

NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 151

March 2023



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Subscriptions

The 2023 ordinary and institutional subscriptions are \$28 (reduced to \$25 if paid by the due date on the subscription invoice). The 2022 student subscription, available to full-time students, is \$15 (reduced to \$10 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 March *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 June 2023 issue is 25 May 2023.

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

Send email contributions to lara.shepherd@tepapa.govt.nz Files are preferably in MS Word, as a Microsoft Word document. 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

Juncus procerus by Eleanor Burton.

NEW ZEALAND BOTANICAL SOCIETY
NEWSLETTER
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NEWS

New Zealand Botanical Society News

■ Call for Nominations for Allan Mere Award 2023

Nominations meeting the following conditions are invited for the award of the Allan Mere for the year 2023.

Conditions of the Allan Mere Award

1. The Award shall be made annually to a person or persons who have made outstanding contributions to botany in New Zealand, either in a professional or amateur capacity.
2. The Award shall be administered by the New Zealand Botanical Society.
3. Nominations for the Award may be made by regional Botanical Societies, or by individuals, to the Secretary of the New Zealand Botanical Society. Nominations shall close on 30th June each year. Nominations shall be signed by nominator and seconder, and accompanied by supporting information.
4. Selection of the successful nominee/nominees shall be made by the Committee of the New Zealand Botanical Society, normally within three months of the closing date for nominations.
5. If, in the opinion of the Committee, no suitable nomination is received in any particular year, the Committee may refrain from making an award.
6. The Mere shall be formally presented to the recipient on an appropriate occasion by the President of the New Zealand Botanical Society or his/her nominee, but otherwise shall remain in the custody of, and be displayed by, the Herbarium Keeper of the Allan Herbarium (CHR) at Landcare Research, Lincoln, together with the book recording awards.
7. The recipient shall receive an appropriately inscribed certificate.

Nominations should be forwarded by 30 June 2023 to:

Ewen Cameron, Secretary, New Zealand Botanical Society, c/- Canterbury Museum, Rolleston Avenue, Christchurch 8013.

Regional Botanical Society News

■ Auckland Botanical Society

Christmas pot luck luncheon

Warkworth and District Museum's kitchen and veranda were hired for the day and were ideal for our needs. With the museum being situated in Parry Kauri Park, as well as our picnic requirements being met, the second of our needs – some good botany – was also at hand. The two giant kauri trees were admired, as were the new viewing platform and replacement of part of the track that has been undertaken by the Auckland City Council. More of the track will be replaced this year. With 40 years of animal and plant pest control by locals, the bush was in fine condition. After our picnic our retiring president, Ewen Cameron, was presented with a beautiful painting of the sea holly (*Eryngium vesiculosum*) with the Cape Campbell lighthouse in the background. This was painted by our South Island friend and life member, Cathy Jones, and was presented by our new president, Bec Stanley.

February field trip

Aucklanders, after experiencing two devastating floods within a week of each other, were basking in a lovely sunny day, and Bot Soccers took advantage of the good weather to join with Mike Wilcox on a walk through Cornwall Park. This walk followed the publication of, and preceded the launching of the new ABS book, *Nature in the City*, by Wilcox et al. The outing ended with a walk beside the stone wall boundary of the park and Greenlane Road, and the scoria wall was home to an interesting flora, including lush patches of earina – the discussion as to whether it was *E. mucronata* or *E. aestivalis* was inconclusive.

Auckland Botanical Society PO Box 26391, Epsom, Auckland 1344

President: Bec Stanley

Secretary: Kirsty Myron

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■ Rotorua Botanical Society

December Trip - Okere Falls

A small group of 9 headed out from the Okere Falls Reserve car park. We initially took a relatively new hill track down river that mostly followed along a ridge. The route was rather open, often in low kamahi and, towards the descent to the lower carpark, through open areas and very low scrub not long from pasture. Because there were many open patches a wide variety of herbs and species generally were present, including wineberry, fuschia, dogwood, hawthorn, lawn daisy and ragwort. In the forest a good lot of epiphytic orchids was present including *Drymoanthus adversus*. The records also included a long list of grasses including pampas, Himaalyan fairy grass (a common local sight), *Pentapogon crinitus*, *Poa pusilla* and of course the forest fairy grass. Then, after a short detour to the Trout Pool and lunch, we returned upriver along the older river track. The contrast was strong with a steady uphill grade mostly well above the gorge but looking down on the river. Initially again through low scrub but soon into tall, mature tawa or tawa-kamahi forest. Here the list of weeds was much smaller including the native *Pelargonium inodorum*. Typical closed forest plants included toropapa, pukatea, the odd rimu and distinctive lowland species such as kohekohe, titoki and puriri. There were many more ferns here, highlights being *Lastreopsis microsora* and *Tmesipteris sigmatifolia*. With time to spare most of us visited Nick and Liz Miller's place nearby to see an extensive garden collection set in native forest.

February Trip - Manawahe gully crawl

A group of Rotorua Botsoc members, mostly from Whakatane, were led by members of the Manawahe kōkako trust to explore a privately owned native forest block. The area is part of a network of privately owned blocks near Whakatane, which make up the Manawahe forest corridor, set up to manage a North Island kōkako population. The block had old logging tracks and fencelines through it and a network of bait stations so animal pest numbers were relatively low. The block was a sloping face dominated mainly by tawa-(rewarewa) forest with kamahi, mangao and kohekohe abundant in the subcanopy in places. A good range of epiphytes were noted with supplejack and kiekie common in the gullies. A wide range of shrubs included kawakawa, heketara and rangiora. Ramarama were sparsely scattered through the block. Myrtle rust was not seen. Relatively few weed species were present, mainly *Cotoneaster franchetti* and tutsan, with *Carex divulsa* around some of the forest margins. The fern list was quite long but the highlight of the day and the main purpose of the field trip was to visit the king fern population. This was discovered several years ago by kōkako trust volunteers doing pest control. It was an impressive population along two adjacent gullies near their junction. Although only the upper part of the population was visited, it was estimated to contain at least several hundred largely mature king ferns. This would be one of the larger king fern populations known in the Bay of Plenty. The population appeared to be relatively healthy with no major animal browsing noted despite being in a relatively accessible gully.

FUTURE EVENTS

March 18	Kaharoa
March 25	Tarawera
April 2	Lake Rototau & Rotongata, Okataina
May 6	Whale island
May 20	Ohuanu (Tikitere)
June 10	Waharoa QEII

President: Sarah Beadel 021 924476; Sarah.Beadel@wildlands.co.nz

Secretary: Elizabeth Miller (07) 343 5613 rotorua-botanicalsociety@gmail.com

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■ Wellington Botanical Society

September Field trip: Kiripiti Scientific Reserve, Otaki

This small 2 ha tōtara-tītoki-mataī forest remnant was fenced off from livestock in 1971. It is an example of a now rare forest type that sits on a densely settled, dry, stony terrace originally formed by outwash

from the nearby ōtaki River. Some native forest blocks nearby have been subsumed into the landscape of rural gardens with many exotic intrusions, while others have had some management and livestock exclusion.

Led by A. P. (Tony) Druce, the reserve was first visited by BotSoc in 1963 as part of a study of six severely degraded forest remnants. Another trip by the society ensued in 1977. Point-intercepts along a North-South transect were taken on both these trips to analyse the structure of the forest canopy and the effects of livestock exclusion. On our trip Pascale Michel guided a small group of the twenty-five attendees to replicate the methodology to assess the current state of the forest structure. It will be interesting to see the results of the point-height intercepts, but first impressions are that any changes are small and the biggest changes in structure are yet to come.

The rest of us were greeted at the forest edge by a *Melicope simplex* festooned with the mistletoe *Korthalsella lindsayi*. Another was inoculated with seedlings, many of which had their feet successfully planted on their host. A large *Coprosma crassifolia* was the first bush-edge tree we saw. Then we saw the milk trees *Streblus banksii* and *S. heterophyllus*. On bursting through the edge of the forest, we saw that the forest floor was a mat of tītoki / *Alectryon excelsus* subsp. *excelsus* seedlings. We did not see if there were any other larger cohorts of tītoki in the reserve but in an adjacent block, also fenced off for about the same period, there were larger plants. Within the reserve sub-canopy were healthy kohekohe / *Didymocheton spectabilis*, up to 3 m high. Further in were mats of *Corybas trilobus*. The canopy cover looked reasonably intact but we saw evidence of recent wind damage that had opened up small light gaps. The sub-canopy and ground cover appear to be continuing to develop. Large *Geniostoma ligustrifolium* var. *ligustrifolium* and *Piper excelsum* subsp. *excelsum* are making the understorey much harder to push through. Disturbingly, there are also large *Rhamnus alaternus* / evergreen buckthorn up to canopy height and along most fence-lines. In the adjacent block on private land, evergreen buckthorn had enveloped the edges of the block and *Pandorea pandorana* had infested the edges. We saw mataī seedlings and, in an adjacent block, a miro.

Ferns may have, so far, been the largest beneficiaries of the elimination of livestock for the last 50 years but there appeared to be no evidence of possum control. The small presence of grasses such as *Microlaena stipoides* and *Oplismenus hirtellus* subsp. *imbecillus* may be suffering from the apparent high rabbit population and the intrusion of weed grasses around the edges of the forest.

