

# AUSTRALASIAN

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## 12th Australian Bryophyte Workshop 2014 Eungella, Central Mackay Coast, Queensland

### Lyn Cave

Twenty eager participants arrived at Quandong Creek Rainforest Lodge, in Eungella National Park, Queensland, on the afternoon of Sunday, 29 June, ready for five days of bryologising. Our group was almost all Australian, with Barbara (a student from Brazil) and Daniel (soon to return to the USA) comprising the 'international' contingent. We were soon made very welcome by our hosts, Merrilyn and Evert Bulder, and settled into our accommodation.

The workshop organisers, Andrew Franks and Rosemary Lovatt, seemed to be of the belief that since everyone had arrived safely, and more or less on time, there would be nothing further for them to worry about! Andrew gave an introductory talk, describing the Central Mackay Coast bioregion, and informing us that the bryophytes of the area had not been extensively studied. The conference notes provided were very comprehensive, and well put-together. Andrew enlightened us on possible health and safety issues with stinging trees, snakes, scrub itch, ticks, and leeches. Those wishing to have personal encounters with these nasties would have been sorely disappointed; the field trips went almost without incident.

On the first morning, those of us from southern states felt quite at home when faced with a hard white frost, a reminder that we were 900 m above sea level. However, the cold conditions were soon forgotten: it was generally agreed that the eggs and bacon breakfast served by Merrilyn and Evert set a new standard for bryophyte workshops!

Our first field trips were to sites within Eungella National Park. The Mt Dalrymple trail, through evergreen microphyll mossy forest provided plenty of opportunity to collect bryophytes, but many of us didn't manage to leave the roadside in the time available! Those that did make it into the forest soon found plenty of interest. Significant bryophytes found here included *Camptochaete excavata* and the epiphytes *Trachyloma diversinerve*, *Braithwaitea sulcata* and *Lopidium struthiopteris*. However it was the crimson-tinged complanate moss growing over wet rock along the roadside that captured much attention. It turned out to be *Hookeriopsis utacamundiana*, the only species of the genus that occurs in the Australian tropics.

After a lunch stop at the Sky Window carpark, many more collections were made, all within a very short distance. And the views down the valley to the coast were magnificent.

Our field day ended with a walk around the Washing Pool Circuit, under evergreen notophyll feather palm vine forest. This provided more good collecting in particular to find *Mesochaete undulata* and *Tetraphidopsis pusilla* growing on the riverbank. Although most of us completed the 2 km circuit comfortably, two keen bryologists (who shall remain anonymous) managed to extend their walk to 6.9 km, finishing at a place unknown to them, and at the time, to us. Their eventual return was very welcome, especially to Andrew!

While the rest of us were out, Andi Cairns and Helen Ramsay took advantage of probably the only quiet time at the lodge, working together over microscopes. In the evening, Andi presented a talk titled 'Not always the usual suspects – new additions to the Bryo Flora of the Australian Wet Tropics' that included information on a number of new moss species that she and David Meagher have found. Andi provided participants with amendments to the 'Key to Genera of Australian Mosses' to reflect some new generic records.





View to the coast from Sky Window, Eungella.



Roadside bryologising — Alison Downing, Nimal Karunajeewa, Chris Cargill, Pina Milne (obscured), Graham Bell, Rosemary Lovatt, Cécile Gueidan.

Paddy Dalton's talk, 'In the footsteps of Joseph Dalton Hooker', was an account of his recent collecting expedition in the Cape Horn Archipelago. The forthcoming IAB meeting in January 2015 will provide an opportunity for others to see the area for themselves.

Pina Milne gave a synopsis of 'The family Neckeraceae in Australia', bringing us up to date with changes made since the publication of her account in 'The Flora of Australia' in 2005. Of all Australian states, Queensland has the greatest number of species of Neckeraceae; and quite a number were found during the workshop.

For the second day's field trip, Andrew and Rosemary had chosen two very different sites in the Conway National Park, on the coast near Airlie Beach. The Coastal Fringe Circuit, through lowland rainforest was much drier than the Kingfisher Circuit, which descended through a rainforest valley. Some people eschewed the promised 300 steps and elected to walk along the road instead. Several new bryophyte records for the Central Mackay Coast bioregion were found: *Neckeropsis cyclophylla* from the Kingfisher Circuit, *Meteoriopsis reclinata* and *Aerobryopsis longissima* from Conway National Park, were all southern range extensions.

For her evening talk, Chris Cargill tackled a difficult liverwort genus with 'Adding the Upper Crust: *Riccia* Up North', in which she presented her recent findings. For this group, morphology alone is not sufficient to separate the taxa, and molecular work is needed also. This is not good news for field bryologists!

Cécile Gueidan, the lone lichenologist at the workshop, gave a talk entitled '*Willeya*, a poorly known tropical lichen genus' from Vietnam, closely related to the genus *Staurothele*, that also occurs in tropical Australia.

The morning of our third day saw us heading back down the range to the beautiful Finch Hatton Gorge. Once again we found plenty of bryophytes to keep us busy, and it took a long time for some of us to get 50 metres from the carpark. Only the determined few made it to the end of the track; most ventured no farther than the beautiful Araluen Cascades. Here, Daniel Stanton indulged in some Extreme Collecting techniques, to gather *Fissidens* specimens from wet rocks by the river, his contribution to Rod Seppelt's call for Queensland specimens. (Rod is preparing a treatment of *Fissidens* for Australian Mosses Online.)

