and *Splachnobryum procerrimum* Dix. & P. Vard. The Madkot sulphur spring site

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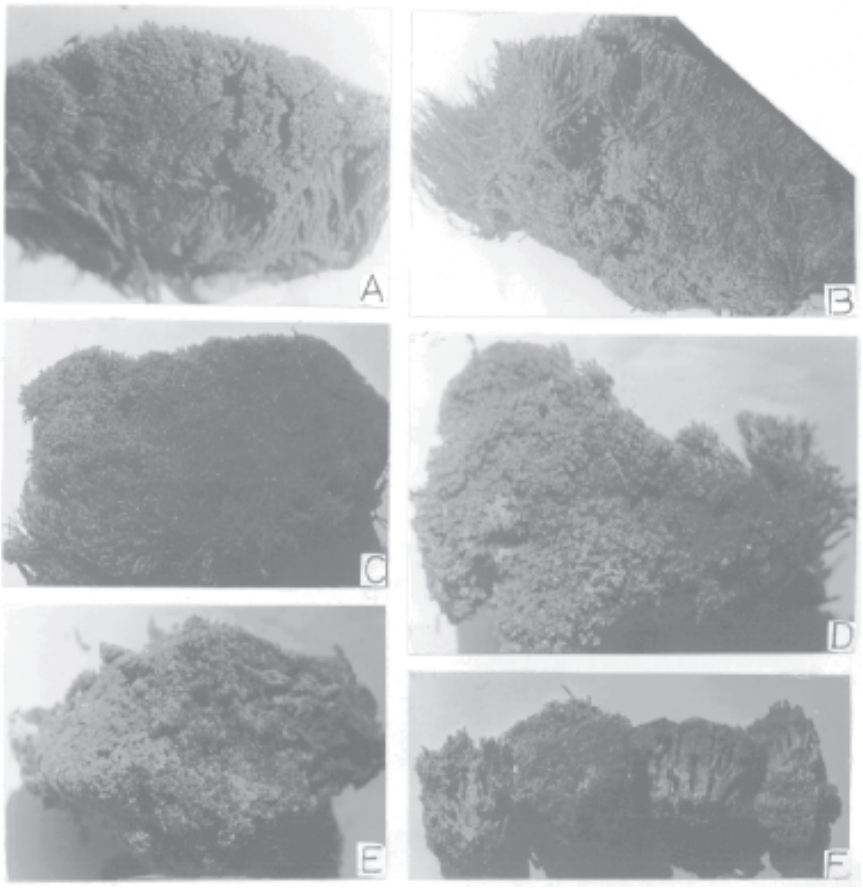

Fig. 2. A. Thick cushion of *Hydrogonium gracilentum* from hot water carbonated sulphur spring site, Madkot (Pithoragarh). B, C. Pure patches of *Splachnobryum procerrimum*, a dominant moss of geothermal spas along Gori river (Pithorargh) forming swollen cushions. D. Calcite incrusted cushion of *S. procerrimum* forming solid accretion below. E. Solidified chunk of *Splachnobryum* tufa with regenerating green leafy shoots. F. Sulphur-tufa fabrics of *S. procerrimum* from Madkot showing incrusted solidified shoots.

Howard Crum Retires

Professor Howard Crum, long time Bryology faulty member at UMBS, announced his retirement effective September, 1995.

Howard was first associated with the Biological Station in 1946 and 1947, when he was a student in "Bryophytes" taught by Professor William Steere. He received his B.S. at western Michigan University and his M.S. and Ph.D. at the University of Michigan. He joined the faculty at the University of Michigan in 1965, after working at Stanford University, the University of Louisville, and the National Museum of Canada. His work at the Biological Station has figured heavily in the preparation and publication of four books. In addition, he brought to the Station his wife, Irene, his children, Roger and Mary, and grandchild, Michael. He has taught bryophytes, lichens, and peatlandd for 27 summers, until 1994.

Irene has also been valued member of the Station summer staff for many years, supervising classroom services ant the vehicle pool and overseeing numerous tasks in the summer office. All Station faculty, students and alumni thank Howard and Irene for a job superbly well done over the many years. We wish them their very best in their retirement.

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is conspicuous. Here the spring water flows in a considerable area along the banks of the river Gori. Thick, swollen cushions of *Hydrogonium* (Fig. 2 A), *Philonotis* and *Splachnobryum* (Fig 2 B, C) have shown prolific growth and expansion all around the lukewarm zone of sulphurous water. The constant humidity around these springs is maintained by clouds of steam produced from the geothermal spring waters.

Since these are carbonated-sulpurous springs, in situ tufa deposition has occurred in places around the spring outlets. Solid accretions of calcite (Fig 2 D, E, F) are built around moss taxa: *Hydrogonium* and *Splachnobryum* (moss shoots recognizable) with an algal (*Phormidium*) scum.

