

NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 136

June 2019



New Zealand Botanical Society

President:	Anthony Wright
Secretary/Treasurer:	Ewen Cameron
Committee:	Bruce Clarkson, Colin Webb, Carol West

Address:	c/- Canterbury Museum Rolleston Avenue CHRISTCHURCH 8013
Webmaster:	Murray Dawson
URL:	www.nzbotanicalsociety.org.nz

Subscriptions

The 2019 ordinary and institutional subscriptions are \$25 (reduced to \$18 if paid by the due date on the subscription invoice). The 2019 student subscription, available to full-time students, is \$12 (reduced to \$9 if paid by the due date on the subscription invoice).

Back issues of the *Newsletter* are available at \$7.00 each. Since 1986 the Newsletter has appeared quarterly in March, June, September and December.

New subscriptions are always welcome and these, together with back issue orders, should be sent to the Secretary/Treasurer (address above).

Subscriptions are due by 30 April each year for that calendar year. Existing subscribers are sent an invoice with the December *Newsletter* for the next years subscription which offers a reduction if this is paid by the due date. If you are in arrears with your subscription a reminder notice comes attached to each issue of the *Newsletter*.

Deadline for next issue

The deadline for the September 2019 issue is 25 August 2019.

Please post contributions to:
Lara Shepherd
Museum of New Zealand Te Papa Tongarewa
169 Tory St Wellington 6021

Send email contributions to editor@nzbotanicalsociety.org.nz. Files are preferably in MS Word, as an open text document (Open Office document with suffix ".odt") or saved as RTF or ASCII. Macintosh files can also be accepted. Graphics can be sent as TIF JPG, or BMP files; please do not embed images into documents. Alternatively photos or line drawings can be posted and will be returned if required. Drawings and photos make an article more readable so please include them if possible.

Cover Illustration

Microlaena stipoides by Eleanor Burton.

NEW ZEALAND BOTANICAL SOCIETY
NEWSLETTER
NUMBER 136 June 2019

ISSN 0112-6865 (Print) 2230-3502 (Online)

CONTENTS

New Zealand Botanical Society News

From the President: Results of Postal Ballot.....	2
---	---

Regional Botanical Society News

Auckland Botanical Society	2
Whanganui Museum Botanical Group.....	3
Wellington Botanical Society	3
Nelson Botanical Society.....	5
Botanical Society of Otago	7
Other Botanical Societies	7

Announcements

37th annual John Child Bryophyte and Lichen Workshop Camp Taringatura, Southland.	8
--	---

Notes and Reports

North Island fern jumps ditch.....	8
<i>Phyllostachys aurea</i> flowering in Auckland	9
Correction of errors about John Davies Enys.....	15

Biography/Bibliography

Biographical Sketch – Gilbert Mair (1843-1923).....	16
---	----

Publications

Flora of Tokelau – by Art Whistler	17
Publications received.....	18
A Field Guide to New Zealand Fungi – by Shirley Kerr	19

NEWS

New Zealand Botanical Society News

■ From the President: Results of Postal Ballot

As outlined in the Newsletter 135, March 2019, a Postal Ballot was held to change the Rules to rectify the issue of defining a “quorum” of the Society, which was inadvertently missed in the rule change published in Newsletter 133, September 2018, and to approve the 2018 Financial Statements. 50 voting papers were received by the due date of Friday 12 April 2019 at 5.00 pm.

The first resolution, that the Society's Rules be amended by the replacement of section 9 carried unanimously, obviously greater than the required two-thirds majority to change the Rules.

The second resolution, that the 2018 Annual Financial Statements be adopted was also carried unanimously, also greater than the required simple majority to decide the matter.

The Rules, as amended, have therefore been filed with the Registrar of Incorporated Societies, and the financial statements have been filed online.

Thank you to everyone who took the time to return their voting papers.

Anthony Wright, President, New Zealand Botanical Society

Regional Botanical Society News

■ Auckland Botanical Society

AGM & March Meeting

After the AGM and Ewen Cameron's re-election as our President, PhD student Rachel Nepia gave a thought-provoking talk on the role and impact of honey bees in our forests, concentrating specifically on *Ixerba brexioides* and *Weinmannia racemosa*. One important area she considered was the effects of honey bee visitation on native flower visitor fauna.

March Field Trip

Dunn's Bush between Puhoi and Ahuroa is c. 50ha of podocarp/taraire forest now owned by QE II Trust, consisting of two ridges with a steep gully between. This was our third visit, but the quality of the forest is such that there is always something of interest to see. The main highlights are a rocky knoll covered with *Metrosideros carminea* (unfortunately not in flower) and tiny plants of *Asplenium hookerianum*, which is extremely uncommon in the north. Some people only explored one ridge, but the fitter ones tackled the steep gully and the second ridge.

April Meeting – 35th Lucy Cranwell Lecture

So popular was this lecture by David Mabberley, a British-born Australian botanist, entitled “Sir Joseph Banks and his *Florilegium*”, that bookings were necessary to attend a packed Auckland Museum Auditorium. Amazingly, the proposed publishing of the botany of Cook's first voyage was never completed and it wasn't until the 1980s that an eye-wateringly expensive edition of the colour plates was issued. Fortunately a selection of the very best were published in 2017 at a price the average person could afford, and books were for sale at the end of the lecture. During the talk David told the story of European knowledge of Australasian botany with an emphasis on the ground-breaking work of Banks and Solander on that all-important voyage.

April Field Trip

Despite being held in the middle of the Easter Weekend a good number of people attended this visit to the Miranda saltmarsh on the Thames Estuary. Starting from the Miranda Shorebird Centre we walked along the road to check out the population of the mistletoe, *Ileostylus micranthus*, that parasitises the *Coprosma propinqua* growing there. This was our introduction to the worrying plight of a low-lying habitat as rising sea-levels affect both the environs and the plants growing there. A five-day inundation of salt water 16 months ago has badly damaged the *Coprosma*, and like all parasites,

the mistletoe is completely dependent on the health of its host. This saltmarsh is the type locality for *Bolboschoenus caldwellii*, and we saw swathes of it in the hollows. The other plant of note was *Thyridia repens*, (some of us cling to the old name of *Mimulus repens*), and this was seen in quantity, especially in a newly purchased block.

May Meeting

Plant of the Month by Richard Hursthouse was mountain cabbage tree *Cordyline indivisa*, a plant always much-admired by Bot Soc members on their visits to Mt Ruapehu. Craig Bishop of the Auckland Council's Research & Evaluation Unit (RIMU) explained his work on Auckland's terrestrial ecosystems. He mentioned the modelling work on the impacts of rising sea levels, and the recent surveys on the local sand dune vegetation (3870 ha) involving assessing and ranking the condition/biodiversity of numerous sand dune sites and the programme for monitoring these on a 5-year cycle. Auckland's biggest sand dune system by far is Papakanui Spit at South Kaipara Head.