In the afternoon, the party split into two groups. Chris Cargill, Graham Bell and Alison Downing escaped with Rosemary Lovatt to look for bryophytes along Schumann's Road at Eungella. After one or two stops where you could say that bryophytes were relatively underwhelming, Chris struck gold, finding magnificent populations of *Anthoceros punctatus*, on the roadside in relatively open fields on the top of the range. The second stop was very exciting, particularly for anyone with an interest in thallose liverworts. Graham had previously noted *bright green* on roadside structures along the Eungella to Mackay Road, just below the top of the escarpment.

Along the roadside, Graham located a treasure trove of thallose liverworts, including *Reboulia hemisphaerica*, *Asterella drummondii* and *Riccia*. However, the site just below the village was also home to *Rhodobryum aubertii*. And the irony was that these gems were collected in spite of the fact that the party were unable to access the concrete structures that had attracted Graham's attention in the first place!

The larger group stayed at Quandong Creek, to process specimens and make use of the microscope lab that Evert had set up for us in a marquee.

Students presented talks on Thursday night. Elly Pearce, from the University of Queensland, discussed 'Species turnover of epiphytic bryophytes in cloud forest of south-east Queensland: a comparative study'. She found that liverwort composition of cloud forest is more likely to be influenced by microclimate than is moss composition. At her sites, liverwort species richness was also greater than that of mosses.



Daniel Stanton  
collecting *Fissidens*.



Microscopes in the marquee – Helen Ramsay, Paddy Dalton, Daniel Stanton.

Contrasting with the tropical and subtropical focus of many of the talks, Daniel Stanton, who also doubled as our capable minibus driver, spoke about subantarctic mosses in 'Functional trait analysis of Macquarie Island mosses'. Daniel is investigating whether techniques used to study vascular plant populations can be validly applied to cryptogams.

In addition, Barbara Azevedo de Oliveira presented a poster from her student group entitled 'Taxonomic survey of leafy liverworts in an urban forest fragment in the municipality of Belo Horizonte, state of Minas Gerais, Brazil'. Barbara's study produced several new records for the Minas Gerais state.

The last field day was spent closer to the coast, our first stop being in dense tropical rainforest at the top of Mt Blackwood, a prominent feature of the coastal plain. Here we found *Garovaglia* in abundance. For those unable to drive past a good roadside bank, there was a fine example part way down, which yielded more samples of *Fissidens* for Rod while a species of *Radula* grew over the exposed rocks.

Right at the coast, Cape Hillsborough proved an excellent spot for a lunch stop. After an introduction to the area by the National Parks Ranger, we followed the Yuibera Trail through coastal woodland to a small area of rainforest with interesting conglomerate rock formations. Signs along the track highlighted aspects of the lifestyle of the Yuibera Aboriginal people. Bryophytes were less common than at our other field sites, but we found very nice capsule-bearing material of *Trachycarpidium brisbanicum* and fertile (sexual and asexual) *Calymperes tenerum* growing at the base of a palm.



Introduction to Cape Hillsborough: Daniel Stanton, Irene Champion, ranger, Pina Milne, Graham Bell, Alison Downing, Gary & Suzanne Clark



After yet another fantastic dinner, workshopers settled in for our meeting to wrap up the workshop. A proposal to meet in two years in South Australia was unanimously accepted and we concluded a light-hearted evening, with David Meagher's excellent quiz testing our wits. 'Awards' were presented, speeches of thanks were made, bags were packed. It was hard to believe our time at Eungella had finished.

For a small group unwilling to go home, Andrew Franks had arranged a post-workshop trip to Whitsunday Peak on Friday July 4. National Parks staff ferried us from Airlie Beach to Whitsunday Island by boat, agreeing to pick us up again in the afternoon. We walked the track through forest to the top of the peak (altitude 407 m), where we found abundant *Campylopus* and *Leucobryum* on the summit rocks. Despite not being the best day for picture-postcard views, we caught glimpses of the surrounding islands through gaps in the clouds. Certainly a very beautiful part of the world!



Transport to Whitsunday Island.



View towards Hamilton Island from Whitsunday Peak.

At Eungella we were given a fine introduction to what was, for many of us, a very different flora. We hope that, between us, we have added to the bryological knowledge for the region — one of Andrew's and Rosemary's main aims. Congratulations are due to both of them for such a well-run workshop.



## Mosses

The tender little mosses that grow upon the stone,  
They have no pretty blossoms that they can call their own.  
We do not stoop to smell them for the fragrance they impart,  
Yet in the world of beauty they play a real part.  
'Tis theirs to cover over with sweet and silent grace,  
What else were rude and ugly in many a barren place;  
Though they cannot make the wilderness to blossom sweet and fair,  
They cover up the ugliness with sweet and patient care.  
And if I do as much as this, it is a lovely task,  
And deeds more great and mighty I need not stay to ask,  
If I can turn with graciousness a frown into a smile,  
Or hide away unlovely things, 'tis surely worth the while,  
For love that works in many ways doth also work in this,  
And they who make the unlovely fair their blessing shall not miss,  
And in the barren ways of life to make some beauty spring,  
Will ever be, for you and me, a sweet and gracious thing.