The bryoflora of geothermal springs in the Kumaon Himalaya has been explored for the first time. In all the sites, *Splachnobryum procerrimum* was found to be a conspicuous colonizer (Pant 1995). The moss was first found and described in the Kumaon region by Tewari & Pant (1989).

Incidentally it may be mentioned here that *S. procerrimum* has also been collected from the sulphur spring site of Sahasradhara, Dehra Dun (768 m), U. P., India. Here the moss was found growing all over the spray-zone of lukewarm sulpurous water in association with *Hydrogonium gracilentum.*

Acknowledgements

Financial assistance for field trips from Council of Scientific and Industrial Research (C.S.I.R.) and Dept. of Science and Technology (D.S.T.), New Delhi is greatfully acknowleged.

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Tewari, S.D. & Pant, G. 1989. *Splachnobryum procerrimum* Dix. & P. Vard., a little known species from Western Himalaya (India). *J. Bryol.* 15:555-557.

Voles eating bryophytes selectively

Janice M. Glime, Department of Biological Sciences, Michigan Technological University, Houghton, Michigan 49931, U.S.A.

Often we are challenged to explain what good mosses are. I shall relay to you here a delightful, informal experiment conducted by Kate Frego about 35 km south-west of Chapleau, Ontario, Canada (47° 43' N, 83° 45' W).

Kate was doing a mark-recapture study on small mammals in a stand of old upland black spruce. She had been catching mostly red-back voles (*Clethrionomys gapperi*), but occasionally she got the more passive heather voles (*Phenacomys intermedius*). These latter voles were so much easier to handle that one day she decided to tickle one of them in the face with a moss to get her attention while she (Kate) was taking photos. Kate used a shoot of *Ptilium crista-castrensis*, which the vole grabbed with both "hands" and nibbled down from tip to base. Kate next tried *Pleurozium schreberi*, which the vole also ate. When she tried *Dicranum polysetum*, the vole rejected it. For the next few days (July, 1991), Kate repeated these experiments whenever she caught a heather vole. Each time, the vole "happily" accepted *Ptilium*, *Pleurozium*, and sometimes *Ptilidium ciliare*, but always rejected *Dicranum*.

Kate also observed that in early spring the vole runways under the snow were clipped very closely, and often the *Dicranum* clippings were lying there, but clippings of other species were absent, suggesting they had been eaten.

Kate's observations are consistent with our feeding experiments (Liao & Glime, unpubl.) using isopods and *Dicranum polysetum*, but in contrast to the voles, isopods also reject *Pleurozium schreberi*. On the other hand, they readily consume *Thuidium delicatulum*. The feeding results are consistent with high phenolic content in *Dicranum polysetum* and *Pleurozium schreberi*, but relatively low content in *Thuidium delicatulum*.

Studies by Prins (1981, 1982) suggest that lemmings may eat mosses to prepare their feet for winter. Certainly these Arctic voles must have a similar need. The arachidonic acids in the mosses are more pliable fatty acids and this arachidonic fatty acid may be stored in the lemming foot pad in winter to permit these rodents to run around on the frozen ground without getting frozen feet. A nice cryoprotectant - I wonder how many other animals take advantage of the higher arachidonic acid content of mosses when they prepare for winter?

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Additions to "Directory of Bryophyte Collecting"

Colombia

Jaime Uribe M., Instituto de Ciencias Naturales, Universidad de Colombia, Bogotá

1. All bryophytes are protected by law.

2. Generally a collecting permit is required, not only for national reserves and national parks but for the whole country. The permit can be obtained from Dr. Antonio Villa Lopera, Dirección General Forestal, Ministerio del Medio Ambiente, Cra. 8a #15-73, piso 10 Santafé de Bogotá.

3. A permit for exportation must be obtained from ICA,. Agricultural Colombian Institute, through the Instituto de Ciencias Naturales, Herbario Nacional Colombiana, Universidad Nacional de Colombia, A.A. 7495, Santafé de Bogotá.

Bryologische Rundbriefe stopped.

At the end of 1995, the German bryological newsletter "Bryologische Rundbriefe" was issued for the last time. This newsletter was published over 5 years by Jan-Peter Frahm since 1989 with 4 issues a year because the Bryological and Lichenological Working Group of Central Europe failed to produce a comparable source of information for bryologists. The style of this newsletter was copied from the Bryological Times, which has proved to be very successful with a mixture of information and short scientific contributions and frequent issues. The Central European lichenologists soon followed this example by editing a lichenological newsletter, the "Aktuelle Lichenologische Mitteilungen". However, writing contributions, preparing manuscripts for print , copying, mailing and billing beside the editorial work for "Tropical Bryology" and "Limprichtia" proved to be too much work over the time for a single person. Since steady efforts to share the work amongst other bryologists had no success, the edition was finally stopped. This drastic step caused the Bryological and Lichenological Working Group of central Europe to fill this gap. Therefore the issuesof the "Bryologische Mitteilungen" was announced, which is now being edited by a group of several German bryologists and is being distributed by the "BLAM" to their members. For copyright reasons, and because the editors intended to change the style from a newsletter to a small journal similar to "Myrinia" or "Meylania" and also intended to reduce the frequency of edition, a new name was chosen. The first volume was recently issued. Subscriptions can be addressed to the treasurer of the BLAM.