Forthcoming Activities

June Meeting	The effects of elevated CO ₂ levels on plants, Sebastian Leuzinger
June Field Trip	Lichen workshop
July Meeting	Orchids, Carlos Lehnebach
July Field Trip	Western Springs
August Meeting	Insect damage on plants, Nicholas Martin
August Field Trip	Mangawhai Park

Auckland Botanical Society, PO Box 26391, Epsom, Auckland 1344

President: Ewen Cameron

Secretary: Stephanie Angove-Emery

aucklandbotanicalsociety@gmail.com

■ **Whanganui Museum Botanical Group**

For monthly meetings the Whanganui Botanical Group has merged with Birding Whanganui (local branch of OSNZ) and the Whanganui branch of Forest and Bird, under an umbrella name of 'Nature Talks'. Each group will arrange a speaker for about 4 meetings per year. Meetings will normally be on the 3rd Tuesday of each month. It is intended to continue with monthly botanical field trips to which members of the other two groups are invited.

President: Clive Higgie (06) 342 7857 clive.nicki@xtra.co.nz

Secretary: Robyn Ogle (06) 347 8547 robcol.ogle@xtra.co.nz

■ **Wellington Botanical Society**

Bannockburn Summer Camp

Thirty-three people made the trek south to the 2019 Wellington Botanical Society summer camp at Bannockburn in mid-January. Bannockburn School Camp was a superb base for our week-long camp, with plenty of bunks, tenting-space and even a pool!

Chapman Road Scientific Reserve – Salt pans used to cover more than 40 000 ha within the Central Otago region. Today there are fewer than 100 ha remaining.' No wonder so many of these plants are threatened today. We saw the rare *Puccinellia raroflorens* / saltgrass, but not in flower and the tiny *Poa maniototo* was relatively common in places. We also spotted *Raoulia beauverdii* and *Isolepis basilaris*. Not surprisingly, given the long history of disturbance, the most obvious plants were weeds, e.g., *Navarretia squarrosa* / Californian stinkweed, and two mulleins, *Verbascum thapsus* (woolly) and *V. virgatum* (moth). If nothing else, some of us saw several exotic species new to us.

Flat Top Hill Conservation Area - The area as a whole is dry grassland, retired from grazing, with many outcrops of schist. The usual exotic grasses predominate, plus much thyme and wild rose (*Rosa rubiginosa*). On bare patches there was lots of stonecrop, a weed that does well in the dry stony soil when native cover is removed. There were a few scattered native shrubs, including

matagouri (*Discaria toumatou*) and a few *Olearia odorata* and *Kunzea sericea*. We saw two “hot rock” ferns, *Cheilanthes sieberi* and *Pellaea callidrupium*, the latter being very large. The herbs present were a mix of weeds and native species, with the former outnumbering the latter. Some natives present were sub-alpine species—*Anaphalis bellidioides*, *Acaena caesiiglauca*, *Raoulia subulata*, *Brachyglottis lagopus*, *Helichrysum filicaule*, and some were more lowland—*Wahlenbergia rupestri* and *Euchiton audax*.

Old Man Range - We left most vehicles at c. 200 m below the crest of the range and began botanising by a tiny creek. *Dracophyllum muscoides* dominated the large alpine cushions, the minute plant's little woody stems often hidden. The berries of *Coprosma perpusilla* subsp. *perpusilla* were eye-catching. The flowers of *Oreobolus pectinatus*, *Geum* sp., *Gentianella grisebachii*, *Oxalis magellanica* and a late-flowering *Ranunculus gracilipes* were among others we saw. We then climbed the slope above the creek to the top ridge, where we lunched by a large tor where *Anisotome imbricata* appeared everywhere. The woolly *A. lanuginosa*, *Celmisia sessiliflora*, and tiny plants of species of *Raoulia*, *Poa*, *Carex* and *Luzula*, covered the surrounding slate and stone surface. We admired the hairy *Plantago lanigera*. Among the rocks we saw *Polystichum cystostegia*, *Veronica hectorii* subsp. *demisa*, *Myosotis pulvinaris* and a mat of *Ourisia glandulosa*.

Cardrona, Crown Range - It was a quick climb up the bank from the barrenness of the skifield facilities. We soon recognised that just as with the previous two days, there were discoveries to be made. Aside from the more prominent *Aciphylla montana* were the more cryptic *Anisotome imbricata* var. *imbricata*, as well as *A. imbricata* var. *prostrata* among the ubiquitous beds of *Abrotanella caespitosa* and *Dracophyllum muscoides*. We saw patches of *Pimelea aridula*, *Raoulia apicinigra*, *Leptinella wilcoxii*, *Hebe buchannanii*, *Hectorella caespitosa* and even *Lycopodium fastigiatum*.

Remarkables, Lake Alta - The first wetland near the start of the walk had a red-leaved carex, later determined as *C. petriei*, growing through the cushions. *Dolichoglottis lyallii* was flowering profusely beside the public carpark and was also present along the stream draining Lake Alta. There was a single patch of what was probably a hybrid between *D. lyallii* and *D. scorzonoides* with creamy flowers and wider leaves than *D. lyallii*. Towards the lookout *Veronica epacridea* was locally common in the scree and the shattered rock above. *Haastia sinclairii* var. *sinclairii* was noted in the scree. Other species of interest noted by the group included an undescribed *Raoulia* (apparently aff. *bryoides*), *Aciphylla lecomtei*, *Myosotis lyallii* var. *elderi*, *Hectorella caespitosa* (in flower), *Raoulia youngii* (also in flower), *Pimelea notia*, *Euphrasia zelandica* and *Myosotis bryonoma*.

Mahaka Katia Scientific Reserve - This reserve is the site of *Myosotis brevis* and it is said to be quite a sight when in flower, creating areas of yellow flowers, visible from a distance. However the season was over and it took much searching to find even one remaining plant. We found examples of the minute *Convolvulus verecundus* and *Atriplex buchananii*. Next to the fenced reserve was a series of cages protecting from any browsing *Lepidium solandri* currently with seed heads.

Lindis Crossing & Bendigo Historic Reserve – At the river terrace at Lindis Crossing we saw *Muehlenbeckia ephedroides*. This site also had *Convolvulus verecundus*, *Raoulia monroi*, *R. beauverdii*, and on the way up, *Carmichaelia petriei*. On the way back we had a close look at an ephemeral wetland, where we found *Limosella lineata* and *Isolepis basilaris*, a new record for a rare plant. At Bendigo Historic Reserve was a mix of weedy grassland with bare patches of scabweeds, and some open shrubland, mostly *Kunzea* (probably *K. serotina*) but including *Corokia cotoneaster*, *Gaultheria antipoda* and *Coprosma propinqua*. Small plants included a lot of *Vittadinia australis*, *Acaena buchananii*, *Raoulia beauverdii*, and several weeds we hadn't seen before.

Bob's Cove – This beech remnant on the edge of Lake Wakatipu made an enjoyable change from the exposed mountain environments of our previous few days botanising. The forest understorey had a variety of ferns including many *Asplenium appendiculatum*, *A. hookerianum*, *A. gracillimum* and *A. richardii*, which are plentiful in the South Island. We saw *Gleichenia dicarpa*, and many *Dicksonia squarrosa* and *Cyathea smithii*. One *D. squarrosa* intrigued as it appeared to have no hairs. Also intriguing was the *Isoetes alpinus* specimen found washed up on the water's edge. Among the rarities was the mataī with its roots exposed by the wash of the lake for about a metre on the lakeside with

many seedlings nearby. There were also mountain five-finger / *Pseudopanax colensoi* var. *ternatus*, the nationally endangered and unusual *Senecio dunedinensis*, and the mistletoe *Isolepis flavida* growing on *Coprosma propinqua*. The only orchids we saw were *Thelymitra* sp, a *Corybas* sp. and *Gastrodia cunninghamii*, most past the flowering stage.

