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13th Australian Bryophyte Workshop: first circular

Graham Bell

State Herbarium of South Australia, Kent Town, SA 5071, Australia

The next Australian Bryophyte Workshop will, for the first time, be held in South Australia. ‘Too dry!’, I hear you say. Well, yes, it can be, and that limits the diversity of bryophytes. For that reason, and especially because of the relative unpredictability of the arid / Mediterranean climate of southern central Australia, planning is towards a slightly different approach to the Workshop from that of recent years. The first Australian Bryophyte Workshop was aimed more as an identification workshop for teaching those unfamiliar with bryophytes. Recent Workshops have spent much more time on field collecting than on identification. One of the potential strengths of our Workshops has always been the opportunity to interact with colleagues in the ‘laboratory’ setting, enabling those who have particular knowledge of plant groups to share their expertise with others. It is that aspect which we seek to develop for the next Workshop.

The current working model is to base the 2016 Workshop in the facilities of the centrally located University of Adelaide, pitching a course which will be of relevance to University students but, of course, open to anyone who wishes to participate. The dates are expected to be during the week 26–30 September 2016. This is a University Common Week and is the final week of school term 3 in South Australia.

After an initial morning session giving an overview of bryophytes, we expect to have a short field trip in the afternoon to a near-city location to see local habitats and species. The city of Adelaide is quite close to the Adelaide Hills / Mount Lofty Ranges and some seasonally wet sites where diversity is relatively high within the dominant dry sclerophyll woodland areas.

Time during the remainder of the Workshop will be set aside for training sessions by experts on special interest groups, and there will be evening sessions devoted to talks and poster presentations. The Workshop will be based in a well-equipped laboratory setting with microscopes to allow for detailed examination and identification of collections, especially material gathered locally by participants. Should the season be particularly poor and good material hard to find, collections from the State Herbarium can be provided for identification sessions.

Accommodation

Common accommodation will be sought at a near-city site to facilitate social interaction and discussion among participants. Further details will be provided in the next circular.

Field trips and collecting

There will be at least two field trips to sites within the southern Mount Lofty Ranges as part of the Workshop, with the option to add an extended field trip to the Flinders Ranges, or possibly to a different area in the case of a very poor season. Seasonality in arid central Australia is highly variable and unpredictable. Plans will need to be subject to change dependent upon the season. Collecting Permits are required within SA and a group permit will be sought to allow legal collecting for appropriate purposes.

Student assistance

It is likely that some financial assistance will be available to assist full-time students to participate in the Workshop.

Arrival and departure

Adelaide Airport is very close to the city centre and very convenient, with daily flights from other Australian capitals. Direct flights from outside Australia are limited. Arrangements will be made to collect people from the airport for transport to their accommodation.

Cost

The cost is yet to be determined but will include workshop materials, accommodation, meals and minibus transport as appropriate. Costs will be kept as low as possible. Details for any field trip extension will be costed separately, and will depend on the number of people interested and the type of accommodation needed. Because of the remoteness of the Flinders Ranges and other potential sites, options will inevitably be limited and costs could be significant.

Expressions of Interest

Please contact Graham Bell (Graham.Bell@sa.gov.au) to register your interest. It would be helpful to know whether you are interested in an associated field trip to the Flinders Ranges, and whether you would prefer this to be before or after the Workshop.

Please indicate if you will be a full-time student at the time of the workshop, and outline your course of study.

Indications would be appreciated of possible contributions in the form of research or general interest talks or posters, or of interest in presenting a workshop training session.

Q, Y, and the Brollywort

As far as I know there are no published liverwort genera beginning with Q or Y, which is surprising considering the number of suitable Latin words beginning with *q*, Greek words beginning with *y* (upsilon; although this can also be *u* or *hy*), and potential names based on personal or geographic names. (Two moss genera begin with Q, and two with Y.) U almost missed out in liverworts (there are seven moss genera), but thanks to Carl Gottsche we have *Umbraculum* Gottsche 1861. The name is Latin for a parasol or umbrella and alludes to the appearance of the gametophyte, which has ribbed fronds radiating from an erect stipe.

The type of the genus was *Jungermannia flabellata* Labill., which was already the type for *Hymenophyton* Dumort. 1835. *Umbraculum* is therefore a synonym of *Hymenophyton*. *Umbraculum* Rumph. 1743 (Primulaceae) pre-dates *Species Plantarum*, so *Umbraculum* Gottsche is a legitimate name. However, *Umbraculum* Kuntze 1891 (Primulaceae) is a later homonym and thus illegitimate.

Three English names have been suggested for the only species in *Hymenophyton*, *H. flabellatum* — Fernwort, Fan-fern Liverwort and False-fern Liverwort (David Cameron, DELWP Victoria, pers. comm.), but none of these are inspiring and the reference only to ‘fern’ misses the point that *Hymenophyton* resembles a *filmy* fern. So perhaps as a nod to Gottsche’s discarded name, ‘Brollywort’ might be considered as a (very) English name for this genus and its single species.

A quick count of published names for liverwort and hornwort genera suggests the following numbers of genera for all letters of the alphabet:

A	86	G	24	L	47	Q	0	V	7
B	30	H	50	M	76	R	29	W	3
C	100	I	6	N	31	S	90	X	4
D	36	J	9	O	20	T	34	Y	0
E	21	K	9	P	98	U	1	Z	3
F	17								

— David Meagher

Bryophytes, Antarctic Beech and Beagle Channel

Conference of the International Association of Bryologists, January 2015

Puerto Williams, Isla Navarino, Cape Horn Biosphere Reserve, Southern Chile

Alison Downing¹ and Pina Milne²

¹ Department of Biological Sciences, Macquarie University, NSW 2109, Australia

² Royal Botanic Gardens Melbourne, Birdwood Avenue, Melbourne, VIC 3004, Australia

The iconic names ‘Cape Horn’ and ‘Tierra del Fuego’ relate to locations of great significance to historians and biologists alike. In recent years Bill Buck has enthralled us with graphic accounts of moss collecting expeditions to this southern realm; and Paddy Dalton at the Eungella Workshop in 2014, with his beautiful images of snow-covered mountains, fjords, Antarctic Beech forests and alpine herb fields, brought Bill’s accounts to life. So almost immediately after Bernard Goffinet announced that this year’s IAB conference was to be held in Puerto Williams on Isla Navarino in southern Chile, we decided we absolutely had to go and see for ourselves. This was an opportunity too good to miss.