October Field trip: Tuapaka/Hutton's Covenant, Te Horo

The Tuapaka covenant is a bush remnant in a steep valley east of Te Horo. It is home to one of only two populations of *Powelliphanta traversii* var. *otakia*, and the owners work closely with the Department of Conservation to ensure the population continues to thrive. To this end there is good pest control on the property, and periodic monitoring of the snails.

Our trip started down through a stand of planted mānuka/kānuka, with broadleaf seedlings beginning to establish underneath it, across a stream / wetland area still in long pasture grasses though with some wetland species amongst it. *Syzygium maire* / swamp maire planted in this area is doing well. Then we entered the covenanted area. This is regenerating bush, with a surprising number of podocarps - especially tōtara - present. The bush is in good health, with a dense understorey, probably due to good pest control. We saw numerous dead snail shells, especially in the lower part of the covenant near the stream, but also up near the ridge. There are several tracks in the covenant; most of us did a steep loop track, and some newer members spent most of the time in the lower part of the covenant having an introduction to plant identification. Highlights were the many tōtara, the *Earina mucronata* in flower, and the snails; others were pleased to find *Trichomanes elongatum*, and some spent the day among the bryophytes. A few species were added to the list, and a list compiled of liverworts and mosses.

October Field trip: Akatarawa 4WD trip

Twenty BotSocers were transported into the heart of the GWRC-managed Akatarawa Forest by eight 4WD vehicles from the Wellington Cross-Country Vehicle Club, enabling us to visit areas that would be otherwise be out of reach for most members. Akatarawa Forest has an interesting mix of actively-managed *Pinus radiata*, unusual exotic timber trees in what appear to be abandoned plantations, regenerating native forest and some larger remnant natives, particularly species that were not valued for timber, such as northern rātā and hard beech.

Starting at the Upper Hutt suburb, Tōtara Park, we drove on well-formed logging roads to McGhie's Bridge over the Akatarawa West River, then through an actively-logged area (with clear-felled steep hillsides dropping straight into the river) to the Pram Track. From here the road became a little more challenging. We stopped partway up to admire flowering Kirk's daisy / *Brachyglottis kirkii*. Several plants were at the top of a steep bank, out of reach of browsers. We saw numerous *Chamaecyparis lawsoniana* seedlings that were self-sown here on the roadside. We travelled on to Whakatikei Rd, then Titi Rd. From here an old logging tram track took us through regenerating kāmahī to a "grove" of hutu / *Ascarina lucida*), where this species, which is rare in the Wellington region, is unusually common. We discussed the similarities and differences between hutu and pukatea.

Our next stop was the causeway across the Hydro Valley Rd wetland. Here we had a poke around the edges of the wetland where two buttercup species drew our attention - one weedy - *Ranunculus flammula* - and one native - *R. glabrifolius*. We saw several *Clematis paniculata* flowering near the causeway. We then headed to our main destination – the Whakatikei rātā, a five-minute walk off the Pram Track through an old *Chamaecyparis lawsoniana* plantation. This tree is the world's largest known northern rātā / *Metrosideros robusta*, along with another tree also in the Akatarawa Forest that is more difficult to access. We attempted a tree 'hug' and it took 15 of us holding hands to encircle the trunk, although the ground was not level all the way around. We noted pig rooting of the nearby ground.

November Workbee: Te Mārua Bush, Kaitoke Regional Park, Upper Hutt.

In slightly wet conditions, our group from BotSoc and Upper Hutt F&B gave the bush a good tidy-up, removing montbretia and Peruvian lily. We left the markers for the Peruvian lily so we can check next year because it grows from tubers. We removed a small amount of rubbish. We could not find any sign of tradescantia around the tōtara by SH2; we saw a small patch of broomrape / *Orobanche minor* about 15 m from the gate and found another yew / *Taxus baccata* about 50 m from the previous site and about the same age - it will be cut and painted.

November Field trip: Saline wetlands, eastern Wairarapa

The saline springs and wetlands are situated on a ridge top in Glenburn pine plantation at 370 m a.s.l. and about 3.5 km from the coast. The site is of particular geological interest as it is where two tectonic plates meet. Cold saline springs such as these are rare both nationally and globally. The string of saline springs from Glenburn to Hicks Bay, occurring on land, is only one of two or three in the world and thus is of intense interest for scientific study. It was visited by Thomas Kirk on 2 February 1880 where he recorded a new species, *Schoenus moorei* (WELT 20473), now considered to be *S. concinnus*. His basis for the identification was the size of the plants, particularly the height, but on our visit in 2017 there was a vast range in the height of the plants depending where on the site they were growing.

The saline wetlands had a deer fence erected around them and there was copious deer and pig sign outside the deer fence, with the understorey in parts looking like a mowed lawn. We saw many rabbits' or hares' droppings outside the mesh fence. The vegetation within the fence has recovered well since 2017 and our visit added one tree species, *Hoheria angustifolia*, eight native shrub species, three native climbing species, three native tree ferns, six native ground ferns, six other native plant species and one moss. The one threat to this proliferation of new native species observed was possum browse on the *Pseudopanax arboreus* / five-finger.

The freshwater wetland was dominated by the native *Carex* spp, *Machaerina rubiginosa*, *Eleocharis* and *Schoenus concinnus* and the exotic species *Carex flacca*. Down slope to the north we were greeted by the odour of rotten eggs and then saw the saline springs. The saline turfs of *Triglochin striata*, *Samolus repens* and *Selleria radicans* were obvious with the *Triglochin* spreading across the grey muds.

December Field trip: Rātā walk, Lower Hutt

The rātā walk returned for another year, this time a bit shorter at 4 km. There were thirteen northern rātā on the route and many other natives, including rimu, pukatea, tōtara, kauri and kahikatea. Unfortunately, the rātā were later flowering this year, but the Chilton rātā and one on Witako Street still put on a bit of a display. Next year it's likely we'll take a different route to view different trees.

President: Frances Forsyth

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■ Nelson Botanical Society

May Meeting: Talk by Shannel Courtney, Department of Conservation

Shannel presented the results of his four-month secondment from DOC to Wakatū Incorporation – the Nelson-based hapū-owned business – where he contributed to their Indigenous Organisms Project by developing a checklist of all the indigenous vascular plants of Te Taihū o Te Waka a Māui – the rohe of the eight iwi in the northern South Island. One of the main purposes of this project is to better connect iwi with whenua. This is the first time such an inventory has been done at a regional scale and specifically tailored for iwi needs. Data collected for each species include distribution within the rohe, known Māori names, life form, frequency of occurrence, threat status, degree of endemism, geographic limits and various other attributes including hybrids and varieties. The result is an electronic library in spreadsheet form with, at this stage, 2134 entries. Analysis of these data has revealed some interesting insights: Of the around 2800 New Zealand indigenous vascular plants, 1629 (58%) are indigenous to Te Taihū, 136 (5%) of NZ indigenous plants are endemic to Te Taihū, with a further 31 nearly endemic, occurring at a few places outside the rohe, 8% of the Te Taihū flora is endemic to Te Taihū, 6 plants have been introduced to Te Taihū by Māori ancestors and are now naturalised. Flora naturalised from the North Island as a result of Māori introductions to Te Taihū, include: pōhutukawa, tītīrangi, karaka, whau, rewarewa, rengarenga. Fewer than 25% of indigenous plants are abundant or common in Te Taihū, with just over 10% being extinct or occurring in fewer than 5 locations, 69 of the 136 plants (51%) endemic to Te Taihū have no formally published name. Of the 133 trees, more than 70% have Māori names; of the 618 dicot herbs, just over 10% have Māori names; fewer than 10% of orchids have Māori names. Shannel's interesting analysis and presentation of data concurred with what we know anecdotally: that we live in an area of rich and diverse flora with a high degree of endemism. A corollary to this, as in so much of Aotearoa, is that there is also a high level of threat.

June Field trip to Maitai Caves

Botanising began after the track diverged from the Coppermine trail, with *Carmichaelia australis* among the kānuka, and soon we were among rich lowland forest. Tall miro, tawa, lowland tōtara, kahikatea, red beech and matai form the canopy over wineberry, *Carpodetus serratus*, *Cyathea smithii* and *Dicksonia fibrosa*, young matai and beech. At ground level *Blechnum procerum*, *B. vulcanicum* and *Leptopteris hymenophylloides*, along with various filmy ferns, were lush after recent rain. Where the forest becomes more open two pōkākā stand, either side of the track, one in the juvenile form and the other all adult except for the lower branches. At the creek crossing we noted the first southern rātā, and the increased moisture from creeks running either side of the track along a raised bank makes the perfect spot for *Hymenophyllum nephrophyllum* and *Notogrammitis heterophylla* on rocks, also with *Pterostylis alobula* among the moss. A few clumps of *Libertia mooreae* occur here, along with *Hydrocotyle dissecta*. On the edge of the dense forest area are clusters of *Cordyline banksii*, along with *Phyllocladus trichomanoides* among the red and hard beech. *Griselinia littoralis* and *Pterophylla racemosa* with *Cyathea dealbata* provide the understorey, with *Blechnum discolor*. *Rumohra adiantiformis* grows on tree-fern trunks and rocks, *Scepstridium biforme* occurs between a rock and a tree root and *Leptolepia novae-zelandiae* spreads over the ground here and *Icarus filiformis* displayed both juvenile and adult forms as it ascended a tree-trunk.