— Anonymous (*Cairns Post*, 21 March 1935, page 10)





## Chinese soil crust biologists in Australia

Alison Downing and Kevin Downing

*Biological Sciences, Macquarie University*

In 2007, Australian bryologists who travelled to Kuala Lumpur, Malaysia, for the meeting of the International Association of Bryologists were fortunate to have the opportunity to hear Professor Zhang Yuanming, of the Key Laboratory of Biogeography and Bioresource in Arid Land of the Chinese Academy of Sciences in Urumqi, Xinjiang, speak about the work carried out by his team on the biological soil crusts of the Gurbantunggut Desert of North Western China. This was the beginning of a very productive relationship between Australian and Chinese biologists with interests in soil crusts, and this year we welcomed two Chinese soil crust biologists, Associate Professor Zhang Jing and Vice-Professor Wu Nan.

The Xinjiang Uyghur Autonomous Region is a self-governing administrative region of China. It is bordered by Siberian Russia to the North, Kazakhstan, Kyrgyzstan, Afghanistan and Pakistan to the west, and Tibet and India to the south. Xinjiang is vast — 1.6 million square kilometres — but it is its topography that makes this region unique. The landscape is dominated by three mountain ranges: the Altai bordering Russia to the north, the Tian Shan running through central Xinjiang, and the Himalaya to the south. These great mountain ranges enclose two deserts: the Taklimakan, famous for its huge shifting dunes to the south, and the Gurbantunggut, more than 48 000 square kilometres, with its fixed or semi-fixed dunes to the north. ‘Fixed’ and ‘semi-fixed’ refers to the presence of biological soil crusts that stabilise dunes. In the Gurbantunggut there are three types of soil crusts — cyanobacterial, lichen and moss crusts — and these are a major area of study for Professor Zhang and his team. There are similarities in biological soil crusts in arid and semi-arid regions throughout the world, not the least in Australia, hence the value of collaborative work between Chinese and Australian researchers.



Xinjiang, north-western China: three mountain ranges enclosing two deserts. (Map modified from [http://www.tectonics.caltech.edu/outreach/trips/GPS\\_TianShan2006/](http://www.tectonics.caltech.edu/outreach/trips/GPS_TianShan2006/))



Field work in the Gurbantunggut Desert of far north-western China. Professor Zhang Yuan Ming with his team of staff and students from the Key Laboratory of Biogeography and Bioresource in Arid Land of the Chinese Academy of Sciences, Xinjiang. Note that moss and lichen crusts are far more abundant in the swales than on the dune crests.



In November 2013, Zhang Jing arrived in Sydney to spend a year working with David Eldridge at the University of New South Wales. During this time she worked with David studying the effects of grazing on ecosystem multi-functionality in a model shrubland in arid eastern Australia. The major objective of this study was to examine the effects of long-term grazing by domestic livestock on multiple ecosystem functions related to water infiltration, nutrient cycling and surface stability. Jing spent four months (February–May) at the University of New South Wales' Fowlers Gap Arid Zone Research Station, a pastoral property in arid shrub lands north of Broken Hill, in north-western New South Wales. Jing made detailed measurements at 140 sites in an area with a long history of grazing by sheep as well as an area within a long-term vegetation exclosure that has been ungrazed by sheep for more than 50 years.

Rod Seppelt is well known for his very generous support and encouragement of bryologists in Australia, but you may not realise that this also extends to many overseas colleagues, friends and students. I started working with Professor Zhang's group in early 2008, and almost from the beginning Rod has been tireless in assisting with editing and advising on manuscripts. It was fortuitous that an invitation to write a chapter on bryophytes for a new publication on biological soil crusts reached Rod about the time Jing arrived in Sydney. So in addition to her work with David Eldridge, Jing prepared the bryophyte ecophysiology section for this publication (chapter title: *Bryophytes within biological soil crusts*, by R.D. Seppelt, A.J. Downing, K.K. Deane-Coe, Zhang Y.M., Zhang J., in prep.)

Our second visitor, Wu Nan, arrived in November 2014, for a brief but hectic fortnight of visits and field trips. Nan's research has focused on the microbiology of biological soil crusts of the Gurbantunggut Desert, and her visit was arranged through the Australia–China Young Scientists Exchange Program, which is jointly funded by the Australian and Chinese Governments for early to mid-career researchers. Australian involvement is supported through the Australia-China Science and Research Fund. This program aims to facilitate future long term science, technology and innovation collaboration between Australia and China, with a particular focus on future Australia-China research cooperation. Nan had hoped to visit Fowlers Gap, but given the short time frame, the long distance and difficulty of travel, it was decided it would be more productive for her to spend the time visiting herbaria, botanic gardens and meeting bryologists with similar interests.

After an initial orientation session at Darling Harbour, Nan came to Macquarie University where she met with the Head of Department of Biological Sciences, Professor Mariella Herbertstein, Nan's official host for her visit to Australia. Nan also had discussions with ecologist Mark Westoby, microbiologist Michael Gillings, microscopist and bryologist Nicole Vella and plant physiologist Brian Atwell.

Next was a visit to Canberra, where Nan met biologists with extensive experience in soil crust studies – Chris Cargill, Cécile Gueidan, Jack Elix, Judith Curnow and Heino Lepp. Highlights of the visit included a tour by photographer and botanist Murray Fagg to the Australian National Herbarium (vascular plants), Centre for Australian National Biodiversity Research, in the morning and an afternoon spent in the cryptogamic herbarium with Judith Curnow and Chris Cargill. The Gurbantunggut Desert has few moss species, but one species, *Syntrichia caninervis*, occurs in relative abundance in swales, so to demonstrate the differences between Chinese and Australian soil crusts, Judith produced numerous samples of Australian biological soil crusts, each with many species of moss

and/or lichen. It was a great pleasure for us to have Jack Elix join us as well. (The last time we met was on Mount Canobolas near Orange in Central Western NSW!) Before we returned to Sydney we visited the new Canberra Arboretum.