February Fieldtrip: Pāuatahanui inlet

At Camborne Walkway a moderate diversity of indigenous plants (40 species) was recorded, many of which had been planted by Porirua City Council, and some of which (karo, and *Pseudopanax crassifolius* × *P. lessonii* hybrids) were abundant but not local to the area. A long, but not exhaustive list of adventive species (30) was also recorded. At Motukaraka Point botanising was simple with a few coastal forest species including *Streblus heterophyllus* on the inland side of the road, and a limited number of small saltmarsh and beach species on the right, dominated by *Plagianthus divaricatus* and *Apodasmia similis*.

March Field Trip: Steenkamp property, Long Gully, Brooklyn

The main plant community of secondary successional forest includes the only species of later successional forest—*Griselinia littoralis*/kāpuka/broadleaf—all seedlings less than 10 cm tall, plus *Melicytus ramiflorus* subsp. *ramiflorus*/māhoe/whiteywood and *Schefflera digitata*/patē/seven-finger. Most of the rest of the site is rank pasture with some native species emerging from the grassland. We saw impressive small groves of large *Coprosma propinqua* subsp. *propinqua*. A highlight among our finds was *Botrychium biforme*/fine-leaved parsley fern.

April Field Trip: Wellington Botanic Garden Bush Remnants BioBlitz

This was BotSoc's contribution to the Botanic Garden BioBlitz, during which people sought to record all flora and fauna, native and introduced, in the Botanic Garden within 24 hours. We botanised the two largest bush remnants in the Wellington Botanic Garden. We had lists from the report prepared by Chris Horne and Barbara Mitcalfe in 2007 as a starting point, and many of the species on these lists we found again. For this remnant there were very few additions to the native species, but we did add a number of weeds. Highlights from the 'Glen remnant' were *Earina mucronata*, *Adiantum viridescens*, and huge old ngaio and hīnau trees; also many interesting fungi. In the remnant near the Dell we found a small plant of *Freycinetia banksii*, some *Notogrammitis* sp., a young *Clematis foetida*, and a number of miro and totara seedlings.

■ Nelson Botanical Society

March Field Trip: Lake Rotorua, Waterfall Walk

We were dismayed seeing the many large dead beech trees as we drove through the Gowan Valley but the cool green of the lowland beech/podocarp forest was welcome and gave our group of 14 a sense that our forests would recover from the severe drought. We noted soon after entering the forest that many species were fruiting heavily. Our revision of the small-leaved *Coprosma* was somewhat helped by fruit colour, with scarlet *C. rhamnoides* and blue *C. propinqua*, but of limited value distinguishing *C. tayloriae* and *C. rigida*, which were white, as was *C. linariifolia*. *Coprosma foetidissima* and *C. rotundifolia* had bright-orange fruits, with those of *C. rotundifolia* notable for their bifid form. A giant *Dacrydium cupressinum*, had copious fruits, which led to a demonstration of the method of determining the sex of this dioecious species – the tips of female branchlets are upturned while those of the male hang down. The presence of bright-red fruits drew our



Alseuosmia pusilla. Photo by Steve Palmer

attention to *Alseuosmia pusilla* among the similar-looking *Pseudowintera colorata*. We were pleased to see a flourishing clump of *Peraxilla colensoi* with a good quantity of unripe green seed. The forest was dominated by *Fuscospora fusca*, with occasional large podocarps – a huge rimu, small groups of *Dacrycarpus dacrydioides*, *Podocarpus laetus*, smaller *Prumnopitys taxifolia* and a lovely group of *P. ferruginea*. We were encouraged to see seedlings of various ages of all podocarps, particularly kahikatea, mataī and miro.

April Field Trip: Nydia Track, Duncan Bay to Ngawhakawhiti Bay

We botanised along the start of the Nydia Track following the edge of Tennyson Inlet around to Ngawhakawhiti Bay. It passes through a forest of *Fuscospora truncata*, *Dacrydium cupressinum*, *Prumnopitys ferruginea*, *Prumnopitys taxifolia* and *Laurelia novae-zelandiae*. Red-orange flowers of *Metrosideros fulgens* were seen all along the track. The hemi-epiphyte *Griselinia lucida* was plentiful. *Coprosma grandifolia* was covered in orange berries and we noticed that some plants were already flowering again. Multiple spikes of red fruit were hanging on *Rhopalostylis sapida*. Climbing through the understorey were tangled stems of *Freycinetia banksii*, with some displaying spikes made up of many small fruits. Lying on the track were large quantities of pink-red 'fruit' of *Prumnopitys ferruginea*. There were several species of tree fern and we particularly admired *Cyathea cunninghamii*, which is more slender, has small oval stipe scars and more-horizontal fronds whose apices are distinctly upturned. The nest epiphyte, *Astelia solandri*, was often seen perching on tree-fern trunks. Along the edge of the track were many plants of *Carex dissita*, identified by their dark-brown pedunculate spikes. On the beach at Ngawhakawhiti Bay were some common shore plants including *Apodasmia similis*, *Samolus repens* and *Juncus kraussii* ssp. *australiensis*.



Cyathea cunninghamii Photo by David Grinsted

April Talk: "Flowers of the Celestial Silk Road, Tien Shan Mountains" Paul Maurice

The 18-day tour in mid-late June took him from Uzbekistan, through Kazakhstan to the most-alpine location of Kyrgyzstan, with just eight people in total and led by Chris Gardner, author of Flora of the Silk Road. Paul showed many beautiful images of the flora in Uzbekistan, Kazakhstan and Kyrgyzstan.

FUTURE EVENTS

- | | |
|---------------|--|
| June 16: | Field trip to the Grampians. |
| July 21: | Field trip to Six Mile Walkway near Murchison. |
| August 18: | Field trip to Kelly's Bush Enner Glyn. |
| September 15: | Field trip to Nell's Bush Otawhero. |
| October 20: | Wairoa Gorge weeding at Inch's Bush. |

President: David Grinsted (03) 5424384, davidgrinsted@gmail.com **Secretary:** Don Pittham (03) 5451985, pitthamd@xtra.co.nz Treasurer: Uta Purcell (03) 5450280, mupurcell@xtra.co.nz

■ Botanical Society of Otago

12th June Revegetation of Wangaloa Coal Mine Reserve. We are privileged to have Cathy Rufaut and Professor David Craw (winner of the 2018 Otago University Distinguished Research Medal) to talk to us about their ongoing geo-ecology project at the Wangaloa Coal Mine Reserve and how they have monitored re-vegetation on this challenging site.

10th July. A search for the co-evolutionary partner(s) of New Zealand's sequestrate fungi. Speaker: Dr Toni Atkinson. New Zealand has long been known as a "land of birds". The idea that the array of sequestrate fungi found here, many of which are colourful, may have arisen through coevolution with birds was first mooted in mycology around 20 years ago. It seemed a natural progression from the widely accepted hypothesis that New Zealand's diverse divaricating plants evolved due to selective pressure from the now extinct moa species. The suggestion appears to have been taken up by mycologists, and is becoming part of the story of science in this land. This year, an international team using high-throughput sequencing techniques to analyse the DNA in moa coprolites, revealed the first real evidence that moa may have eaten fungi.