June Meeting: Talk on "Plants of the Gibson Desert" by Kath Ballantine

About halfway between Alice Springs and Port Hedland in the Gibson Desert lies the remote community of Kiwirrkurra, where Kath spent time enjoying the myriad of plants that have adapted to the harsh conditions there. It is an area of dune fields consisting of laterite gravels and sandstone, uplands, salt lakes and granite outcrops. Considering that the temperature in the summer tops 40 degrees and long periods of drought are normal, it was fascinating to see how many plant families were represented in the flora. There were the expected families, such as Fabaceae, Myrtaceae and Proteaceae, as well as some of the more unusual ones such as the endemic Gyrostemonaceae and includes the desert poplar (*Codonocarpus cotinifolius*) and the monotypic family Brunoniaceae, the sole species of which is the bright blue flowered, *Brunonia australis*. Some highlights were Sturt's desert pea, the upside-down plant (*Leptosema chambersii*), which has leaves on the top and flowers at the base, the lolly bush (*Clerodendrum floribundum*), so called because of its arrangement of protruding seeds, and the bright purple drifts of *Calandrinia balonensis*.

July Field Trip to Paremata Flats and Bishop Peninsula, Delaware Bay

This was an opportunity to see the small forest remnant and extensive replanted area along the lower reaches of the Wakapuaka River, and to contrast these with the much better-preserved forest on Bishop Peninsula. The area has been managed by Forest & Bird, with Nelson City Council support, since 2008. The group walked around the edge of the original bush remnant and along the edge of the river bordering the saltmarsh and rushlands. Tree species in the bush remnant include kahikatea, tōtara, mataī, titoki and ngaio. Understory species include *Parietaria debilis*, *Urtica ferox*, nikau seedlings, *Hydrocotyle moschata*, *Senecio hispidulus*. *Plagianthus divaricatus* has been extensively planted on the upper areas of saltmarsh, extending remnant populations. Kōwhai also occurs along the estuary edge. *Austrostipa stipoides* and *Olearia solandri* are also present. Lower on the shore is a zone of sea rush and thickets of oioi. Around and down-shore from the rushes are carpets of sea primrose and *Selliera radicans*, with *Leptinella dioica* hiding among them. Further down-shore again, higher mud-banks contain glasswort.

Bishop Peninsula lies north of Paremata Flats Reserve. There is a Māori defensive trench across the far end of the peninsula and the area is a Māori reserve. The group walked a circuit starting on the southern side looking out for an old hard beech and hīnau. The forest remnant includes tōtara, mātaī, kahikatea, titoki, ngaio and ribbonwood. We also saw māhoe, kōwhai, black beech, juvenile miro, a single tawa, *Olearia paniculata*, *Coprosma rhamnoides* and *C. areolata*, *Veronica stenophylla*, and a lot of *Metrosideros perforata* and *M. fulgens*. A large specimen of *Passiflora tetrandra* was scrambling over a tree. A highlight was a magnificent *Streblus heterophyllus*. Individuals of *S. banksii* have been planted in the area. The banks beside the path on the south side of the island had numerous *Pterostylis alobula* and *Acianthus sinclairii*. Ferns were common, including *Adiantum cunninghamii*, *Asplenium* spp., *Blechnum* spp., *Pellaea rotundifolia*, *Parapolystichum glabellum*, *Polystichum neozelandicum* and the filmy ferns *Hymenophyllum bivalve*, *H. demissum*, *H. dilatatum* and *H. sanguinolentum*. *Microlaena polynoda* is also present. The coastal-edge natives included *Apium prostratum* and *Suaeda novae-zelandiae* in addition to the species that characterise the saltmarsh at Paremata Flats.

July Evening (Zoom) Talk on "The Allan Herbarium" by Ines Schönberger,

A herbarium is sometimes referred to as a 'hortus siccus' (dry garden) or a plant morgue. What is believed to be the oldest herbarium specimen, held at Kew, is an olive branch discovered in 1885 in a tomb not later than the period of Ptolemy, which began in 305 BC. The Allan Herbarium, named in 2001 to honour H. H. Allan, is New Zealand's largest collection of dried plants, with over 700,000 specimens. It specialises in indigenous and exotic plants of the New Zealand and Pacific regions. The first continuous numbering of specimens started in 1928 with *Veronica serpyllifolia*. It wasn't until 1960 that the herbarium moved into purpose-built buildings on the present site in Lincoln. The herbarium consists of three main rooms with vaults laid out by life form with comprehensive indexes. Cryptogam specimen sheets are stored in envelopes, and some specimens, such as fleshy fruit, are in spirit jars. Type specimens are housed in more secure cabinets. Historically significant items include specimens collected by Banks and Solander on Cook's first voyage (1769-70).

When specimens are received, they are put between absorbent paper, cardboard and corrugated aluminium sheets in a press and put in a drier at about 32°C for up to three weeks, depending on the plant. Volunteers then mount and file the specimens, and details are entered in the index. Ideally, the specimens are supplied with names or IDs or are identified on arrival, if sent by external collectors. Users of the herbarium include amateur and professional botanists, students, ecologists, biosecurity officers and the general public. Desks, microscopes, and photography and scanning equipment are available. Ines emphasised that everyone is welcome to visit and use the facilities.

Herbaria have served a crucial role in botanical documentation and research for five centuries and will continue to do so, even as digital information systems dominate. According to Ines, a virtual herbarium will never replace an actual one. The work is highly specialized and labour-intensive, and with diminishing resources and paid staff, herbaria around the world are relying increasingly on volunteers.

August Field trip to Jeff Lukey's covenanted bush in Sherry Valley

It is excellent to see so much pest control effort, which is contributing to numerous spectacular clumps of *Peraxilla colensoi* on the silver beech. Considered a reasonably cold, frosty site, divaricating shrubs and immature podocarps form a dense understorey. There are *Olearia polita* near the track start. *Melicytus* 'Waipapa' and *Coprosma x cunninghamii* are common in the understorey. Mature

Lophomyrtus obcordata displayed beautifully multi-coloured bark. Finding a handful of feathery *Sceptridium biforme* fronds excited the group. Species added to the previous site list were *Asplenium hookerianum*, *Pteris tremula*, *Chaerophyllum colensoi*, *Pseudowintera axillaris* and *Corybas vitreus* in its favoured beech habitat. Podocarps and beech form a tall canopy particularly on the upper slopes. Mature red beech, silver beech, black beech and hard beech are all present. Overall, it is encouragingly weed-free. *Pteris cretica* and *Dryopteris filix-mas* are present however and a day dedicated to weeding out these species would be beneficial.

Labour Weekend camp at Karamea, 22–24 October 2022

Saturday: Honeycomb Hill, Ōparara Basin. No sooner had we entered the National Park than Cliff showed us *Gleichenia inclusisora*. *G. microphylla* was growing right next to it, so that we could compare the white underside of the fronds in *G. inclusisora* with the green underside in *G. microphylla*. En route to the parking area in the Ōparara Basin, Cliff pointed out an occasional *Lepidothamnus intermedius*. We were privileged in that Cliff had obtained a permit allowing us to visit the Restricted Access Area at Honeycomb Hill. We noted a number of filmy ferns including *Hymenophyllum scabrum*, *H. multifidum*, *H. revolutum*, *H. flabellatum*, *H. dilatatum*, *H. frankliniae*, *H. rarum*, *H. rufescens*, *H. flexuosum* and *H. nephrophyllum*. There were occasional specimens of *Leptolepia novaezealandiae*. Near the mouth of one of the caves, we saw *Asplenium lepidotum* and *A. cimmeriorum*. Other limestone specialities were *Hoheria ovata* and *Pseudopanax macintyreii*. *Neomyrtus pedunculata* was abundant in the understorey. The orchid enthusiasts identified *Corybas hatchii*, *C. acuminatus* and *Pterostylis banksii*.

We made our way to the Ōparara Arch Track on the true right of the Ōparara River. *Hymenophyllum frankliniae*, covered with stellate hairs, was one of the filmy fern highlights of the track, along with *H. flabellatum*, *H. nephrophyllum*, *Trichomanes venosum* and more. *Cranfillia nigra* and *Austroblechnum membranaceum* were other companions of the shady forest banks and seepages. Orchid lovers admired *Corybas hatchii*, *C. sp.* 'whiskers' and numerous and flowering specimens of *C. oblongus*. Arguably the most spectacular flowering shrub of the day was *Alseuosmia macrophylla*, seen trackside. The white and green *Anaphalioides trinervis* flowers were found on the riverbanks and *Metrosideros colensoi* hanging in long swathes curtained the undersides of the limestone cliffs and arches.