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

Report from the workshop "Briófitas, Indicatores de Biodiversidad" in Panamá.

Geert Raeymaekers, Ecosystem Ltd., Beckersstraat, B-1050 Brussel, Belgium
Grégorio Dauphin, INBIO, Apartado 22-3100, Heredia, Costa Rica (Systematisch-Geobotanisches Institut, Universität Göttingen, Untere Karspüle 2, D-37073 Göttingen, Germany)
Markus Meier, Jozefstrasse 102, CH-8005 Zürich, Switzerland

Between the 11th and 22nd of March 1996, the workshop "Bryophytes, indicators of Biodiversity in Tropical America" took place at the Universidad de Panamá. The workshop was part of a two-year project to make a Guide to the Bryophytes of Tropical America. The project is co-ordinated by the first author and is financed by the European Union. During the year and half preceding the workshop, Rob Gradstein (hepatics), Steve Churchill and Noris Salazar (mosses), worked hard to prepare the draft manuscript of the Guide. Noris Salazar, assisted by Maria Isabel Morales, was able to translate into Spanish the liverwort part of the Guide and keys to the moss families and genera. Nearly all of the 34 participants from 17 different countries, most of them from the Latin America, arrived in time to attend the inaugural meeting at the Smithsonian Tropical Research Institute (STRI). Noris Salazar, who took most of the load to prepare the workshop, welcomed the participants and gave the floor to the Rector of the University of Panama and other officials of the University, STRI, and INRENARE, the Panamanian nature conservation authority. Immediately after the inaugural session, Rob Gradstein and Steve Churchill gave a brief introduction to tropical bryophytes and during the first afternoon, several of the participants had their first opportunity to look at tropical bryophytes and to see important morphological characters.

Testing the Guide

Since the workshop focused on the importance of tropical bryophytes as indicators of biodiversity as well as on the promotion of the use of the Guide, most of the activities took place either in the field, where bryophytes were collected and their ecology discussed, or in the lab were the keys of the Guide were tested. In particular, the beginning bryologists, tested with much perseverance and enthusiasm the keys and provided essential comments which might have been overlooked by experienced bryologists.

Collecting lowland bryophytes

After a day of lab work, a bus took us to the first of the five excursion sites, the "Parque Nacíonal Soberanía", located in the Canal Area. Along the "Camino de Cruces", a historical path used to carry goods from the Pacific to the Caribbean coast, we found a bryoflora typical for the seasonal lowland forest. Although it did not have the overwhelming number of species of the mountain areas, it provided the participants the opportunity to see a wide range of typical tropical species and growth forms. The next field trip took us to Barro Colorado Island (BCI). One of the first biological reserves of the new world (1923), Barro Colorado Island is now a major site for tropical research managed by STRI and open to visiting scientists. Mrs. Oris Acevedo showed us the research facilities and park rangers guided us along the trails of the island. We saw all kind of research equipment during our excursion through a small area in the dry season. A relatively small number of genera were seen. Rob Gradstein, Noris Salazar and others who studied the bryoflora of Barro Colorado, only recorded 70 hepatic and 81 moss species.

The enchanting cloud forest of western Panama

On Thursday, we left Panamá City for the Boquete area in the western province of Chiriqui. We stayed at Hotel Panamonte, a cosy colonial style and friendly haven, at the foothills of the Volcán Barú and the transboundary Panamanian-Costa Rican Parque Internacional La Amistad (PILA). The next morning, we got up very early to take the two-hour bus ride to Cerro Punta, then three pick-up trucks took us to the park headquarters where we were welcomed by the park rangers. The plan was to walk the two km long "El Retoño" trail, hiking through the mountain tropical forest (at 1700 m). Here, the bryophyte diversity was so overwhelming, that it prevented us from walking the whole length of the whole trail. *Szweykowskia* , a genus newly described by Rob Gradstein and Elena Reiner-Drehwald, was also found and gave us a reason for a 1-minute forest celebration! We moved only a short distance collecting material. On Sunday, the next day, we went to a pre-mountain tropical forest (1200 m) near the dam of Fortuna. The protected area of the watershed of the reservoir is owned and well managed by the Instituto de Recursos Hidraulicos y Electrificacion (IRHE); the forest is undisturbed, and many shade-loving mosses and hepatics cover the trunks and branches. This was the most diverse area in terms of bryophytes, for the site is extremely wet. Also the collections yielded interesting results: *Mytilopsis albifrons* (Hepaticae, Lepidoziaceae), was found as a new generic record for central America!