For both of us, this was our first visit to South America. From Sydney we flew to Santiago, then southwards to Punta Arenas, following the Andes, over snowy peaks of volcanoes and then over snow covered cordilleras wreathed with innumerable mighty glaciers. Punta Arenas, located on the shores of the Strait of Magellan, is an exciting city, a mix of old and new and a people preferring to be known as *Magellanes* rather than *Chilenos*, descendants of immigrants from many countries most notably Spain and Croatia, but also from Germany, Italy, England and Ireland. Although it was midsummer, it was cold, with maximum day temperatures ranging from about 12 to 14 °C. The hillsides on the outskirts of town were covered in *Nothofagus* woodland.

Yagan — Punta Arenas to Puerto Williams

We had booked early to travel on the Ferry *Yagan*, not a cruise ship, but a working ferry transporting cargo, vehicles and people from Punta Arenas to Puerto Williams and met up with our fellow travellers late afternoon. The excitement was intense; we were embarking on the Straits of Magellan, named for Portuguese explorer and navigator Ferdinand Magellan, almost 500 years after Magellan sailed into the passage in 1520. Our navigation from Punta Arenas to Puerto Williams, 350 km south on the Island of Navarino, took 33 hours. The coastline gradually changed from low rolling hills to islands of high mountains and menacing, rocky shorelines. Sometimes *Nothofagus* forest and woodland clothed the lower slopes, giving way in clearly defined lines to alpine herb fields. Eventually these were topped by the immense snow fields and glaciers of the Darwin Cordillera. We saw penguins in abundance, skuas, whales, dolphins and albatrosses. As we sailed through this southern archipelago, Ricardo Rozzi (Universidad de Magellanes and University of North Texas) pointed out islands with dense liverwort communities, richly endowed by penguin populations.

Much to our astonishment, as we approached the Italian Glacier, Bernard Goffinet and Ricardo had a word with the captain. Our vessel slowed, then nosed up towards the glacier, for a superb photo opportunity in front of this great ice flow. Spine-tingling is the only way we could describe entering Beagle Channel, the rich biological history of this region not lost on these voyagers. After 33 hours on the *Yagan*, we arrived in the dark, in the early hours of the morning and were met by an assembly of buses and transported to our accommodation, some staying in hostels, some at the Research Station, others at Lakutaia Lodge.



Volcanoes in the Chilean Andes.



Glaciers in the Chilean Andes.



Strait of Magellan from Punta Arenas.

Navigation from Punta Arenas to Puerto Williams – Yagan ferry.



Omora

The preconference workshop, *Ecotourism with a Hand Lens*, was held at Omora Ethnobotanical Park, a public–private protected wilderness area to the west of Puerto Williams. Omora was established to support ecological research, environmental education and biocultural conservation and lies within the Cape Horn Biosphere Reserve of the Sub-Antarctic Magellanic region of Chile which extends south to Cape Horn and includes a great diversity of habitats and extreme climatic conditions. Initially, protection sought for the area was unsuccessful as it supposedly lacked biodiversity; there are only 6 tree species; however, recent surveys reported 5% of the world's bryophytes (500 moss species) occur in the area, making it a global hotspot for mosses, liverworts and hornworts; it is also an area rich in lichens. Thus in 2006 the diversity of the *miniature forests* led to the designation of the Cape Horn Biosphere Reserve by UNESCO.

Undergraduates from University of North Texas and University of Connecticut who had arrived on Navarino some weeks earlier, were our guides for this excursion, and gave us an excellent introduction to the birds, bryophytes and lichens (the 'miniature forests') and water life of the *Nothofagus* forest.

We were amused to have *jamón y queso* (ham and cheese) empanadas for lunch. We had been served this before and were to enjoy it on many more occasions. We had expected fiery dishes in Chile, but by the end of our travels, we were sure that *jamón y queso* sandwiches (or empanadas) must be the national dish!

Wulaia Bay

This must be the most extraordinary field trip we have ever undertaken! We were up early, at the jetty by 4.30 am, to board the Chilean Navy patrol boat *Isaza* which took us to Wulaia Bay, at the western end of Navarino Island. We sailed westward along Beagle Channel, then south along the Canal Murray to our destination, Wulaia Bay (Bahía Wulaia) where we were ferried to shore in zodiacs. For biologists, visiting Wulaia Bay is an extraordinary opportunity to walk in the footsteps of Charles Darwin, who went ashore in 1833 when he accompanied Captain Robert FitzRoy on the second voyage of the *HMS Beagle*. Here an archaeological site provides evidence of the indigenous Yaghan people from 10 000 years ago. On *our* voyage to Wulaia Bay, we were particularly well looked after by members of the Chilean Navy, many of whom had accompanied us to Omora Park the previous day. We were impressed by their comprehensive knowledge of the environment — birds, animals, plants (and yes, even mosses and lichens).

The scenery, again, was magnificent. We could have easily spent hours here, and, armed with a species list prepared by Bill Buck, had great plans to collect. However, there was too much of historical interest to see in a very short time there. Daniel Stanton (our honorary Australian) pointed out to us *Embothrium coccineum* (Proteaceae) in flower.

Arrival of Chilean President Michelle Bachelet

There had been an element of mystery about the conference ever since we left Punta Arenas on the *Yagan*. Why were there two Americans from the United States Embassy in Santiago and a three-man film crew on the *Yagan*? Why was the Rear-Admiral picked up from Wulaia Bay and flown back to Puerto Williams by helicopter rather than accompany us on the patrol boat? We had heard whispers, which were confirmed that afternoon when Michelle Bachelet, the President of Chile, flew into Puerto Williams to open the conference herself. Seemingly this was the first international scientific conference to be held in Puerto Williams. How refreshing to find a government not only place so much importance on the environment, but also on the importance of mosses, liverworts and lichens, the miniature forests of Cape Horn!