Sunday morning: A walk beside the Heaphy River and over the bridge to the Nīkau Walk. Of note was one specimen of *Cyathea cunninghamii*. The trunks of *Rhopalostylis sapida*, tree ferns and rocks were frequently covered in epiphytes, consisting largely of filmy ferns. *Hymenophyllum flexuosum* occurred in shaded places on trunks and rocks. Another distinctive filmy fern was *H. nephrophyllum*. An intriguing filmy fern was *Trichomanes venosum*, which formed dense, bright green carpets on the trunks of tree ferns. On the ground, among a myriad of ferns and mosses were occasional *Corybas oblongus*.

Sunday afternoon: Kohaihai to Scotts Beach. In places there were young northern rātā overhanging the track but some of the banks also had scattered pōhutukawa seedlings from plantings around the carpark. In the mature forest coastal ferns included *Arthropteris tenella* and *Asplenium obtusatum*. The track was lined with *Libertia ixioides* in full flower and a small patch of *Pterostylis irsoniana*. As we headed up the hill, the forest turned to hard beech with northern rātā, kamahi and quintinia, with māhoe, hutu and mamaku prominent in the gullies. The track banks provided a rich haul of ferns, including *Lindsaea trichomanoides*, *Loxogramme dictyopteris*, *C. fluviatile* and *Austroblechnum lanceolatum*.

At the summit, we viewed *Drymoanthus flavus* in late bud. A smaller group heading down the Fisherman's Track to the beach. Here new species included *Olearia avicenniifolia*, kidney fern, *Lastreopsis hispida* and *Parapolystichum glabellum*, with karaka seedlings from mature trees at the former Māori occupation sites near the shore. Near the track exit there was a population of the coastal scurvy grass. The beach had scattered marram, with *Carex pumila* on the upper shore and odd patches of *Leptinella dioica*. In rocky places *Samolus repens*, *Senecio lautus*, *Dichondra repens*, *Lobelia anceps* and *Plantago raoulii* prevailed. The forest fringes had abundant *Fuchsia procumbens*. Highlights here included *Geniostoma ligustrifolium* at its southern limit on the West Coast.

Monday morning: Lake Hanlon. The Lake Hanlon track runs upwards gradually for the first 300 m, through dense low-canopy forest. Tree ferns are prominent along this track and their trunks host diverse communities of epiphytes and climbing plants such as: *Asplenium flaccidum*, *Hymenophyllum dilatatum*, *H. frankliniae*, *H. scabrum*, *Phlegmariurus varius*, *Metrosideros diffusa*, *Earina autumnalis*, *Freycinetia banksii* and healthy colonies of *Trichomanes venosum*. Trees observed along this section

of track were: *Coprosma autumnalis*, *Fuchsia excorticata*, *Hedycarya arborea*, *Schefflera digitata* and *Carpodetus serratus*. At ground-level, *Asplenium bulbiferum*, *Lomaria discolor*, *Austroblechnum lanceolatum*, *Parablechnum novae-zelandiae* and *Pakau pennigera* were all common. Other ferns seen in lower numbers were *Adiantum cunninghamii*, *Parablechnum procerum*, *Parapolystichum glabellum*, *Leptopteris hymenophylloides*, *Notogrammitis billardiarei* and *N. pseudociliata*. A damp, shaded bluff that runs alongside the track was home to colonies of *Austroblechnum colensoi* and scattered plants of *Lindsaea viridis*. Small herbaceous plants seen along the edge of the track included: *Cardamine forsteri*, *Gunnera monoica*, *Hydrocotyle moschata*, *Nertera depressa*, *Oxalis magellanica*, *Stellaria parviflora* and *Urtica sykesii*. Below the broken canopy there were scattered smaller trees, including: *Coprosma lucida*, *C. foetidissima*, *Coriaria arborea*, *Dracophyllum elegantissimum*, *Leucopogon fascicularis*, *Myrsine australis*, *Myrsine salicina*, *Quintinia serrata*, *Pterophylla racemosa* and young *Dacrydium cupressinum*. Smaller plants in this area were: *Hiya distans*, *Lindsaea trichomanoides*, *Diphasium scariosum*, *Senecio minimus*, *Lobelia angulata* and a very stunted colony of *Corybas oblongus*. The lake is fringed by *Gahnia xanthocarpa* and *Phormium tenax* behind which is a tangled shrubland of *Coprosma tenuicaulis*. From the observation pier we were able to see a range of plants in the shallows: *Myriophyllum robustum*, *Isolepis prolifera*, *Machaerina rubiginosa* and *Potamogeton cheesemanii*.

FUTURE EVENTS

See the website: <https://www.nelsonbotanicalsociety.org/>

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■ **Botanical Society of Otago**

FUTURE EVENTS

8th March, 5:20pm: The coastal sand dunes of Otago. Speaker: Teresa Konlechner.

Sand dunes are an important feature of the Otago coast. However, the sand dunes of Otago have experienced considerable modification over the last 100 years. Human-induced destabilisation followed by stabilisation by exotic and invasive plants have altered geomorphic processes and the indigenous flora of the dunes. This talk provides an overview of past modification to Otago's dunes. It outlines the state of knowledge regarding the indigenous flora of Otago sand dune habitats and identifies priorities for conservation and restoration of these now uncommon sand dune species.

25th March, 8:00am: All day field trip to Rock and Pillar Range.

We will travel to just north of Middlemarch to a carpark at the foot of the Rock and Pillar Range. From here the poled route of the Glencreag track is followed first through regenerating shrubland, then tall tussockland, and finally alpine cushionfield and rockland. Big Hut (1320 m above sea level) will provide a base for further exploration of the local botanical treasures. The return will be back the same way. This is a steep and arduous trip of c. 1000 m height gain. Participants need to have good fitness and be capable of walking for 3 hrs or more uphill and equivalent downhill. Be prepared for all weather conditions in an exposed alpine environment. The vehicle round trip is approximately 170 km. Depart Botany Department carpark at 8 am. Expected return approx. 6 pm. For more details contact the leader John Barkla mjbarkla@xtra.co.nz. This date differs from that previously advertised.

12th April, 5:20pm: Members night.

Members are invited to bring items of botanical interest to the monthly meeting and talk about them. Items may be short slide shows, books, photographs, plants or any plant related object that has a story attached. You are invited to get in touch with Angela Brandt (brandta@landcareresearch.co.nz) or Stella Fish (sls.fish@outlook.com), who are organising the meeting, to chat about what you're thinking of bringing or to let them know you want to present a slide show.

15th April, 9:00am: Burns Reserve – one of Dunedin's hidden gems!

The 87 hectares of coastal podocarp forest which makes up this reserve, lies on the flanks of Signal Hill high above Ravensbourne, Maia, Burkes and St Leonards. Though established in 1907 by residents concerned at the amount of deforestation on the West Harbour Hills, the Reserve had, until recently, been largely forgotten. Its flora includes good specimens of the original podocarp forest and a fabulous swath of Easter Orchid, *Earina autumnalis* and *Earina mucronata*, growing on a prominent rocky

outcrop. The views of Taiaroa Head to Taieri Mouth are spectacular. Meet Botany Department carpark 9am Saturday 15th April 2023. Rain date Sunday 16th April 2023. Ring Robyn 021 235 8997

6th May: Fungal Foray to Waikaia.

Waikaia Forest at Piano Flat is an isolated remnant of the mixed beech forests (red beech - *Fuscospora fusca*, mountain beech - *Fuscospora cliffortioides* and silver beech – *Lophozonia menziesii*) that once covered much of the area. The area supports a unique invertebrate fauna with several rare species being found there. Beech trees are dependent on various mycorrhizal fungi for their survival and growth. We plan to look at the fungal diversity of this forest in conjunction with Prof. David Orlovich of the Otago University Botany Department as part of his ongoing research. The trip is dependent on a DoC permit, so will be confirmed closer to the date. For further details and to arrange carpooling contact David Orlovich (david.orlovich@otago.ac.nz)

10th May, 5:20pm: AGM and Photographic Competition.

The photographic competition is a popular and eagerly anticipated event for anyone interested in botanical photography. Enter your best photos and learn what makes a good photograph and how to improve your photographic skills from our panel of expert judges. Your photographs may be chosen for the BSO Calendar so this is your opportunity to have one month of fame. Start organising your entries now and don't wait until the last minute.

14th June, 5:20pm: Takahē, scouts for fungal diversity. Speaker: Josie McGovern.

The study of dung has long been a revelatory science. Analysing the dung of certain organisms is a great way to gain insight into local fungal diversity. Takahē are a unique flightless bird, endemic to New Zealand. They exhibit a heavy grazing behaviour that encourages interaction with fungi and fungal spores. DNA metabarcoding of takahē dung collected from Orokonui ecosanctuary can teach us many interesting things about dispersal and fungal species important to our forests.

17th June, 9am: Ferntree Reserve, Dunedin.

Join us on an easy morning's walk through Ferntree Reserve and adjoining streets. The small reserve, nestled between Taieri Road and Ferntree Drive, has an interesting array of naturally-occurring natives as well as planted natives and exotics. On its western boundary the reserve adjoins Dunedin's oldest house, Ferntree Lodge. The walk should take no more than a couple of hours and is graded easy. Meet and park at the southwestern extension of Helensburgh Road near the entrance to Leslie Groves Hospital at 9 am. Leaders John Barkla (027 326 7917) and Sharon Jones.