Conservation issues

That evening, Clotilde Arrocha (Universidad de Chiriquí, Panamá) gave a talk on the exploitation of bryophytes from PILA for ca 30 years, local farmers have been gathering large amounts of bryophytes (mainly pleurocarps) to sell on the local markets for the making of Christmas nativity scenes. Juan David

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Parra (Universidad de Antioquia, Medellin, Colombia) also presented a video on the importance of bryophytes (probably the first ever transmitted by TV) in Tropical mountain forests, and on the use of bryophytes or bryology in high schools as a means to promote conservation awareness, in particular for these small plants. Since few participants were aware of the IUCN and its aims and activities in conservation worldwide, Markus Meier (IUCN Gland, Switzerland) presented IUCN, its Species Survival Commission and the Global Action Plan for the Protection of Bryophytes. Rob Gradstein reported on his experiences in applying the new Red List criteria and all participants were invited to communicate any salient conservation issues to the IUCN Bryophyte Specialist Group. Sunday morning, returning to Panama, we had the chance to do some shopping at the Feria Internacional de David.

Final presentations and excursions

The next two days were divided between lab sessions to key out part of the collected material, several presentations, and a reception at Smithsonian Tropical Research Institute. Dr. Inés Sastre-de Jesús (Universidad de Puerto Rico) showed us the change in the bryoflora of her country. Based on her long-term field experience in Costa Rica and other Neotropical countries, María Isabel Morales (Universidad de Costa Rica) gave a very nice presentation on the diversity and ecology of epiphylls in the tropical forests. Efraín De Luña (Instituto de Ecologia, Veracruz, Mexico) discussed the modular structure and ontogeny of branching systems of moss gametophytes. Juan David Parra (Universidad de Antioquia, Medellin, Colombia) presented a video on the importance of bryophytes in Tropical mountain forests and on the use of bryophytes or bryology in high schools as a means to promote conservation awareness, in particular for these small plants. Finally, Luis Carrasquilla (Universidad de Panamá) introduced us to the rich flora of Cerro Jefe and Cerro Azul which was the next excursion site. Cerro Azul turned out to be an extremely good biotope for hepatics, Lejeuneaceae in particular. A new *Cheilolejeunea* species for science was found here. By the end of the two weeks, most participants had collected so much material and had learned so much that, despite the excellent introduction to the phanerogamic flora of Campana by Mireya Correa and the epiphytic mosses in the Park by Clementina Chung (both of the Universidad de Panamá), most people decided to work another day in the lab instead of having another field trip. We regretted nevertheless that we were unable to go to Campana with Mireya and Clementina as guides. So, on Friday, before the closing ceremony, Catherine Lovelock (STRI) took us far away from the tropics and explained her ecophysiological work in Antarctica, and Ray Stotler and Barbara Crandall-Stotler (University of Illinois, Carbondale, USA) presented their monographic work on the Fossombroniineae.

A forum

The workshop was not only very instructive for all of us, but provided an excellent forum, where experience was shared and many stimulating contacts were made. Since then, the first author received several letters, acknowleding the importance of such workshops on tropical bryology. The workshop certainly targeted the right people and promoted the Guide and bryological research among beginning bryologist and other people active in tropical forest conservation. All participants agreed that the Guide will represent a landmark in the study of neotropical bryophytes, for this will be the first work (in English and Spanish versions) that will allow anyone to identify mosses and liverworts to the genus level, give essential ecological information, and provide additional information on the nearly seven hundred described and illustrated genera. The wide press coverage in Panama certainly contributed to this.

News from Bai Xueliang

Department of Biology, Inner Mongolia University, Hohhot, 010021 CHINA.

Projects:

1. The bryoflora of Inner Mongolia (the project supported by Natural Science Foundation of Inner Mongolia, China)
2. Research on ecology of bryophytes in Inner Mongolia Plateau (the project supported by national Natural Science Foundation of China).

New publications:

Preliminary report of the Mosses in Inner Mongolia. Acta Sci. Nat. Univ. Intramongolicae 18 (2): 311-350, 1987.

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New recorded genus and species of Pottiaceae in China. Acta Sci. Nat. Univ. Intramongolicae 24 (4): 421-426, 1993.

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Ephemerum minutissimum Lindb. and *E. serratum* (Hedw.) Hampe

Dr. Siegfried Risse, Hobirkheide 14, D-45149 Essen, Germany

In 1987 I found *Ephemerum serratum* and *E. minutissimum* together on the same field. The plants were so different that they seemed to be certainly two different species. Yet these taxa are often regarded only as varieties (Dixon 1924, Grout 1935, Smith 1978, Margadant & During 1982, Landwehr 1984 [1978 as species], Touw & Rubers 1989, Düll 1994) or even as synonyms (Andersen et al. 1976, Crum & Anderson 1981, Corley et al. 1981). They are treated as species by Brotherus 1923, De Sloover & Demaret 1968, Nyholm 1975 and 1989, Frahm & Frey 1983.