The conference

In all, 50 bryologists from 20 countries attended the meeting; the numbers probably smaller than usual because of the distance, difficulty and cost of travel. Unsurprisingly all week there was a strong focus on bryology of the Southern Hemisphere. At the opening ceremony we were honoured



The *Yagan* Ferry transports goods, vehicles and people from Punta Arenas to Puerto Williams.



Bryologists on the *Yagan*; Italian Glacier in the North Beagle Channel.



Pina Milne and Alison Downing on the deck of the *Yagan*, en route to Puerto Williams.

by the presence of President Bachelet, by Cristina Calderón (born in 1928), the last full-blooded Yaghan and by our host from earlier in the day, Rear-Admiral Garcia-Huidobro. The key note speakers for the evening included IAB president Bernard Goffinet and Ricardo Rozzi.

The next day saw the conference proceed along more traditional lines in the assembly hall of the high school, Liceo Donald McIntyre Griffiths. The morning presentations related to bryology of the Antarctic, Subantarctic and Arctic. Peter Convey from the British Antarctic Survey, presented the Plenary Talk with an excellent introduction to the geological and glaciological history of Antarctica together with its biodiversity and the urgent need for a significant increase in protected areas. Afternoon presentations focussed on bryophyte conservation and evolution of land plants. After dinner at the Navy Hall, we visited an archaeological site where Chilean anthropologist Maurice Van de Maele gave us further insights into the origins and lifestyles of the Yaghan people.

Field trip to Cerro La Bandera

Molecular biology and evolution dominated on Tuesday morning but in the afternoon, we enjoyed a magnificent, albeit intensely cold and snowy, walk through *Nothofagus* forests then alpine herbfields to the top of Cerro La Bandera, 655 metres above sea level. Here a Chilean flag flies every day, visible from Argentina on the northern side of Beagle Channel. We were enthralled by the vegetation through which we walked that afternoon: at low elevation, mixed forest of evergreen *Nothofagus betuloides* and deciduous *N. pumilio* together with a mix of species more usually associated with temperate habitats — *Drimys winteri* (closely related to Australian *Tasmannia* spp.), *Maytenus magellanica* — then deciduous forest of *N. pumilio* which gradually became mixed deciduous woodlands of *N. pumilio* and *N. antarctica*; finally, cushion plants in alpine herbfields. And of course, bryophytes in abundance, everywhere. In the forests we also found *Gunnera magellanica*, an unusual plant which hosts symbiotic nitrogen-fixing cyanobacteria (*Nostoc punctiforme*) in its leaf petioles; dwarf ferns (*Blechnum penna-marina*); white dog orchids (*Codonorchis lessonii*); spheres of edible orange beech fungus (*Cyttaria harioti*) on tree trunks and branches and also on the ground; beech strawberries (*Fragaria chiloensis*); and of course, calafate (*Berberis microphylla* [*B. buxifolia*]) source of the delightful but very intoxicating Calafate liqueur.

Australian and New Zealand bryologists have every reason to feel at home in these forests. We are familiar with many bryophyte taxa that we have in common with the Cape Horn Biosphere Reserve of Chile. Consider these, for example: *Bartramia mossmaniana*, *Blindia magellanica*, *Brachythecium albicans* and *B. paradoxum*, *Bryum caespiticium* (= *Ptychostomum angustifolium*), *Campylopus introflexus*; *Catagonium nitens* subsp. *nitens*, *Ceratodon purpureus*, *Conostomum pentastichum*, *Dicranoloma robustum*, *Distichium capillaceum*, *Funaria hygromitrica*, *Grimmia pulvinata* (although Australian material belongs to var. *africana*), *G. trichophylla*, *Leptotheca gaudichaudii*, *Lepyrodon pseudolagurus*, *Muelleriella crassifolia* subsp. *crassifolia*, *Orthotrichum rupestre*, *Philonotis scabrifolia*, *Polytrichadelphus magellanicus*, *Polytrichum juniperinum*, *Syntrichia anderssonii*, *Tayloria gunnii*, *Tortella knightii*, *Marchantia berteriana*, *Metzgeria decipiens* (= *Metzgeria furcata*), and an abundance of additional genera and families with which we are familiar. We were surprised to hear from Ricardo Rozzi that landslips are essential in regenerating the *Nothofagus* forests. The oldest trees may be up to 450 years old and often fall in high winds, taking others with them and in the process clearing large areas for regrowth.

Bryoecology, posters and peatlands

Bryoecology and posters occupied the Wednesday morning sessions, with a visit to a local peatland/bog in the afternoon. Beavers were introduced to Argentina (Tierra del Fuego) from Canada in 1946. However, their potential for fur trading was never achieved, and, with no natural predators they have become a great problem in this southern area of South America. Beaver dams kill *Nothofagus* forests, which is usually replaced by bogs and peatland. There was evidence of this damage in the bog we visited. For all that, the bryophytes were spectacular: mounds, banks and hummocks of red *Sphagnum magellanicum* and yellow green *S. fimbriatum*, interspersed with brightly fruiting Ericaceous cushion plants and occasional *Nothofagus* saplings.

Riccardo Rozzi and Bernard Goffinet at Omora Ethnobotanical Park.



Omora Ethnobotanical Park – bryologists together with officers from the Armada de Chile and students from University of Connecticut and University of North Texas.

Not every day you get to do field work like this! Bryologists on board the Chilean Navy patrol boat *Isaza*, Wulaia Bay.



Pina Milne at Wulaia Bay with cairn and plaque commemorating Captain Robert FitzRoy's voyages in *HMS Beagle* to southern Chile; the first in 1830, the second with Charles Darwin in 1833, when three of the four Yaghan people taken from here on the first voyage were returned.