But what happens if we take a fresh look at the whole question? Are moa the most likely coevolutionary partners of our sequestrate fungi, out of all the vertebrate and invertebrate inhabitants of prehistoric New Zealand? In this recently humanised but greatly altered land, it is challenging to hold in mind the relationships that might have played out over evolutionary time. What might we have missed?

Chair: Gretchen Brownstein, BrownsteinG@landcareresearch.co.nz www.bso.org.nz

Secretary: Allison Knight, P O Box 6214, Dunedin North. bsotago.ac.nz

■ Other Botanical Society Contacts

Waikato Botanical Society

President: Kerry Jones

Secretary: Wyne Johns

General contact: secretary@waikatobotsoc.org.nz

Website: <http://waikatobotsoc.org.nz>

Rotorua Botanical Society

President: Paul Cashmore 027 650 7264 pcashmore@doc.govt.nz

Secretary: Elizabeth Miller (07) 343 5013 rotorua-botanical-society@gmail.com

www.wildlands.co.nz/company/rotorua-botanical-society

Taranaki Botanical Society

Contacts: Barbara Hammonds 06 7597077; Email: barbara_ha@outlook.com

Janica Amore 06 7520830. Email: waihongona@clear.co.nz

Hawke's Bay Botanical Group

<https://www.facebook.com/Hawkes-Bay-Botanical-Group-590670161140095/>

Manawatu Botanical Society

Jill Rapson: Massey University. Ph (06) 350 5799 Ext 7963; G.Rapson@massey.ac.nz

Wellington Botanical Society

President: Jon Terry

Secretary: Lara Shepherd, lara.shepherd@tepapa.govt.nz

<http://wellingtonbotsoc.org.nz/>

Canterbury Botanical Society

President: Paula Greer

Secretary: Fay Farrant www.canterburybotanicalsociety.org.nz

ANNOUNCEMENTS

- **37th annual John Child Bryophyte and Lichen Workshop Camp Taringatura, Southland.**

We are pleased to announce that the 2019 John Child Bryophyte and Lichen Workshop will be based at Camp Taringatura from the evening of Thursday 14 November, to the morning of Tuesday 19 November. The Camp sits beside the Taringatura Reserve, situated between Dipton and Winton. Nearby are all sorts of rare and interesting remnants of the original wetlands, tussock grasslands, shrublands, rock outcrops, and diverse forests that once covered the Southland plains and Hokonui Hills, most of them carefully preserved by QEII Covenants or DOC Reserves. The covenant owners especially will be pleased to have bryophytes and lichens added to their species lists.

The workshop is open to anyone and everyone with an interest in the mosses, liverworts, and lichens of New Zealand, from beginner to expert. We have booked exclusive use of Camp Taringatura for the workshop and accommodation is available on site (bunks in 5 separate cabins for \$25/night or campsites for \$15/night). Evening meals will be catered and breakfast/lunch foods will be provided as well. We anticipate total cost for the workshop will be around \$350; we will be requesting a deposit of \$150 to confirm your place by 14 October.

Tom Moss Award: This award is open to any student studying any aspect of Australasian bryophytes and/or lichens. See the Wellington Botanical Society page for details.

Botanical Society of Otago Grants: This year the Botanical Society of Otago is offering two grants of \$100 each to assist two people who might otherwise not be able to attend the workshop. If you would like to apply for one of these grants, please email bsot@otago.ac.nz by 1 September with a paragraph summary, including:

- 1) Your background and why you would benefit from the grant
- 2) What you can do to benefit the Workshop (e.g., give a talk, help set up a display table)

Estimate of numbers: We would appreciate your indication of interest in attending the workshop. Please email angela.j.brandt@gmail.com as soon as possible with one of the following responses:

1. Yes, I will be attending the workshop and I'll stay at Camp Taringatura
2. Yes, I will be attending the workshop but I will find my own accommodation
3. I do not know if I can attend yet but will let you know as soon as possible
4. No, I will not be attending this year
5. Please take me off your mailing list a) for this year or b) forever

Please spread the word! Feel free to pass this information on to any other interested parties, who can request to be added to the mailing list for further updates on the workshop. We will send out the next circular with more details by early May.

We look forward to seeing you in Southland this November!

Organisers: Angela Brandt, Allison Knight, Maia Mistral, John Steel, David Glenney, Kelly Frogley, and Penelope Gillette

NOTES AND REPORTS

- **North Island Fern Jumps Ditch**

Cathy Jones, Nelson Botanical Society

In 2017 Susan Cook (Nelson Botanical Society) found an *Adiantum* under secondary lowland forest adjacent to Jimmy Lee Creek in Richmond, Nelson. She thought it looked like *Adiantum hispidulum* but that it couldn't be because it hadn't been recorded in the South Island. After looking at a specimen, I agreed with her identification and sent photos to Leon Perrie who confirmed it. Speaking with Shannel Courtney, Nelson DOC botanist, recently, I discovered that Simon Walls of Golden Bay DOC had also found *A. hispidulum*, about the same time, in East Takaka, on a very warm and well-drained marble scarp under kanuka. Global warming? Or just a suitably strong wind at the right time of year?



Adiantum hispidulum, Jimmy Lee Creek, Richmond, Nelson



Susan Cook, Jimmy Lee Creek, Richmond, Nelson

■ *Phyllostachys aurea* flowering in Auckland

Elizabeth Miller¹, Stuart Rogers and Mark Mortimer

¹National Forestry Herbarium, Scion, Private Bag 3020, Rotorua 3046.
elizabeth.miller@scionresearch.com

Introduction – *Phyllostachys aurea* in New Zealand

Phyllostachys aurea, known as fishpole, golden or walking stick bamboo, has been planted as shelterbelts in New Zealand, especially in northern regions, but as far south as Canterbury. It forms dense thickets via extensive rhizomes (Edgar & Connor 2010). It can quickly spread outwards from deliberate garden plantings or pieces of its root system (i.e. rhizomes) that are dispersed in soil or dumped garden waste (Queensland Government). It was first recorded as naturalised in New Zealand in 1977 (NZPCN).

It is a hardy bamboo, native to subtropical and temperate coastal provinces of China, distinguished from other species by a swollen band beneath each node and by the short, closely crowded, sometimes asymmetric internodes at the base of the culm (Bean 1976; Edgar & Connor 2010; Lawson 1968).

The New Zealand Grass Flora (Edgar & Connor 2010) states that for *P. aurea*, "Flowering is not reported for N.Z." It is interesting that The Flora of China does not describe or illustrate inflorescences or flowers of *P. aurea*. A book on Chinese bamboo (Wang & Shen 1987) explains that because flowering occurs so rarely, inflorescence and flower features are not reliable identification aids. Two other species of *Phyllostachys*, *P. bambusoides* and *P. nigra*, have each flowered occasionally in New Zealand, at long time intervals, and descriptions were made from the material where possible (Edgar & Connor 2010).

Flowering *Phyllostachys aurea* cultivated in other countries

Reports of flowering from other countries to which *Phyllostachys aurea* has been introduced, mainly for amenity purposes, are that flowering is rare (e.g. Lady Bird Johnson Wildflower Center; Queensland Government), and at variable flowering intervals, from 14 to 30 years (Dransfield and

Widjaja, *in* USDA). Lawson (1968), however, states that this species frequently produces flowering shoots, but that flowering is invariably partial and when present, the flowers are drab and inconspicuous. Flowering has been reported over more than one season, e.g. in the British Isles and other countries in 1904-05, 1919-21, 1935-37 (Bean 1976). Janzen (1976) records the last of this list as 1934-38, over four to five years and also observed that a bamboo 'mast crop', or mass flower and seed production event, is generally 'heralded' by scattered clumps of bamboo coming into flower in the previous year.



