

The BRYOLOGICAL TIMES

ISSN 0253-4738

Newsletter of the International Association of Bryologists

May, 1984.

No. 26

DEATH ON THE GALAPAGOS

By W.A. Weber & S.R. Gradstein

IN 1976 Bill Weber and I went to the Galapagos Islands for a survey of the islands' bryophyte and lichen floras. Our results appeared in the *Journal of the Hattori Botanical Laboratory*, (52: 127-152, 1982) and in the new Pergamon Press book on the Galapagos Islands (series *Key Environments*).

In December 1983, Bill Weber went back to his islands and had the rare opportunity to examine the dramatic local changes in animal and plant life due to an entirely natural cause: an extreme "El Niño" effect. El Niño is the warm sea current from the West coast of Central America that brings warm surface waters and spells of rain to the islands and the adjacent coasts of South America in the first half of the year. In 1982-83, the islands have suffered the strongest and most prolonged El Niño effect known in history.

The effect of this climatic abnormality on the fragile ecosystems of the islands has been staggering, according to many sources. Rainfall at the Charles Darwin Research Station on the central island Santa Cruz between August 1982 and July 1983, was over ten times the average amount. Marine fishes died due to the abnormally-high surface-water temperatures and starvation and death occurred among the rare and endemic animals feeding on them: sea lions, fur seals, marine iguanas, penguins and flightless cormorants. Plant life, including the bryophytes and lichens, was seriously affected too. A comprehensive account of the El Niño effect on the cryptogams of the Galapagos Islands will be provided by Bill Weber as a chapter in a book on this phenomenon to be published by the Charles Darwin Research Station.

Christmas card from Bill Weber - provides a brief account of what happened on the island of Santa Cruz.

Santa Cruz, Galapagos Isl., 28 December, 1983.

Dear Rob,

The effects of Niño were disastrous for the lichens and many mosses, as well as for other life. Rainfall at the playa (= coast), usually no more than 8 inches (up to 46 in the worst previous Niño) was 120 inches in 7 months! 31 waterfalls over the cliffs between Plazas and Baltra. Probably over 400 inches in the wet zone! A gully 20 feet deep was excavated below Hornemanns place and through the square at Bella Vista. All ground mosses are gone and only a little of the most hardy (*Philonotis*) left on the stones. All parmelioid lichens, *Ramalina*, *Roccella*, *Sticta*, rotting, or *desvanecidos*! Weeds and vines completely cover the understory, shading out everything, and *Frullania* and *Zelometeorium* are absolutely dominant on the trees, but very little variety in bryophyte remains. Even the *Ramalina usnea* in the Transition Zone is mostly rotted and gone.

Much of the *Jasminocereus* is dead or dying. An enormous number of *Opuntia* have fallen, having been undercut by the water. *Bursera*, *Pisonia* and *Piscidia* trees have rotted out and fallen over (the best lichen substrates). The gorgeous lichen displays of the shore rocks are almost gone due to the high tides and spray and rain. My type localities near the beach have now only deteriorated and nondescript lichens on them.

The sea life has suffered as much. Marine iguanas deprived of their usual food had to

ACD TO A BRYOPHYTE

FRULLANIA

By Claude Benezra

ALLERGIC CONTACT DERMATITIS (ACD) is part of what is known as "type IV" allergy or delayed hypersensitivity. It occurs as an eczema (redness, swollen skin or oedema) affecting the parts of the body in contact with an offending substance called an allergen. Fortunately, not everybody is susceptible to developing ACD, but the reasons, probably genetic, why some are and others not, are still obscure.

The mechanism of ACD is thought to involve the coupling of the offending agent (called hapten), which penetrates into the skin, to a carrier protein (probably epidermal). The association between hapten and protein is of a covalent nature: the protein contains electron-rich nucleophilic groups (SH, NH₂ etc.), while most of the known haptens are electrophilic (electron-poor) (Dupuis and Benezra, 1982).

The number of aggressive agents in nature (plants of the Anacardiaceae and Compositae are particularly offensive) and synthetically produced is now extremely large. Of particular interest to bryologists is the existence of ACD to the widespread liverwort, *Frullania*. An excellent review of this subject by Suire & Ducombs (1977) appeared some years ago.

Allergic contact dermatitis to

Frullania

ACD to *Frullania* was first described in France, in the Bordeaux area, by LeCoulant and Lopes (1956). Other cases of contact dermatitis to this plant were described in British Columbia by Mitchell et al (1970), in France by Foussereau and Ducombs and in Oregon by Storrs. The most frequently-quoted sensitizing species are *Frullania dilatata* (L.) Dum. and *F. tamarisci* (L.) Dum. ACD to *Frullania* is also known in other parts of Europe (Spain, Portugal, Denmark, Great

The following letter - a

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[ACD to a Bryophyte (continued from last page).]

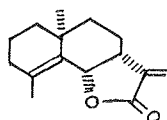
Britain, etc.) and North America.

Twelve species of *Frullania* have been tested on a patient in Canada: *F. asagrayana* Mont., *F. riparia* Hamp., *F. squarrosa* (R. Bl. and N.) Dum., *F. dilatata* (L.) Dum., *F. nisquallensis* Sull., *F. tamarisci* (L.) Dum., *F. kunzei* Lehm. and Lindenb., *F. eboracensis* Gottsche, *F. franciscana* Howe, *F. inflata* Gottsche, *F. bolanderi* Aust. and *F. usamienensis* Steph. Among them, only one species, *F. squarrosa*, was not sensitizing.

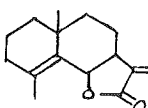
The way to find out about the sensitivity of a patient to a given compound or plant is to carry out a "patch" test. The compound, in solution (ethanol, acetone, etc.) or in suspension (vaseline is the most commonly-used vehicle) or the plant itself (e.g. *Frullania*) is applied to the patient's back with a tape. Twenty-four or forty-eight hours later, the tape is removed and the test "read": redness (= erythema) or swelling (= oedema), with or without the presence of vesicles and bullae, indicate that the tested compound is a skin sensitizer for the patient.