Nan spent another morning at Macquarie, then the afternoon at University of New South Wales where she visited David Eldridge's laboratory, part of the Evolution and Ecology Research Centre in the School of Biological, Earth and Environmental Sciences. On Nan's last day in Sydney, Nola Hancock from Biology at Macquarie, co-ordinated a tour for Nan to *Plantbank* at the Australian Botanic Gardens at Mount Annan, south-west of Sydney. Peter Cuneo (Manager Natural Heritage) and Cathy Offord (Manager Horticultural Research) gave us a wonderful introduction to the facility.

Nan flew to Melbourne the next morning and, thanks to Pina Milne, managed to fit in a visit to the National Herbarium of Victoria later that day. Next day Cassia Read, who has just submitted her PhD thesis titled 'The role of biological soil crusts in vegetation dynamics of the Murray Mallee bioregion, Victoria', took Nan out for a day in the field. We were most amused that although both Nan and Cassia have specialised in the study of soil crusts consisting of minute plants no more than a few millimetres high, they visited the giant trees in the ranges north of Melbourne. Doubtless during the day they had plenty of opportunities to discuss soil crust issues.



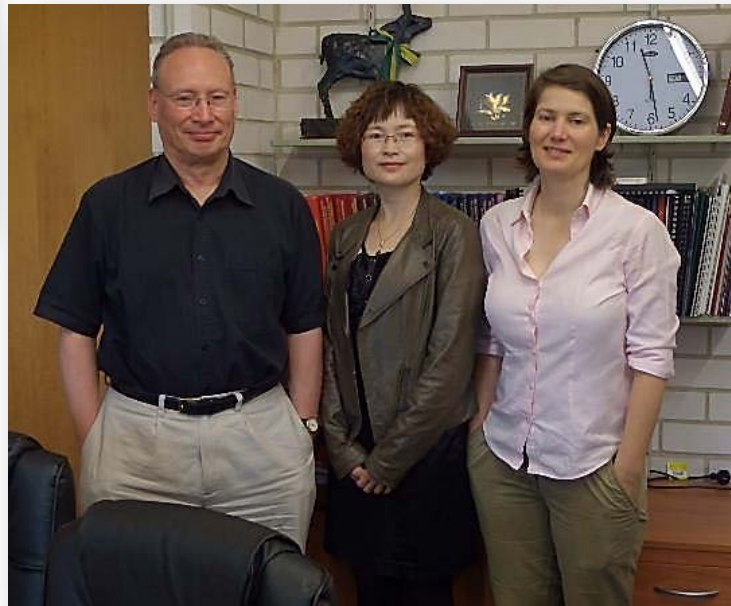
Heino Lepp, Jack Elix, Wu Nan, Chris Cargill, Cécile Gueidan, Judith Curnow, Kevin Downing in the Canberra Botanic Gardens. Photo: Alison Downing





Wu Nan (left) and Cassia Read (right) among the giant trees.

Professor Mark Westoby, Associate Professor Wu Nan and Professor Mariella Herbertstein at Macquarie University



Zhang Jing and friend.



Professor Mariella Herbertstein, Head of Biological Sciences at Macquarie University, wearing a traditional Uyghur scarf from Xinjiang, with Zhang Jing.

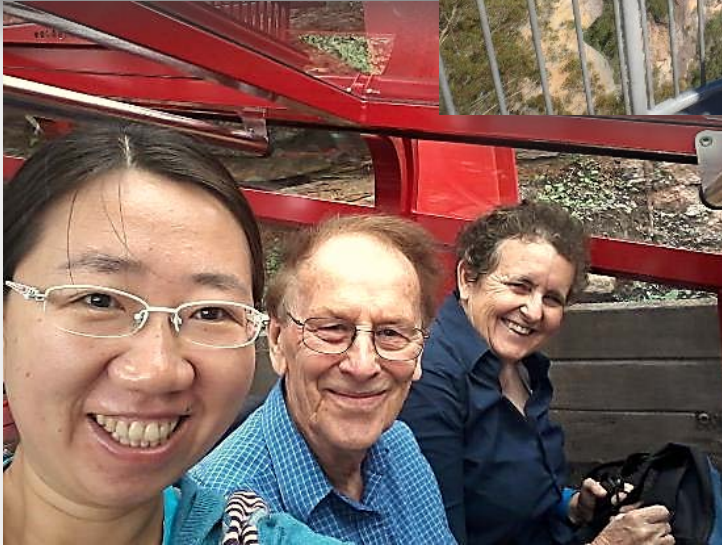






Sheep in Australia are much bigger! The Big Merino at Goulburn, on the return trip from Canberra to Sydney.

A visit to Sydney and New South Wales is not complete without a visit to the Three Sisters in the Blue Mountains.



An adrenalin rush on the Scenic Railway at Katoomba doesn't go astray either: Zhang Jing, Kevin Downing and Alison Downing.

There were many who facilitated Nan's visit, but we would particularly like to thank Anne Houston, Senior Research and Policy Officer with the Australian Academy of Technological Sciences and Engineering, for her assistance with planning, for booking flights and accommodation, and for her reassurance! Without Mariella Herbertstein's support and encouragement, Nan's visit would not have been possible. Also, many thanks to Chris, Cécile, Jack, Judith, Heino and Murray in Canberra; Nola, Nicole, Mark, Michael and Brian at Macquarie University; Peter Cuneo and Cathy Offord at Plantbank; Sam, Angela and Max at UNSW; Pina and Cassia in Melbourne.

