

AUSTRALASIAN BRYOLOGICAL NEWSLETTER

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Participants at the Xth Australasian Bryophyte Workshop
Manjimup, Western Australia 30th August – 5th September 2009.

Back row: Allan Fife, Rowena Whiting, Jim Shevock, Pina Milne, Sapphire McMullan-Fisher, Lyn Cave, Alison Downing and Endymion Cooper

Front: Ron Cranfield, Eric Whiting, Chris Cargill, Graham Bell, Barbara Andreas, Kristina Lemson, Helen Jolley, Bill Buck, Chris Tyshing, Louise Biggs, Cassidy Newland and Niels Klazenga

Absent: Elizabeth Brown and Paddy Dalton (behind the camera).

Xth Australasian Bryophyte Workshop Manjimup, Western Australia 30th August – 5th September 2009.

It has taken over 20 years since the first Australasian workshop was held that we finally ventured west to the vast State of Western Australia. The Xth Australasian Workshop was located in the southern forests based at Tone-Perup Ecology Centre some 35 kms east of Manjimup which is in the south-west of the State over 300 kms from the capital city of Perth.

After a delayed departure from Perth airport it was a long drive and late arrival at Perup Centre. However 18 Australian bryologists were joined by our sole New Zealander, Allan Fife, and three North Americans, Bill Buck, Jim Shevock and Barbara Andreas with whom acquaintances were made or in many cases renewed over a most welcome dinner.



Louise Biggs, Bill Buck (background), Lyn Cave (on knees) & Alison Downing

Our first day took us to a rocky granite outcrop known locally as “Grevillea rock”. The area was surrounded by eucalypt/*Allocasuarina* forest with *Xanthorrhoea* and cycad understory. A number of good collections were made and included the mosses *Hedwigidium integrifolium*, *Hedwigia ciliata*, *Campylopus bicolor*, *Dicranoloma diaphanoneuron*, *Sematophyllum homomallum* and hepatics *Chaetophyllopsis whiteleggei* and *Fossombronia intestinalis*.

The unseasonal showery weather which persisted for much of the week enabled the cryptogams to be readily observed in the field and didn't prevent the suspected appearance of a local reptile!

Tuesday presented us with the opportunity to assess cryptogam diversity in a number of monitored sites in the Kingston Forest Block. Three sites were sampled in these managed regenerating jarrah forests and the meagre number of bryophyte species were well outnumbered by the lichen flora. Our species list was recorded for the ongoing research that is part of the Long Term Ecological Research (LTER) which has been established to assess forestry management activities. Our return to Perup saw us stop at a local swamp where the moss *Entosthodon producta* and the liverwort *Lethocolea squamata* were present on the bare clay soil.

The weather deteriorated to cold showers on Wednesday for our field trip to Lake Muir Reserve, a low swamp forest dominated by *Melaleuca cuticularis*. The surrounding eucalypt woodland (*E. rudis*, flooded gum) provided the more interesting diversity of bryophytes. Here the epiphytes *Zygodon* and *Tortula papillosa* were found on the trunk of the eucalypt. The tall karri forest near Manjimup provided the chance for the tree climbers to display their skills on Thursday. “The diamond tree” was scaled by a couple in our party while others concentrated on the cryptogams in the forest below. The trunk of the karri (*Eucalyptus diversicolor*) was found to support *Thuidiopsis sparsa*, the decaying logs had good turfs of fertile *Dicranoloma diaphanoneuron* and *Orthodontium lineare* was collected from burnt logs.

Niels Klazenga & Allan Fife



Our return to Perup allowed a stop at Manjimup. It didn't take long to discover an ash tree in the town's park to be laden with fertile *Tortula papillosa*. However it was a visit to two cemeteries that was of more interest, not to pray for the departed, but to search for Pottiaceae. Passing traffic would have been astonished to observe semi-prostrate bodies amongst the gravestones. It did result in excellent fertile collections of *Entosthodon producta*, *E. subnudus* and *Pleuridium nervosum* from Balbarrup cemetery, but it was the find of some unidentified mosses that created most interest. A species of *Archidium* with large multicellular spores from Manjimup cemetery and a sterile moss from the roadside at the Balbarrup cemetery still await identification.

Fine sunny weather was a pleasant return on Friday where we divided into two groups. A small contingent headed several hundred kilometres south towards Mt. Lindesay, while the larger group drove through tall forests to Beedelup Falls National Park. Two endemic mosses have been reported from the Mt. Lindesay area – *Rhacocarpus rehmannianus* and *Pleurophascum occidentale*. There is some scepticism as to the identity of *R. rehmannianus* and Cassidy Newland was eager to show the senior muscologists in our group the type location.



Niels Klazenga "wading"



Pleurophascum occidentale growing under a *Kingia australis* on a gravelly ant nest (on the left) and cushion with a single semi-immersed capsule (on the right)

We arrived at the west side of Mt. Lindesay and undaunted waded "crotch" deep through a creek to a granite outcrop only to be disappointed not to locate the species. However our endeavour to locate *P. occidentale* at Little Mt. Lindesay was successful. To the delight of Allan Fife and Paddy Dalton several good populations were discovered and Niels Klazenga collected a specimen which had a sole semi-immersed capsule. We were later informed that fruiting material is best seen in June/July. There were more good finds on our return journey. A stop at the Rocky Gully Store to stretch our legs (actually purchase ice creams) Bill Buck, who never missed a collecting opportunity, located *Stonea oleaginosa* (later confirmed by Helen Jolley) on bare roadside soil. As well abundant fertile *Fossombronia cultriformis* was found in the adjacent picnic area.

This was a challenging workshop logistically, however Louise Biggs with assistance from colleagues at DEC, is to be commended for her excellent organisation. A well prepared program of field trips and seminars with ample time for laboratory work ensured all participants gained valuable experience from this workshop.

Several seminars were presented. Sapphire McMullan-Fisher presented results from a Tasmanian study into vegetation types as a surrogate for cryptogam conservation. Preliminary investigations into the biology of the invasive moss, *Rhytidiadelphus squarrosus*, were presented by Paddy Dalton. Alison Downing gave us a journey into the far reaches of Xinjiang of north-western China in search for mosses and fossils. Helen Jolley outlined the results of an analysis of the phylogenetic position of two Pottiaceae taxa, *Phascopsis rubicunda* I.G. Stone and *Stonea oleaginosa* (I.G. Stone) R.H. Zander. The nature of the conservation work in the Perup/Kingston area was detailed by Ian Wilson. The occurrence in New Zealand of three species belonging to the tropical family, Calymperaceae, was presented by Allan Fife. Chris Cargill introduced us to Bryophyte wiki, a new website established by TRIN (Taxonomy Research Information Network). We are encouraged to participate and contribute to this online workspace for the taxonomy of Australian mosses, liverworts and hornworts.

The catering was of a high standard and wholesome dinners were a highlight following a day in the field. The accommodation was cosy, perhaps a little crowded in some bunkrooms, but plenty of alternate space for microscopes and socialising with a glass of wine or port in front of an open log fire. The only setback was the raging swine flu (“manjimup plague”) which struck during the week. Several members were severely affected while others felt its impact on their return home.

On the last evening there was a vibrant discussion regarding the future directions of Australian bryology and agreement was reached on the following matters.

- Change the name of the workshops to “Australian Bryophyte Workshop”
- Niels Klazenga is to develop an Australian Bryology website for implementation in 2010
- Retain the current format for the Australasian Bryological Newsletter, but develop a succession plan for future editorship
- The next workshop is postponed until 2012 due to the biennial IAB meeting to be held in conjunction with the 2011 International Botanical Congress in Melbourne.

David Meagher and Chris Cargill would investigate the option of a workshop at Eden, NSW.

A 6am start on Saturday required frenetic cleaning and packing, but with many hands to assist another successful workshop came to a close.

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24th John Child Workshop

15th – 20th October 2009, Waipukurau, Hawke’s Bay

The twenty-fourth John Child Bryophyte Workshop was held on the 15-20 October 2009 at the Pukeora Estate, near Waipukurau in Hawke’s Bay. This was the first time a Child workshop was held in Hawke’s Bay region of the North Island’s central east coast. It is predominantly an area of rolling hills of modest elevations. The forest cover of Hawke’s Bay was largely removed in the later 19th century as the land was converted to more “productive” purposes; the prevailing 21st century views can only be described as pastoral. The sites visited by the workshop were thus mostly forest remnants, mostly covered by mixed broad-leaved and podocarp forest.