The nature of the allergen

The main offending agent in *Frullania* is a sesquiterpene lactone, frullanolide, whose



(+) - Frullanolide



(-) - Frullanolide

chemical structure was determined in Strasbourg (Knoche et al., 1969). It contains an α -methylene - γ -butyrolactone group, also present in a number of other sesquiterpene lactones, found in a number of botanical families, in particular the Compositae. Most of the miseries of allergic patients come from the existence of cross-reaction; somebody sensitized to one taxon, a *Frullania* sp. for instance, can also be sensitized to others, e.g. *Laurus nobilis* L., (Lauraceae), *Chrysanthemum*, (Compositae) etc. i.e. to plants containing structurally-related substances.

An interesting characteristic of *Frullania* is that two species, *F. dilatata* and *F. tamarisci*, produce enantiomeric frull-

anolides. Sensitization to the (+) - isomer (in *F. dilatata*) does not imply sensitization to the (-) - isomer, as has been shown in a guinea pig study (Barbier and Benezra, 1982). Patients in the Bordeaux area reacted to both, because the two species are very often growing in the same area. This is called co- or multiple sensitization. However, some patients reacted only to one species, revealing exposure to this species only (Ducombs, personal communication, 1982).

Many other forest plants can cause ACD. In particular lichens are known to provoke eczema among lumberjacks and other forest workers. The genera involved include *Cladonia*, *Usnea*, *Parmelia*, *Evernia*, etc. One of the agents responsible for the dermatitis is usnic acid.

It seems that in some way the sun can aggravate the eczema. This is not quite clear however, and no direct proof of sun involvement has been found yet. What is sure is that *Frullania* can be transported by the wind, causing the well-known (to dermatologists, at least) airborne contact dermatitis.

In conclusion, since *Frullania* is a strong sensitizer, bryologists are advised to exercise care in handling it, since the only antidote, known at the moment to prevent ACD, is to avoid contact with the allergen!

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Laboratoire de Dermato-Chimie, Universite Louis Pasteur, Clinique Dermatologique, CHU de Strasbourg, 67091, Strasbourg, France.

[Death on the Galapagos (contd. from first page).]

eat indigestible red algae and many have died. Sea lions - none at all in Academy Bay. But fishing is coming back and the tides are now much lower than normal, with cooling waters.

On Christmas day we went to Media Luna, and very unwisely tried to return via the old trail. It is only visible because of masses of weeds, mostly *Kalanchoe*, and we got lost near the top of the barranco, (= cliff) at nightfall. Rather than break our legs, we slept on the lava rocks till morning and eventually found the trail down the barranco. The vine cover on everything is unbelievable (*Passiflora* and *Momordica* everywhere) and the sticky fruits of *Plumbago scandens*, *Commicarpus*, etc. are miserable on the bare legs, since to remove them you have to pull your hair off with them!

Well, collecting seems out of the question, but instead we will go and see all the old places and write up what we can about this phenomenon (once every 1,000 years? - or more). I don't think it has ever been appreciated that cryptogamic vegetation could be so drastically affected anywhere in the world!

Yours sincerely, Bill.

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Instituut voor Systematische Plantkunde, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands.

News from Societies

FORMATION OF INDIAN BRYOLOGICAL SOCIETY

THE AD HOC EXECUTIVE of the Society is as follows:-

- President: Professor Ram Udar, Department of Botany, University of Lucknow, Lucknow, 226007, India.
- Vice-President, Professor R.N. Chopra, Department of Botany, University of Delhi, Delhi, 110007, India.
- Secretary, Dr. S.C. Srivastava, Department of Botany, University of Lucknow, Lucknow, 226007, India.
- Treasurer, Dr. Dinesh Kumar, Department of Botany, University of Lucknow, Lucknow, 226007, India.

The Society has been formed for the promotion of bryological research in India. So far 63 ordinary members have been enrolled.

S.C. Srivastava, Secretary.

The four bryologists in this Institute are: Prof. Chien Gao

(mosses and liverworts), Mr. Kuang-chu Chang (liverworts), Mr. Tong Cao (mosses and spore morphology of bryophytes), and Mr. N.Z. Bao (mosses).

In spite of its name, this Institute is a centre of botanical research in north-east China. They have a large herbarium of vascular plants, mainly from this area which number some 200,000 specimens and include 148 families, 820 genera and 3,000 species. They have about 70,000 specimens of bryophytes from the north-east and other areas of China. They also have about 20,000 specimens of lichens and about 10,000 specimens of fungi.

In 1977 Prof. Gao published a large volume: *Flora muscorum Chinae boreali-orientalis* (404 pp.) which has been highly valued. Unfortunately, the book does not carry the author's name, but we can recognize Prof. Gao's authorship from 10 new taxa described at the end of the book. Prof. Gao has also published, with Mr. Chang, another book dealing with the liverworts of north-east China: *Flora hepaticarum Chinae boreali-orientalis* (220 pp., 1981). It is my pleasure to report that the local government gave them three certificates of merit for their research works, and you can see them hanging on the wall of Prof. Gao's office. I must say that Shenyang is one of the centres of Chinese bryology.

During our stay there, Prof. Gao took us to two very interesting places for bryology: Chien Shan (Mt.) near An-shan in Liaoning Prov. and Chan-bai Mountains in Jilin (Kirin) Prov. I really enjoyed these field trips.

The Chang-bai Mountain Research Station belongs to the Institute of Forestry and Soil Sciences, Shenyang, and is located about 70 km. north of the summit of Chang-bai Mt. There is a road to the summit (2,692m. alt.) from the station, and we easily got to the summit area by jeep to work on the bryophytes there. The station has good facilities for scientists from other areas. However, it is not very easy for them to reach there, and one must travel overnight on a train from Shenyang, followed by about a 3-hour jeep ride in the mountains. Collecting bryophytes in the Chang-bai Mountain area is wonderful, as recently reported by Koponen and others (1983). We added a few moss species to their list. While I was busy with bryophytes, my wife enjoyed the beautiful scenery and alpine vegetation, gorgeous waterfalls and a hot spring beside a mountain stream. It was a pity that we could not see Tenchi, a lake near the summit, or North Korea beyond the lake, as they

were hidden by fog.