The visits of these two talented young biologists highlight the opportunities for further collaborative work between Australia and China. On a personal note, we really enjoyed their company and will miss them. We hope that in the future they will have further opportunities to visit Australia. Jing and Nan can be contacted at:

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[wunan@ms.xjb.ac.cn](mailto:wunan@ms.xjb.ac.cn)



If you would like to know more about the work of the Key Laboratory of Biogeography and Bioresource in Arid Land of the Chinese Academy of Sciences in Urumqi, Xinjiang, please contact Professor Zhang Yuanming:

[zhangym@ms.xjb.ac.cn](mailto:zhangym@ms.xjb.ac.cn)

If you are interested in the Australia–China Young Scientists Exchange Program and are considering applying for a place in next year’s program, see:

<http://www.industry.gov.au/science/internationalcollaboration/acsr/Pages/YoungResearchers.aspx>

**Selected publications from the Key Laboratory of Biogeography and Bioresource in Arid Land, X**

Chen Rongyi, **Zhang Yuanming**, Li Yuan, Wei Wenshou, **Zhang Jing**, **Wu Nan** 2009. The variation of morphological features and mineralogical components of biological soil crusts in the Gurbantunggut Desert of Northwestern China. *Environmental Geology* 57: 1135–1143.

Su Yangui, Wu Lin, Zhou Zhibin, Liu Yaobin, **Zhang Yuanming**. 2013. Carbon flux in deserts depends on soil cover type: A case study in the Gurbantunggut desert, North China. *Soil Biology & Biochemistry* 58: 332–340.

**Wu Nan**, Pan Hui-Xia, Qiu Dong, **Zhang, Yuan-Ming** 2014. Feasibility of EPS-producing bacterial inoculation to speed up the sand aggregation in the Gurbantunggut Desert, Northwestern China. *Journal of Basic Microbiology* [doi: 10.1002/jobm.201400355]

**Wu Nan**, Wang Hongling, Liang Shaoming, Nie Huali, **Zhang Yuanming** 2006. Temporal-spatial dynamics of distribution patterns of microorganism relating to biological soil crusts in the Gurbantunggut Desert. *Chinese Science Bulletin* 51: 124–131. [doi: 10.1007/s11434-006-8216-x]

**Wu Nan, Zhang YM**, Downing A, Aanderud ZT, Tao Y, Williams, S. 2014. Rapid adjustment of leaf angle explains how the desert moss, *Syntrichia caninervis*, copes with multiple resource limitations during rehydration. *Functional Plant Biology* 41: 168–177 <http://dx.doi.org/10.1071/FP13054>

**Wu Nan, Zhang Yuanming**, Downing Alison, **Zhang Jing**, Yang Chunhong 2012. Membrane stability of the desert moss *Syntrichia caninervis* Mitt. during desiccation and rehydration. *Journal of Bryology* 34: 1–8.

**Wu Nan, Zhang Yuanming**, Pan Huixia, **Zhang Jing** 2010. The Role of Non-photosynthetic Microbes in the Recovery of Biological Soil Crusts in the Gurbantunggut Desert, Northwestern China. *Arid Land Research and Management* 24: 42–56.

Zhang Bingchang, **Zhang Yuanming**, Su Yangui, Wang Jingzhu, **Zhang Jing** 2013. Responses of microalgal-microbial biomass and enzyme activities of biological soil crusts to moisture and inoculated *Microcoleus vaginatus* gradients. *Arid Land Research and Management* 27(3): 216–230.

Zhang Bingchang, **Zhang Yuanming**, Zhao Jiancheng, **Wu Nan**, Chen Rongyi, **Zhang Jing** 2009. Microalgal species variation at different successional stages in biological soil crusts of the Gurbantunggut Desert, Northwestern China. *Biology and Fertility of Soils* 45: 539–547.

Zhang Bingchang, Zhou Xiaobing, **Zhang Yuanming** 2015. Responses of microbial activities and soil physical-chemical properties to the successional process of biological soil crusts in the Gurbantunggut Desert, Xinjiang. *Journal of Arid Land* 7(1): 101–109 [doi: 10.1007/s40333-014-0035-3]

**Zhang Jing, Zhang Yuanming**, Alison Downing, Cheng Junhui, Zhou Xiaobing, Zhang Bingchang 2009. The influence of biological soil crusts on dew deposition in Gurbantunggut Desert, Northwestern China. *Journal of Hydrology* 379 (1–4): 220–228.

- Zhang Jing, Zhang Yuanming**, Alison Downing, **Wu Nan**, Zhang Bingchang 2011. Photosynthetic and cytological recovery on remoistening *Syntrichia caninervis* Mitt., a desiccation-tolerant moss from Northwestern China. *Photosynthetica* 49: 13–20.
- Zhang Jing, Zhang Yuanming**. Diurnal variations of chlorophyll fluorescence and CO<sub>2</sub> exchange of biological soil crusts in different successional stages in the Gurbantunggut Desert of north-western China. *Ecological Research* 29(2): 289–298.
- Zhang Yuanming, Wu Nan**, Zhang Bingchang, **Zhang Jing** 2010. Species composition, distribution patterns and ecological functions of biological soil crusts in the Gurbantunggut Desert. *Journal of Arid Land* 2: 180–189.
- Zhou Xiaobing, **Zhang Yuanming**, Downing Alison 2012. Non-linear response of microbial activity across a gradient of nitrogen addition to a soil from the Gurbantunggut Desert, northwestern China. *Soil Biology & Biochemistry* 47: 67–77.