Hawke’s Bay is historically significant in the annals of New Zealand bryology, with both G.O.K. Sainsbury and Emily A. Hodgson living for much of their lives in or near Wairoa, on the northern shore of Hawke Bay. Sainsbury’s and Hodgson’s collections notwithstanding, the Hawke’s Bay region has remained relatively poorly represented by moss and hepatic collections in New Zealand herbaria.

The workshop was based at the Pukeora Vineyard and Winery, some c. 5 km west of Waipukurau. The Pukeora Winery is located in a former tuberculosis sanitarium, with stunning views over the Matukituki River valley and the more distant Ruahine Ranges. We had ample room to spread out microscopes (kindly provided by Massey University), specimens, etc. The roomy lab area was some distance from the sleeping area and some thought that roller skates would be helpful to move from one area to the next. Sadly, it seems that no one encountered the nurse/ghost who purportedly wanders the long corridors after dark.

We had a very strong turn-out, with 35 registered participants. It was heartening that these included several first-timers and at least two young students, one primarily interested in mosses and the other in lichens. On this theme it should be noted that the participants voted in favour for “updating” the name for future workshops to “the John Child Bryological and Lichenological Workshops. This name change reflects the active participation of lichenologists in our meetings over the past several years. The pteridologists, alas, still didn’t find their way into the workshop title, but they also attend (and are most welcome!). It was suggested that the late John Child would have approved of our new, more inclusive, sobriquet.

Participants included only two of our Australian friends this year, almost certainly because this workshop followed soon after the Australian meeting in Western Australia. However, those who attended both these meetings were sufficiently recovered from the Manjimup plague (aka swine flu) that the sanitarium facilities were not really required. One or two were still on restricted alcohol rations preventing full enjoyment of the excellent “SanHill” wines available with our evening meals, however. Others, *au contraire*, enjoyed them to the full.



Participants in 24th John Child Bryophyte (and Lichen) Workshop, Waipukurau, Hawke's Bay, 15-20 October 2009.

Front center: Lindsey Gray. **Front row** (l to r): Terry Evans, Paula Warren, Graham Pritchard, Barbara Polly, Lara Shepherd (organizer), Leon Perrie (organizer), Carlos Lehnebach, Mikael Boulic, Pascale Michel, Owen Spearpoint. **Second row:** Anne Redpath, John Steel (hidden), Ben Myles, Maia Mistral, Helen Jolley, Jessica Beever, Hugo Baynes, Betina Fleming, Barbara Beveridge, Susan Hansard, Ant Kusabs, Lyn Fischer, Matt Renner, Allan Fife, Ross Beever, Barbara Parris. **Back row:** Peter Beveridge, Allison Knight, Pat Brownsey, Rodney Lewington, Darea Sherrat, Lyn Cave, Ursula Brandes. Missing: Jill Rapson (organizer). Photo by Ross Beever

A few short talks were presented each evening. Only those by students will be mentioned here. Betina Fleming presented an interesting talk on the spatial distribution of mosses on a masonry wall in Dunedin, while Ben Myles discussed the systematics of New Zealand representatives of the lichen genus *Menegazzia*. The Tom Moss Prize for the best student paper on bryophytes was awarded to Betina.

During the period of the Workshop, much of GodZone experienced several days of heavy rains. In Waipukurau, however, were blessed with mostly sunny skies and only scattered and well-time showers. We thank the organizers (and Huey) for this.

The first field trips (16th Oct) visited the lowland mixed podocarp-beech forests of the Monckton Scenic Reserve and A'Deane's Bush Scenic Reserve. One thing that I noted at both of these reserves was the very sparse representation of *Ditrichum* species (this seems a curious feature of the Hawke's Bay region generally). *Ditrichum cylidricarpum*, however, did occur at the margins of the Monckton Reserve, along with such relatively uncommon epiphytic species moss species as *Tetraphidiopsis pusilla* and *Cladomnion ericoides*. At A'Deane's Bush, the nationally endangered hepatic *Radula papulosa* grew as an epiphyte on titoki (*Alectryon exselsus*) and totara (*Podocarpus hallii*). This is the third modern locality for this species, with the other two records deriving from past John Child Workshops (in the Wairarapa and at Pohara, Golden Bay).

The second day of field trips found most of us climbing the eastern flank of the Ruahine Range via the track to Sunrise Hut and the Armstrong Saddle. Our leader, Leon Perrie, made an inspired call on the weather and

selected this day for us turn our attention to alpine cryptogams. Most of us climbed to elevations of c. 1300-1700 meters. Among the liverworts of note were *Austrolejeunea hispida* which, although previously recorded for the Ruahine Ranges is only known from this single North Island locality. *Riccardia colensoi*, *Haplomitrium gibbsii*, and *Pachyschistochila subhyalina* were all located in alpine seepages and at least three species of *Radula* grew on mountain beech forest close to tree line. Particularly exciting was the collections of an undescribed species of *Nephelolejeunea* with secund leaf lobes found growing on *Hebe tetragona* subsp. *subsimilis* by Matt Renner. The alpine/subalpine mosses also yielded collections of special interest, with *Chrysoblastella chilensis* and the striking purple plants of *Racocarpus purpurascens* (both species which occur in the South American Andes) providing interest. *Ptychomnion densifolium* grew among stems of *Olearia nummularifolia* on an exposed high-elevation ridge. This species occurs in South America and Tristan d’Acunha (the latter its type locality); in New Zealand is known mainly from high-elevations sites in the South Island, Stewart Id, and the Auckland and Campbell Islands. It is known from the North Island only from the Ruahines and the Tararuas.



Hylocomium splendens near Armstrong Saddle, Ruahine Range Photo by Matt Renner

A species of particular phylogeographic interest here was *Hylocomium splendens*. This species is a remarkable example of a bipolar disjunct moss species occurring in New Zealand. It is known from the temperate southern hemisphere only from a very few high-elevation localities in the North Island. In the northern hemisphere this species is sometimes termed the “stair-step Moss” because of its usual growth form. Although previously recorded from high-elevation sites at Mt. Hikurangi, Mt Hector & Field Peak in Tararuas, and the Ruahines, this was the first time any of the workshop participants had seen this characteristic but poorly-documented species. Previously, this species was recorded by Bryony Macmillan (Wellington Bot. Soc. Bull. 46: 61–62, 1994) from the Ohutu Ridge in the NW Ruahines; Macmillan speculated that “perhaps *Hylocomium* will prove to be widespread in the Ruahine Range.” The Workshop’s collections and observations support Macmillan’s suggestion.

Further, our collections permit a re-evaluation of the morphological variability of N.Z. *Hylocomium splendens*. This is significant because NZ high elevation (above c. 1300 m) material is morphologically unrepresentative of the species as it occurs through most of the northern hemisphere but similar to named varieties from tundra habitats. Collections made by the workshop from a range of elevations show that populations growing below tree line exhibit a more species-representative growth form (i.e. approaching the “stair-step moss” growth form with annual growth increments) than populations in the extremely exposed alpine sites.



The workshop collections thus help clarify confusion surrounding the taxonomic status as well as the distribution, altitudinal range and habitat preferences of *Hylocomium* in N.Z. Hugo Baynes, climbing higher than other weary trampers, gathered *H. splendens* (the epithet means shining, but we all thought the moss was indeed splendid) from very near to 1500 m elevation and this collection has been placed in WELT with auspicious accession number M40000. To quote Patrick Brownsey (photo left courtesy Ross Beever): “what could be more appropriate than designating this number to the appropriately named *Hylocomium splendens* collected by Hugo from the highest point of the trip!”

Other Workshop participants found rich-gatherings of both bryophytes and lichens on the epiphyte-laden trees at the base of the track (elevation c. 650 meters).

What could follow our day in the Ruahines? On the 18th most of us travelled to Mohi Bush Scenic Reserve, with a dense podocarp-broad-leaved forest developed over a coarse marine limestone. The Reserve here was contiguous with a golf course, which made me think this would have been an ideal site for at least one Australian, oops, Tasmanian, bryologist to visit. Among the tree species prominent here (and admittedly at other Hawke's Bay sites) was tawa (*Beilschmiedia tawa*), a species not often encountered by this South Island botanist. Here I was struck by beautiful colonies of the arborescent *Plagiochila stephansoniana* and lush *Monoclea forsteri* growing over shaded limestone. The latter sparked discussion about the etymology of its generic name and admiration of its unusual sporophyte. Also present were *Echinodium umbrosum* (seen by me only at this site during the workshop...why was it so uncommon?), lush growth of *Dendrohypopterygium filiculiforme* (a.k.a. *Hypopterygium filiculaeforme*), both *Racopilum strumiferum* and *R. robustum* (the latter surprisingly uncommon at our sites), and nice material of *Pseudotaxiphyllum falcifolium*. Some very stunted *Calypstrochaeta cristata* was seen, which made me wonder why we had seen so little of this genus and the allied *Distichophyllum* on the workshop. On the way back to our "home winery" many stopped at the promising looking, but bryologically disappointing, Maraetotorara Gorge. There the accessible forest was very disturbed and there, too, the rain started...so we left in a hurry.