Often the tops of these hummocks were colonised by *Polytrichadelphus magellanicus*, *Polytrichum juniperinum* and *P. strictum* (Polytrichaceae). However, the gems were the dung mosses (Splachnaceae) including *Tayloria dubyi*, *T. gunnii*, *T. mirabilis* and *Tetraplodon fuegianus*. Whilst searching for the illusive *Tetraplodon fuegianus* we came upon a small stream with an extensive colony of *Marchantia berteriana* and *Noteroclada confluens*, a thallose liverwort which at first glance resembled *Treubia*.

In the evening we were invited by the Yaghan residents of Ukika village, on the eastern side of Puerto Williams, to enjoy a traditional Patagonian barbecue in a magnificent old growth forest of *Nothofagus* along a stream bank, and opportunely protected from the bitter westerly winds. This was a most enjoyable and entertaining evening, with excellent food, wine and good company and an ideal opportunity for the presentation of IAB prizes by Dietmar Quandt and Bernard Goffinet. (Details can be found at: www.facebook.com/Bryodivevol)

Final presentations, visit to Martin Gusinde Anthropological Museum

Our final morning of presentations included a good combination of bryophyte diversity and bryology outreach and education before the final winding up by Bernard Goffinet and Dietmar Quandt. The afternoon provided an opportunity to visit the Martin Gusinde Anthropological Museum and gain further insights into the geology, environment, anthropology and history of European discovery. We were amused to see horses that we had been accustomed to see running free throughout town, now grazing on grass and herbs between the whale bones carefully displayed on the lawn in front of the museum. At first we were surprised at the number of youngsters present in the museum, until we discovered it was one of the very few places in town with free computer and wi-fi access!

We had stayed at Lakutaia Lodge, a few kilometres out of town, in an idyllic setting, looking east along a small inlet that led into Beagle Channel and across to the snowy peaks of Argentina. Each day as we walked back to the Lodge we enjoyed magnificent views of the Dientes de Navarino — the Teeth of Navarino — obvious once you have seen them.

Departure and Torres Del Paine

Bernard Goffinet negotiated to have a BAe 146 fly everyone back to Punta Arenas at the one time, rather than split into two groups and travel by Twin Otter. Our voyage from Punta Arenas to Navarino on the *Yagan* took 33 hours; our return, a direct flight over the snow-covered peaks and glaciers of the Darwin Cordillera, took less than an hour! In Punta Arenas, bryologists dispersed in all directions. Some headed for Antarctica, but we were more interested in vegetation than snowy wastes, so headed north to Puerto Natales, and Torres del Paine Parque Nacional. Torres must incorporate some of the most spectacular mountain ranges in Chile. The mountains of Torres del Paine are estimated to be about 15 million years old, much younger than the Andes at about 60 million years and further to the west. We saw massive, spectacular, blue grey granite spires, icefields, glaciers, waterfalls and also grasslands, woodlands, forests and bogs. We also saw rheas, flamingos and guanacos. In Bernardo O'Higgins Parque Nacional, near the base of the Serrano Glacier, there were bryophytes in abundance, both in *Nothofagus* forest and in more exposed areas adjoining the glacier. These exquisite miniature gardens grew with brightly fruiting Ericaceae cushion plants and *Fuchsia magellanica*.

Andes and Valle Nevado ski fields

Just when it seemed that the trip could not get better, we flew back from Punta Arenas to Santiago on a beautiful fine, clear day. We marvelled again at the snow-covered mountains and glaciers of the southern Andes, and the snow covered peaks of the volcanoes in the north. We took a short day trip from Santiago into the Andes, climbing over 3000 metres on a terrifying, narrow, winding road with no less than 61 hairpin bends to get to the Valle Nevado ski fields. The highest, snow-covered peaks in the distance were another 1000 metres higher. We saw numerous Andean condors but sadly sheep, cattle, goats and horses are still pastured in this high country.



Embothrium coccineum (Proteaceae),
Wulaia Bay.

Chilean President Michelle Bachelet
meets Cristina Calderon at the official
opening of the International Association
of Bryologists, Puerto Williams, Chile.



Nothofagus forest on Cerra
La Bandera.



Daniel Stanton in Beech forest on
Cerro La Bandera.

It's hard collecting when it's snowing!
Alpine herbfield with cushion plants on
Cerro La Bandera. Note the clearly defined
line between *Nothofagus* forest and
herbfield.



Grass protected by steel grids grew up to a metre high; elsewhere the ground was bare, compacted, hard, dry and dusty. We found a surprising number of low, hardy perennial but it seems somewhat of a contradiction that so much attention is paid to the *miniature forests* of the south, and so little to the tourist potential of rich alpine herb fields in the north.

Acknowledgements

We would particularly like to thank Bernard Goffinet. We have great admiration for the fact that he had the courage to organise a conference at the southernmost town in the world! Our thanks, too, to Ricardo Rozzi, Francesca Massardo and Paula Caballero. Daniel Stanton, fluent in Spanish, greatly facilitated proceedings, both formally at the conference, on field trips and in town. We understand from Bernard Goffinet that without the logistic and financial support of the Institute of Ecology and Biodiversity (IEB Chile) this conference would not have been possible.

We would like to thank all those from the Armada de Chile, Distrito Naval Beagle and Tercera Zona Naval, who welcomed us on the *Isaza* and at the Navy Hall. These immaculately presented men and women were ever tolerant of the visiting bryologists who were invariably dressed in chunky outdoor gear, wearing boots and parkas and carrying backpacks. Everywhere we went in Puerto Williams we were made welcome and we thank all at Omora Ethnobotanical Park, at Ukika Village, at the high school (Liceo Donald McIntyre Griffiths), at Lakutaia Lodge and at the Martin Gusinde Anthropological Museum. Finally, in Patagonia they say that if you eat the berries of the calafate, you will be sure to return. Rest assured, we did this at every opportunity!

If you are interested in visiting this part of the world, Bernard Goffinet advises that the 8th Southern Connection Congress will take place in Punta Arenas from 18 to 23 January 2016 (www.umag.cl/southernconnection2016/). This will link scientists interested in natural sciences across the southern hemisphere, with particular emphasis on temperate ecosystems. The last Congress was held in New Zealand (www.otago.ac.nz/V11-southern-connection/index.html). If you are interested in contributing or organising a symposium on southern bryophyte or lichen biology, enquiries should be sent to Dr Mary Kalin Arroyo, Institute of Ecology and Biodiversity, University of Chile, Santiago (southern@uchile.cl).