Flowers (centre of photo) on *Phyllostachys aurea*, December 2018. Photo: Stuart Rogers.

numbers of flowers in the hedge than before, and at two other sites in the vicinity flowers were present. However, one small satellite clump nearby had no flowers (Rogers 2019).

In central Auckland, on the boundary of Old Government House, significant flowers were seen on 25 October 2018. Mark Mortimer received images of significant flowering at Huia, on the north edge of the Manukau Harbour, at about the same time. Mark and Stuart have found that while there are some examples of *P. aurea* flowering across the Auckland region, there are just as many examples that are not flowering. Their observations are that in the hedge where the flowering was first noticed, it started slowly, and the amount of flowering has increased each year.

In February 2019, some members of the New Zealand Bamboo Society were taken to see the flowering at Motu Road, near Huapai, West Auckland, where the non-leafy, flowering culms were clearly visible. Voucher material was collected (NZFRI 31934).

Right: Shoot of *Phyllostachys aurea* with new leaves after flowering, May 2019. Photo: Stuart Rogers



Reports of *Phyllostachys aurea* flowering in Auckland

Mark Mortimer and Stuart Rogers work professionally with bamboo in the Auckland area, and are also members of the New Zealand Bamboo Society. In November 2016, Stuart Rogers noticed a single flowering culm of *P. aurea* in a hedge near where he lives, in NW Auckland. The next year he noticed more flowers. "Of about 20 culms, removed from an advancing end of the hedge, some 15 culms had at least one flower bract" (Rogers 2019). He wondered whether this could be attributed to stress on the plant. In spring 2018 there were greater



Examining the flowering culm of *Phyllostachys aurea* at Motu Road, Huapai, February 2019.

Further recent reports of flowering from Stuart include two contrasting examples at Waiheke Island, one of several culms on the end of a small roadside clump, and the other of near complete flowering of a large grove, most of which was dead or dying. On trips north of Auckland, Mark has not spotted any groves of *P. aurea* which have come into flower recently and those that were flowering previously seemed no further advanced. Both Stuart and Mark think that any flowering of *P. aurea* seems to have slowed down, possibly with the onset of shorter, cooler days. Stuart reports that where there had been flowering in his area, several branches have new leaf growth, although he wonders whether this is a response to heavy caterpillar browse.

How widespread is the current flowering of *P. aurea* in New Zealand?

The reports mentioned above support the view that *P. aurea* can flower partially, with some clumps flowering synchronously, while others remain sterile. The clumps where partial flowering was observed in 2016 by Stuart Rogers have not all died, and flowering has increased over the years since then, supporting the idea of some early 'heralds' of more widespread flowering.

It would be of interest to note and record how widespread the occurrence of flowering has been, and how long it may last. This current flowering may be restricted to areas around Auckland, but there may be undetected flowering further afield. McClintock (1967) appeals for recording of bamboo flowering, including degree of flowering and length of time of the episode, to increase understanding of flowering behaviour. Information is still sketchy. As flowering of this species has not previously been recorded in New Zealand, close observation of brownish, unthrifty bamboo clumps on roadsides to check for flowering, and reporting of such locations if flowers are detected, e.g. to the iNaturalist website (<https://www.inaturalist.org/>) would be worthwhile. A herbarium voucher including diagnostic features is also a useful record.



Check for the crowded, asymmetric internodes at the base of the culm and the swollen band beneath each joint, to identify *P. aurea* (Bean 1976; Edgar & Connor 2010; Lawson 1968), together with other *Phyllostachys* characteristics (Queensland Government) including two or occasionally three uneven branches at each node, and a groove lengthwise on the culm below each set of branches, the grooves alternating from side to side down the culm.

One practical point to keep in mind is that this species is often sprayed with herbicide when it encroaches on roadside infrastructure. This causes it to look similar to when it is flowering, especially when leaf growth occurs in dense short tufts (Stuart Rogers, pers. com.).

Left: Crowded, asymmetric internodes at the base of the culms of *Phyllostachys aurea*. Photo: Stuart Rogers, May 2019.

General flowering patterns in bamboos

It was considered in the past that all bamboos that flower would then die, but this is not the case. For example, *P. aurea* is a species that is known to flower more than once without suffering serious harm (Lawson 1968).

Brandis (1906) divided bamboos into three classes with different flowering strategies:

- (1) Species that flower annually, on leaf-bearing culms, the plants dying afterwards.
- (2) Plants of a species within a district flowering at the same time (synchronously) at long time intervals, each culm of a clump becoming a huge flowering panicle, with culms (and often the rhizome as well) usually but not always dying afterwards. In different districts the species flowers at different times.
- (3) Plants flowering irregularly, including species that sometimes show gregarious flowering and at other times only one or several culms in a clump, or several clumps in a population, flowering at the same time. Sometimes there is complete clump mortality. The majority of bamboo species belong to this class.

More recent botanists e.g. McClintock (1967), describe two main groups, similar to those of Brandis:

- (1) Those in which flowering is sporadic and partial, at irregular intervals; and
- (2) Those in which flowering is gregarious and general, at wide intervals; flowering may appear partial, by starting at one end of a clump and looking sparse, but gradually spreading to the whole clump, followed by death of the clump, or by recovery.

A third group has been added, that, rather than flowering annually and then dying, flowers continuously in a population, without sudden resultant mortality (Wong 1995; McClintock



Thin-walled fruit (caryopsis) of *P. aurea*. It is characteristic of grasses, that the ovary wall is united with the seed coat. Photo: Elizabeth Miller

1979). Valder (1999) records that flowering in bamboos may occur in one year only or continue for many years on the same plant. "Sometimes only a few flowers are produced on one culm, while at other times a whole culm, or even every culm in a clump, may be involved. Very often the culms, which produce flowers and seeds, die. Sometimes the whole plant will die, but in most cases new shoots arise." McClintock (1979) considers that flowering in bamboos can be easily overlooked if only a small part of a clump or one branch has produced a few flowers, with the rest of the plant sterile. The extent to which flowers are being produced is important, but rarely noted.

If a clump is well-established and naturally vigorous, it may have the necessary stamina to overcome the drain on its resources caused by flowering. However, if a clump is less vigorous, or has been recently transplanted, the plant may be exhausted by flowering, and die. This suggests that heavy flowering is more likely to cause a plant to die, than just a few culms flowering would do. Lawson (1968) states that when flowering starts, the rhizome stops making new branches and latent buds on existing branches lose the power to break into active growth. It is generally agreed that the flowering culm, which has usually dropped any leaves, dies after flowering is over, and any seed has been shed, but clump survival depends on whether the rhizome also dies. Complete recovery of an area may take 15-20 years (Campbell 1985). Natural stands in China are managed to prevent or minimise flowering, to avoid interruption of healthy culm production (Wang & Shen 1987).