The following day most people either stayed near the microscopes or travelled a short distance to the Elsthorpe Scenic Reserve. I do not know what was found there, except that Matt reliably found more *Radula* of interest, in this instance *Radula papulosa* growing epiphytically on kahikatea

I was feeling slightly crazed myself, so I spent much of the day with some potti-ologists (Jessica & Ross Beaver, Helen Jolley, and Lyn Cave), on my knees in a selection of Waipukurau cemeteries. Jessica & Helen, it seems, spent most of the week in cemeteries, and were well-pleased with their findings of minute Pottiaceae. They also gave one local landowner something to chuckle about when he discovered two rather strange women, bizarrely dressed and crawling excitedly beside his driveway. The excitement, they relate, was due to their finding rich pickings on soil where a drain had recently been laid across the gentleman's lawn. Amongst the more mundane *Tortula truncata*, *Didymodon australasiae* and *Barbula unguiculata* colonising the bare earth, were *Pseudocrossidium hornschuchianum*, and beautiful fruiting material of the well-named 'stemless Tortula', *T. acaulon*. Also present, although not recognised until back at the microscope, which seems to be the usual way with this rather cryptic moss, was *Chenia leptophylla*.

Fashion Statements in the Waipukurau Cemetery: Jessica Beaver, Helen Jolley, Allan Fife, Lyn Cave. Photo by Ross Beaver.



And so, with a flurry of communal microscope-packing and floor-sweeping the 24th John Child Bryophyte (and Lichen) Workshop came to a sudden end. The entire event was superbly organized by Leon Perrie, Jill Rapson, and Lara Shepherd. The meals, the wine, the company, the weather, and the botany were superb. What more can I add? Oh, yes, the 25th (!) JCB&L Workshop will be held in 2010 in the Longwood Range in the far south of the South Island. It will be different. We hope more of our Australian colleagues can join us. Details can be obtained from Allison Knight alli_knight@hotmail.com or John Steel (john.steel@botany.otago.ac.nz).

Allan Fife, Landcare Research, Lincoln, New Zealand. fifea@landcareresearch.co.nz

Spanish Mosses – a laboratory visit to The University of Murcia

We are sitting in the cafeteria laughing over my choice of tea rather than coffee. I have tea leaves and hot water in what my Spanish friends tell me is an oil tin! The problem arises when I want to pour the tea; we all giggle as I am given a huge strainer. Apparently this combination has not been seen before, I am informed that it must be especially for me – the Australian visitor!!!!

I reflect on how I came to be here, in the Department of Biology at The University of Murcia in South-eastern Spain. With the generous support from the Friends of the Royal Botanic Gardens Melbourne I was awarded a staff scholarship. Travelling first to London, I visited the current ABLO (Australian Botanical Liaison Officer) Tony Orchard, at the RBG Kew. Tony gave me a personal tour of the herbarium at Kew. A highlight was using the spiral wrought iron staircases – an icon of Kew herbarium. I also visited the Natural History Museum where Len Ellis allowed me access to the bryophyte specimens. Fortunately the Charles Darwin exhibition – “The Big Idea”- was still open and I was able to attend, it was excellent!

After a 13 hour journey from London, (including only four hours of flying time), due to a missed connection, I finally arrived in Murcia, minus my luggage! Thankfully it was delivered the next day; I have never been so pleased to see a suitcase in my life!! I was greeted by my Spanish colleagues Dr Maria Cano, my host and her student David Orgaz. I spent the next ten days working in the bryological laboratory with Maria, David, Juan Guerra, Juan Antonio and Mayte. The groups which they specialise in are listed below:

María Jesús Cano Bernabé

Crossidium, Tortula, Pottiaceae

Jose David Orgaz Alvarez

Brachythecium (Brachytheciaceae)

Juan Guerra Montes

Director of the Herbarium, Flora Briofitica Iberica

Juan Antonio Jiménez Fernández

Didymodon

María Teresa Gallego Morales

Aloina, Syntrichia

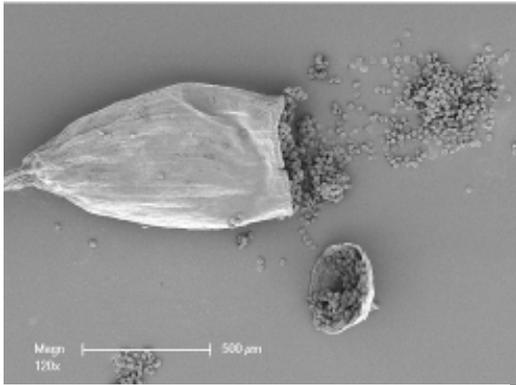
This was my first opportunity to work with a group of bryologists. I was equally fortunate that the majority of them specialise in the Pottiaceae (the family of mosses which I also work on). Only David was the odd one out, he doesn't work on Pottiaceae! Nevertheless, they all proved to be excellent hosts and my visit was an enriching experience for me. The knowledge and experience that I gained during this visit is invaluable. Maria was particularly helpful as we examined specimens together; discussed my research and studies; molecular techniques and methods; problematic groups; development of a generic key; donation of specimens from our institutions and the IAB (International Association of Bryologists) meeting in Melbourne in July 2011.



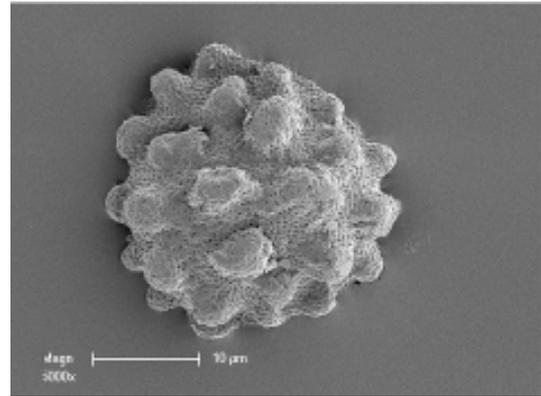
From left: Maria, Juan Antonio, Juan Guerra, David, Mayte



Fortunately I was able to undertake field work– which was a unique experience. The lovely aroma of lavender and thyme whilst kneeling to look at mosses was a new experience for me, as was the prickly Mediterranean flora! We found some lovely fertile mosses during our two days in the field, including species that are endemic to Spain and species that I have not seen before. I collected over 20 taxa, including 14 species of Pottiaceae. Although we share many genera of Pottiaceae, the majority of the species are different. The opportunity to collect and examine different species with a group of Pottiaceae experts has been fantastic. It has given me a greater understanding of our common taxa and of the variation in the Australian species. My Spanish colleagues have published extensively on the Pottiaceae, including the Flora Briofitica Iberica and also have a useful website called Pottiaceae, Integrated Taxonomic Information System. The address is: <http://www.pottiaceae.com>.



Capsule of *Microbryum davallianum*, a species which I collected in Spain



A spore of *Microbryum davallianum*

I would like to thank the Friends of the Royal Botanic Gardens Melbourne for their generous support in funding my trip. It was a most productive and enjoyable time and I feel privileged to have had this opportunity. I hope that this is the beginning of a long association with my Spanish colleagues!

Helen Jolley, Herbarium, Royal Botanic Gardens, Victoria

IAB South Africa 2009 – An Australian Perspective

This conference, in contrast to Kuala Lumpur in 2007, was smaller in both participation and presentations, but lacked none of the bryological spirit and camaraderie that is characteristic at IAB. To this end the organisers, Terry Hedderson and Claudine Ah-Peng with assistance from Nicholas Wilding and Phelex Manyanga are to be commended. Enroute to Cape Town I arrived at the Johannesburg International (Tambo International) Airport having spent 18 hours in flight only to find my baggage was still at Melbourne airport. After three days waiting for the baggage to turn up, I began to feel like an orphan, no one wanted to sit next to me! I wasn't the only one to suffer the disruption to air travel. A contingent from the UK was delayed by over twelve hours and all this tested the organisational skills of our hosts. However all was in readiness for the opening session on Monday morning.