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Mosses buried under sago snow in the Cerro La Bandera Beech forest.



Edible Orange beech fungus (*Cyttaria harioti*), Cerro La Bandera Beech forest.



White Dog Orchids (*Codonorchis lessonii*), Cerro La Bandera Beech forest.



Calafate berries (*Berberis microphylla*).



Puerto Williams, Chile, with the Dientes de Navarino in the background.



Noteroclada confluens at the edge of a stream in the peatland.



Sphagnum fimbriatum in the peatland.



Serrano Glacier, Bernardo O'Higgins National Park.



Horns of Torres del Paine Parque Nacional.

The spread of *Lunularia cruciata* in Australia

David Meagher

School of BioSciences, The University of Melbourne, VIC 3010, Australia

The thallose liverwort *Lunularia cruciata* (L.) Dumort. is a well-known coloniser of soil in disturbed damp or wet habitats, such as horticultural pots, gardens, roadsides and degraded stream banks. That it is introduced into Australia is beyond doubt, as shown by the following choropleth map (Figure 1). This map documents the decadal spread of the species from its introduction in the late 19th century to 2010. It is based wholly on herbarium records, so it is important to note that herbarium records do not necessarily reflect search effort, and the species might have been present at a particular location long before it was collected. But overall the records give a useful picture of the spread of the species in Australia.

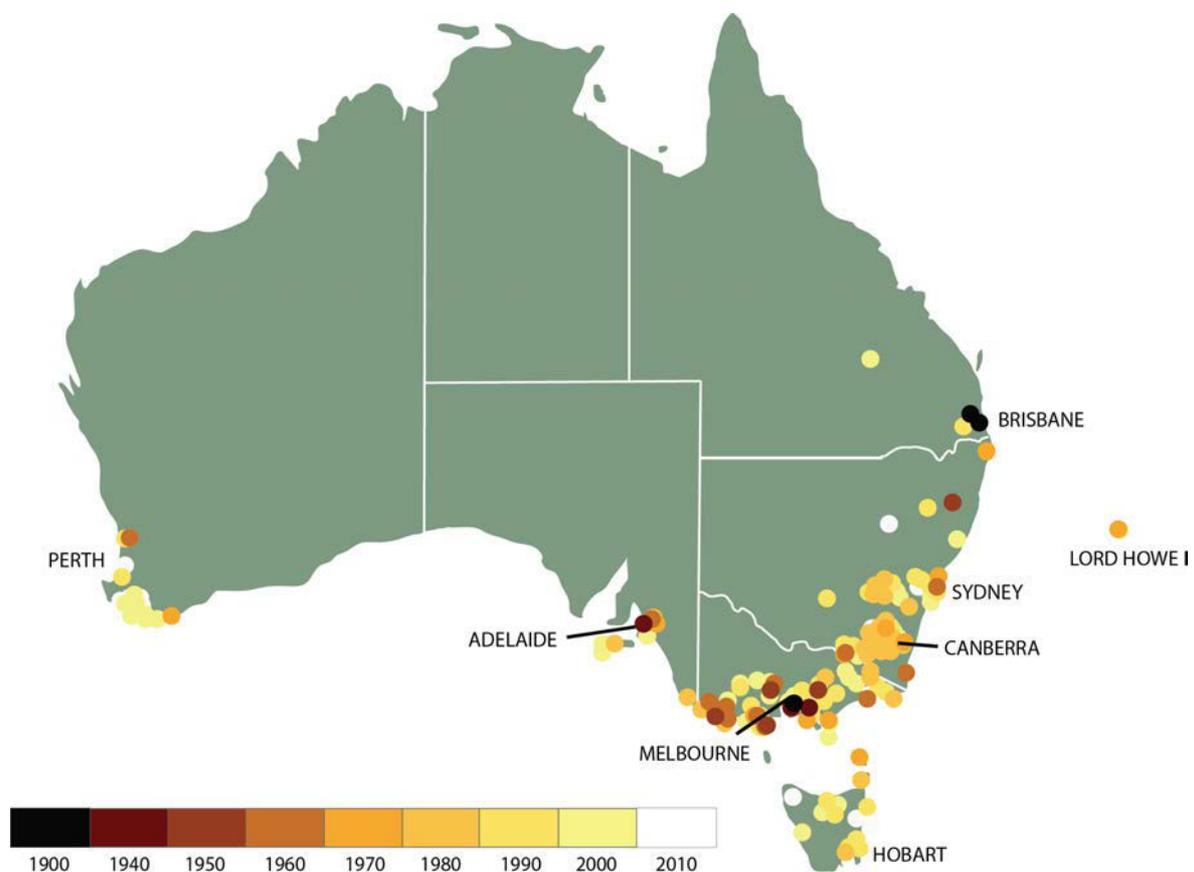


Figure 1 The spread of *Lunularia cruciata* in Australia. Data from AVH (2015). Dates refer to a first record in the preceding decade. Thus '1950' means first recorded in the 1940s.

The first known collections of the species in Australia were made in and near Brisbane in 1888, and soon after in Melbourne in 1896. No further collections were made until the 1930s (perhaps because of a downturn in bryological activity in Australia in the inter-war period), but by 1940 the species had been found in rural landscapes east of Melbourne and had reached Adelaide.

By 1950 it had been found west and north of Melbourne, as well as at Armidale in north-eastern New South Wales. Its known range expanded rapidly in the 1960s, reaching Perth and Sydney, south-eastern New South Wales, and East Gippsland, the Otway Ranges and the Western District of Victoria. This expansion continued in the 1970s to include Canberra and far-flung Lord Howe Island, Albany in Western Australia, and Flinders Island in Bass Strait, and the range extended

farther east of Melbourne and Adelaide. By 1990 it had been recorded on the Tasmanian mainland as far south as Hobart. It was by then widespread throughout Victoria and had spread west into the Murray–Darling Basin in New South Wales and south from Perth.