12th July, 5:20pm: Naturally uncommon ecosystems in Otago. Speaker: Scott Jarvie.

Naturally uncommon ecosystems are defined as having a total extent of less than 0.5% (i.e., <134 000 ha) of Aotearoa New Zealand's land area. These ecosystems are rich in threatened species, but many are poorly understood and nearly two thirds are classified as threatened, primarily from human associated threats, with a large proportion of these ecosystems being found on private land in lowland and coastal regions. This talk provides an overview of naturally uncommon ecosystems in the Otago region and discusses recent work to establish programmes to monitor extent and condition, focussing on inland saline (salt pans) and coastal turfs. In addition to the overview on naturally uncommon ecosystems, I will briefly touch upon work for a regional threat classification for indigenous vascular plants in Otago.

22nd July, 9:00am: Taieri River Track.

We'll follow the track from Taieri Mouth to the John Bull Gully picnic area for lunch (4 km), and then return. The track passes through several vegetation types, including estuarine salt marsh, carr (wooded fen), podocarp forest, and open shrubland. A highlight will be stands of regenerating kahikatea, as well as Hall's totara, tree ferns, and miro. The track is in good condition but is undulating, and cuts downhill to the picnic area alongside the river. Bring good walking shoes, water and lunch, and clothing for the weather. Meet at Botany car park at 9:00 a.m.; expected return by 3:30 p.m. 37km drive each way. If the weather is very poor on the Saturday, we'll switch the trip to Sunday. Contact Angela Brandt (brandta@landcareresearch.co.nz) 021 121 5657

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Whanganui Museum Botanical Group

Our meetings are held every two months on the second Tuesday, alternating with 'Nature Talks' (where the Whanganui Botanical Group has merged with Birding Whanganui and the Whanganui branch of Forest and Bird), which are held on the third Tuesday in even-numbered months. It is intended to continue with monthly botanical field trips to which members of the other two groups are invited.

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NOTES AND REPORTS

■ A balanced sex ratio among flowering *Aciphylla squarrosa* near Wellington

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Introduction

During November and December 2022, we visited *Aciphylla* populations around the South Island, collecting samples for genetic analyses of various taxonomic problems. We were intrigued to observe a strong sex bias towards males among the flowering individuals in some populations, seemingly in the order of even 90%. This was especially evident in some of the bigger species, particularly *Aciphylla aurea*. But it was also found in at least some populations of *A. dobsonii*, *A. simplex*, and *A. trifoliolata*.

All 40 or so species of *Aciphylla* are considered dioecious: individuals are either female or male (Figure 1), although a small amount of inconstancy occurs (David Glenny pers. com. in Young 2006, p.12), where an inflorescence can include a few flowers of the alternate gender (also see www.inaturalist.nz/observations/145641961).



Figure 1. Left: male flowers of *Aciphylla squarrosa*. Some have opened to reveal their central, brown stylopodium, which is more-or-less flat. Right: female flowers of *Aciphylla squarrosa*, each with a prominent ovary as well as paired styles. Their small petals have fallen, but some have vestigial stamens. Scale-bars = 1 mm. Both from plants cultivated in Karori, Wellington, 27 & 29 Oct. 2015. Photos by Phil Garnock-Jones CC BY-NC-ND.

Webb & Lloyd (1980) reported statistically significant higher percentages of males in populations of *A. monroi* (75%), *A. scott-thomsonii* (62%), and *A. aurea* (59%), but also sex ratios statistically indistinguishable from parity for *A. hectorii* (55%), *A. aurea* (52%, near the other investigated population of this species) and *A. pinnatifida* (49%). Similarly, Young (2006) reported statistically significant higher percentages of males among flowering individuals in (different populations of) *A. scott-thomsonii* (68%) and *A. aurea* (57%), along with non-significant percentages for *A. aurea* (55%) and *A. colensoi* (53%, as “*A. ‘lewis’*”). Hunt (1996) reported no statistically significant sex biases among flowering individuals of studied populations of *A. aurea*, *A. glaucescens*, and *A. squarrosa*. Statistically significant male biases among flowering individuals have also been reported for the two Australian species of *Aciphylla*, with 60% for *A. glacialis* (Pickering 2000) and 63% for *A. simplicifolia* (Pickering & Hill 2002). Interestingly, the latter study found the bias to increase from the montane to alpine zones. Contrastingly, Brookes & Jesson (2007) reported a higher percentage of females for *A. squarrosa* (69%), which is statistically significant (see Methods) based on their sample size.

Webb & Lloyd (1980) suggested that male biased sex ratios may reflect a higher energy cost for females; in addition to producing flowers, females also have to mature fruit. They suggested that the growth or survival of males may be higher. It is also possible that males flower more regularly than females (Pickering 2000), which is notable in that at least some *Aciphylla* species are masting (Mark 1970; Campbell 1981), with seasons of heavy flowering interspersed with seasons of limited flowering.

Our observations during our 2022 fieldwork were merely casual impressions, made while we sought both female and male material for herbarium specimens; female samples were regularly more difficult to obtain. We thought it would be interesting to study *Aciphylla* flowering in more detail, both with quantitative measurements of sex ratios and by tracking the flowering of individuals through time. For instance, populations exhibiting a strong male bias in flowering individuals may still have an underlying sex ratio of 1:1 across all (flowering and non-flowering) individuals. A study across multiple seasons would identify more females, even if they flower less often.

The only species close to our Wellington home is *Aciphylla squarrosa*. Near Wellington, *A. squarrosa* occurs patchily around the coast as well as on coastally-exposed hillsides and ridges up to elevations of about 500 m. It, as var. *squarrosa*, has a regional conservation status of Regionally Vulnerable (Crisp et al. 2020), in large part because of pigs uprooting plants through the wilds west of Wellington.

Methods

We surveyed two areas near Wellington for *Aciphylla squarrosa*: Te Kopahou on 2 January 2023, and Mākara Peak on 4 January 2023. Neither survey was exhaustive; at Te Kopahou we surveyed along a circuit, and at Mākara Peak only a section of track south-west of the peak was surveyed. These sites are the same as or neighbouring those investigated by Hunt (1996) and Brookes & Jesson (2007).

All individuals with a rosette dimension of about 40 cm or more were counted and photographed. That size is about the smallest that we saw *Aciphylla squarrosa* flowering. Georeferenced photos were uploaded to www.iNaturalist.nz. Some photos included multiple individuals.

At this time, the male inflorescences were largely spent, with stamens and petals lost and stalks failing (Figure 2). They were nevertheless obvious (i.e., unlikely to be overlooked) and were readily distinguishable from the female inflorescences that were in fruit (Figure 2).

For each of the two populations, a chi-square test was performed using www.graphpad.com to determine if the sex ratio statistically differed from 1:1.

Results

On the circuit of Te Kopahou, 201 individuals were recorded across 151 iNaturalist observations; 43 (21%) had inflorescences, with 23 being female and 20 male. On the stretch of track at Mākara Peak, 70 individuals were recorded across 44 iNaturalist observations; 18 (26%) had inflorescences, with 8 being female and 10 male. The chi-square test result for both populations was not significant.

The iNaturalist observations for Te Kopahou and Mākara Peak are available at www.inaturalist.nz/observations?on=2023-01-02&&taxon_id=399355&user_id=leonperrie and www.inaturalist.nz/observations?on=2023-01-04&taxon_id=399355&user_id=leonperrie, respectively. They are mapped in Figure 3.



Figure 2. Left: male individual with spent inflorescence; Mākara Peak, 4 Jan. 2023, www.inaturalist.nz/observations/145811260. Right: female individual with fruiting inflorescence; Te Kopahou, 2 Jan. 2023, www.inaturalist.nz/observations/145642012. Photos by Leon Perrie CC BY.

Discussion

A total of 271 individuals of *Aciphylla squarrosa* were recorded. Across the two populations, 61 individuals (23%) had flowered during the 2022/2023 season. This is a similar flowering percentage to the 21% found by Hunt (1996) for a population of *A. squarrosa* in Long Gully, which lies between our two sites. Hunt (1996) also cited flowering percentages from earlier studies of *A. squarrosa* around Wellington of 15%, 9%, and 6%. Brookes & Jesson (2007) reported on a mast season where 62% of *A. squarrosa* flowered during 2003/2004 around Hawkins Hill, which overlaps our Te Kopahou site.