The location for the conference was approximately 100 kilometres out of Cape Town at the resort, Goudini Spa ("the place of bitter honey"), nestled amidst the Boland Mountains, surrounded by superb vineyards where attractive hostesses tempted our sapidity – what an ideal location! I shared a modest Rondavel (photo) while others were accommodated in more luxurious Slanghoek villas overlooking the resort. The conference facilities and accompanying meals were adequate for the size of our group.

In accord with IAB custom, the meeting opened with the keynote address by Jeffrey Duckett who received the Richard Spruce award in 2007. He presented a stimulating view of the function of stomata in bryophytes where Jeff argued that their role may not always be in the regulation of gaseous exchange. I will not attempt to summarise all the presentations here as I'm sure they will be provided elsewhere. The following give an insight into the disciplines covered. In Community ecology, Claudine Ah-Peng discussed colonisation and succession of bryophytes along a chronosequence of lava flows in Réunion. Results support a hotspot of bryophyte diversity and Claudine proposes the establishment of BRYOLAT – a study of the altitudinal and latitudinal gradient in the Indian Oceanic islands. Jeff Bates outlined his concept for the development of an ecological atlas of British bryophytes. Silvia Pressel introduced the Biology session with a stimulating

insight into desiccation biology using moss protonemata as a model system. Irene Bisang discussed studies into sex expression in the European moss, *Pseudocalliergon trifarium* and Javier Martinez-Abaigar presented field and laboratory studies to demonstrate that the aquatic liverwort *Jungermannia exsertifolia* may be a useful bioindicator of ultraviolet radiation. Lars Söderström provided an overview to the Conservation Symposium and was supported by Thomas Hällingbach discussing how we may utilise short-cuts to identify hotspots and endangered species. An outline of the Early Land Plants Today project was presented by Matt von Konrat, who discussed its importance and application to liverwort conservation. There were a number of papers on phylogeny and systematics. Lisa Montero outlined her studies into resolving relationships among families and genera of the Hookeriales. A taxonomic revision of the poorly studied African Thuidiaceae is being undertaken by Nonkululo Phephu and colleagues at the Pretoria National Herbarium. Several papers addressed the phylogeography and biogeography of African bryophytes while Lars Hedenäs presented studies into the diversity patterns among European pleurocarpous mosses. Several presentations did challenge our traditional thoughts. The plenary presentation by Cymon Cox asked that we “need to be sceptical” with some of the current interpretation of bryophyte phylogeny, while Terry Hedderson questioned the populist view of species definition in his plenary presentation. Student papers provided evidence that the future of bryological research will be maintained at a high level. The best student paper was awarded to Rafael Medina ‘Epiphytic bryophytes of inland juniper forests throughout the Mediterranean basin’, while Amélie Pichonnet was highly commended for her paper “New insights into the genus *Dicranum* Hedw.” The best student poster went to Greg Buda for his informative “Understanding of the evolution of plant cuticles using the moss *Physcomitrella patens* as a model experimental species”.



It was not all hard work. The day trip to the Cape, Kirstenbosch Gardens and South African Biodiversity Institute provided the opportunity to capture the remarkable scenery and floristic diversity. At the Institute, I was most impressed to hear that over a 5-year period a comprehensive conservation plan has been produced for the South African flora at a modest budget of only \$650,000. By comparison we are well behind such a target for the Australian flora.

Cycad Grove in Kirstenbosch Garden

The Kirstenbosch Botanic Gardens lived up to their reputation and I was busy capturing on camera the groves of Cycads and numerous beds of flowering Proteaceae as the late afternoon sunshine disappeared behind the majestic Table Cape Mountain. The day concluded with an excellent dinner at the Kelvin Grove Club in the heart of Cape Town. Suitably attired with dresses and jackets (let me qualify that statement, ladies in dresses and men in jackets) we enjoyed good food, fine wine and some uninhibited dancing all of which prepared us for the long drive back to Goudini Spa.

Leucadendron uliginosum (mountain fynbos) in Kirstenbosch Garden



During the evening the new president of IAB, Jeff Duckett, announced that the remaining founding father of the IAB, Zen Iwatsuki, was unanimously elected an honorary member in recognition of his contribution to international bryology.

The concluding session of the conference provided the opportunity for the new president to report on the outcomes of the Council meeting held earlier in the week. The 2011 IAB meeting will be held in Melbourne as part of the IBC Congress and the proposal to hold the 2013 meeting at University of British Columbia, Vancouver was accepted. This meeting will be co-chaired by Wynne Miles and Judith Harpel and an

invitation will be extended to the ABLS for a joint meeting. Jeff Duckett also announced the recipients of awards as follows:

Richard Spruce Award: Jon Shaw

Hattori Prize: Bell, N.E., D. Quandt, T.J. O'Brien & A.E. Newton for the 2007 paper "Taxonomy and phylogeny in the earliest diverging pleurocarps: square holes and bifurcating pegs."

The Stanley Green Award: Jessica M. Budke

Ricief Grolle Award: Claudio Delgadillo



It was announced that the future position of Secretary/Treasurer would be held by one person and Jim Shevock (pictured left with Wynne Miles) has accepted the appointment. A week may be a long time in politics, but all too short in bryology. Far too quickly the conference week came to a close, but not before we experienced the traditional South African braai (barbeque). On a pleasant evening, entertained by our hosts overlooking the surrounding landscape, we reflected on the week's events and discussed among other things the attributes of Test Cricket (Australia had just lost TheAshes) for the benefit of our Spanish guests.

According to Javier Martinez-Abaigar, only the English would invent a game where you play for 6 hours a day with a break for lunch and tea, and do this for 5 consecutive days.

This was my first visit to South Africa and hopefully not the last. The country has come a long way during the past decade but it is obvious there is more to be done. On driving from Cape Town airport it was evident that many social challenges still confront the South African people.

Thomas Hällingbach, Blanka Shaw and Terry Hedderson in Worcester Garden



The flora of the Cape was captivating. As an Australian I am very familiar with families like Proteaceae, Ericaceae and Restionaceae, but nothing could prepare me for the extraordinary diversity encountered. The afternoon spent at Worcester Botanical Garden was enthralling and to walk amongst some of the most extraordinary plants like diverse euphorbias, the quiver tree (*Aloe dichotoma*), the sweet thorn (*Acacia karroo*), the fascinating Namibian grape (*Cyphostemma juttae*) and the remarkable *Welwitschia mirabilis* with male cones, was very special. I regret not being able to participate in the post conference field trip, there would have been much more to learn particularly the distinctive bryophyte flora.

The conference left a lasting impression of a floristic hotspot where there is still enormous amount of research to be done. It is evident that this is being achieved through collaboration and the bryological community is embracing this approach. Once again I'm indebted to our IAB conveners, Terry, Claudine and many others, for the opportunity to broaden my bryological horizon. On behalf of the Australian bryophyte organising committee, we invite bryologists of the world to join us in two years time in Melbourne, Victoria, from 23rd to 30th July 2011. A warm welcome awaits and we look forward to reciprocate the generous hospitality and continue the grand tradition that IAB conferences have established.

Paddy Dalton, School of Plant Science, University of Tasmania. p.j.dalton@utas.edu.au

Research News

***Radula multiflora* Gottsche ex Schiffn. — a new record for the Chatham Islands, New Zealand.**

The Chatham Islands lie some 830 km east of the main New Zealand archipelago. Despite their isolation from the rest of New Zealand, and their large number of endemic vascular plants (36 named with at least 16 more to be formally described (de Lange et al. 2008)), until the last decade the cryptogamic flora of the islands had been scarcely investigated (de Lange et al. 2008). Prior to 1997 knowledge about the bryophyte flora was solely based on the often scanty “chance” gatherings made by mostly fauna staff of the former New Zealand Wildlife Service during the 1960s and early 1970s, botanically motivated visitors to the islands and most notably the late David Given – who was involved for a time in plant conservation work on the islands. From these gatherings just the one endemic moss, *Macromitrium ramsayae* was described by Vitt (1983). During 1997 the first serious attempt to examine the hepatics and musci of the islands was made by bryological staff of the Allan Herbarium, Landcare Research. For their visit they were only able to visit the largest of the islands, Rekohu (Chatham), and for most of their time there they were hampered by transport difficulties and the fact that much of the islands are in private ownership, making access to particularly remote areas difficult. Specimens obtained during that visit found – unsurprisingly - that Rekohu at least, had a bryophyte flora that was derived from, and primarily a subset of the main New Zealand islands. Nothing especially significant was discovered though it was observed that *Macromitrium ramsayae* was abundant.