The difficulties with these taxa are partly due to the description of *E. minutissimum* by S.O. Lindberg (1874). His description is confusing to a certain degree, e.g. his remark: "*spori sexies minores, laeves*" "spores six times smaller, smooth". Lindberg examined specimens from North America: "Philadelphia (James), Carlton House, Saskatchewan (Drummond)". Up to now I have not seen these specimens. The material in Helsinki, where Lindberg was working, is in a bound exsiccate set and cannot be sent on loan.

As to *E. serratum* Schreber (1770) mentions expressely the very rough spore surface ("*punctis protuberantibus exasperata*") of his *Phascum serratum*. Also his illustration of this species clearly shows *E. serratum* sensu stricto. The herbarium of Schreber has probably been lost.

Brotherus (1923) described more precisely than Lindberg (1874) the spore ornamentation in *E. minutissimum* and difference from *E. serratum.* Spore characters are the reliable differential characters. The two taxa also differ in size, *E. minutissimum* having smaller leaves, capsules and spores than *E. serratum*. In *E. serratum* the cells in the upper part of the leaves are narrower than in *E. minutissimum*. In my experience, however, it is difficult to name plants with immature spores. Capsules of dried specimens should be soaked very carefully before examination, otherwise the hyaline veil of the spores amy be destroyed. Good illustrations of these species are to be found in Landwehr (1978 or 1984).

American authors seem to have relied more on gametophytic characters (Grout 1935) and have difficulties with Lindberg's assertion of the spores being smooth in *E. minutissimum* (Bryan & Anderson 1957). The determination of the two taxa should be based on spore characters as given by Brotherus (1923).

I have examined specimens of the two taxa from B, H, S and the herbarium of Prof. Dr. Düll: *E. serratum* from Scandinavia, England, Belgium, France, Germany and Poland; *E. minutissimum* (*E. serratum* var. *angustifolium*) from Scandinavia, England, France, Switzerland, Austria, Germany, Czech Republic, Poland, Hungary, Romania, Italy, Croatia, Canada and USA. *E. minutissimum* (*E. serratum* var. *angustifolium*) was usually named correctly. *E. serratum* on ther contrary, was often understood in a broader sense, i.e. it was not distinguished from *E. minutissimum*. 65-75% of the specimens named *E. serratum* were *E. minutissimum.* Only in H, where Lindberg and Brotherus worked, were more specimens correctly named. Hence one can conclude that in northern and central Europe *E. minutissimum* is more frequent than *E. serratum.* Only in two specimens were both taxa found together. This may reflect different ecological demands of the species. In Europe the two taxa, as defined by Brotherus (1923), are clearly different and deserve the rank of species.

	E. serratum	*E. minutissimum*
Spores	warty	finely papillose
	surrounded by a hyaline veil	without hyaline veil
	(62) 64–88 (96) µm	(38) 46–68 (72) µm
Upper leaves	acumen often with a hint of a nerve	nerve lacking
Length of plant	1.4–2.2 mm	1.0–1.8 mm

I thank the curators of the herbaria B, H, S and Prof. Dr. Düll for loan of specimens.

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Wanted

In order to accomplish my research concerning *E. serratum* and *E. minutissimum* (se the article) I would like to see specimens from extra-European areas, also from southern Europe. Alleged intermediates are particularly welcome.

Especially required are plants form "Philadelphia (James), Carlton House, Saskatchawan (Drummond)" USA.

I would be very much obliged to anyone who can send me relevant material on loan.

Candidates for addition to the world list of endangered bryophyte

The IAB Committee on Endangered Bryophytes would like to solicit additions to the list of endangered bryophytes of the world. Since the first list was published in Bryological Times 1994 (vol. 77: 3-6 and 78: 4-5), progress has been achieved as a consequence of the Rio Biodiversity Convention. For example more and more bryophytes have been accepted in some countries as an important and endangered part of the flora.

The first list of the worlds most endangered bryophytes was short and skeletal. The undertaking aimed only to serve as an initial project. One of the shortcomings of the list was that these critically selected species occur only in a handful of habitats and are found (or have occurred) in a restricted number of countries. The list is therefore not operative or relevant to the many countries in the world. To make a more operative and inclusive red list of bryophytes of the world, the list has to be expanded and the species in question be more carefully selected. Therefore we ask that you spend some time and feel free to suggest new species candidates for the second round consideration!! Please be reminded that any reported endangerment of a species has to be assessed from a global perspective. To avoid uncertainty, please note further that species or taxa of unsatisfactory definition or controversial taxonomy may not be considered at the moment.