Flowering coincidences

For a long time, there has been speculation on why multiple clumps of the same species of bamboo flower synchronously. It used to be believed that the interval between successive flowerings is constant for a given species, but there are enough records to prove that this generalisation is not true (Lawson 1968). In countries to which bamboo has been introduced, such as New Zealand, it is likely that at least some species have had only a small number of introductions, and been spread by division, as shelter was required for development of horticultural and agricultural land, so that there are many plants of the same parental genetic identity or cohort (Lawson 1968). Offsets taken from a clump before it flowers come into flower at the same time as the parent clump (Brandis 1906). Because *P. aurea* can exhibit partial flowering, it cannot be concluded that flowering and non-flowering clumps at any particular time are from different cohorts.

There have been "some striking coincidences of flowering dates" between native plants and the same species introduced and cultivated in different continents (Campbell 1985). However, if plants are raised from seed, the botanical make-up varies within narrow limits and there is a chance of evolving to suit different conditions (Lawson 1968). At one site, examples of one species introduced from several different sources have not all flowered synchronously (Lawson 1968).

Seed production

Seeding is not often observed in cultivation (McClintock, 1967; Janzen 1976). Brandis (1906) mentions that after "the fires of the hot season have swept away the tangled mass of dry stems, the next rainy season produces millions of seedling bamboos...", an indication that seed production may at least sometimes be more successful in natural bamboo forest areas than in cultivated situations. In native bamboo habitats, widespread synchronous flowering is likely to benefit seed production, through better cross-pollination.

Theories on benefits of flowering patterns

Studies and reviews have analysed the hypotheses for advantages of synchronous flowering, production of flowers and seed at long time intervals, and of individual clumps flowering only once, then dying (monocarpy) (Campbell 1986; Kelly 1994; Keeley and Bond 1999). Such masting species are considered to respond to 'internal calendars' at a cell level that cause cessation of vegetative growth and production of flowering culms instead (Kelly 1994).

'Predator satiation', proposed by Janzen (1976) suggests that even though high volumes of seed will attract large numbers of rodents and other seed eaters, there will be surplus for germination, but the predator population will not be sustained during a long gap between flowering episodes. However, the long interval between mass flowering greatly exceeds the lifespan of predators, much longer than needed to interrupt the pest cycle. If adjacent clones or other potential food sources are not synchronised, predators could migrate to alternative nearby areas (Campbell 1985). Mass seeding events of bamboo do cause population explosions of rodents that then disperse to eat crops and grain, sometimes causing human famine, so their population is not limited by the consumption of all

available bamboo seed (Bedi 2006). Also, a mast event often carries on for more than one season, allowing predator populations to continue to build (Keeley and Bond 1999). From these detracting factors, it is concluded that although predator satiation may be a weak selective force, it is unlikely to be the only influence, and there are probably multiple causes including climate factors that help set the baseline in any particular case (Kelly 1994). Proposals in which plants match time of flowering and seeding to their own build-up of resources, or to particular climatic conditions, are not considered likely to be major selection factors on their own, but matching such conditions will contribute to success of individual particular events (Kelly 1994).

Keeley et al's 'fire cycle hypothesis' (1999) links mast flowering with flowering and seeding only once, delayed reproduction, and typical gregarious distribution. It proposes that destruction of the large fuel accumulation removes competition, to allow bamboo seedlings to establish. The long vegetative phase before flowering would allow build-up of resources in the plant to support the heavy flowering that will, from synchronised flowering over a wide area, encourage cross-pollination and hence seed production. The large amount of accumulated fuel from a long growth phase and accumulation of many culms followed by death, would support efficient burning to clear the ground for succession, and discourage competition from invading trees or weeds. This generalised situation seems plausible for at least some regions.

Bamboo reaches full culm height in one season, which leads to the production of continuous stands with no temporary gaps, as in tree populations (Campbell 1985). Large clonal patches densely occupy space, forming a closed canopy that inhibits seedling recruitment. Seed dispersal is passive around the parent. Death of the parent plant allows space for seedling development (Keeley and Bond 1999). Parental competition is seen as a major factor affecting succession, with seedling survival occurring if parent plants die after shedding seed (Campbell 1985). Disturbance, such as by fire, would clear away the fuelwood resulting from the death of the mature bamboo, and Keeley and Bond (1999) argue that wildfire initiated by lightning strikes would clear the ground for seedling recruitment. There are areas in Asia with dry season climate cycles where wildfires are either a common or occasional occurrence.

On a large scale, in native habitat, long time intervals between flowering episodes tend to be correlated with rapid canopy invasion from forest trees, and slower bamboo maturation (Keeley and Bond 1999). *Phyllostachys aurea*, reported as flowering partially in clumps at long time intervals without complete mortality, may be adapted to maintaining rhizomatous growth, possibly in a less fire-prone temperate forest region. This is also the type of situation which occurs in New Zealand.

Recent research has examined how the transition from producing vegetative shoots to reproductive shoots is regulated (Hisamoto & Kobayashi 2007) and concludes that mechanisms that alter gene expression such as foliage variegation are probably responsible. It is possible that a single amino acid residual change could control flowering behaviour. Reasons for the gene expression change seem to be still elusive.

There is still much to learn about flowering behaviour of bamboos such as *Phyllostachys aurea*, especially in cultivated situations.

Acknowledgements

Thanks to Matt Buys and Nick Miller for helpful comments on the text.

References

- Bean, W.J. 1976. Trees & shrubs hardy in the British Isles. Vol. 3 N-Rh. 8th Edition revised. John Murray.
- Bedi, R. "Rat boom threatens hunger for millions". New Zealand Herald 11 June, 2006. https://www.nzherald.co.nz/world/news/article.cfm?c_id=2&objectid=10386105 (accessed 21 May 2019)
- Brandis, D. 1906. Indian trees. London. 767 p.
- Campbell, J. N. N. 1985. Bamboo flowering patterns: a global view with special reference to East Asia. Journal of the American Bamboo Society 6:17-35.
- Dransfield, S.; Widjaja, E. A., eds. 1995: Plant resources of South-East Asia. No. 7: Bamboos. Leiden, The Netherlands: Backhuys Publishers. 189 p.