### Blast from the past: Bothering after mosses

[In this article, published on page 6 of the Hobart *Mercury* on Saturday, 2 January 1886, Alfred Taylor (1849–1921) described a visit to Browns River and some other localities near Hobart. The article is reproduced here in part with spelling, punctuation, etc. as in the original. Taylor was the head librarian of the Tasmanian Public Library, but maintained an active interest in natural history and medicine.]

“*BOTHERING AFTER MOSSES.*”

[BY ALFRED J. TAYLOR]

At the sphagnum bed I found a very fine specimen of *Funaria hygrometrica*, the fruit being unusually large; also *Splachnum* and *Ceratodon purpureus*. From the banks of the little stream I obtained *Jungermannia lepidozia*. In the creek running through the garden at Whitewater I found *Bryum pachytheca* and *B. binum*, *Hypnum rutabulum*, and *H. furfurosum*, *Campylopus introflexus*, and specimens of *Fissidens* and *Dicranum*. Beside the *Jungermannias*—*Plagiochila* and *Anthoceros* I was fortunate enough to find *Psiloclada clandestini*, an imperfectly known plant of which but a few scraps have been found. On a previous occasion I had found at Brown’s River, in the scrub at back of the parsonage, *Bartramia pusilla* and *Splachnum octoblepharum*, and in a creek—a very paradise of mosses—near a log hut, about a mile from Whitewater, *Polytrichum undulatum*, *Hookeria denticulata*, *Isoetecium spininervi*, *Fissidens incurvis*, and quite a variety of *Hypnums*. Of *Jungermannias*, *Lophocolea biciliata*, and *L. Tasmanica*. Within a hundred yards of the farm house at Whitewater *Polytrichum juniperinum* flourishes luxuriantly.

I took advantage of one of the Christmas holidays to visit the Bower, on the Huon road...On the banks a variety of mosses were growing most luxuriantly, and in full fruit, tempting me at every step to stop and gather. I make it a rule, however, to collect on the way home, otherwise I should never reach my destination, and should miss much worth seeing...From the rocks I gathered a fine sample of *Polytrichum juniperinum* as a memento of the visit.

On the way back between the Basin and the Fern Tree Inn I gathered *Bartramia pomiformis*, *Bryum tasmanicum*, *B. binum*, *Trichostomum elongatum*, *Rhizogonium novae Hollandiae*, *Leptotrichum flexiosum*, *Hypnum crinitum*, *H. clandestinum*, *Polytrichum compressum*, *P. juniperinum*, and another handsome *Polytrichum* which I have not yet been able to identify. *Jungermannias* flourish on the banks and trees, and I obtained *Frullania falciloba*, *F. Pentapleura*, *F. probosciphora*, *Sarcomitrium multifida*, *Lepidozia quadrifida*, *Lophocolea biciliata*, *Anthoceros laevis*, *Zoopsis argentia*, *Symphyogyna phizobola*. Those who go “bothering after mosses” (as the lady members of my family put it) have to poke about in the most likely places for snakes to abound.

[Taylor went on to describe his own curious remedy for snake bite, which it would not appropriate to reproduce here!]



## Proposed Red List of threatened bryophytes in Australia: extinct species (EX, EW, RE)

### Threatened Bryophytes Advisory Group

The first checklist of threatened bryophytes in Australia was compiled by George Scott (Scott 1997). However, that list was based on the classification system of Briggs and Leigh (1988), which was applicable only to Australia, and no justification was given for the inclusion of species or their classification. Since that time much more information about the distribution and taxonomy of Australian bryophytes has become available, and many more species have been discovered here, particularly in the Wet Tropics.

The Threatened Bryophytes Advisory Group (TBAG) was formed in late 2014 to begin work on a draft national Red List of threatened bryophytes for Australia, for critical assessment by the bryological community and eventual publication as a formal list. Current members are Sapphire McMullan-Fisher, David Cameron, Perpetua Turner, Andi Cairns and David Meagher (chair).

Our first priority is to identify species that are considered Extinct, Critically Endangered and Endangered, so that action can be prioritised where necessary to protect those species and to encourage searches for unknown populations. At the same time, however, we intend to identify species that can be easily classified as of 'Least Concern' in Australia, so that they can be eliminated from further consideration.

The following classifications of species as Extinct (EX, EW or RE) are proposed here. They are based on the current IUCN criteria for listing (IUCN 2012a,b), using the current IUCN guidelines for application at a national level (IUCN 2012b).

Comments on these proposals should be sent to David Meagher at the email address shown on the last page of this newsletter. Several other species that might qualify for classification as Extinct (EX) are not included because doubtful disjunct records are yet to be evaluated, or because the genus is currently under formal review.

**EXTINCT (EX)** A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

**EXTINCT IN THE WILD (EW)** A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

**REGIONALLY EXTINCT (RE)** A taxon is Regionally Extinct when it is extinct within the region (that is, there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region) but extant in other parts of the world.

**SPECIES CONSIDERED TO BE EXTINCT (EX)**

**MOSSES**

***Macromitrium subulatum* Mitt.** — Known distribution: Bass Strait, [William] Milne, exact locality unknown (possibly Flinders Island), ? December 1857. Justification: The type collection is the only record of this species. The most likely locality is Flinders Island. Extensive bryological collections have been made in Bass Strait by John Whinray, and recent comprehensive surveys have been made on Flinders Island by David Meagher and George Scott (1990s) and Matthew Dell (2000s), without locating this species. References: Vitt & Ramsay (1985), Meagher (2003).