Please send names of your nominees of endangered bryophytes from your part of the world to me, or for mosses directly to Ben Tan at Farlow Herbarium, Harvard University Herbaria, 22 Divinity Avenue, Cambridge, MA 02138, USA (btan@ huh.harvard.edu) and hepatics directly to Patricia Geissler Conservatoire et jardin botaniques of Geneva, 1292 Chambesy, Switzerland (geissler@ cjb.unige. ch).

Other important criteria of selecting the world endangered bryophytes that the IAB Committee has adopted are:

1) the species can be considered to be threatened on a world-wide scale;

2) the species is confined to threatened habitats;

3) the species should be narrowly distributed; and,

4) not presumed overlooked due to under-collection

Tomas Hallingbäck, Swedish Threatened Species Unit, SLU, S-750 07 Uppsala, Sweden (tomas.hallingback@dha.slu.se)

Report from the ABLS meeting 1996

The ABLS meeting just completed in Seattle was a smashing success, thanks in large part to the extraordinary quantity and quality of student presentations, in keeping with this year's theme, "The Student."

Katie Glew and Judy Harpel got the meeting started off on the right foot with a well-organized trip to outstanding localities in the Olympics and the Cascades. We had several novel and interesting workshop/discussions relevant to the theme: Training and employment issues (Terry O'Brien, organizer), National Science Foundation grant opportunities and proposal-writing, World Wide Web resources for bryologists and lichenologists (Brian Speer, organizer), Consulting opportunites for bryologists and lichenologists (Nancy Slack, organizer), and What can ABLS do for amateur bryologists and lichenologists? (Charis Bratt, organizer). The symposium on "Regeneration Niche: Dispersal and Establishment of Bryophytes and Lichens, organized by Robin Kimmerer and Dale Vitt was likewise quite thought-provoking. The meeting was completed by another "field trip," this one a novel trip to a laboratory organized by Michael Christianson.

The core of the meeting was four sessions of student talks, 32 in all. The quality of the talks was very high in general. The committee of judges, Lloyd Stark (Chair), Efrain De Luna, Ted Esslinger, and Cliff Smith, none of whom had students participating in the competition, thus had a very difficult decision to make.

The winner of the A.J. Sharp Award for best student presented paper was: **Scott LaGreca** of Duke University for his paper: "A phylogenetic evaluation of chemical variation in the *Ramalina americana* complex based on rDNA sequence data"

Honorable mention (first runner-up) went to: **Walter Bien** of Drexel University for his paper: "Seasonal growth patterns and niche dynamics of two interacting Sphagnum species from the New Jersey Pine barrens"

Because of the large number of papers, the judges also wished to mention other outstanding talks that were considered, including those of Brian Speer, John McMurray, Katie Glew, and Joanne Romagni. They also wished to give a special encouragement to international students who gave outstanding talks not in their native language, including Mostafa Mansi, Carmine Colacino, and Yuki Kobiyama.

Congratulations to these as well as other students who gave fine talks. We hope to see you all at next year's meeting which will be in Montreal, Canada, Aug. 3-7, 1997.

Brent Mishler

Additional Regional Bryological Societies

Sociedad Española de Briologia: Dues to the society are 3000 Pts per year. Student dues are 1000 Pts per year. Payment for three years is desirable. The members will receive the “Boletín de la Sociedad Española de Briología”. Dues are payable to Sociedad Española de Briología, Banca Bilbao Vizcaya, C/ Itturama 24, Pamplona, Spain, account Nr.: 0182 5005 00 00000 16627.

Mossornas Vänner: Annual dues are 50 SEK (from Sweden) or 90 SEK (all other countries). Members receive “Myrinia” with two issues per year. Dues are payable to Mossornas Vänner, c/o G. Kristensson, Dekanvägen 8, S-240 10 Dalby, Sweden or to Swedish National Giro Account no. 13 37 88-0

Half a million species of mosses in the world ?

The genus *Schistidium* is apparently a difficult one. So far, mainly two authors (Poelt and Bremer) have made attempts to clarify the taxonomic situation, but, with different results. A new treatment by Blom (1996) differs considerably from the previous ones. Usually revisions today result in a considerable reduction of species. This is not the case in Blom's revision of the *Schistidium apocarpum* complex in Norway and Sweden. The author describes about two dozen species new to science (the exact number is not given in the abstract), which raises the number of species from about 7 to 31, and this based on only two countries, not even Scandinavia or even the northern hemisphere.

As indicated by the author, 20 000 specimens have been studied for this revision. However, all types of the new species were collected by Blom, and the taxonomic results were based primarily on 2600 of his own collections.Thus it seem as if Blom has based the study on his private collections and then included the majority of 17400 specimens from other collectors and other herbaria into the concept gained from the minority of his specimens.