2. Institute of Botany, Academia Sinica, Peking.

I must say this is one of the largest botanical institutes in the world. The Institute has 9 research divisions and a botanical garden. These divisions cover all fields of botany, such as taxonomy, ecology, morphology, cytology, chemistry, physiology and palaeobotany. About 400 scientists (excluding technical assistants) work in these divisions. They have compiled half of the 80 volumes of a Chinese vascular flora which will include about 30,000 species. The Institute has a complicated history. At the time we visited the Institute, it was temporarily housed in an old temple near the zoo. We looked around some of the laboratories in these temple housings. Every scientist was working hard, and I felt that more important for botanical research might be the abilities of scientists and their continuous efforts, instead of buildings.

There are 45 botanists working in the taxonomy and geography division which has more than 1.5 million specimens of vascular plants. Most of these botanists are working on vascular plants, but 4 are bryologists: Prof. P.C. Wu (bryophytes of China); Mrs. J. S. Lou (mosses); Mr. S. He and Miss M.Z. Wang. Almost all the bryophyte collections of the late Prof. Chen are located in this Institute. This important collection had a complicated history before being settled in Peking. Prof. Wu made much effort to save it during the cultural revolution. It was originally housed at the Nanking Teachers College but the bryophyte herbarium was used for some other purposes, and the herbarium had been moved to other places several times. Prof. Wu finally brought the specimens to Peking due to Mrs. C.L. Wan's kind request and help.

Prof. Wu told me that the bryophyte collections have grown fast from around 20,000 specimens about 10 years ago to about 100,000 at present. However, it was a pity, when we visited Peking, that the whole bryological collection was housed, with all bryological staff members, in a small temporary house of about 5m x 10m. It was almost impossible to work in such a small space. One day Prof. Wu took us to see a huge new herbarium building, under construction, located near the botanical garden. The new building has 6 floors plus basement, and has a total floor space of 13,000 m². It must be one of the world's largest herbarium buildings. It will have a large research area, a lecture hall with 200 seats and living quarters for visiting scientists

are also under construction. Prof. Wu told me that it was to be completed by the end of 1983, and I imagine they should be settled now in the new herbarium.

As Prof. Wu wrote in his recent article in the *Bryological Times* (24:3, 1984), Prof. Paul Fearn* Jr. was staying in Peking when we reached there on September 16, 1983. We stayed at the same place, Friendship Hotel, located about 10 minutes by car from the Institute where we were treated very warmly. On the last day in Peking, we had an exciting meeting with several people from outside Peking. Mrs. C.L. Wan, wife of the late Prof. P.C. Chen, a graceful lady who lives in Nanking, came to Peking to see us. She is very well although she is very old. She has 4 daughters and 1 son, and now 2 grandchildren. At the same time, we met Prof. Ranliang Hu of Teachers University, Shanghai, who is a specialist on the Entodontaceae of China, and who worked at the New York Botanical Garden in 1982. Mr. Zhong-ling Liu of Shanghai Museum of Natural History, a young bryologist, was also at the Institute with Prof. Hu.

They told me that the Nanking Teachers College raised a tomb to Prof. Chen on a hill near the city. I evaluate Prof. Chen's books "*Genera muscorum Sinicorum*", *pars prima* (1963) and *pars secunda* (1978), as both monumental and fundamental works on Chinese mosses. It was a great tragedy to lose Prof. Chen, father of bryology in China, during the cultural revolution.** However, I should say that Prof. Chen's great contributions and his desires are being carried on by his many active and capable students.

We had very pleasant days at the Institute, visiting many sightseeing spots in or outside Peking, such as the Great Wall, Ming Tomb, the Fragrant Hill and the Sleeping Temple. We left Peking airport about noon on 21 September for our last destination, Guangzhou.

3. South China Institute of Botany, Academia Sinica, Guangzhou

Guangzhou is located about 140 km. north-west of Hong Kong and was very hot when we were there. The Institute has 6 divisions, a botanical garden and an arboretum. The taxonomy division has 22 scientists, and most of them have been working on the

*[An account of Prof. Redfearn's visit will be published in a later issue. Ed.]

**[For obituary notice and portrait see *Taxon* 29 (5/6): 671-72, 1980. Ed.]

vascular plants of southern China, including Hainan Island. The Institute is the centre of botanical research in south China, and has about 600,000 herbarium specimens and a library of 40,000 botanical publications. Several years ago it was decided to work also on bryophytes. I agreed with Dr. F.H. Chen, Director of the Institute, that bryology is very interesting and important for the flora of south China. Mrs. Pan-juan Lin, an enthusiastic lady, is working on the bryophytes of the region. Her main interest is monographic work on the tropical moss family Calymperaceae and floristic work on the bryophytes of south China. The Institute has about 20,000 bryophyte specimens mostly collected by Mrs. Lin.

On our first day in Guangzhou, Mr. Lin and Dr. Chiming Hu, a vascular taxonomist, took us to the botanical garden, a beautiful place with many kinds of bamboo and tropical plants growing in the open air. This botanical garden was established in 1958, and has an area of 300 ha.

Mrs. Lin and Dr. Hu also took us to Seven Star Mountain (a limestone area), and Dinghu Mountain, about 80 km. west of Guangzhou. I collected a

Cyathodium and several species of *Fissidens* at Seven Star Mountain.

There is an arboretum on Mt. Dinghu. It covers over 1,100 ha., and more than 250 ha. are natural forest. About 143 species of bryophytes have been recorded from the mountain, most being tropical or subtropical species. I am sure this number will certainly be increased by future investigations. We enjoyed this field trip very much and collected quite a few specimens of bryophytes.

After a very fruitful five days, though it was hot, we left Guangzhou for Hong Kong on Sept. 26, 1983.

This trip to China reminded me of the poor research conditions we had in Japan after the second World War. We did not have enough reference books on bryophytes, no foreign specimens to compare with our Japanese materials, no good microscopes for observation of fine structures, etc. etc. I am sure all Chinese bryologists badly need bryological literature (including reprints) and foreign specimens to compare with Chinese materials. I hope many bryologists outside

China will help Chinese bryologists with these materials. They also need more literature and specimens from neighbouring areas such as Japan, Siberia, south-east Asia, etc.