- Edgar, E.; Connor, H. E. 2010. Flora of New Zealand Vol. V. Gramineae. Second Edition. Manaaki Whenua Press, Lincoln, New Zealand. 716 p.
- Flora of China Vol. 22 Page 165, 168. *Phyllostachys aurea*
http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200025882 (accessed 22 May 2019).
- Hisamoto, Y.; Kobayashi, M. 2007: Comparison of Nucleotide Sequences of Fragments from Rice FLOWERING LOCUS T (RFT1) Homologues in *Phyllostachys* (Bambusoideae, Poaceae) with Particular Reference to Flowering Behaviour. *Kew Bull.* 62: 463-473.
- Janzen, D. H. 1976. Why bamboos wait so long to flower. *Ann. Rev. Eco. Syst.* 7: 347 –391.
- Keeley, J. E.; Bond, W. J. 1999. Mast flowering and semelparity in bamboos: the bamboo fire cycle hypothesis. *The American Naturalist Volume 154 No. 3, September 1999:* 383-391.
- Kelly, D. 1994. The evolutionary ecology of mast seeding. *Trends in Ecology & Evolution* 9:465-470.
- Lady Bird Johnson Wildflower Center. 2007: Texas Invasives Database. *Phyllostachys aurea* Carr. ex. A. & C. Riviere. https://www.texasinvasives.org/plant_database/detail.php?symbol=PHAU8 (accessed 11 April 2019).
- Lawson, A.H. 1968. Bamboos - A gardener's guide to their cultivation in temperate climates. 192 p.
- McClintock, D. 1967. The Flowering of Bamboos. *Journal of the Royal Horticultural Society Vol. 92, part 12:* 520-525.
- McClintock, D. 1979. Bamboos - Some facts and thoughts on their naming and flowering. *The Plantsman Vol. 1(1) June 1979:* 31-50.
- NZ Plant Conservation Network. *Phyllostachys aurea*.
http://www.nzpcn.org.nz/flora_details.aspx?ID=3050 (accessed 11 April 2019).
- Queensland Government. Weeds of Australia, Biosecurity Queensland edition. *Phyllostachys aurea* fact sheet. https://keyserver.lucidcentral.org/weeds/data/media/Html/Phyllostachys_aurea.htm (accessed 11 April 2019).
- Rogers, S. 2019. Aurea flowers? *NZ Bamboo, New Zealand Bamboo Society Magazine Issue 38*, February 2019.
- USDA. *Phyllostachys aurea* fact sheet.
<https://www.fs.fed.us/database/feis/plants/graminoid/phyaur/all.html> (accessed 12 April 2019).
- Valder, P. 1999. Bamboos. Chapter 5 in *The garden plants of China*. Florilegium.
- Wang, D.; Shen, S-J. 1987. Bamboos of China. Timber Press, Portland, Oregon. 172 p.
- Wong, K.M. 1995. The bamboos of Peninsula Malaysia. *Malayan Forest Records*, No. 41. Forest Research Institute, Malaysia. 210 p.

■ Correction of errors about John Davies Enys.

Jenny Abrahamson, jenny.abrahamson.canterbury@gmail.com

I have recently published a book titled 'John and Charles Enys; Castle Hill Runholders 1864-1891'. After 14 years of research I have found that the literature contains mistakes copied by subsequent writers, including an article about John Davies Enys by Dr Eric Godley published in the December 2009 issue of the New Zealand Botanical Society Newsletter. John Enys was a keen naturalist and collector in early Canterbury and member of the Provincial Council. He was chairman of the committee that pushed to get Canterbury Museum, Christchurch Public Library and the Technical College (later the University) established.

The main mistakes are that John Davies Enys does not have Gilbert in his name. He was born at Enys, Cornwall (not Enys Place). He was not educated at Harrow (his two brothers were). Acland was NOT his cousin nor did they travel to New Zealand together. Charles Enys arrived in New Zealand in 1864 - not 1863. Marianne North was only their third cousin, not first cousin. Charles Enys became ill in 1890 (not 1888), and returned to Cornwall where he died in 1891 (not the eldest brother Francis, who died in 1906).

More information about the book and how to buy it is available from the following website: www.castlehill.net.nz.

BIOGRAPHY / BIBLIOGRAPHY

■ Biographical Sketch – Gilbert Mair (1843-1923)

Val Smith, 80 Mill Road, New Plymouth 4310.

Ancestors of the Mair family lived at Deveron in Banffshire, Scotland, for more than four hundred years before a line became established in New Zealand. Robert Mair (1764–1844) of Deveron was a joiner and later a merchant ship owner, and three of his four sons had early maritime contacts with New Zealand. In 1824, when the second son Gilbert Mair (1799–1857) made his third visit, he helped Henry Williams and others build the 55-ton mission schooner *Herald* at Paihia in the Bay of Islands, and he commanded her until she foundered on the Hokianga bar in May 1828. He had known the Puckey family since their arrival in 1819 on one of Samuel Marsden's missions: boat-builder and carpenter William Puckey contributed to the building of Kemp House (now known as Mission House) and the *Herald*, which his son also helped to build and then served on as mate. William, and especially his wife, became addicted to alcohol as they struggled with the hard life, and after eight years at the mission the family returned to Sydney. On 15 September 1827, during the next visit of the *Herald*, Gilbert Mair married 17-year old Elizabeth Puckey at St James Church, Sydney, and they arrived back in New Zealand on 9 October. Elizabeth's parents both died of alcohol poisoning shortly afterwards.

In 1842, after running a successful trading station at Te Wahapu Inlet in the Bay of Islands, Mair moved his growing family to Whangarei, where he had acquired a large block of land. Gilbert junior, the eighth of his twelve children, was born in the family home "Deveron" on 10 January 1843. Local rangatira called and gave him the name Tawatawhiti, their name for the area, and he commonly became known as Tawa. The missionaries and their wives at the Bay of Islands would have taught his older siblings, but the younger children had a private tutor until the first school at Whangarei Heads was established in 1858. By then young Gilbert was helping his father and older brothers in the kauri gum trade, which brought him into contact with Māori, many of them Te Arawa, camped on the northern gumfields; he became proficient in the language and developed a keen interest in Māori history and culture. Articled to the surveyor general in Auckland in 1860, he received his provincial certificate four years later, and was clerk of the court and interpreter in Tauranga when a boundary dispute in 1867 erupted into fighting. Mair volunteered for active service in the militia and his significant role in New Zealand history, both for his military prowess and crown role as an

advocate for Māori, has been well documented. Promoted to the rank of captain in 1870, he excelled in guerrilla techniques of bush warfare and identified closely with Te Arawa who served under him, but he was also aware of the complexities and moral issues of the campaigns. Although he was present at Parihaka in Taranaki in 1881, he never referred in his later writings to the ignominy of the passive resistance encountered there on what was to be his last military operation.



Utricularia australis. Photo: Wikimedia Commons

From early relationships with Keita Hemi Kupa (1846–1911) and Anahera Patara, Gilbert Mair had two sons and a daughter. On 19 September 1888, when he was 45, he married Eleanor Catherine

Sperry (Kate) at the Congregational Church in Bowen Street, Wellington. She was an acclaimed artist, and they probably first met when she painted his portrait after his belated New Zealand Cross award in 1886. They lived near Foxton, where Gilbert then farmed. A son and a daughter were born, but within five years Kate died, and just three years later their first-born, John Gilbert (Jack) died at Thames. Their daughter Kathleen Irene (Airini) became an artist under her married name, Vane.

A man of many hats – surveyor, soldier, land purchase agent, government interpreter and guide, Gilbert Mair acquired over thirty years a collection of 247 taonga which, with their associated stories, he passed into the safe keeping of Thomas Cheeseman, curator of the Auckland Museum, in 1890 and was purchased by the museum in 1901. Mair's fondness for gardening, and interest in native plants led to the discovery with botanist Thomas Kirk in 1872 of a bladderwort that Cheeseman, in his 1906 *Manual of the New Zealand Flora*, named *Utricularia mairii*, but is now treated as a synonym of *Utricularia australis*. Gilbert Mair worked very hard physically during his final farming years in the Waioapu district and Bay of Plenty and retired to Tauranga when he was 73. In 1922 Te Arawa became aware of his serious financial situation and voted him a £100 annuity for his lifetime from the Arawa Lakes Settlement. He died on 29 November 1923, aged 80. His funeral cortège proceeded to Rotorua where his old friend Frederick Hamilton Spencer (1854–1932) preached at the service in St Faith's Church, Ohinemutu, before his burial in the adjacent Te Arawa cemetery.