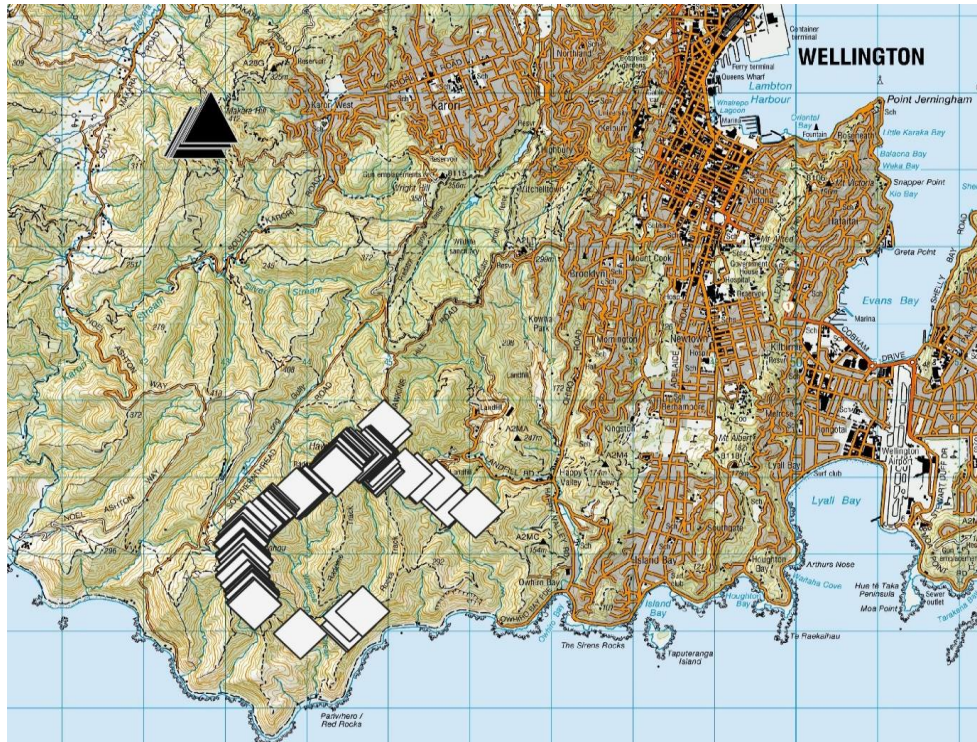


Figure 3. Map of the 201 surveyed plants of *Aciphylla squarrosa* at Te Kopahou (white diamonds) and 70 at Mākara Peak (black triangles) near Wellington. Base Topo50 map from LINZ CC BY.

We found flowering females and males to be in approximately equal proportion, with no indication of any sex bias. This accords with the findings of Hunt (1996), but is very different from the strong female bias reported by Brookes & Jesson (2007); perhaps this relates to their study being during a masting season.

We hope that our recording of georeferenced photographs will allow the individuals within these populations to be tracked across multiple seasons. This might allow some quantification of, firstly, inter-seasonal variation of flowering, including the degree of masting. It is clear that many individuals were of a size where they might have flowered but did not for 2022/2023; this includes some very big plants. How often do flowering percentages get as high as the 62% of Brookes & Jesson (2007), and at what level of flowering do biases in the sex ratio become evident?

A second benefit of tracking individuals through time is that it provides survivorship data for reassessments of the regional conservation status. It is notable that Brookes & Jesson (2007) counted over 1000 individuals at Hawkins Hill. Given we counted 201, we suspect this indicates that the area's population has declined, but this cannot be proven as we do not know exactly where they surveyed. Hunt (1996) reported earlier declines in Wellington populations of *A. squarrosa*.

The timing of surveys of flowering is important. We happened to be a few weeks or so after the finish of flowering, which may be in the latter part of the optimal window. Surveying too late risks missing the shorter-lived male inflorescences, especially in environments where they degrade quickly. This was thought by Webb & Lloyd (1980) to be the cause of the female-biased sex ratios reported in the early literature (but is presumably not an issue for the female bias reported by Brookes & Jesson as their work was carried out November-January). Alternatively, surveys conducted too early in the season will miss late-flowering individuals; their results will be biased if one sex flowers later than the other. This might have affected the ratios we casually observed in some of the South Island populations we visited, particularly those made during November when some individuals were still in bud and others had perhaps not even started.

Those with other amenable populations of *Aciphylla* might like to undertake and report similar studies. The extent to which populations of New Zealand *Aciphylla* exhibit a sex bias with flowering remains an

open question. Comparing masting with non-masting seasons across environmental gradients may be particularly interesting.

Acknowledgements

Thanks to: the landowners of Isolation Station and Puhi Peaks for access to their populations of *Aciphylla* (?*ferox*), where our interest in *Aciphylla* sex ratios was initially piqued; Phil Garnock-Jones for commenting on a draft of this article and for the photos of flowers of *Aciphylla squarrosa*; David Glenney for collaborating with the taxonomic investigations; David Lyttle and Rowan Hindmarsh-Walls for sharing their knowledge of *Aciphylla* identification, both in the field and via iNaturalist; and all those adding observations to iNaturalist of *Aciphylla*, thereby helping document its diversity.

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BIOGRAPHY / BIBLIOGRAPHY

■ Biographical Sketch – Friedrich Wilhelm Sturm (1811-1896).

Val Smith, valdsmit@xtra.co.nz

Descended from a line of aristocratic scholars, Friedrich Sturm was born in 1811 in Anhalt, Germany, the son of Christopher Sturm, an army officer, and Elizabeth Ernestine Sturm (née Kuhne). He became a skilled linguist and gardener at the Imperial Palace in Vienna, and led a small expedition to the Balkans to search for a rare orchid and other plants. Rewarded with a place on the HMS *Beagle* survey expedition, which left Plymouth, England, in December 1831, he was one of eight self-funded supernumeraries; another was the young naturalist Charles Darwin. In 1838, on completion of the survey at Swan River in Western Australia, Sturm, his future uncertain in Germany, left the *Beagle* and returned to Sydney, where he met entrepreneur William Barnard Rhodes. On 8 March 1839 he left on the schooner *Harlequin* with a 17-man whaling gang and seven other passengers, two cases of muskets and 19 barrels of powder, and arrived at Ahuriri (Napier), New Zealand, on 2 August 1839.

From there he explored further north on foot and by trading boat to Nukutaurua on Mahia peninsula, where he made contact with Māori leaders and sought their protection. He is thought to have observed kiore (Pacific rat) and he later studied tuatara on Portland Island. Both were tapu, hence his Māori name Kohingarara (collector of lizards and creeping things) and concern for his safety.

At the end of 1839 he began the first of several journeys on foot to Wellington to get his mail, and was back in Nukutaurua in May 1840 when the Treaty of Waitangi arrived for signing. His relationship with the rangatira's daughter Ani Hinetai may have saved him from death for his cultural blunders, but she died on 10 June 1842 giving birth to their daughter Elizabeth (who traditionally would be raised by her grandparents). After the child's baptism by the Reverend Dudley, Sturm made another Wellington journey via a different, mainly inland route. He then worked briefly as a clerk, superintendent and accountant at a Hicks Bay whaling station, and for about six months in 1845 at the mission station at Rangitukia, near Ruatoria, he tutored the young James West Stack (1835-1919).



Cordyline australis

Back at Nukutaurua Sturm formed a relationship with Hinerakau (Henriette) Pakapuku Tiarere. He leased land at Nuhaka and imported five cows and a bull from New South Wales to start farming, introduced and began growing fruit trees, vines and vegetables on the Wai Station river flats where they lived, and by 1851 was also engaged as an interpreter in the Native Land Court at Napier. By then he had four sons and a daughter, but after the loss within three years (1858–1860) of his wife and two sons due to illnesses, he moved to Napier where he established the area's first nursery and orchard (now a bush reserve named Sturm's Gully). A stint of gold prospecting in the 1860s was unprofitable, but with the help of his youngest son James, the nursery thrived and from 1870 was re-located at Mangateretere, near Clive. (Meanwhile, his eldest son Rudolph enlisted with the Hawke's Bay Militia and in 1871 was awarded the New Zealand War Medal.) Despite extensive flood damage in 1877, a fire that destroyed his home, artefacts, letters and papers in 1884, and a few months later the death of his first grandchild, Sturm was soon selling plants again. But it was not economically viable; he mortgaged the property, walked away and spent his remaining years at West Clive, where he died on 23 May 1896.

Well-educated, an astute businessman and a fluent linguist, Frederick Sturm was considered one of the landed gentry and became a member of the Hawke's Bay Hunt Club. He was also a founding member of the Hawke's Bay Philosophical Institute for 16 years and contributed to the *Transactions and Proceedings of the New Zealand Institute*. In 1882 his friend and fellow member William Colenso named after him *Cordyline sturmii*, a species of cabbage tree Sturm had grown from seed brought back from Waikaremoana, and from the Kaweka Range a shade-loving herb, *Calceolaria sturmii*. Both names are now treated as synonyms.

Cordyline australis

Cordyline australis (Gk *kordyle* 'club'; *australis* 'southern'), tī kōuka or cabbage tree, is an icon of the New Zealand landscape, favouring lowland to lower mountain areas in and near swamps, lake edges and hill seepages. Up to 15–20 m tall, with a stout trunk and thick, corky, fissured bark, the crowns are unbranched when young, many-branched when old, with sword-like leaves, and abundant inflorescences from late spring to early summer. Flowers small but massed, are white and sweetly perfumed.

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■ Tribute to Audrey Eagle

John Barkla

Audrey Eagle died at Birchleigh Rest Home, Mosgiel, on 27 November 2022, aged 97. Much has been written of Audrey's life and extraordinary achievements but to the Botanical Society of Otago (BSO), she was a long-time friend, supporter, and for 14 years, our Patron.