The wonderful days in China are still fresh in my memory, and I would like to thank again all the people we met for all the kindness we received during our trip.

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Botanical Institute, Hiroshima University, Higashi-senda-machi, Hiroshima 730, Japan.

Doyen gets his Des(s)ert!

MR. E.C. (TED) WALLACE, is an internationally-known and eminent amateur British bryologist, who was for twenty-one years (1948-1969) Secretary of the British Bryological Society, and later its President (1972-1973). He has travelled widely and has presented the British Museum (Natural History) with many valuable specimens.

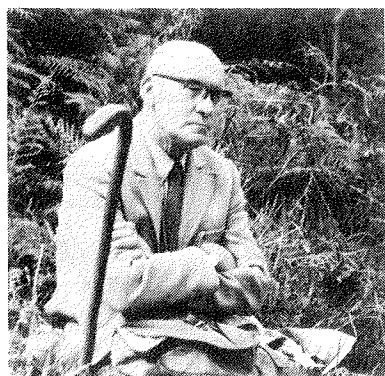


Photo J.C. Gardiner, Sept. 1974. Ex. British Bryological Society Photograph Collection, courtesy of A.R. Perry, Cardiff.

To celebrate the occasion of Ted's 75th birthday on the 14th of February, 1984, Alan Harrington of the British Museum arranged a surprise informal party in his honour and invited the following guests: Alan Eddy, Len Ellis, Jenny Moore and Stuart Honey from the British Museum, the first two being bryologists and the latter two phyco-logists; Stanley Greene and Royce Longton, the present Secretary of the BBS, both from Reading University; Peter Wanstall, a bryologist at Queen Mary College, University of London; and Monica Milnes-Smith and Jack Gardiner, two well-known amateur bryologists from London.

We were to assemble in the Museum's Bryophyte Section. Here, around midday, a note of anxiety slightly ruffled the cerebral atmosphere. Suppose Ted, despite his fixed habit of a Tuesday morning visit, should fail to turn up on this vital day? But all was well. The familiar footsteps of our chief guest were soon heard, and he arrived, benign and smiling, surprised at the sight of so many familiar faces.

A delectable sparkling wine had been selected for the occasion, the rather stubborn corks being deftly drawn by the

experienced hand of Peter Wanstall, and soon Ted's health was drunk. We spent a pleasant half-hour reminiscing and heard, among other things, of Ted's first visit, aged 12, to the Museum with his tin box of mosses for identification.

A table had been booked at the Daquise, a local Polish restaurant, and here we were joined by the BBS Treasurer, Brian O'Shea. Patiently, Alan Harrington guided us through the intricacies of the menu; Kaszanka, Golubly, Shashley, etc. Ted was pleased to find his favourite chocolate ice included among the exotics. Stanley Greene's infectious laughter set the tone. A splendid lunch, rounded off by the digestive national honey liqueur, Krupnik, was enjoyed by all.

M. Milnes-Smith,
141 Dalling Road, London W6 OET

EXCHANGE AND MART

DR. PILOUS wants to sell the remaining copies of *Musci Českoslovenici exsiccati*, Nr. 1 -- 1250, a collection of Middle-European and Carpathian mosses.

Orders to: Zdeněk Pilous,
Komenského Str. 433. 543. 71,
Czechoslovakia.

IAB BRYOLOGICAL METHODS WORKSHOP MAINZ, 1987

THE WORLD CONFERENCE OF BRYOLOGY in Tokyo clearly indicated that bryologists have interests in many non-taxonomical fields in addition to the study of character states and geographic distribution. New methods and approaches to the study of bryophytes are rapidly emerging, and we feel there is a need to share, not only the results of these studies, but also the methodology.

In the framework of the bryological program for the XIV International Botanical Congress in Berlin, 1987, the IAB is planning a bryological methods workshop in Mainz, West Germany. The workshop will be held just prior to or following the actual Congress (not to conflict with a field trip) and will provide "hands-on" experience in bryological methods. We hope that actual experiments can be performed by participants and that techniques in physiology, cytology, experimental ecology, and other aspects can be tried, with guidance by bryological experts. We are anticipating a workshop lasting 3 to 7 days to be held at the University of Mainz (local organizer: Dr. E. Hartmann), where good laboratory facilities are available. We already have instructors for sterilization and culture techniques, chromosome counts and C-banding techniques, pigment extraction, protein analysis, pigment identification and phytochrome experiments. Participants are encouraged to demonstrate techniques and equipment they have developed.

Each workshop instructor will be asked to provide each participant with a printed copy of detailed techniques, sources of supplies and equipment and approximate cost in U.S. dollars or German marks, plus a bibliography of alternative methods and a rationale for the method chosen. We are investigating the possibility of publishing a bryological methods manual based on these workshops. Since most bryologists work in isolation and their students often wish to try different techniques, we hope that this will provide a service to students and researchers by providing more detailed information than is possible in published articles.

We will have to limit participation to about 50 in order to provide actual experience. Costs will be kept as low as possible. We would like a preliminary indication of interest to aid us in planning. An interest form is enclosed with

with this issue of *The Bryological Times* and you are asked to mail it to Dr. Janice M. Glime, to arrive before 1st September, 1984, if you wish to be on the mailing list. Only those persons responding will receive future correspondence.

Organizing Committee for this workshop:-

Dr. Janice Glime, Dept. Biol. Sci.
Michigan Technological University,
Houghton, MI 49931,
U.S.A.

Dr. Elmar Hartmann, Inst. für Allgemeine Botanik der Universität, Saarstrasse 21, 6500, Mainz, West Germany.

Dr. Hans Rudolph, Botanisches Institut, Universität Kiel, Olshausenstr. 40, Biologiezentrum, 2300 Kiel, West Germany.

Dr. Zen Iwatsuki, Botanical Institute, Faculty of Science, Hiroshima University, Higashi-senda-machi, Hiroshima 730, Japan.

RESEARCH OPPORTUNITIES at the Hattori Laboratory

THOSE WHO WERE FORTUNATE enough to take Tour No. 3 to Nichinan after the Tokyo meetings know about the excellent herbarium and library facilities at the Hattori Laboratories. But what most participants had no chance to experience was the wonderful accommodation available.