Since 2006 frequent visits by botanists of the Ecosystems and Species Unit, Department of Conservation and Allan Herbarium, Landcare Research, to examine the vascular flora resulted in better opportunities to collect bryophytes from the less easily visited parts of Rekohu and also the very poorly explored (bryologically) outer islands, Rangiauria (Pitt), Mangere, Rangatira, Forty-fours, Sisters and islets such as Western Reef (de Lange & Sawyer 2008). From these gatherings a surprising diversity has been revealed. Provisionally, there are now 190 mosses, nine hornworts and 272 liverworts known from the islands (de Lange et al. 2008; Fife unpubl. data, Glenny & de Lange unpubl. data). The collections on which these gatherings are based are mainly lodged in the Auckland Museum Herbarium (AK) and Allan Herbarium (CHR).

Although no new taxa have yet been recognised from the islands one distinctive feature that has emerged is that the Chatham Islands has several species of lichen, liverwort and moss with tropical and subtropical affinities, including *Calymperes tenerum*, *Cololejeunea appressa*, *Dumortieria hirsuta*, *Leptogium phyllocarpum*, *Stenolejeunea acuminata*, *Ramalina luciae*, and *Rectolejeunea denudata*, which could be considered unusual for an isolated island group residing on the eastern edge of the now mostly submerged former Zealandia subcontinent at 44° South. Here we report yet another species with distinctly tropical affinities as present on the Chatham Islands, which is also a new record for New Zealand.

Radula multiflora is found throughout SE Asia and the western Pacific, from Sumatra to New Caledonia, Samoa and Tahiti (Yamada 1979). It is a fairly robust species, being up to 2.7 mm wide, so is very large among New Zealand species, rivaling both *R. grandis* and *R. marginata* in size. According to Yamada (1979) the diagnostic characters of *Radula multiflora* are the moderately to densely imbricate leaf lobes, and the obliquely spreading, rhomboid (Yamada uses the term ‘subquadrate’) leaf lobules with a narrowly recurved inner margin. *Radula multiflora* is the only species in New Zealand, and one of a handful worldwide, with the last feature. Unusually, this character is not illustrated in Stephani’s icon for this species (Figure 1). The large size of *Radula multiflora* in combination with the rhomboid lobules with recurved inner margins (Figure 2) should prevent confusion with all other New Zealand species.

Radula multiflora is known in New Zealand from just a single gathering (*P. J. de Lange* CH 1717 & *P. B. Heenan*, AK 303450), which was collected on the 30 May 2008 from Rangiauria (Pitt Island), near the Flower Pot - Glory Road, above an upper tributary stream to the Tupuangi. At this site *R. multiflora* grew on a rotting *Olearia telmatica* log and surrounding clay shaded by overhanging matagouri (*Discaria toumatou*) bushes. Plants were associated with *Campylopus clavatus* and an as yet undetermined species of *Austroscyphus* (AK 303229).

The record of *Radula multiflora* brings the total number of *Radula* species reported for New Zealand to about 44, including synonyms and excluded taxa. There is currently considerable published disagreement regarding the composition of New Zealand's *Radula* flora - the number of species in New Zealand was 23 according to Renner (2005), but 13 according to So (2005), who proposed a flotilla of new synonyms. More recently, So (2006) synonymised *Radula multiflora* with *Radula javanica*. However, *Radula multiflora* can be easily distinguished from *Radula javanica* by its moderately to densely imbricate rhomboidal lobules with reflexed inner margin that are $c. \frac{1}{2}$ the lobe length and obscure the stem in ventral view. In *Radula javanica* the lobules are remote, subquadrate, do not have a reflexed inner margin, are $c. \frac{1}{3}$ the lobe length, and do not obscure the stem in ventral view. *Radula javanica* also reproduces asexually via production of caducous leaves, and this feature has not been observed in *R. multiflora*.

Acknowledgements

We thank Drs Allan Fife and David Glenny for assistance with comments on the bryophyte flora of the Chatham Islands, and The Field Museum and Dr John Engel access to Stephani's Icones.

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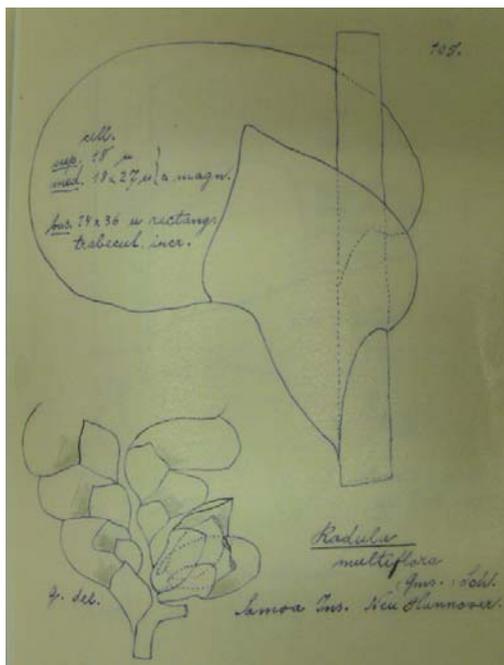


Figure 1 (left) Lobe and lobule of *Radula multiflora* illustrated by Stephani in his Icones.

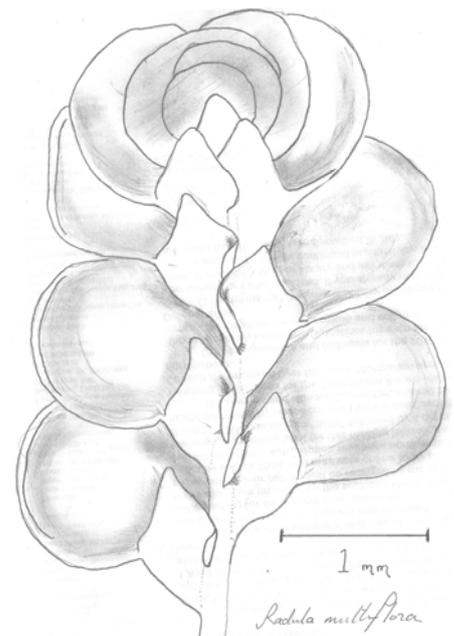


Figure 2 (right) Shoot section of *Radula multiflora* illustrated from the Chatham Islands, showing the characteristically reflexed margin of the lobules.

Matt A. M. Renner¹ and Peter J. de Lange². ¹Wildland Consultants Ltd and ²Ecosystems and Species Unit, Department of Conservation, New Zealand

Calymperes tenerum Müll.Hal. (Calymperaceae) on the Chatham Islands, New Zealand

One of the largest but bryologically least well explored outer New Zealand islands is the Chatham Islands group. The Chatham Islands lie c. 830 km east of New Zealand's South Island. There are two main islands in the group, Rekohu/Wharekauri (Chatham Island), referred to hereafter as Rekohu, and Rangiauria (Pitt Island), referred to hereafter as Rangiauria. In addition to these islands there are some 40 smaller islands, islets and rock stacks. Collectively the islands form the easternmost outpost of geopolitical and geological New Zealand.

Although mosses had been gathered from those islands since at least 1864, most gatherings have been chance 'grab samples' by non-specialists. Despite a concentrated effort made during a week-long visit to Rekohu by Allan Fife (hereafter AJF) in 1997 and specimens gathered during a three-day visit from both Rekohu and Rangiauria by Jessica Beever in 2007 (see Beever 2007) a complete picture of that island group's moss flora has yet to be obtained. This is because many of the islands in the group are difficult to access and because complex land ownership patterns sometimes make access to areas of less modified vegetation difficult.

In 2006 Peter de Lange (hereafter PdL) started to collect bryophytes during routine investigations of the less well travelled parts of Rekohu, Rangiauria and many of the outer islands. Moss specimens from these field surveys have been lodged at the Auckland Museum (AK) and/or Allan Herbarium (CHR) where they have mostly been examined by AJF and Jessica Beever (*Fissidens*, Pottiaceae). There are now some 176 moss species recorded from the Chatham Islands group of which at least eight are believed naturalised and only one (*Macromitrium ramsayae* Vitt) endemic. This endemic is widespread and common throughout the main islands of the group.

Despite the paucity of endemics, the presence of an intriguing assemblage of northern New Zealand (including 'tropical' taxa) and southern New Zealand moss taxa make this flora particularly interesting. Fife and de Lange (2008) briefly document this. Some of the most interesting recent finds in this respect are representatives of two genera in the Calymperaceae, *Calymperes* Sw. and *Syrrhopodon* Schwägr.