The question is, how it is possible that 24 new species could be described from such a comparably small area? Were the famous old Scandinavian bryologists blind that they did not see these species? The answer is that the author has an special species concept, a concept similar to that used by Flatberg for *Sphagnum*. Flatberg's species concept applied here is explained in the way "that two related morphs may be regarded as different species, even if it is impossible to find morphological differences that distinguish between them throughout their habitat ranges." Accordingly, the author has selected "morphs" (as he calls them himself) in the field. The use of "morphs" as species is in my opinion problematical. Children of 3, 8 and 15 have different morphs. They play together (occur in mixed tufts), but they do not belong to different species. Similarly, patches of *Grimmia trichophylla* of different age are found on the same boulder, they look different but are not different species. Not only male and female humans have different morphs but also many dioecious bryophytes. Thus the problem is to argue whether morphs are species. This could have been done by cultivation experiments, or by biochemical, molecular, or biostatistical methods, and in the future the author owes us this evidence. Mixed stands are used as argument for the distinctness of species, however. They indicate at least different genotypes and not necessarily species. Remarks as e.g. under *Schistidium confusum* ("a somewhat non-descriptive taxon") show how problematical this species concept is. The value of species may be tested from how they are keyed out in keys. Blom's key has 129 couplets, and most species are included more than one time which shows that the taxa are apparently not easily defined. For example, *Schistidium crassipilum* is keyed out in the key to plants with mature sporophytes alone 7 times. The correctness of the keys shall not be doubted, but it is problematical if one needs the shape of exothecial cells or a transverse section of the stem for determining even the species groups. It is comforting that Blom has carefully cited the types of the species correctly.

The delimitation of the study area to Norway and Sweden may result in the fact that there are many more morphs in Eurasia and in North America, or the Alps, which may raise the "species" to be described in this complex to 50 or more.

The classification of species groups is based purely on the personal feeling of the author. It shall not say that the author has the wrong feeling, but in a time in which phenetic and cladistic analyses are commonly used, it is hardly understandable that these modern methods are not used.

The distribution maps show the distribution of the "species" in the northern hemisphere, although mainly material from Norway and Sweden was included in the revision, as expressed in the title. This gives a wrong impression if no dots or only three dots of a species are shown from North America. However, North American herbaria were consulted and carefully annotated.

Some of Bloms species names were already used long before publication of his thesis, and no doubt, his "morphs", now published, will automatically be accepted, and numerous publications are to be expected indicating "15 species of *Schistidium* reported as new for Germany, Netherlands, the Alps", etc.

If this taxonomic concept is adopted worldwide, it would raise the number of bryophyte species to about half a million. Using similar concepts, one could easily describe 45 morphs of *Bryum capillare* as new species, 20 new species of *Ceratodon,* or 15 of the *Hypnum cupressiforme* complex. Is this what we want? Do we want to distinguish species or morphs? How can we differentiate between classical species and morphs? Maybe I am too old to understand this Scandinavian kind of taxonomy. But maybe in fifty years, botanists will laugh about my taxonomic opinions and 500 000 morphs will be distinguished worldwide.

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

Half a million species? A reply.

My work on *Schistidium* has raised the temper of Jan-Peter Frahm. It is nice to have energetic readers. I am a slow worker and won't live long enough to contribute too much along the route to a half million of moss species, apparently the ultimate goal for us MORPHIDS.

Now then, what is a MORPH? A morph is a group of specimens or a group of plants that are morphologically distinguishable from other groups. Thus it is just a convenient *term* (to avoid using terms as "type" which should be restricted to formal taxonomy) and not part of a species concept. Moreover, the term is mostly used *before* any taxonomic conclusions are drawn. Some morphs may turn out to be just juvenile plants, rare male plants of dioicious mosses, habitat modifications, supposed genetic aberrations or minor genetical varieties, whereas others eventually represent *taxa*. When the taxonomic results are formally presented, the term may be useful in describing those deviant groups of specimens that you did *not* name.

A "Scandinavian" or "Fennoscandian" approach to moss taxonomy could be described as leaning heavily on extensive field work and further studies of material collected by the worker himself. The main point behind this is to be able to relate a given specimen or groups of specimens to the habitat conditions where the plants grew. Such an approach has also been strongly advocated by taxonomists from other parts of the world, e.g. Rudolf Schuster (cf. Schuster & Damsholt 1974). I strongly believe that *the ability to disconnect such morphs that should never become taxa* given by this approach (including the study of mixed stands), heavily outweights the danger of naming minor genetical variants, or say, individuals. I have studied some genera, e.g. *Campylopus, Grimmia* and *Racomitrium* as thoroughly as *Schistidium*, using the same concepts and methodology. And I arrived at specimen groups which all represented species currently accepted by most authors for northern Europe. I have never felt that my species concept was peculiar.