Adjacent to the main office is a living facility, complete with kitchen, shower, laundry, and sleeping quarters. At one time five of us stayed there quite comfortably. The bedroom is a tatami room (i.e. with a special grass mat floor) with a futon (a mat about 8cm thick) as a bed. This combination is very comfortable and the area is quiet for peaceful sleeping. With grocery stores, post office, photo shop and assorted other shops nearby, living is quite efficient and time can be devoted to the study of bryophytes at a minimal cost. The host is quite generous, but long-term guests should bear such costs as the propane used for cooking and hot water. If you are content with mostly Japanese ingredients, you can eat for about the same cost as in most of the western world, but cheese and other western products are somewhat more expensive. Language is never a problem, even in the shops. If you speak slowly, most Japanese people will understand you, even if they will not speak to you in English very often.

The hepatics laboratory is only a few meters away from the guest house, and the moss laboratory and herbarium are a pleasant 15-20 minute walk. You will find secretaries who speak English and help with every need, whether it is mailing your valuable bryophytes or "figuring out" how to use the Japanese "clothes-line". The herbarium has photocopying facilities, good microscopes and microphotography equipment.

The Hattori Laboratory encourages foreign bryologists to

come and work, and this may well be the most inexpensive and best-equipped place in the world to work in for a long period of time. Several guest researchers can be accommodated and it is thus an excellent place for collaboration, away from the interruptions of home.

For fieldwork, Miyazaki offers luxuriant habitats for pendant and other bryophytes and the hosts will graciously help you get where you want to go.

As an indication of Dr. Hattori's concern for your comfort, I quote his comments verbatim regarding the above description:

"I am a little bit anxious if the visitor supposed our living facility to be of the level of European (much larger in space and comfortable). The living room of my lab, I think, merely provides the lowest level of living for European or American visitors. For example, the room has no air conditioner, so that the visitors may not sleep well in 'tropic nights' in summer. From June to early July it is the rainy season in Nichinan, and the hot and humid summer ends at the end of September, so that the spring and autumn are both shorter here, though these seasons only are comfortable for the visitors from Europe or America."

As a past researcher at the Hattori Laboratory, I encourage any interested bryologist to accept Dr. Hattori's kind offer to be his guest. He can be contacted at the Hattori Botanical Laboratory, Obi, Nichinan-shi, Miyazaki-ken, 889-25, Japan.

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

TECHNIQUES NOTEBOOK

VOLUME OF MOSSES

by Jan Janssens

THE VOLUMES of unfrozen peat samples can be determined with high accuracy and without undue disturbance and contamination by a simple displacement technique. The method is suitable for highly elastic fibrous and woody peats, which are difficult to measure. A peat sample is inserted in a flask with a long neck graduated in ml after calibration (Fig. 1). The

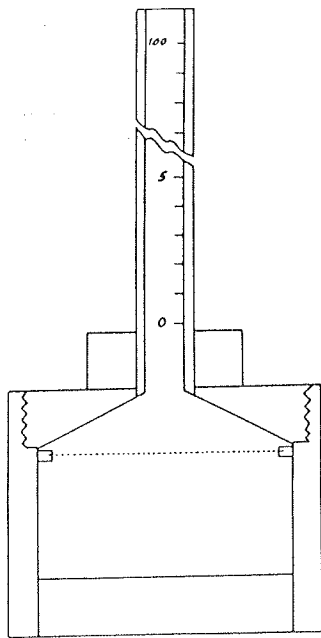


Fig.1. Long-necked graduated flask

increments are marked on transparent tape. With a 250-ml flask and a neck 1-m long by 1.5 cm inside diameter, an accuracy of 0.5 ml on the volumetric measurement of peat can easily be obtained. A known volume of water, enough to reach the 0-ml mark on the graduated neck if no peat is in the flask, is then poured through the neck. A screen at the base of the neck restrains floating particles of peat from reaching the meniscus in the graduated neck, preserves the peat sample *en bloc*, and allows complete recovery of the peat. Water can be added to a level just above the screen before the flask is reassembled, so that there are fewer problems with trapped air.

If chemical studies are planned, and leaching and contamination has to be avoided, the peat samples can be enclosed tightly in a plastic food wrapping before insertion in the flask; a

correction for the volume of the wrapping can easily be made. When done carefully, without much compaction, the error is small (c. 2%). This alternative technique also avoids the replacement of air by water in partially-dried peat samples - unsaturated peat collected from cores above the water horizon. No screen is needed. Bulk density profiles of Red Lake Peatland cores were derived from measurements on consecutive 10-cm increments of a half section core by using the plastic-wrap method. After determination of volume and wet weight (to derive wet density, which can be used to calculate the volume of macro- and microfossil samples), the peat samples can be dried in a ventilated oven at 65° C to restrict loss of some of the more volatile organic components. Dry weight is determined after one-half hour in a desiccator. Bulk density is expressed in g/1000 cm³.

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CULTURE TECHNIQUES

for Physiological Studies

by JANICE GLIME

MOST MOSS SPORES are easily cultured on a variety of media, but when quantitative analysis is required, numerous problems arise. One spore gives rise to a large protonema with many buds, but many spores produce nearly the same number of buds and gametophores. Gradient analysis or dose response curves then become difficult to calculate because of problems in observing germination of individual spores in a large mass through a cloudy Petri plate.

Several good techniques can be borrowed from higher plant tissue-culture methods. I have successfully used the following methods contributed from Dr. Alex Diner, BioSource Institute, Michigan Technological University, Houghton. To achieve a gradient within a plate, slope the plate so that agar at one end will nearly reach the rim while the agar at the upper end will barely cover the bottom. In this plate pour agar containing the diffusible substance for which you desire a gradient (IAA, ACC, etc.). Allow this agar to set (e.g. overnight) and then place the plate flat. Onto the slanted agar pour a layer of agar without the diffusible substance. The rate of diffusion can be slowed by using twice as much agar per unit of water when

preparing the neutral agar medium. The second layer of agar should be cooled to 55°C before it is poured to prevent melting the agar slant. This temperature is close to its solidification temperature. A water bath can be used to maintain this temperature.