In the 1990s it had become widespread in south-western Western Australia and had become established north of Sydney, and even remote Carnarvon Gorge in Queensland had been reached. In the 2000s it was still spreading in Tasmania and northern New South Wales, and around Perth.

It is interesting that, at least judging from herbarium records, *Lunularia cruciata* has not yet reached tropical Australia or the drier interior of the continent, particularly as its distribution is commonly described as ‘cosmopolitan’. However, it seems inevitable that it would occur in well-watered gardens and similarly disturbed habitats in tropical towns and cities, and perhaps the fact that it is known to be introduced and is easily identified in the field makes it more likely to be recorded rather than collected.

Reference

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Australasian Systematic Botany Society Annual Conference

Building Our Botanical Capital

29 November–4 December 2015
CSIRO Discovery Centre, Black Mountain

The Society will be holding its conference in Canberra for the first time in 25 years, providing a forum for presentations and workshops on developments in plant systematics. There will be a particular focus on emerging methods of phylogenetic analysis and on making biological collections data accessible. A conference fieldtrip will also be run in addition to a program of social events for delegates.

Early-bird registrations close **Friday 16 October 2015**.
For more details visit the conference website at asbs.org.au/cbr2015



Bryophytes collected during the 12th Australian Bryophyte Workshop, Eungella, Central Mackay Coast

Andrew Franks¹ and Alison Downing²

¹ O2 Ecology, Fortitude Valley, QLD 4006, Australia

¹ Department of Biological Sciences, Macquarie University, NSW 2109, Australia

The main objectives of the Australian Bryophyte Workshop held in the Central Mackay Coast (CMC) bioregion were twofold: firstly to allow participants to experience the natural areas of this region of central Queensland; secondly to document the bryophyte flora in an historically poorly collected region when compared to similar areas of tropical and subtropical rainforest to the north (the Wet Tropics) and to the south (south-eastern Queensland).

During the four days of the workshop, participants visited 12 sites that supported a range of vegetation types: upland rainforest; lowland rainforest; dry rainforest; Araucarian vine forest; and littoral forests. In all 130 bryophyte taxa were collected (see Table 1), including four hornworts, 33 liverworts and 93 mosses. This figure is likely to increase as additional specimens of liverworts and *Fissidens* are identified. The 93 recorded moss taxa were from 30 families and 56 genera; the 33 liverworts represented 13 families and 21 genera; hornworts were from three genera in one family, the Anthocerotaceae. Orthotrichaceae, Fissidentaceae, Calymperaceae and Lepidoziaceae were the most speciose families recorded during the workshop.

While drier lowland vine forests were comparatively species poor (seven and nine taxa recorded from Hayward Gully (Conway National Park) and Cape Hillsborough National Park respectively) compared to upland rainforests, they still supported some interesting bryophytes including *Trachycarpidium brisbanicum*. The documented bryophyte flora of Whitsunday Island increased ninefold, with 25 taxa collected in the few hours that participants were on the island.

Of the 130 collected taxa, 18 were new records for the CMC bioregion and included ten mosses, six liverworts and two hornworts. New moss records included *Aerobryopsis longissima*, *Neckeropsis cyclophylla*, *Mitthyridium leucoloma*, *Trematodon longicollis*, *Trachycarpidium brisbanicum*, *Barbula indica* var. *gregaria*, *Taxithelium instratum*, *Entodon plicatus*, *Dicranella dietrichiae*, *Sclerodontium pallidum*; liverworts included *Plicanthus hirtellus*, *Heteroscyphus coalitus*, *Marchantia foliacea*, *Solenostoma inundatum*, *Reboulia hemisphaerica*, *Fossombronina papillata*; and the two hornworts were *Anthoceros punctata* and *Folioceros fuciformis*.

Some of these records fill logical gaps in the formerly disjunct geographical distributions of some species. For example, the leafy liverwort *Plicanthus hirtellus*, which has been recorded from upland rainforest areas of south-eastern Queensland and from the Wet Tropics of northern Queensland, had not been previously been recorded from the Central Mackay Coast bioregion. Records of other taxa previously recorded from the Wet Tropics represent a southern range extension; for example *Neckeropsis cyclophylla* (*Himantocladium cyclophyllum*) and *Aerobryopsis longissima*, which were both recorded from Conway National Park.

The results of the workshop highlight the prodigious diversity of bryophytes still awaiting discovery. If bryologists visiting readily accessible locations in just four days can gain results such as these, one can only imagine what might yet still be discovered.

Table 1 Bryophyte taxa collected during the 12th Australian Bryophyte Workshop, Eungella, Central Mackay Coast, 29 June – 4 July 2014. (See page 20 for an explanation of the site numbers.)