REFERENCES

- Brandon, A 2004. *Threatened plants of Waikato Conservancy*. Wellington, Department of Conservation.
- Descendants of Gilbert Mair: <https://www.wikitree/> (accessed 22 March 2019).
- Heritage NZ Report: A historic road and landing rediscovered: <https://contractormag.co.nz/> (accessed 15 March 2019).
- Savage, P. Mair, Gilbert. *Dictionary of New Zealand biography*, updated 2012: <http://www.TeAra.govt.nz/> (accessed 17 November 2018).
- Tapsell, P 2006. *Ko Tawa: Maori treasures of New Zealand*. Auckland, Bateman.
- Vial, J. Sperry, Eleanor Catherine. *Dictionary of New Zealand biography*, updated 2012: <http://www.TeAra.govt.nz/> (accessed 17 March 2019).
- Utricularia australis*: <https://en.wikipedia.org/> (accessed 15 March 2019).
- William Gilbert Puckey: <https://en.wikipedia.org/> (accessed 16 March 2019).

Utricularia australis

In 1753 Carl Linnaeus established the genus *Utricularia* (Latin *utriculus* 'a small bottle, leather bag, bagpipe', referring to the insect-trapping bladders) in his *Species Plantarum*. Over 200 species are spread across all continents except Antarctica. Commonly known as bladderworts, they are carnivorous plants occurring in fresh water or wet soil. *Utricularia australis* (syn *Utricularia mairii*) is a small aquatic herb free-floating below the water surface. It has stems up to 400 mm long with finely-divided feathery leaves and numerous bladders 1-3 mm in diameter attached to leaf bases. The few flowers produced from December to March are yellow, usually with an orange blotch, but some populations may never flower. Scattered from Northland to Westland, in peat lakes, pools and streams, it is threatened by weeds and habitat loss.

PUBLICATIONS

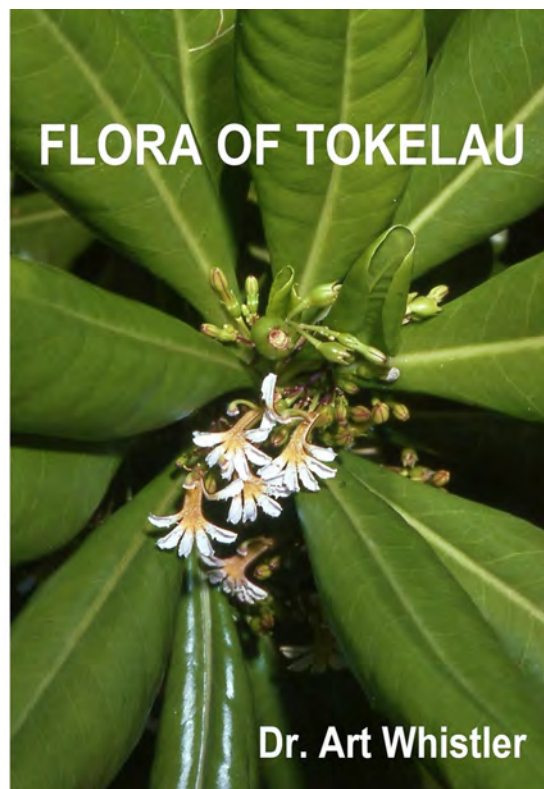
■ Flora of Tokelau – by Dr Art Whistler

The Tokelau archipelago lies about midway between Hawai'i and New Zealand, between 8 and 12° South latitude and 171 and 173° West longitude, several hundred km north of Samoa. It comprises four atolls—Atafu at the north end, Nukunonu to the south, Fakaofu still farther south, and Swains Island (called Olohega in the Tokelauan language) at the southern end. Their combined land area is

10 km² (4 mi²). The *Flora of Tokelau* is based on the author's four botanical expeditions to Tokelau, including visits (1976–2011) to all four islands (including Olohega, a.k.a., Swain's Island, which politically belongs to American Samoa but is geographically a part of Tokelau). It is also based upon the author's study of all the known specimens collected in the archipelago, including his personal collection of 236 specimens.

The *Flora of Tokelau* treats all the native and naturalized vascular plants (flowering plants, ferns, and fern allies) of the archipelago. It does not include ornamental plants whose existence in Tokelau is contingent on their being cultivated and/or planted. The information on the 100 species (38 natives and 62 naturalized alien weeds) presented includes the botanical family to which the plant belongs, its genus, its scientific name, and any synonyms it may have. That is followed by a paragraph that includes the range of the species, its habitat, its ethnobotanical uses in Tokelau, and Tokelauan and English names (if any). That in turn is followed by a complete botanical description, including a summary of "Distinguishing Characters." At the end of the book is a color photograph of each of the 38 native species (and two Polynesian introductions), as well as a listing of all known specimens collected in Tokelau and a bibliography of pertinent literature.

The book, 125 pages long, is designed to be of use to botanists, naturalists, teachers, students, or just nature lovers who visit the archipelago. It sells for \$U.S. 25 which includes free shipping within the US (overseas shipping will be calculated when ordered). Other related books written by the author and available from Isle Botanica (see www.islebotanica.com) include *The Samoan Rainforest*, *The Ethnobotany of Samoa*, *Flowers of the Pacific Island Seashore*, *Samoan Herbal Medicine*, *Tongan Herbal Medicine*, *Polynesian Herbal Medicine*, *Tropical Ornamentals*, *Plants of the Canoe People*, and *Wayside plants of the Islands*.



Specifications

Pages: 125

Size: 7 x 10 inches

Cost: \$25.00

Publication Date: 2018

ISBN: 9681724678201

Color Photos: 40

Binding: softbound

Publisher: Isle Botanica

Weight: 10.2 oz.

A limited number of this book are available for NZ\$30.00 each (incl. postage within NZ) from the Auckland Botanical Society at: Books, PO Box 26391, Epsom, Auckland 1344, E-mail aucklandbotanicalsociety@gmail.com Please email your order and, following confirmation, make payment by cheque or by internet banking. Account no. is 12-3011-0496770-00. Please include your surname and "books" in the reference field.

■ **Publications Received**

Canterbury Botanical Society Newsletter March 2019: Upcoming meetings and trips, trip report for Ataahua Reserve.

Canterbury Botanical Society Newsletter April 2019: Upcoming meetings and trips, meeting report on taxonomy of *Brachyglottis lagopus*, trip report for Lake Coleridge wetlands.

Canterbury Botanical Society Newsletter May 2019: Upcoming meetings and trips, meeting reports on willows in New Zealand and why native plants are vital to nationhood, trip report for climbing broom search in Rakaia Gorge.

Wellington Botanical Society Newsletter April 2019: Upcoming meetings and trips, submissions made, applications sought for Jubilee Award, trip reports for Bannockburn summer camp, Pāuatahanui Inlet, Steenkamp property, Long Gully, Wellington Botanic Garden BioBitz.

■ **A Field Guide to New Zealand Fungi – by Shirley Kerr**

A new guide to New Zealand fungi is now available for purchase. The book contains colour images of over 600 species of fungi that Shirley has found, photographed and identified. A brief description accompanies each image. The book is spiral bound and with plastic covers so it can fulfil its obligations as a field guide.

The price is \$65 including postage within New Zealand.

Email the author Shirley Kerr: shirley@kaimaibush.co.nz to arrange payment and delivery.