Once a gradient is achieved, the next problem is to distribute the spores in a way that results can be quantified. David McMullen and I tried several methods to disperse the spores and quantify the results, using "tween" as a wetting agent. Our final method combines several known techniques. First a capsule is opened on a sterile slide (see Glime, 1984, *Mosses for teaching tropisms*, *Bryol. Times* 25: 5-6.). Spores are squeezed out onto the slide and the capsule is discarded. To the spore mass, add 3-4 drops of "wet water". Our wet water was made by adding 2 drops of liquid dishwashing detergent (Joy) to 250 ml distilled water and autoclaving this for 20 minutes at 120°C, +1 g. The water is cooled to room temperature and sterile pipettes are used to transfer the drops. All this should be done under sterile conditions such as those described for tropisms. Once the spores are immersed in water, alcohol flame an inoculating loop with a small (1-2mm) loop, cool the loop by touching the agar at the edge, and stir and mix the spores in the water with the loop. The low concentration end of the agar slant should be marked with crayon or marker. Then prepare a disc the size of the Petri plate by marking 8 black dots across the diameter at 1-cm intervals (or use the number and interval which suits your purpose). Place this disc under the Petri plate. Dip the inoculating needle in the drop of spores and water and touch the agar over the first dot. Repeat the procedure for each dot. If several different treatments are used in different plates, spores from the same capsule can be used for each of the plates, thus providing paired treatments and reducing differences caused by genetic or past history differences. The needle should be alcohol flamed and cooled between each plate. A new capsule should be used for each succeeding replicate set. Finally, to prevent excessive evaporation and secondary contamination, seal the plate at its perimeter with parafilm. A set from one capsule should be labelled as such, with date of inoculation. If cellophane is used on the agar, single spore cultures can be transferred after the protonema is large enough to handle, but before it grows into other protonemata. This must be done 2-4 days after

[continued over]

* Column Editor. Janice M. Glime

[continued from p.7.]

inoculation. If no cellophane is used, the protonema can be removed with a fragment of agar. This transfer must be done in a sterile chamber.

The next major problem is scoring the results. First, the lid of the plate will fog in the light, obscuring your vision. This can be prevented by placing an empty Petri plate (both halves) over your culture plate. This contribution from Alex Diner is based on the greenhouse effect. Light is transformed into shorter heat rays as it travels through glass (and to a lesser extent through plastic). This means the temperature inside the plate is greater than outside and water condenses on the lid (as it does on your car windshield). By placing a plate on top, you have moved the greenhouse effect to the upper plate. This method has two advantages. It not only reduces condensation on the lid, it also maintains a Petri plate temperature closer to the one you measure in your growth chamber.

High light intensity is desirable. This can often be more than doubled by having all walls, ceiling and floor of the chamber white. Lights will also raise the temperature. However, if fluorescent lights are used at the top and an air opening of about 10cm extends across the top of one wall, most of the hot air will escape and your cultures will experience little temperature increase.

Daylength should be controlled by a reliable timer. Simple household timers used to turn on lamps are not powerful enough to turn on several fluorescent lamps. Even those that succeed soon wear out and buying several timers is as expensive as buying one good electrical timer.

Department of Biological Sciences, Michigan Technological University, Houghton, MI 49931, U.S.A.

BRYOLOGICAL FORAY in U.S.A.

THE NINTH ANNUAL A. Leroy Andrews Bryological Foray will be held in central Pennsylvania, 28-30 September, 1984. Headquarters and accommodation will be at the Sieg Conference Center of Lock Haven University in Lamar.

For further information, please contact: Dr. Ronald A. Pursell, Department of Biology, 202, Buckhout Laboratory, The Pennsylvania State University, University Park, PA 16802, U.S.A.

Membership of IAB

THE FOLLOWING LISTS, for the period 1 November - 29th February, 1984, update those already published. The last list appeared in *Bryol. Times* 24:8.

New Members

Bernth, Thomas*; Bhatla, Satish C.*; Brugués, Montserrat; Cetin, Barbaros*; Crandall - Stotler, Barbara; Crivelli, Philippe*; Daniels, R.E.; Ederra, Alicia*; Eriksson, Fritz*; Evje, Geir Arne*; Gökler, Isa*; Hedenäs, Lars*; Hombler, Kare*; Jacques, Eduard; Klama, Henryk*; Lo Giudice, Rosa*; Malmer, Nils*; Meinunger, Ludwig; Noailles, Marie Claude; Öztürk, Münir*; Pant, Giribala*; Ponciano, Gloria Yadao*; Privitera, Maria*; Rudolph, Hansjörg*; Rydin, Hakan*; Simola, Lusa K.*; Sjögren, Erik; Sloover, Jacques R. de*; Spiess, Luretta D.*; Taylor, Jane; Vaalund, Olav*; Varo, Juan*; Wigginton, M. J.*; Zarnowiec, Jan*.

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Sipman, Harry, Botanisches Museum, Konigin-Luise-Strasse 6 - 8, D-1000 Berlin 33, Germany, B.R.D.

NOTE* Addresses are only given for those members with an * after their surname or family name, i.e. for those whose names will not be found in S. R. Gradstein's *Directory of bryologists and bryological research*, Ed.2 (Regnum Vegetabile Vol. 99, 1979), or where their present address is different to that given in the *Directory*.

Sixth All India Botanical Conference- Bhubaneshwar

28-30 Dec., 1983.

DURING THE ALL INDIA BOTANICAL CONFERENCE, in a Workshop on "Plant Conservation", the author presented a paper on "Development of 'Moss Gardens' for conservation of rare and endangered liverworts" in respect of the Indian hepatic flora.