***Zygodon obtusifolius* Hook.** — Known distribution: Macquarie Harbour, Tasmania, Moore 26 (H), exact locality unknown, c. 1900. Justification: In Australia this species is known only from the single collection cited. In the 1990s Tony Moscal collected a considerable number of bryophytes in South West Tasmania, including around Macquarie Harbour, but did not find this species. Since South West Tasmania represents a considerable disjunction in the species' range, which is largely tropical Northern Hemisphere (tropical South America and Mexico, Nepal, Burma, India, China) it is possible that the collection has been mislabelled or confused with another. Reference: Lewinsky (1990).

***Zygodon gracillimus* Broth. ex M.Fleisch.** — Known distribution: Tasmania, Forth River, near Sheffield, L. Rodway 106, c. 1900. Justification: In Australia this species is known only from the single collection cited. Widespread logging and clearance for agriculture occurred in the area in the 20th century, and the species has not been found again despite many bryophyte collections in the area and Tasmania generally since 1900. Reference: Lewinsky (1990).

**LIVERWORTS**

***Cololejeunea bistyla* (Steph.) Steph.** — Known distribution: Norfolk Island, collector unknown, exact locality unknown, 1916. Justification: Criterion A1a. The type collection is the only record of this species. The greater proportion of Norfolk Island has been cleared for agriculture and settlement, and remnant vegetation has been disturbed by grazing, weed infestation and timber harvesting. Heinar Streimann collected extensively on Norfolk Island in the 1990s but did not find this species. Reference: Thiers (1988).

***Frullania crispata* Steph.** — Known distribution: Norfolk Island, Robinson s.n., exact locality unknown, 1884. Justification: Criterion A1a. The type collection is the only record of this species. The greater proportion of Norfolk Island has been cleared for agriculture and settlement, and remnant vegetation has been disturbed by grazing, weed infestation and timber harvesting. Heinar Streimann collected extensively on Norfolk Island in the 1990s but did not find this species. Reference: Hattori (1979).

***Frullania hamaticoma* Steph.** — Known distribution: Upper Ovens River, Victoria, Mrs McCann s.n. (herb. K. Müller 1884), exact locality unknown, 1882. Justification: Criterion A1a. The type collection is the only record of this species, despite considerable collections made in the region in the 20th century. Widespread timber harvesting, clearance for agriculture and wildfires have greatly diminished the extent and quality of vegetation in the region. Reference: Hattori (1979).

***Riella spiculata* J.Taylor** — Known distribution: Freshwater marsh in Darlots Creek Flora and Fauna Sanctuary in western Victoria, on black peaty soil with *Pilularia novae-hollandiae*, *Isoetes drummondii*, etc., Beaglehole (2455, 4419) and R. Melville (1677), 15 October 1952. Justification: Criteria A1a, B2a+b. Freshwater marshes (aquatic herblands) on Darlot Creek are now rare, and most are prone to stock trampling. Weed invasion has also substantially altered the vegetation at the site. The species has been formally listed as extinct in Victoria. References: Taylor (1954), (DSE 2005), Sinclair & Sutter (2008).



## HORNWORTS

No hornworts are considered Extinct in Australia.

### SPECIES CONSIDERED TO BE EXTINCT IN THE WILD (EW)

No bryophyte taxa that are considered extinct in the wild have populations in cultivation or as naturalised populations, so none qualify for classification in this category.

### SPECIES CONSIDERED TO BE REGIONALLY EXTINCT (RE)

No bryophyte taxa are considered to be Regionally Extinct in Australia.

## References

- Briggs & Leigh 1988. *Rare or threatened Australian plants*. Revised edition. Special Publication 14. Australian National Parks & Wildlife Service: Canberra.
- DSE 2005. *Advisory list of rare or threatened plants in Victoria*. Department of Sustainability and Environment, Victoria: East Melbourne.
- Hattori, S 1979. A revision of the Australasian species of *Frullania*, Hepaticae, I. *Journal of the Hattori Botanical Laboratory* 45: 323–364.
- Hewson, H 1970. The family Aneuraceae in Australia and New Guinea: I. The genus *Riccardia*. *Proceedings of the Linnean Society of New South Wales* 95: 60–121 (plus plates).
- Inoue H 1986. Notes on the Plagiochilaceae. XIII. Review of the genus *Plagiochila* (Dum.) Dum. in mainland Australia. *Journal of the Hattori Botanical Laboratory* 60: 357–378.
- IUCN 2012a. *IUCN Red List categories and criteria: Version 3.1. Second edition*. IUCN: Gland, Switzerland and Cambridge, UK.
- IUCN 2012b. *Guidelines for the application of IUCN Red List criteria at regional and national levels: Version 4.0*. IUCN: Gland, Switzerland and Cambridge, UK.
- Lewinski, J 1990. The genus *Zygodon* in Australasia. *Lindbergia* 15(4): 109–139.
- Meagher, DA 2003. Possible type localities for *Macromitrium subulatum* Mitt. *Australasian Bryological Newsletter* 48: 10.
- Scott GAM 1997. Bryophytes, In GAM Scott, T Entwisle, T May & N Stevens 1997. *A Conservation Overview of Australian Non-marine Lichens, Bryophytes, Algae and Fungi*. Wildlife Australia: Canberra.
- Sinclair, SJ & Sutter, GR (2008). Estuarine wetland vegetation mapping, Glenelg Hopkins CMA. *Arthur Rylah Institute for Environmental Research Technical Report Series* 178. Department of Sustainability and Environment: Heidelberg, Victoria.
- Taylor J 1954. A new Australian hepatic. *Kew Bulletin* 9: 45–47.
- Thiers, BM 1988. The Australian species of *Cololejeunea*. *Beiheft Nova Hedwigia* 90: 113–146.
- Vitt DH & Ramsay HP 1985. The *Macromitrium* complex in Australasia (Orthotrichaceae: Bryopsida). Part I. Taxonomy and phylogenetic relationships. *Journal of the Hattori Botanical Laboratory* 59: 325–452.