Audrey was born in Timaru in 1925. She was raised and educated in England where she trained as an engineering draughtswoman, a training that influenced her later botanical drawings which are notable for their detail and accuracy. She married Harold Eagle in 1949 and the couple opted to move back to New Zealand. Audrey was one of the founding members of the Waikato Branch of the Royal Forest and Bird Protection Society.

During this time, she participated in various field trips and excursions developing a passion for the New Zealand flora. She once remarked that she thought the best way to learn about the plants was to draw them. This idea was perhaps the genesis of her remarkable career as a botanical illustrator which ultimately culminated in 'Eagle's Complete Trees and Shrubs of New Zealand' which incorporated and extended the material from her two previous books. In scope, it is more comprehensive than any work of botanical illustration covering New Zealand's tree and shrubs that had been produced hitherto and it is unlikely that a project of this magnitude will ever be completed again by one artist.

I first met Audrey in May 1991 when she assisted on a DOC trip with John Heaphy, Wayne Hutchinson, Colin Ogle, Robyn Ogle, and myself, in a survey for *Veronica speciosa* along the coastal cliffs of north Taranaki. Over two days we searched the coast between the clifftops at Mokau south to Pukearuhe. At that time Audrey lived in New Plymouth, following the death of her husband Harold in 1988.

I knew a little of Audrey's background before ever meeting her though. Rather famously, she was the last person to collect a specimen of the now extinct mistletoe *Trilepidea adamsii*, on the first Waikato Branch Forest and Bird Society field trip in 1954. The only known illustrations of it are hers and 19th - early 20th century botanical artist Fanny Osborne. This mistletoe gives its name to the newsletter of the New Zealand Plant Conservation Network and the Network's logo utilises the Franny Osborne illustration.

I rekindled my friendship with Audrey again in Dunedin when I moved there in 1997. She had moved a year earlier to be closer to her daughter Alison. Audrey lived out at Macandrew Bay on the Otago Peninsula, and soon developed a garden containing many of the special plants she had come to know and appreciate.

Audrey became a keen supporter of the BSO, which was re-invigorated in 1999 under the stewardship of Dr. J. Bastow Wilson and Barbara Anderson. Newsletter No. 15 of that year includes her request for specimens of nine taxa from the Canterbury/Otago region for what she was then calling Volume 3 of 'Eagle's Trees and Shrubs of New Zealand'.

David Lyttle, stalwart of the BSO, recalls first getting to know Audrey in 2002 when he joined the BSO, at which time she was a regular attendee at meetings and participant in field trips. "*Through a shared interest in growing native plants, I ended up visiting Audrey's home in Macandrew Bay in December 2004 to help her divide her Poor Knights Lily plants (Xeronema callistemon) (Fig. 1). She had three pots lined up on her deck each containing a vigorous plant in full bloom. We successfully divided and re-potted the crop and I was rewarded with three plants that I still have though my plants have never matched Audrey's originals. Audrey's garden was a treasure trove of rare and unusual native plants which she had propagated so she could get material in flower or in fruit for her work. There was a fine specimen of Pittosporum obcordatum growing next to her letter box so you did not need to remember the street number to know you were at the right address. Her gardening interests were not confined to native plants. She grew a selection of ornamentals and was an accomplished vegetable grower. She had her own strain of runner beans that she considered far superior to anything that came from a garden shop and was happy to bring the seed along to BSO meetings and share it with other members. At this stage she was still in the process of completing the illustrations for 'The Complete Trees and Shrubs'.*

Her work area was meticulously tidy and the visitor could see the great care and patience that went into producing a finished watercolour painting."

Many botanists, both local and much further afield supported Audrey in the lead up to the publication of her life's work by gathering specimens, and providing notes and taxonomic advice. In particular she spoke highly of Tony Druce, Colin Ogle, Peter de Lange, Shannel Courtney and locally, Professor Alan Mark. One sought-after shrub was what we knew by the tag name of *Pimelea* "Turakina" (now *Pimelea actea*). I remember collecting and sending Audrey a fruiting specimen, and much later she wrote a thank you note to which were attached the seeds of this threatened plant, such was her concern for the welfare of the species.



Fig. 1. Audrey's *Xeronema callistemon* on her deck at Macandrew Bay, Dunedin. Photo David Lyttle.

'Eagle's Complete Trees and Shrubs of New Zealand' was published by Te Papa Press in 2006 and the two-volume set brought together Audrey's botanical artworks from her best-selling 1975 and 1983 publications. This was followed by a 6-month long exhibition of her botanical paintings at the Otago Museum.

In the lead up to this magnum opus it became apparent that there was insufficient space in the books for all the wealth of comments and observations that Audrey had amassed since she started gathering such information in 1967. The BSO wanted to ensure this valuable information was made accessible to the

wider botanical community and worked with Audrey to publish a Supplement to coincide with the publication of her artistic volumes. Funds for this project were generously provided by the Wellington and Nelson Botanical Societies and the Waikato and Dunedin Branches of the Royal Forest and Bird Protection Society, all organisations that Audrey had a long association with.

Profits from this venture, donated by Audrey, were the basis of a self-perpetuating fund established by the BSO as the 'Audrey Eagle Publishing Fund'. The aim of the Fund is to promote the dissemination of New Zealand botanical literature by contributing to publication costs.

Audrey published a second supplement in 2014, (digital only) that contains the specific locality of where, by whom and when, the specimens illustrated in 'Eagle's Complete Trees and Shrubs of New Zealand', were collected.

Audrey participated in a trip to the Chatham Islands in 2007, led by Peter Johnson (Fig. 2). This trip was notable for the number of BSO members on it and another prominent New Zealand botanical artist, J. Bruce Irwin. Audrey enjoyed herself immensely in the company of fellow botanists and was often seen comparing notes with Bruce.

In 2004 the BSO held the first Audrey Eagle Botanical Drawing Competition. Audrey, along with Allison Knight, judged the competition and Audrey awarded prizes during the AGM that year. The competition bearing her name continues to be a regular and popular BSO fixture to this day.

In 2008 Audrey became the Patron of the BSO. She continued to attend Society meetings, the occasional field trip, wrote articles for the newsletter, promoted the drawing competition and provided sketches that graced the cover of our newsletter.



Fig. 2. – Audrey on the Chatham Islands in 2007. Photo David Lyttle.

Over the years Audrey received numerous honours and awards for her work. The BSO nominated Audrey for the 2009 Allan Mere Award. This was a very popular nomination supported by several Botanical Societies and other botanical colleagues. We had the great pleasure of seeing the Allan Mere presented to Audrey at the monthly Botanical Society of Otago meeting on 14th October 2009. Perhaps the most fitting award recognising her contribution to New Zealand botanical science was the honorary doctor of science degree awarded to her by the University of Otago on the 4th May 2013 (Fig. 3).

With advancing years, we saw less and less of Audrey but some members, especially Allison Knight, kept in contact and updated her on Botanical Society matters. Audrey Eagle contributed so much to the BSO and we always felt honoured to have someone of such botanical standing in our midst. Her presence, kindness, and huge generosity are greatly missed but her name and memory live on in so many of our Society's activities.



Fig. 3. – Audrey with Alan Mark and Kath Dickinson prior to her DSc graduation

Honours and Awards

In 1976 Audrey received a **Nature Conservation Council citation**.

She was winner of two **Watties Book of the Year Awards** (now known as the Ockham New Zealand Book Awards); third prize in 1976 for 'Trees and Shrubs of New Zealand' and second prize in 1983 for 'Trees and Shrubs of New Zealand second series'.

In 1985 Audrey won the **Loder Cup** and in the same year became a **Distinguished Life Member of the Royal Forest and Bird Protection Society**.

Audrey was appointed a **Companion of the New Zealand Order of Merit** in the 2001 Queen's Birthday Honours, for services to botanical art.

In 2007, the two-volume edition of *Eagles Complete Trees and Shrubs of New Zealand* earned her the **Montana Medal for Non-Fiction** and the **Booksellers Choice Award**. Audrey was a recipient of the **Allan Mere Award** by the New Zealand Botanical Society, in 2009. The University of Otago conferred an **honorary doctor of science degree** on her in 2013.

In 2017 Audrey was selected as one of the **Royal Society Te Aparangi's "150 women in 150 words"** celebrating the contributions of women to knowledge in New Zealand.

Acknowledgement

Many thanks to David Lyttle for sharing his memories of Audrey and for helpful suggestions and comments on this Tribute.

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■ **Varner James Cook (1901–69), cyperologist of New Zealand**

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Introduction

Readers of the second volume of *Flora of New Zealand* (Moore & Edgar 1970) may have wondered about the unfamiliar authority “V.J. Cook” in the names of several of our Cyperaceae. They are right to do so: after publishing twice on these plants Varner Cook disappeared from the taxonomic literature and, except for three very brief mentions (Eagle 1990; Godley 2000; Wilcox & Singers 2018: 17), is absent from our botanical-biographical literature too.