In the paper reading sessions, thirteen papers were presented on bryophytes, ten from Lucknow University and one each from Kumaun University (Nainital), Botanical Survey of India (Allahabad) and National Botanical Research Institute (Lucknow) as follows:

1. Kumar D. and A. Jain. The status of *Plagiochasma intermedium* L. et G. in India.
2. Asthana, A.K. A new *Folio-ceros* from Silent Valley.
3. Kumar, D. Role of sporophyte characters in the taxonomy of the genus *Radula* Dumort.
4. Srivastava, S.C. Sporophyte and SEM details of spore and elater of *Apometzgeria pubescens* from Valley of Flowers.
5. Kumar, A. Scanning electron microscopy of spores of some *Jungermannia* L.
6. Awasthi, U.S. Capsule wall structure in some Indian taxa of *Ptychanthoideae*.
7. Jain, A. The genus *Taxilejeunea* in India.
8. Saxena, S. On two species of *Plagiochila* from eastern Himalayas.
9. Srivastava G. An interesting *Cololejeunea* from Kerala.
10. Shaheen, F. The genus *Ceratolejeunea* in India.
11. Pant G.B. and S.D. Tiwari. Bryophyte communities associated with various mineral-rich substrates in Kumaun Himalayas.
12. Lal, J. Bryophytes of Kanha National Park (Madhya Pradesh).
13. Nath, V. The genus *Acrobolbus* Nees in India.

J. Lal, Botanical Survey of India, 10-Chatham Lines, Allahabad 211002, India.

ADVANCES IN BRYOLOGY

THE TYPING OF THE ADVANCES, Vol. II is nearing completion and it will be about half the size of Volume I. The regular price will be DM 100-120, and the special IAB Membership price is fixed at DM 40. An order form is enclosed with this issue.

It will be the last volume to appear under Dr. W. Schultze-Motel's editorship. It is hoped to be able to announce his successor in the next issue of the *Bryological Times*.

Personalia

Dr. H.J.B. Birks has resigned his lectureship at the School of Botany, University of Cambridge.

Dr. R. Grolle has been elected a Corresponding Member of the Finnish Biological Society, Vanamo.

Recent Publications

Briolatina No. 2: 1-8, 1984.

Bryologische Beiträge 3: 1-119, 1984.

Bryologist 86(4): 309-418, 1983.

Miscnea Bryol. Lichen. 9(9):181-202, 1983.

Taxon 33(1): 1-168, 1984.

[*Bryomania* Issue 45, May 25, 1-8, 1983.]

GRADSTEIN, S.R. (ed.) 1983.

Studies on Colombian Cryptogams XI-XX Utrecht, Institute of Systematic Botany.

This series of papers on cryptogamic plant groups, especially mosses, hepatics and lichens, of Colombia and adjacent, tropical Andean regions, is published in the framework of the ECOANDES project.

The present volume contains revisions of *Frullania*, *Herbertus*, *Kingiobryum*, *Dendrocryphaea*, *Metzgeria* and *Stereocaulon*, a key to the macrolichens of Colombia, a review of the bryological exploration of the Andes, and a quantitative analysis of bryophyte diversity in relation to ecological parameters along an altitudinal transect.

A limited number of copies of this volume is available for sale, at the price of D.Fl.25 (including postage). They can be ordered by cheque or money order from the Institute of Systematic Botany, Heidelberglaan 2, Utrecht, The Netherlands - orders prepaid please!

FRAHM, J-P and W. Frey, 1983. *Moosflora*. Stuttgart, Verlag Eugen Ulmer. 522 pp., 108 figs. ISBN 3-8001-2463-7. Price DM. 29.30.

This "Uni-Taschenbuch", (UTB 1250), although its title does not say so, treats the mosses and liverworts of the whole of Western Germany and is, in fact, the successor to K. Bertsch's *Moosflora von Südwestdeutschland*.

It is packed with information. There is a synopsis of the classification of the Bryophyta, brief notes on collecting and identification, an illustrated glossary and a list of author names. Keys are provided for

for the higher groups of bryophytes and two sets to genera, one for vegetative and the other for sporophyte-bearing material: there are also keys to species. The descriptions are necessarily brief, concentrating on salient characters: most species are illustrated, if sketchily. Distribution within Germany and a brief synopsis of the world range of taxa is provided. Its handy size, 180 x 120 x 20 mm, means that it can be carried in the pocket.

HOE BRYOPHYTE HERBARIUM

IT IS REPORTED in *Taxon* 33(1): 159, 1984, that William Hoe, has donated his entire collection of Hawaiian bryophytes (about 5,700 specimens) and all his bryophyte material from other parts of the world (about 17,100 specimens) to the Bishop Museum, Honolulu.

BRYOLOGICAL WORKSHOP

In DUISBURG (B.R.D.)

and ROBERTVILLE (Belgium)

FROM FRIDAY 23rd to Sunday 25th November, 1984, Profs. R. Duell and R. Schumacker are jointly organizing a Bryological Workshop to be held in Duisburg (B.R.D.) and Robertville (Belgium). There will be sessions on important themes such as taxonomy of difficult groups (e.g. R. Duell: *Didymodon*, *Bryoerythrophyllum*; G. Nordhorn-Richter: *Pohlia*; mapping bryophytes in West Germany, etc. (e.g. R. Duell, R. Schumacker); importance of life strategies and growth-forms (e.g. R. Duell, H. During); distribution of European bryophytes (e.g. R. Schumacker, R. Duell); etc.

On November 23rd, the session will be in Duisburg. In the evening the delegates will go to Mont Rigi/Robertville where they will stay for the remainder of the time. Accommodation at Mont Rigi will be in the Station Scientifique des Hautes Fagnes. An excursion from Robertville is also planned. Everybody who is interested in participating and contributing a paper should write to one of the undersigned by 1st October, 1984.