## Bryogear

### A cheap mounting medium for semi-permanent slides

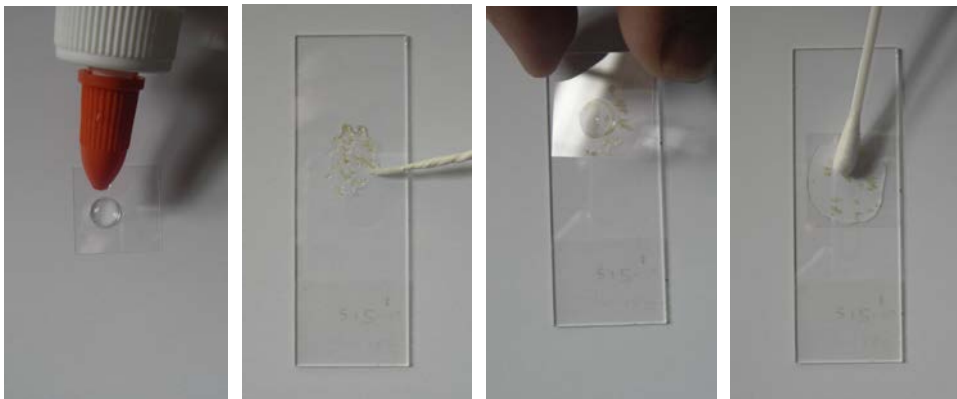
Traditional slide mounting media can be fiddly, messy or expensive (or all three), which is problematic when you just want to make up a slide to last a short time, e.g. for classes or workshops, or when doing field IDs that need to be checked in the lab.

A simple solution is to use a commercial water-soluble liquid glue. The best one I have found is Elmer's Washable Clear School Glue (Elmer's Products Inc., Columbus, Ohio, USA). This is very inexpensive and non-toxic, and seems to be available in many countries. It comes in a 147 mL (5 fl. oz.) bottle with a twist nozzle that can deliver a small, neat drop. There are probably other brands that can be used, but this is the best one I have found so far and the glue is optically very clear.

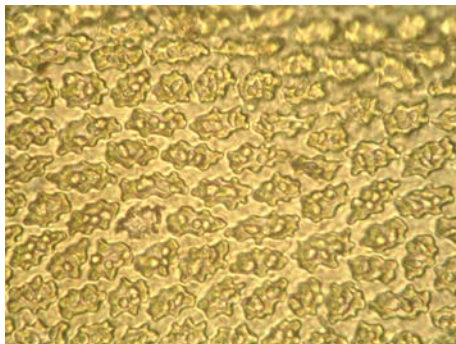


Prepare the specimen as usual, then place a drop of glue in the centre of a cover slip. The glue is quite thick at normal temperatures and will not run. Use a wick of absorbent paper to remove all excess water from the specimen (this minimises the formation of annoying bubbles), and before the specimen has a chance to dry out turn the cover slip over and drop it onto the slide. Press the cover slip down gently with a soft tip such as a cotton bud to spread the glue to the edges. The slide can be used immediately.

Slides prepared in this way should be good for several weeks; in fact, slides I made five months ago are still perfectly good, except for some slight discolouration. If you want to re-use the slide, soak it in cold water until the cover slip comes loose, then wash it in soapy water to remove any residue.



Preparing a slide.



Left: cells of *Plicanthus hirtellus* in a fresh mount.  
Right: underleaf of *Cheilolejeunea trifaria* five months after mounting.

— David Meagher



## What's that green stuff?



This large forest epiphyte is known from New Zealand, Australia and New Caledonia. The core of its distribution seems to be either side of the Queensland – New South Wales, and it is presumed extinct in Victoria.

Robust plants can be spectacular, with fronds over 10 cm long, but most plants are smaller and might be hard to identify in the field.

A creeping stem gives rise to thick, erect, black secondary stems. The stipe is usually more or less leafless. The leaves of the frond are of two types. Those on the stems are up to 5 mm long, ovate-lanceolate and flat, with a weak costa reaching to the apex. Those on the branches are smaller, to about 2 mm long, concave and slightly secund, with a less acute apex and a stronger costa that is often excurrent.

As in the closely related genus *Hypnodendron*, the back of the costa is armed with spine-like teeth. Capsules are more or less cylindrical, to about 4 mm long, on a seta up to about 15 mm long.

*Answer at bottom of page.*

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Editor: David Meagher (dameag+unimelb.edu.au)  
(replace + with @ to email)

Articles relating to bryology in Australasia are welcome.  
The deadline for Issue 66 is 19 June 2015.

### Cover photo

*Bazzania vittata* (Reinw., Blume & Nees) Trevis., with *Zoopsis liukiensis* Horik. and *Schistochila cristata* Steph., Mount Lewis, Queensland Wet Tropics. (DAM)

### What's that green stuff?

*Braithwaitea sulcata* (Hook) Lindb., Lamington National Park, Queensland. (DAM)