Taxon	Site											
	1	2	3	4	5	6	7	8	9	10	11	12
ANTHOCEROTOPHYTA												
Anthocerotaceae												
<i>Anthoceros punctatus</i> L.					+		+	+				
<i>Folioceros fuciformis</i> (Mont.) D.C.Bhardwaj								+				
<i>Phaeoceros carolinianus</i> (Michx.) Prosk.	+				+			+				
<i>Phaeoceros cf. carolinianus</i>							+					
MARCHANTIOPHYTA												
Aneuraceae												
<i>Riccardia</i> sp.	+						+		+			
Aytoniaceae												
<i>Asterella</i> sp.						+					+	
<i>Asterella drummondii</i> (Hook.f. & Taylor) R.M.Schust. ex D.G.Long							+	+				
<i>Reboulia hemisphaerica</i> (L.) Raddi							+	+				
Fossombroniaceae												
<i>Fossombronia papillata</i> Steph.											+	
Frullaniaceae												
<i>Frullania</i> sp.	+		+						+	+		+
Lejeuneaceae												
<i>Acrolejeunea securifolia</i> (Nees) Steph. & Watts											+	
<i>Cheilolejeunea</i> sp.									+			
<i>Drepanolejeunea</i> sp.	+				+							
<i>Lejeunea</i> sp.									+			
<i>Thysananthus retusus</i> (Reinw., Blume & Nees) B.M.Thiers & Gradst.												+
<i>Thysananthus</i> sp.												+
Lepidoziaceae												
<i>Bazzania corbieri</i> (Steph.) Meagher	+		+			+			+			
<i>Bazzania fuhreri</i> Meagher	+											+
<i>Bazzania ?intermedia</i> (Gottsche & Lindenb.) Trevis.			+									
<i>Bazzania mittenii</i> (Steph.) Steph.							+					
<i>Bazzania ?parisii</i> (Steph.) N.Kitag.							+					
<i>Bazzania</i> sp.							+				+	
<i>Kurzia</i> sp.	+						+					
<i>Telaranea</i> sp.			+				+					
Lophocoleaceae												
<i>Chiloscyphus semiteres</i> (Lehm. & Lindenb.) Lehm. & Lindenb.									+			+
<i>Chiloscyphus</i> sp.							+					
<i>Heteroscyphus argutus</i> (Reinw., Blume & Nees) Schiffn.	+				+	+						+
<i>Heteroscyphus coalitus</i> (Hook.) Schiffn.												+
Marchantiaceae												
<i>Marchantia foliacea</i> Mitt.								+				
Metzgeriaceae												
<i>Metzgeria furcata</i> (L.) Dumort.	+	+			+							
Radulaceae												
<i>Radula</i> spp.		+	+		+	+			+			
Ricciaceae												
<i>Riccia ?duplex</i> Lorb. ex Mull.Frib.	+				+							
<i>Riccia luticola</i> Na-Thalang					+							
<i>Riccia multifida</i> (Steph.) Steph.		+				+						

Taxon	Site											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Riccia</i> sp.				+	+	+		+				
Scapaniaceae <i>Plicanthus hirtellus</i> (F.Weber) R.M.Schust.	+											
Solenostomataceae <i>Solenostoma inundatum</i> (Hook.f. & Taylor) Mitt. ex Steph.	+											
BRYOPHYTA												
Archidiaceae <i>Archidium</i> sp.									+			
Bartramiaceae <i>Philonotis tenuis</i> (Taylor) Reichardt	+		+			+						
Brachytheciaceae <i>Eurhynchium laevisetum</i> Geh. <i>Rhynchostegium tenuifolium</i> (Hedw.) Reichardt						+						+
Bruchiaceae <i>Trematodon longicollis</i> Michx.	+											
Bryaceae <i>Rhodobryum aubertii</i> (Schwägr.) Thér. <i>Rosulabryum subfasciculatum</i> (Hampe) J.R.Spence								+	+			
Callicostaceae <i>Hookeriopsis utacamundiana</i> (Mont.) Broth.	+											
Calymperaceae <i>Calymperes graeffeanum</i> Müll.Hal. <i>Calymperes tenerum</i> Müll.Hal. <i>Leucophanes octoblepharoides</i> Brid. <i>Mitthyridium flavum</i> (Müll.Hal.) H.Rob. <i>Mitthyridium leucoloma</i> (Müll.Hal.) H.Rob. <i>Octoblepharum albidum</i> Hedw. <i>Syrrhopodon armatus</i> Mitt. <i>Syrrhopodon perarmatus</i> ? <i>Syrrhopodon platycerii</i> Mitt.				+	+		+	+		+	+	+
Cryphaeaceae <i>Cryphaea ovalifolia</i> (Müll.Hal.) A.Jaeger <i>Cryphaea tenella</i> (Schwägr.) Hornsch. ex Müll.Hal.			+									
Cyrtopodaceae <i>Bescherellia elegantissima</i> Duby	+											
Dicranaceae <i>Dicranella</i> sp. <i>Dicranella dietrichiae</i> (Müll.Hal.) A.Jaeger <i>Dicranoloma leichhardtii</i> (Hampe) Watts & Whitel. <i>Sclerodontium pallidum</i> (Hook.) Schwägr. subsp. <i>pallidum</i>	+											+
Entodontaceae <i>Entodon mackaviensis</i> Müll.Hal. <i>Entodon plicatus</i> Müll.Hal.									+			+
Garovagliaceae <i>Euptychium</i> sp. <i>Garovaglia elegans</i> subsp. <i>dietrichiae</i> (Müll.Hal.) During						+	+		+		+	+
Fissidentaceae <i>Fissidens ?ceylonensis</i> Dozy & Molk. <i>Fissidens linearis</i> Brid. var. <i>linearis</i> <i>Fissidens oblongifolius</i> Hook.f. & Wilson var. <i>oblongifolius</i> <i>Fissidens pallidus</i> Hook.f. & Wilson var. <i>pallidus</i>	+	+					+	+		+	+	