R. Duell, Fach Botanik, Universität - Gesamthochschule, 4100 Duisburg, Lotharstr. 65, B.R.D.

R. Schumacker, Station Scientifique des Hautes Fagnes, Mont Rigi, B-4898, Robertville, Belgium.

DIARY

1984

- May 12-13. SBLs & BLAM, Westlichen Bodensee-Gebiet. SBLs Annual assembly with a joint SBLs & BLAM field trip. Leaders Alfons Schaefer-Verwimp and his wife Inge Verwimp. Schienerberg, southern Germany and Ittinger Wald (Thurgau, Switzerland). Further details from Dr. K. Ammann, Syst.-Geobot. Institut, Altenbergrain 21, CH-3013, Bern, Switzerland or Dr. G. Philippi, Landessaml. f. Naturkunde, 7500 Karlsruhe, B.R.D.
- 18-20 May. BLAM. Bryologische Exkursion im Harz. Leader W. Heimhold. Registration by 1st April to W. Heimhold, Rottenweg 4, Langelsheim 1, B.R.D.
- June 4 - 6 July. Course in Field Bryology to be taught by Dr. Lewis E. Anderson at Highlands Biological Station, North Carolina. Further information in *Bryol. Times* 23:8, and from Dr. Richard C. Bruce, Director, Highlands Biological Station, P. O. Drawer 580, Highlands, North Carolina 28741, U.S.A. Tel. (704) 526-2602.
- July 18-25. BBS. Summer Field Meeting, Wooler, Northumberland. Local Sec.: Dr. P.J. Lightowlers, Institute of Terrestrial Ecology, Bush Estate, Penicuik, Midlothian EH26 0QB, Scotland. Details in *Bull. BBS* 43:13.
- July 21-31. DBLW. Summer Field Meeting in the Vosge, (Lüttenbach). For further information (and registration before 1st April), contact Han van Dobben, Mariaplaats 16, Utrecht 3111 LJ.
- Aug. 3-5. ABLs Foray. Rocky Mountain National Park, Estes Park, Colorado. Based on the LAZY T Motor Lodge, Estes Park. Foray reservations and further

- particulars from Roger A. Anderson, Dept. Biol. Sciences, Univ. Denver, Denver CO 80208, U.S.A. or Dr. Sam Schushan E.P.O. Biol., Dept. Mail Code 334, Univ. Colorado, Boulder, CO 80309, U.S.A.
- Aug. 5-9. ABLs. Annual Meeting Fort Collins, Colorado. For details see *Bryol. Times* 25:7.
- Aug. 13-24. Summer course in Bryology and Lichenology, Universities of Liège and Utrecht. Station Scientifiques des Hautes Fagnes, Mont Rigi, B-4898, Robertville, Belgium. Further particulars from Prof. R. Schumacker at the above address.
- Aug. 20-24. VIIIth. International Symposium on Sexual Reproduction of Seed Plants, Ferns and Mosses. Wageningen. Further information from Profs. J.L. van Went and M.T.M. Willmse, Arboretumlaan 4, 6703 BD, Wageningen, The Netherlands.
- Aug. 23-28. SBLs. Field Meeting, Val Piora, Ticino (central Alps SE of St. Gotthard), Switzerland. Further details from Dr. K. Ammann, Syst.-Geobot. Institut, Altenbergrain 21, CH-3013, Bern, Switzerland.
- Sept. 15-16. BBS Paper-reading Meeting and AGM. University of Birmingham. Local Sec.: Dr. D. C. Lindsay, 20 Gibbs Hill Road, West Heath, Birmingham B31 3NZ. For details see *Bull. BBS*, 43:14.
- Sept. 28-30. Lamar, Pennsylvania. 9th A. Leroy Andrews Foray. For further information see this issue, p. 8.
- Nov. 17-18. BBS. Taxonomic Workshop. University of Keele. Local Sec.: Dr. R. Murphy, 73, St. Christopher Ave., Penkull, Stoke-on-Trent ST4 5NA. For details, see *Bull. BBS*, 43:14.
- Nov. 23-25. Bryological Workshop. Duisburg and Robertville. Organizers Profs. R. Düll and R. Schumacker. See this issue p. 9 for further details.
- For details of BBS local Meetings

and Bryophyte Courses at Field Studies Council Centres, see *Bull. BBS*. 43:15.

1985

- April. BBS. Spring Field Meeting. Chichester, West Sussex. Local Sec.: Mr. R. C. Stern, 14, Cherry Avenue, Yapton, Arundel, West Sussex, BN18 0LB. Preliminary details in *Bull. BBS*. 43:14.
- July 4-10. Brighton, England. Third International Congress of Systematic and Evolutionary Biology.
- July 28 - 3 Aug. BBS. Summer Field Meeting, Bavarian Alps. Local Sec.: Prof. Dr. R. Düll, Lehrstuhl f. Biologie (Botanik), D. Pädagog. Hochschule, 4100 Duisburg 1, Lotharstrasse 65, B.R.D. Preliminary details in *Bull. BBS*, 43:14.
- August 5-10. IAB. Budapest and Vácrtót. Conference on Bryoecology. For 1st circular, see *Bryol. Times* 24:7.
- August 12-14. CEBWG. Eger, Hungary. 4th Biennial Meeting. For 1st circular, see *Bryol. Times* 24:7.
- September. AETFAT. St. Louis. Proposed mini-symposium on African bryophytes. For further information see *Bryol. Times* 23:8.
- 1987
- July 24-1 Aug. XIVth IBC Berlin (West). Preceded by IAPT Nomenclature Sessions, July 20-24. For preliminary notice, see *Bryol. Times* 23:9.
- Congress Address: XIV IBC. Bot. Garden & Museum, Königin-Luise-Strasse 6 - 8, D-1000, Berlin (West) 33, Germany.

THE INTERNATIONAL ASSOCIATION OF BRYOLOGISTS publishes *The Bryological Times* every two months and the *Advances in Bryology* every two years. Material for *The Bryological Times* can be sent at any time, but submission dates for the *Advances* should be discussed with its editor, Dr. Schultze-Motel (Berlin). The editors do not accept responsibility for the views of authors.

For details regarding membership of the International Association of Bryologists (currently U.S. \$ 8.00 p.a.), write to the Honorary Secretary, Dr. S.R. Gradstein, Instituut voor Systematische Plantkunde, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands.

THE BRYOLOGICAL TIMES is published in Utrecht and distributed from Beijing (China), Kingston (Tasmania), Missouri (USA), Reading (UK), Tokyo (Japan), Vácrtót (Hungary) and Utrecht. All correspondence concerning mailing to: M.A. van Slageren, Instituut voor Systematische Plantkunde, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands.

ITEMS FOR THE NEXT ISSUE to be with the Editor, Dr. S.W. Greene, Department of Botany, The University of Reading, London Road, Reading RG1 5AQ, Berkshire, England, (Telex 847813 RULIB) by 1st June at the latest. Items for the Techniques Notebook should be sent direct to Dr. Janice Glime, Dept. of Biological Sciences, Michigan Technological University, Houghton, Michigan 49931, U.S.A.