In the New Zealand moss flora the Calymperaceae are not well represented. Indeed since 1982 the only known New Zealand representative of the family was *Syrrhopodon armatus* Mitt., which was first discovered in northern New Zealand by the late John Bartlett who initially recorded it as *S. fimbriatulus* Müll.Hal. (Reese & Bartlett 1982). We now know that *S. armatus* occurs on Raoul Island, the largest island in the subtropical Kermadec Islands group and in the North Island at five localities from North Cape south to the Coromandel Peninsula. Intriguingly, *S. armatus* also occurs very locally on Rekohu (CHR 592093) and on Rabbit Island (CHR 592094) off the north-western side of Rangiauria.

In 2006 PdL, together with Landcare Research botanists Peter Heenan and Rob Smissen, made a chance gathering of a yellowish moss that was growing on the base of a *Coprosma chathamica* Cockayne (Rubiaceae) tree sited on the lower slopes of the Sweetwater Covenant (44° 5' S, 176° 18' W, 247 m a.s.l.), Southern Tablelands, Rekohu. This gathering (AK 297863) was in due course recognised by Jessica Beever as a *Calymperes* and forwarded to AJF who identified it as *Calymperes tenerum* – a hitherto tropical species whose nearest known locations include the Cook Islands, New Caledonia and northern Queensland. In September 2007 PdL and Heenan made another visit to the Chathams during which they specifically collected mosses and kept an eye out for *Calymperes*. Although they were unable to visit the Sweetwater site they unknowingly collected *C. tenerum* again, this time from a second site at Ocean Mail (43° 45' S, 176° 25' W, 1 m a.s.l.; de Lange & Heenan CH2282, CHR 604759) at the northern end of Rekohu where tiny tufts were found growing on a rotting *Corynocarpus laevigatus* J.R.Forst. et G.Forst. (Corynocarpaceae) log. Its identity went unrecognised until December 2008 when AJF identified it from one of the many bryological 'grab bag' samples from that trip. In May 2008 PdL, Heenan, and Gary Houliston (Landcare Research) found another population of *Calymperes tenerum*, this time growing on *Rhopalostylis sapida* H.Wendl. et Drude (Arecaceae) at Waipaua (44° 18' S, 176° 12' W, 40 m a.s.l.), a forest remnant on the eastern coast of Rangiauria.



It was at the same site that later in 2008, PdL, Peter Heenan and local Department of Conservation officer Ben Horne found additional plants on the root plate of *Pseudopanax chathamicus* Kirk (Araliaceae) (Fig. 1).

These finds, four in total from three sites, appear to represent the southernmost collections of a moss more at home on coconut trunks and husks in the tropics than on an island group in the roaring forties.

Fig 1.

Calymperes tenerum growing on the exposed root plate of *Pseudopanax chathamicus*, Waipaua, Rangiauria (Pitt Island). November 2008. P. J. de Lange

Unfortunately, none of the Chatham Islands locations for *Calymperes tenerum* is secure from disturbance. Later visits to the Sweetwater Covenant confirmed that the sole host tree there had been removed during the construction of a predator-exclusion fence. As yet we have been unable to check to see if further plants are present in this area. The status of *C. tenerum* at Ocean Mail requires a follow-up survey. On Rangiauria we know of *Calymperes* from one unfenced forest remnant, which is in an advanced state of collapse (Fig. 2) due mainly to stock grazing. Thus, *C. tenerum* is considered to be threatened in New Zealand.

The question arises as to why a predominantly tropical moss occurs on the Chatham Islands. As in many instances of species disjunction we can only speculate. However, species that are predominantly distributed in the tropics and restricted to northern portions of New Zealand are numerous in the Chathams flora



Fig 2. Waipaua Forest, Rangiauria (Pitt Island), habitat of *Calymperes tenerum*. Note severely degraded condition of forest remnant, which is unfenced, cattle-damaged, and exposed to the easterly wind. November 2008. P. J. de Lange

Among the mosses, we note especially the presence of *Ectropothecium sandwichense* (Hook. et Arn.) Mitt. (CHR 604664) and the forementioned *Syrrhopodon armatus*; both these species occur in the Kermadecs and at a few localities in the northern North Island. Among the hepatics *Radula multiflora* Gottsche ex Schiffn. (AK 303450 – see Renner & de Lange *in press*), *Cololejeunea appressa* (A.Evans) Benedix (AK 303250) and *Lejeunea anisophylla* Mont. (M. Renner *pers. comm.*; specimen in F) and among the lichens *Leptogium phyllocarpum* (Pers.) Mont. (AK 304741), *Ramalina exiguella* Stirt. (AK 303637), and *Ramalina luciae* Molho, Bodo, Culb. et C.Culb. (AK 303634) are all ‘northern’ or ‘tropical’ species occurring here. Among vascular plants we will cite only two examples: *Senecio marotiri* C.J.Webb (Asteraceae) and *Asplenium pauperequitum* Brownsey et P.J.Jacks. (Aspleniaceae), both species once believed endemic to northern New Zealand. Cameron et al. (2006) cited many more such species. They proposed that a long-distance dispersal

event, mediated by the New Zealand endemic Buller's shearwater (*Puffinus bulleri*), as the most plausible explanation for populations of *A. pauperequitum* on the Chatham Islands group.

We think that long-distance dispersal events involving pelagic birds may be facilitating the movement of these plants. We speculate that pelagic birds, after picking up spores, gemmae, and seeds during their onshore nesting, likely disperse these propagules as they move about northern New Zealand. We consider that such movements provide the most likely explanation for the occurrence of *Calymperes tenerum* in the Chatham Islands group. If this is correct, one would assume that *C. tenerum* might also occur in northern New Zealand and/or the Kermadecs. *C. tenerum* is not yet known to occur on the North Island or any proximate inshore islands, but in May 2009 PdL did collect *C. tenerum* at Fishing Rock Road (*de Lange & Havell K149*, CHR 604755) on Raoul Island in the Kermadecs. We believe a focused search for this species in coastal parts of the North Island and associated inshore islands would be worthwhile. One of the distinguishing features of *C. tenerum* is spherical clusters of multicellular fusiform gemmae conspicuously borne at the apex of vegetative leaves; these abundant gemmae make it a particularly good candidate for effective long-distance dispersal. Similar arguments might be made for *Syrrhopodon armatus*, which is found closely associated with the burrows of shearwaters and petrels at both the Poor Knights and the Rabbit Island sites.

We suggest that the occurrence of *Calymperes tenerum* and other 'tropical' or 'northern' bryophyte species may provide further evidence of past connectivity caused by sea bird movements between the Chatham Islands, mainland New Zealand, the Kermadecs and possibly more distant Pacific Islands.

Acknowledgements

We thank Matt Renner for sharing his knowledge of the liverwort flora of the Chatham Islands. Matt, David Glenny, and Peter Heenan made useful comments on this article. Peter de Lange thanks Chatham Islands Department of Conservation, Te One Area staff Ken Hunt, Maria Pasco, Alex McKillop, Ben Horne, Bridget Gibb, Kenny Dix and Amanda Baird for assistance with transport, accommodation on the islands and for obtaining permission to visit and collect from private land. Peter also thanks Peter Heenan, Gary Houliston and Rob Smissen for company in the field on the Chatham Islands, the crew of the *RNZN Resolution* for transport to and from the Kermadec islands and lastly Dave Havell (Auckland Conservancy, Department of Conservation) for field assistance on Raoul Island. We acknowledge Graeme Taylor (Department of Conservation, National Office) for his comments about Buller's Shearwater as a likely vector moving tropical and northern New Zealand plants to the Chatham Islands.

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Cololejeunea floccosa (Lehm. & Lindenb.) Steph. new to New Zealand.

A second species of *Cololejeunea* subg. *Taeniolejeunea*, *Cololejeunea floccosa*, is present in New Zealand. Like *C. appressa*, the other species in New Zealand belonging to this subgenus, *C. floccosa* has a line of four ocelli at the base of the leaf lobe. This character serves to separate these two species from all other members of the genus in New Zealand. Unlike *C. appressa* which has unicellular first and second lobule teeth at the lobule apex, *C. floccosa* has a two-celled first tooth prominent at the lobule apex, which is strongly falcate and deflexed toward the postical lobe margin. Neither *C. appressa* nor *C. floccosa* can be confused with any other in New Zealand.