Taxon	Site											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Fissidens perobtus</i> Dixon									+			
<i>Fissidens</i> sp.	+	+	+	+	+	+			+	+	+	
<i>Fissidens submarginatus</i> Bruch												+
<i>Fissidens tenellus</i> Hook.f. & Wilson var. <i>tenellus</i>							+					
<i>Fissidens ?victoralis</i> Mitt.		+							+	+		
Hypnaceae												
<i>Ectropothecium</i> sp.	+			+							+	
<i>Hypnum subchrysogaster</i> (Broth.) Paris						+						
<i>Vesicularia</i> sp.												+
Hypnodendraceae												
<i>Hypnodendron vitiense</i> subsp. <i>australe</i> Touw			+									
Hypopterygiaceae												
<i>Hypopterygium tamarisci</i> (Sw.) Brid. ex Müll.Hal.	+	+	+			+			+			+
<i>Lopidium struthiopteris</i> (Brid.) M.Fleisch.	+	+				+						
Lembophyllaceae												
<i>Camptochaete curvata</i> Tangney						+			+			
<i>Camptochaete excavata</i> (Taylor) A.Jaeger	+				+	+			+		+	
Leucobryaceae												
<i>Campylopus introflexus</i> (Hedw.) Brid.	+										+	
<i>Leucobryum aduncum</i> var. <i>scalare</i> (M.Fleisch.) A.Eddy		+				+			+		+	
<i>Leucobryum candidum</i> (P.Beauv.) Wilson	+					+			+		+	+
Meteoriaceae												
<i>Aerobryopsis longissima</i> (Dozy & Molk.) M.Fleisch.												+
<i>Meteorium polytrichum</i> Dozy & Molk.												+
<i>Papillaria crocea</i> (Hampe) A.Jaeger	+	+										
<i>Papillaria leuconeura</i> (Müll.Hal.) A.Jaeger	+	+							+			
<i>Papillaria nitens</i> (Hook.f. & Wilson) Sainsbury								+				
Neckeraceae												
<i>Neckeropsis cyclophylla</i> (Müll. Hal.) S.Olsson, Enroth & D.Quandt					+						+	
<i>Neckeropsis lepineana</i> (Mont.) M.Fleisch.											+	
<i>Thamnobryum pandum</i> (Hook.f. & Wilson) I.G.Stone & G.A.M.Scott	+		+		+							+
Orthotrichaceae												
<i>Macromitrium aurescens</i> Hampe									+			
<i>Macromitrium exsertum</i> Broth.											+	
<i>Macromitrium involutifolium</i> (Hook. & Grev.) Schwägr.			+			+						
<i>Macromitrium involutifolium</i> (Hook. & Grev.) Schwägr. subsp. <i>involutifolium</i>						+						
<i>Macromitrium involutifolium</i> subsp. <i>ptychomitrioides</i> (Besch.) Vitt & H.P.Ramsay									+			
<i>Macromitrium leratii</i> Broth. & Paris											+	
<i>Macromitrium ligulaefolium</i> Broth.	+					+			+		+	
<i>Macromitrium ligulare</i> Mitt.			+									
<i>Macromitrium microstomum</i> (Hook. & Grev.) Schwägr.						+						+
<i>Macromitrium repandum</i> Müll.Hal.						+						
Polytrichaceae												
<i>Pogonatum</i> sp.			+									
<i>Pogonatum neesii</i> (Müll.Hal.) Dozy	+		+									
Pottiaceae												
<i>Barbula indica</i> (Hook.) Spreng.						+						
<i>Barbula indica</i> var. <i>gregaria</i> (Mitt.) R.H.Zander										+		
<i>Hyophila involuta</i> (Hook.) A.Jaeger						+					+	

Taxon	Site											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Trachycarpidium brisbanicum</i> (Müll.Hal.) I.G.Stone <i>Weissia</i> sp.								+		+		
Pterobryaceae <i>Calyptothecium acutum</i> (Mitt.) Broth. <i>Calyptothecium recurvulum</i> (Broth.) Broth. <i>Muellerobryum whiteleggei</i> (Broth.) M.Fleisch.		+				+						
Pylaisiadelphaceae <i>Isopterygium albescens</i> (Hook.) A.Jaeger <i>Taxithelium instratum</i> (Brid.) Broth. <i>Wijkia extenuata</i> (Brid.) H.A.Crum				+	+						+	
Racopilaceae <i>Racopilum cuspidigerum</i> (Schwägr.) Ångstr. <i>Racopilum cuspidigerum</i> var. <i>convolutaceum</i> (Müll.Hal.) Zanten & Dijkstra		+	+			+						+
Rhizogoniaceae <i>Mesochaete taxiforme</i> (Hampe) Watts & Whitel. <i>Mesochaete undulata</i> Lindb. <i>Pyrrhobryum latifolium</i> (Bosch & Sande Lac.) Mitt. <i>Pyrrhobryum paramattense</i> (Müll.Hal.) Manuel <i>Pyrrhobryum ?spiniforme</i> (Hedw.) Mitt.			+	+								+
Sematophyllaceae <i>Meiothecium secundifolium</i> Dixon <i>Sematophyllum homomallum</i> (Hampe) Broth. <i>Sematophyllum subhumile</i> M.Fleisch. var. <i>subhumile</i>						+					+	
Thuidiaceae <i>Thuidiopsis sparsa</i> (Hook.f. & Wilson) Broth. <i>Thuidium cymbifolium</i> (Dozy & Molk.) Dozy & Molk.		+		+	+	+				+		+
Trachylomataceae <i>Braithwaitea sulcata</i> (Hook.) A.Jaeger <i>Trachyloma diversinerve</i> Hampe		+	+									

Notes

Site numbers correspond to the following:

- 1 Track to Mount Dalrymple, Eungella NP
- 2 Sky Window, Eungella NP
- 3 Wishing Pool Circuit, Eungella NP
- 4 Coastal Fringe Circuit, Conway NP
- 5 Kingfisher Circuit, Conway NP
- 6 Finch Hatton Gorge, Eungella NP
- 7 Schumann's Road, Eungella
- 8 Mackay-Eungella Road near Eungella village
- 9 Mount Blackwood, Pioneer Peaks NP
- 10 Yuibera Trail, Cape Hillsborough NP
- 11 Whitsunday Peak, Whitsunday NP
- 12 Great Walk (Repulse Creek to Mount Hayward Section), Conway NP.

What's that green stuff?



This plant belongs to a tropical and subtropical genus of about 50 epiphytic species, of which eight are reported from Australia. The long, branched thalloid structure consists of a thick midrib and a pair of wings one cell thick. The cells contain a single star-shaped chloroplast associated with a spherical pyrenoid. The wings are usually strongly crisped, giving the plant a bubbly appearance, and contain mucilage cavities in which colonies of *Nostoc* cyanobacteria grow. Single-celled rhizoids bind the thallus tightly to the substrate. The capsule is long and needle-like, and pale brown when mature, and splits along one cleavage line (sometimes two) to release green multicellular spores. *Answer at bottom of page.*

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Articles relating to bryology in Australasia are welcome.
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Cover photo

Bescherellia elegantissima Duby covering the trunk of a tree in Mt Hypipamee National Park, northern Queensland. (DAM)

What's that green stuff?

Dendroceros crispatus (Hook.) Nees, Misty Mountains, northern Queensland. (DAM)