Frahm mentions that the outcome of modern revisions is usually a reduction of the number of species. I am not sure that this is true for well-worked temperate and boreal areas. To note just a few examples, Murray (cf. Murray 1988) added three very distinct species of *Andreaea* to the British moss flora. Frisvoll (1983) showed us that much of the confusion separating *Racomitrium canescens* from *R. ericoides* was due to the presence of an additional species, *R. elongatum*, and he also added the highly disjunct *R. himalayanum* to the European flora (Frisvoll 1988). Recently Hedenäs (1994) described *Hedwigia stellata*, widely distributed in Europe, and further split *Hedwigia ciliata* into two subspecies.

Frahm raises the interesting question why the Scandinavian moss taxonomists did not recognize and describe the novelties presented in my work. He might also have asked why they did not circumscribe e.g. *S. apocarpum* as I do. My main answer is that the tradition in *Schistidium* has been *strong, longstanding* and *wrong* as opposed to the tradition with other difficult species-rich genera like *Grimmia* and *Orthotrichum* which has been longstanding and *quite good*. In Bryologia Europaea only three species of *Schistidium* were recognized, and this authorative treatment has greatly influenced the taxonomic views of succeding students of the genus. This is probably one of the reasons why so few *Schistidium* species have been described from Europe after 1845, and why there occur several novelties in my book. The previous European workers hesitated to describe new species (without doing a full revision of the genus), being well aware of the extreme range of variation in the genus as a whole. Most of my novelties are alpine species, whereas the tradition in *Schistidium* says there are no such species (contrary to in the closely related genus *Grimmia)*. I have found that several sporophytic characters are crucial in *Schistidium* taxonomy. In *Schistidium* the immersed urns wither quite quickly after dehiscense in early spring, and in summer several characters of the peristome and exothecial cells cannot be fully evaluated. Most of the previous workers failed to elucidate these sporophytic characters, and combine them with gametophytic ones. This may be one explanation why they did not recognize even very common species like *S. crassipilum*.

Tradition often makes blind. Once learned, you take your *Hedwigia ciliata* for granted. You tend to loose the curiosity and critical open-mindedness so typical for all real progress in science. However, I believe the "Scandinavian approach" really opposes the blunting effects of tradition. Perhaps it is not a coincidence that the distinctness of *Hedwigia stellata, Racomitrium elongatum* and *Sphagnum rubiginosum* was discovered by Scandinavian bryologists?

It seems reasonable that modern computer technology should free up time for the tedious, but necessary work in the field and at the microscope for the taxonomist. The opposite seems to be true. Time has really become the main limiting factor, and time is exactly what is needed to critically evaluate the results of taxonomic works such as my own.

Don't take the Blom species for granted. See for yourself what is there, and I would really feel that I have achieved something more than just what is presented in my book.

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Column Editors

J.-P. Frahm & B. O'Shea (computer techniques); J. M. Glime (ecology); T. Hallingbäck & E. Urmi (conservation); A. R. Perry (news from the herbaria); T. Pócs (tropical bryology); M. L. Sargent (techniques); J. Vána & W. R. Buck (floristics and phytogeography); D. H. Vitt (best book buys, taxonomy).

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DIARY

1996

October 14-17. The ninth Bryological-lichenological meeting of the Czech bryologists in Jihlava town. Send the applications to RNDr. Ivan Novotny, Department of Botany, Moravian Muzeum, Preslova 1, CZ-602 00 Brno, Czech Republic. E-mail mzm@mzm.anet.cz.

October 20-22. BBS Annual General Meeting and Symposium Meeting at Ness Botanic Garden, Wirral. Local Secretary: Dr. Hugh McAllister, Ness Botanic Gardens, The University of Liverpool, Environmental & Horticultural Research Station, Ness, Neston, Wirral, Cheshire, L64 4AY. Tel.: 0151 3530123.

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April 2-9. BBS Spring Meeting, Torquay, Devon, U.K. Local secretary: Mr Mark Pool, "Camelot", 91 Warbro Road, Torquay TQ1 3PS, UK Tel: (+44) (0)1803-316154 (evenings please). Fax: (+44) (0) 1803-386507 (please mark your fax "M. Pool - personal".

May 26-30. IAB meeting in Beijing, China. Topic: "2000's Bryology. Followed by two excursions, one to SE China and one to NW China. The first circular will be ready in mid 1996. Contact person: Prof. P. C. Wu, Inst. of Botany, Academia Sinica, Xian shan, 100093 Beijing, China. Fax: 0086-010-8319534.

June 13 - 15. Annual assembly of the SVBL. Les Diablerets (Calcareous Alps in Western Switzerland). Contact person: Patricia Geissler, Conservatoire et jardin botaniques de la Ville de Genève, Case Postale 60, CH-1292 Chambésy, Switzerland. Phone +41 22 418 51 48 (direct) 418 51 00 (switchboard), Fax +41 22 418 51 01, e-mail: geissler@cjb.unige.ch

Is this all activity in bryology until next summer?????