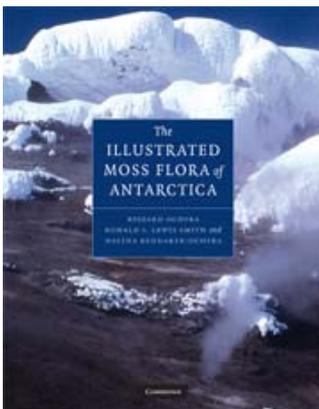
Cololejeunea floccosa is known in New Zealand from two locations in the far north of the North Island: Herekino Forest, Okahu Stream, Kiwanis Reserve, epiphyll on *Beilschmiedia taraire*, a fragment collected by J.E. Braggins among *Cololejeunea appressa* in 1986 (AK284031). Also known from Waihaha Stream, Russell State Forest, epiphyllous on nikau (*Rhopalostylis sapida*) and epiphytic on nikau and hangehange (*Geniostoma rupestre*), again with *Cololejeunea appressa* (D. S. Glenny & M.A.M. Renner 4145, 4147 - AK). At Waihaha Stream this species was copiously fertile, so reproduces sexually in New Zealand. In Australia this species is widespread in tropical and subtropical rainforests in New South Wales and Queensland. This species was included in the unpublished threatened bryophyte list (Hitchmough et al. 2007) as *Cololejeunea* sp. 2. We identified *Cololejeunea* sp. 2 as *C. floccosa* using the key, description, and illustration in Thiers (1998).

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Matt Renner and David Glenny. Wildland Consultants Ltd, and Landcare Research Ltd. New Zealand.

New Publications



The Illustrated Moss Flora of Antarctica
Edited by Ryszard Ochyra, Ronald I. Lewis Smith & Halina Bednarek-Ochyra

Cambridge University Press, Cambridge, 2008.
ISBN 978-0-521-81402-7, XVII+1685 pp. £125.

The Illustrated Moss Flora of Antarctica represents the culmination of a great many years of painstakingly thorough taxonomic research by Ryszard Ochyra, very capably assisted by his taxonomist wife Halina, who also completed the illustrations.

This work can justly claim to be the first truly comprehensive flora treatment for the entire Antarctic biome. The introductory chapters outline the biogeographic zones, climate and geology of Antarctica, the history of bryological investigation, terrestrial environments and ecology, and diversity and phytogeography of the

moss flora. These chapters provide a very useful background to the bulk of the work, around 500 pages of taxonomic treatments.

As stated by the authors, knowledge of the composition of the moss flora of the Antarctic biome has remained inadequate until recently, and the taxonomic status of many taxa and collections was very imprecise and controversial.”

Bryophytes – mosses and liverworts – have now been comprehensively detailed for the Antarctic biome in two publications: the present volume, and a companion volume dealing with the liverworts (Bednarek-Ochyra et al, 2000). One could ask why it is that the Polish Government has the foresight and seen fit to support basic taxonomic research when other national interests shun such fundamental work. The bryophyte volumes are also far superior in quality and taxonomic usefulness than a companion volume dealing with the lichens of Antarctica (Øvstedal & Lewis Smith 2001).

Around 10000 moss specimens have been studied from all regions of continental and maritime Antarctica and the nearby islands. The moss flora is represented by 111 species and 4 varieties in 55 genera of 17 families. There are four pages devoted to novel taxonomic changes.

For each taxon a comprehensive Antarctic synonymy is given together with a very detailed description, followed by a discussion of variability, related species, notes on likely to be confused species, reproduction in Antarctica and habitat. There are maps detailing Antarctic and global distributions and lists of selected specimens examined from all regions.

The keys to genera and species work well and these, coupled with the comprehensive descriptions, notes, and very detailed illustrations should ensure that anyone working with mosses from the region should be able to easily identify any specimen.

So, are there any criticisms? My personal preference would have been for slightly wider margins. My only criticisms are directed, not at the authors, but at Cambridge University Press. For a book presented ready formatted and as camera ready copy, one wonders how the cost of this important work could be justified. It is prohibitively expensive to those working with the Antarctic Flora and who would benefit greatly by having easy access to the work. Some of the colour plates are rather too heavy on the blue tints and this could have been corrected with more careful oversight by the Press. Otherwise, the quality of the colour plates is good.

This is truly a bench mark flora for any region of the world and represents a magnificent tribute to the diligence of the Ochyra's and the wisdom of the Polish Government in supporting this fundamental work.

Rod Seppelt, Australian Antarctic Division, Tasmania

CALIFORNIA MOSSES

title: *California Mosses*

ISBN: 0-9582224-5-2

authors: Bill and Nancy Malcolm, Jim Shevock & Dan Norris

publisher: Micro-Optics Press, Nelson, New Zealand

page size: 220 x 155 mm (about A5)

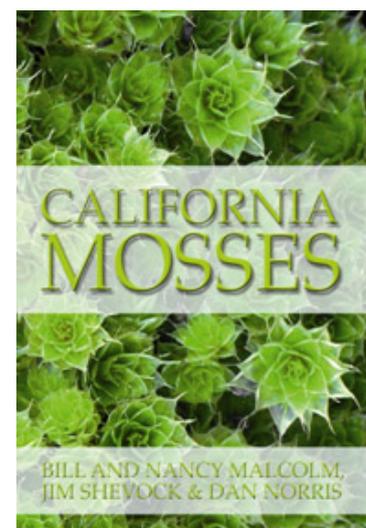
page count: 430

illustrations: about 2200 colour and 1100 black-and-white

cost: US\$68 (about AUD78) + shipping (about AUD14 to Australia)

orders (e-mail): nancym@clear.net.nz

orders (post): P.O. Box 320, Nelson, New Zealand 7040



In 1989, Bill and Nancy Malcolm astonished and delighted botanists in New Zealand and Australia with their production *The Forest Carpet*, a beautiful, elegant book featuring bryophytes, lichens and fern allies. We have no doubt that this book inspired many to pursue an interest in these less well-known plant groups. In recent years, Bill and Nancy have focused their attention on production of books that provide the *tools of*

trade for those wishing to study bryophytes and lichens and certainly work in our laboratory could not proceed as well if we did not have *Mosses and other Bryophytes, an Illustrated Glossary* ready at hand to help us decipher at times perplexing and interminable bryological terminology.

California Mosses, written with Jim Shevock and Dan Norris, is Bill and Nancy's latest contribution to bryology. This beautifully illustrated, comprehensive publication includes about 2200 colour and 1100 black&white photographs and is a refreshing new approach to moss identification. *California Mosses* includes a page with colour plates for just under half of California's 600 moss species and includes black&white thumbnail images of leaves for all but 5 Californian species. The authors have recognized that the conventional terminology used to describe bryophytes has been a huge obstacle for novices who have tackled traditional keys with fear and trepidation. Instead the authors have opted to use visual recognition of images in combination with concise and economical text in a consistent format, thus avoiding long winded descriptions.

The introduction has been written for both amateur and professional botanists. The authors give a comprehensive description of how to get started, including equipment needed both for field work and in the laboratory and how and what to collect. This is followed by a section on how to examine specimens, what to look for, and how to use this reference book. This is actually very important, as the book is quite different from any other we have ever come across. *Launching a thumbnail search* recommends gaining an overall impression of the leaf by studying the outline of the leaf, the shape of the leaf tip, leaf base, costa, margin, and, if possible, cell detail and then matching this impression with specimens in either the colour plates or in the black&white thumbnail images. Once a match has been found, the authors recommend carefully reading the text that accompanies each plate to confirm identification of your specimen. This is a very different approach, both from traditional dichotomous keys and from interactive keys which have gained popularity in recent years.

The introduction is followed by colour photographs (stem, leaf, sometimes capsules) of 24 of the most widespread California mosses, with three species illustrated on each page. These are all included in more detail in the plates that follow. Coincidentally, eleven of these widespread Californian mosses occur in Australia.

The main section of the book features one species to a page. Each page follows the same format. In the upper right hand corner there is a black&white thumbnail of the leaf. On the upper left hand side of the page, the text is set out in a standard format, with taxon, form and habitat, followed by leaf details (length, shape, tip, base, nerve, border, margin and cells), then capsule length and shape and finally comments. Up to twelve colour images take up the remaining two thirds of each page, including the whole stem, leaf outline, leaf tip, sometimes leaf sections, cell details, capsule details and so on. The clarity of each image is quite remarkable and it is often hard to believe that these are photographs and not paintings.

There are two sections in the 79 pages of black&white thumbnails of leaves that follow the colour plates: firstly leaves arranged in groups with distinctive traits for example asymmetrical leaves, leaves with hyaline tips, decurrent leaf bases, strong borders, costa absent or double, cell walls sinuose or nodulose; secondly, those belonging to selected genera which include many species and species that can be quite confusing, for example, *Didymodon*, *Entosthodon*, *Gemmabryum*, *Grimmia*, *Ptychostomum*, *Orthotrichum*, *Pohlia* and *Syntrichia*.

The glossary is very comprehensive although, from our experience, we would recommend using the Malcolm's *Illustrated Glossary* as a companion guide. The authors have included a list of species added to the checklist of Californian mosses since 2004 and these are carefully cross-referenced both to the plates and to the distinctive traits and selected genera thumbnails. This is followed by a list of species deleted from the California check list over the same period of time. Names of many mosses have changed in recent years so an index of synonyms is invaluable. There are only five *Bryum* species listed in the index but there are 51 in the index of synonyms! And who can keep up with recent changes to Pottiaceae and Grimmiaceae? We were amused but also pleased at the inclusion of an index of Californian moss epithets and realize we may not be the only ones who suffer *seniors' moments* when we can only remember one component of a binomial name. The index is very straight forward: page numbers for species illustrated with colour plates appear in bold, page numbers for thumbnails otherwise. Two useful appendices include detailed drawings of a *Fissidens* leaf and stomata of *Orthotrichum*.

When presented with such a beautifully illustrated and eminently practical publication there is a reluctance to criticize any aspect of the work. However, there does seem to be a need for a well-defined heading to precede the various sections, Introduction, Widespread California Mosses, The Plates, Leaves with Distinctive Traits and Leaves of Species of Selected Genera. The *Introduction* includes a wealth of information but we found the sequence of sections somewhat confusing. Perhaps *Collecting Mosses* could be included immediately after *Getting a good look at your specimen in the field*. *Launching a thumbnail search* appears twice. Perhaps the title first up could be *Launching a thumbnail search (1) using a hand lens* and then *Launching a thumbnail search (2) using images from a microscope* could precede *Getting a good look at your specimen under a microscope*. It is also somewhat confusing to have the index of thumbnails of leaves with distinctive traits included on page 13 and on page 315, although, on reflection, perhaps it is useful to have the information repeated. We wonder if beginners would find the plates more accessible if they were arranged in alphabetical order by family, genus and species rather than the arrangement following Goffinet, Buck and Shaw (2008). It is a dilemma with such a publication which caters to both professionals and amateurs. We would also like *family* included in the text accompanying the plates.

New Zealanders and Australians may speculate on the significance of this reference work in the southern hemisphere. However, more than 50 species that feature in the colour plates can be found in Australia and New Zealand, with an additional 30 or so species featuring as black&white thumbnails. We never, ever, have enough images, drawings or photographs, to help us with identification. Also, it is always useful to have images that clearly show characteristics of genera and families. Some species, such as *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus*, that have invaded New Zealand and Australia in recent years are included and who knows when this book might be useful in identifying yet another introduction

We congratulate Bill and Nancy Malcolm, Jim Shevock and Dan Norris for this superb publication and look forward to completion of their latest project, *Tasmanian Mosses*.

Alison Downing and Ron Oldfield, Department of Biological Sciences, Macquarie University NSW 2109 Australia. Email: adowning@rna.bio.mq.edu.au roldfiel@rna.bio.mq.edu.au

Arable Bryophytes

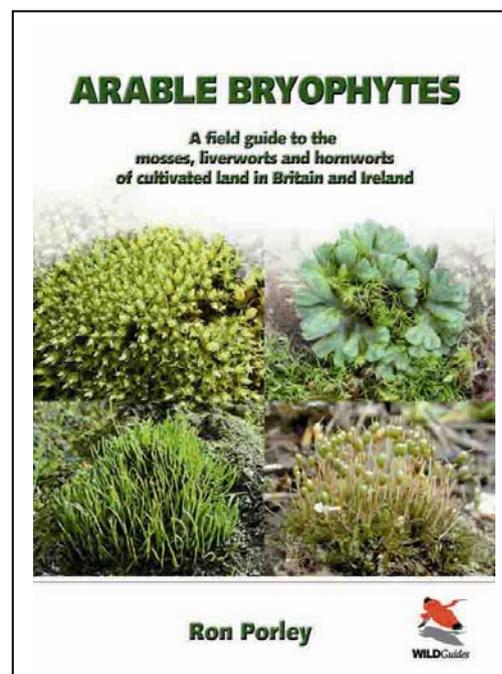
A Field Guide to the mosses, liverworts and hornworts of cultivated land in Britain and Ireland

By Ron Porley

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Heterokontobionta p.p. (Heterotrophic Heterokontobionta): Labyrinthulomycota, Oomycota
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Appendix Fungi imperfecti (Deuteromycetes)
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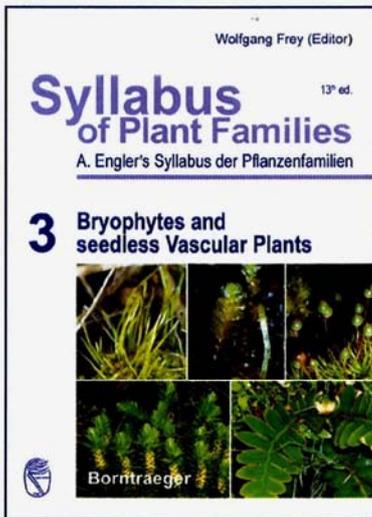
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Wolfgang Frey (Editor) 2009. X, 419 pp., 72 figs, 1 tab., 17 x 24 cm hardcover ISBN 978-3-443-01063-8 € 89,-



Part 3 provides a thorough treatment of the world-wide morphological and molecular diversity of a part of "lower" plants [Marchantiophyta, Bryophyta, Anthocerotophyta, Polysporangiomorpha, Protracheophytes, Rhyniophytina, Lycophytina, "Trimerophytina", Moniliformopses (Cladoxyllopsida, Psilotopsida, Equisetopsida, Marattiopsida, Polypodiopsida)], and Radiatopses (Progymnospermopsida). The advent of DNA sequencing and advances in phylogenetic analysis has raised new interest in the relationships of liverworts, mosses, hornworts, ferns, and fern allies

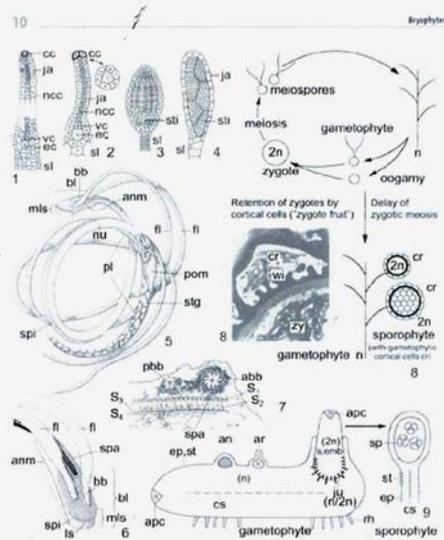


Fig. 3-1. Bryophytes (Marchantiophyta, Bryophyta). Gametangia, embryophytic plant evolution. 1-2. Anthocerotia. 1. Bryopsis (x250). 2. Tangiermossidae (x200). 3-4. Anthocerotia. 3. Marchantiidae (x150). 4. Bryopsis (x190). 5. Riccia pusilla. Spermatozoid (x3,000). 6. Marchantia polymorpha. Heteroplast morphology. 3-basal splanter aperture (x3,000). 7. Georhynchus tuberosus. Heteroplast anatomy. C in the region of the anterior end of the splanter aperture. Anterior basal body with 9 triplets, posterior basal body. 3 triplet extension associated with pbb. TEM micrograph (x 50,000). 8. Antithetic hypothesis of embryophytic plant evolution. The hypothesis proposes that delay in meiosis occurred in the haploontic life cycle of an alga similar to Colobosiphonia, generating a small, multicellular diploid generation - a sporophyte. Retention of zygote and "zygote fruit" with gametophytic cortical cells upon parental thallus. TEM micrograph junction between a cortical cell and a zygote of

Bryophytes
Division I Hepatica
Division I Foliaceae
Division I Hornwort

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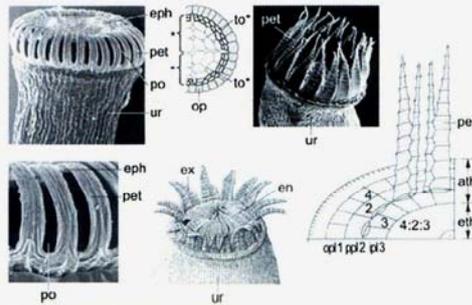


Fig. 5-7 (partly). Bryophytina.

as extant representatives of early land plant evolution. Following the tradition of Engler with the morphological-anatomical data and incorporating latest results from molecular phylogenetics and phylogenomics, an up-to-date overview of families and genera has been created that will serve as reference for a long time.