In this article Cook’s life and career in school teaching, and his two botanical publications, are discussed. A brief family history is given in Appendix 1. What I have learnt about Cook’s life is to a fair degree based on occurrences of his name in school jubilee booklets and newspapers (these references have mostly been omitted in what follows). His distinctive personal name has been a help here, but it should be noted that he used his father’s “Cooke” spelling of his surname for the first thirty-five or so years of his life. The reason for the change is unknown.

Cook’s collections, in the Cheeseman Herbarium (AK) of the Auckland War Memorial Museum, are examined in Appendix 2. Most were incorporated into AK in 1959. No collecting books or personal letters came with them, and we can only speculate as to what led this arts-graduate (languages, education) to take up in mid-life the study of these difficult and not conventionally attractive plants, write two well-constructed articles, and then, apparently, lose interest in them.

Life and career

Varner James Cook was born in Stratford near New Plymouth but grew up mainly in Auckland, where his father R. V. Cooke had risen from blacksmithing in Ponsonby to manufacturing springs and industrial knives in his own factory in the city. He was a very good student, as shown by his getting in November 1917 a Senior Free Place in the national scholarship exams, where he was placed high on the success list (110th out of several thousand).

He attended Auckland University College, first studying Law and part-qualifying for this in April ’23. The next time we sight him, late in 1924, he had attended Training College and had become a certificated teacher. He appears in the 1925 Electoral Roll as a teacher living at 83 St Andrews Rd, Epsom (his parents’ home). He then seems to have returned to study at AUC, where he majored in French and education and graduated a B.A. in these subjects in 1926.

Some years later Cook moved out of Auckland to begin what would be a succession of rural and small-town teaching posts: Opotiki District High School (c. Dec ’31 to ’35); Waikokowai School west of Huntly (Aug ’35 to May ’44); Te Kuiti District High School (May ’44 to ?); Ohakune District School (senior secondary school assistant master, perhaps from c. Aug ’47 to the end of ’49); Drury School (start of ’49 to ’54); Hukerunui School near Whangarei (’54 to c. ’56); Hamilton (’56 to ’60?, school unknown); Whenuapai near Auckland (from c. 1960 to his compulsory retirement at age 65?, school unknown). At Opotiki Cook furthered his interests in language and education and in 1932–3 passed the Auckland University College M.A. Dip.Ed. degree with papers in three subjects and a thesis titled “A comparative study of the attainments of Maori and European children in some aspects of English ability”.

His nine years as Headmaster at Waikokowai in the coal mining country west of Huntly seem to have been fondly remembered, a jubilee booklet (Donaldson 1985) saying that “We had teachers Mr Cook and Miss Adams who were very dedicated to the school and district and whose hearts were very much in the right place”. A reference more purely botanical comes in the section of this booklet “A history of the district”, which says [p. 4] that “The major feature of the Waikokowai school environment is the native trees planted in the ’30s by the then headmaster Mr B. Cook [*sic*] and pupils”. This grove of trees is still flourishing (M. Smale pers. comm. Dec ’22). It is likely to have been done under the influence of Leonard Cockayne’s urging that native trees be planted at schools as a vital educational activity (Cockayne 1923).

During his time at Waikokowai Cook married. Their only child, Joseph Varner Cook, was born in 1936–7. Cook's Waikokowai tree-planting provides the only photograph I have found of him (Fig. 1). Cook had joined the NZ Army's Territorial Force during his time as a student in Auckland and was commissioned a Second Lieutenant of the First Battalion of The Auckland Regiment in Aug '23. During WW II he served as a Lieutenant in The Huntly Battalion of the Home Guard.

In Ohakune, Cook was a contributor of musical items to local gatherings (he had a good baritone voice) and at one time was president of the Ohakune Community Arts Society. Like his father, he was a keen bowler, and he bowled at Ohakune as he had done at Opotiki and Waikokowai.

Material relevant to his subsequent teaching posts (noted above) provides nothing about his botanizing or other activities. Tragedy came in November 1955 when his wife Edris died in a car crash near Whangarei, and more sadness followed not long before his death, when his son, a law clerk in Hamilton,

committed fraud and in May 1966 was given a four-year gaol sentence.



Mr V. Cook and pupils planting native bush

Fig. 1. "Mr V. Cook and pupils planting native bush. 1938." From Donaldson (1985 [p. 10]).

are accepted by Moore & Edgar (1970) while the third, *B. perviridis*, is placed by these authors in the synonymy of *B. fluviatilis* (found in Australasia and North America). Cook distinguishes the three species from one another and gives them long Latin descriptions.

A plate of line-drawings compares the inflorescences and achenes of the relevant taxa. This fine work is acknowledged as that of "R. Tizard". Ron Tizard (1908–2000) was a well-known oils and watercolour artist of the 1930s and '40s but, as far as I can tell, did not make any other scientific illustrations. Hutchins (1997: 73) mentions that Tizard was teaching in the secondary department of Te Kuiti School in 1946 (he designed the school's badges), which would have been where he met fellow-teacher Cook.

The specimens cited by Cook show that he had been collecting the *Bolboschoenus* group since the early 1940s. He examined specimens from AK and the other major New Zealand herbaria. Help from H. H. Allan is acknowledged, as is an exchange of specimens with expert on the group Alan A. Beetle of the University of California. Cook seems not to have wondered whether these plants might also occur in Australia and so missed discovering that all his taxa occur there too.

A few years later he produced another very competent article (Cook 1953), on new or obscure species of *Scirpus* (now all *Isolepis* spp.) and *Carex*. It too was read before the Auckland Institute, on Sept 3 1952. Acknowledgments are made to H. Talbot and other New Zealand botanists, and to three overseas experts, S.T. Blake, M.R. Levyns and E. Nelmes. This clearing of some difficult parts of the family must have been of considerable help to Elizabeth Edgar in her *Flora of New Zealand* treatment.

The publications

Cook joined the Auckland Institute (the local branch of the Royal Society of New Zealand) in 1941–2 and kept his membership until the end of the 1951–2 year. The first of his two publications was read before the Institute in 21 Aug 1946 and appeared in *TRSNZ* the next year (Cook 1947). It describes three new native coastal species in *Scirpus*, these replacing what Cheeseman (1925) had treated as two varieties of the cosmopolitan *S. maritimus* (Note 2). Cook's taxa are now placed in *Bolboschoenus*: *B. caldwellii* and *B. medianus*

The article begins with a Latin description of *Scirpus pottsii*, which Cook apparently first collected from Tokaanu in 1940 (but I have not been able to find the specimen in AK). He states his confidence that suggestions of hybridism here and elsewhere in the group (*Isolepis*) are mistaken. A description follows of *S. caligenis*, a plant shown to him by amateur botanist Harry Talbot (Godley 2000); Cook distinguishes it from *S. basilaris* and *S. aucklandicus*. Then another long Latin description is given of *Scirpus antipodus* (now *Isolepis chlorostachyus*); *S. reticularis* is distinguished from *S. inundatus*; and there are notes for *S. merrillii*, *S. lenticularis*, *S. antarcticus*, *S. setaceus*, *S. aucklandicus*, *S. prolifer*, *S. nodosus*, and *S. basilaris*. The article finishes with a description of *Carex inopinata* (another Talbot discovery) and information on seven other members of the genus, several of them non-native species (with Cook himself making the first collections of *C. pallescens* and *C. scoparia*).

There are two questions whose answers now can only be guessed at. The first is, how did Cook overlook the existence of *Isolepis habrus*, so often found growing alongside *I. pottsii* and *I. subtilissimus* (Cook's *Scirpus merrillii*)? Then, what demon caused the Latin-adept Cook to misspell the epithet of his *Scirpus caligenis*? This adjective is correctly spelt *caliginis*, meaning "obscured, mist-shrouded" (Note 3); it is an apt one for a rare mountain sedge, though as Godley (2001) pointed out, since Cook did not mention a habitat it might just be a joke between him and Talbot about their differences of opinion concerning this plant's variability. Godley noted that the present *caligenis* spelling is an orthographical error, but no correction has appeared on the IPNI website (accessed 18 Jan 2023), nor was any comment made by Muasaya & Simpson (2002).

Cook's herbarium

In the Annual Report 1959–60 of the Auckland Institute & Museum AK's botanist Robert Cooper wrote (p. 20) that "In June 1959 Mr. V. Cook of Hamilton, who has revised some of the native rushes [*sic*] and sedges, presented his large collection, consisting of some 600 folders in 40 boxes". This major contribution had been preceded by two much smaller donations: Cook's *Bolboschoenus* type specimens and some others (*Ann. Rep. Auck. Inst. Mus.* 1946–47, pp. 10, 38); and 35 sheets of herbarium specimens from England (*Ann. Rep. Auck. Inst. Mus.* 1953–54, p. 38).

In AK, according to its Collections database (accessed Nov '22), there are nearly 600 sheets attributed to Cook as collector. Almost all are native members of the Cyperaceae, the exceptions being mainly rushes. One of his earliest-dated collections was made in January 1939 (AK 50363 (*Carex geminata*, Kowhai River, Canterbury), but it lacks a collecting number. After 1950 Cook seems to have collected rather little; his last substantial collecting effort being in January 1965, when he collected sedges and one grass from the South Island.

Some of Cook's collections bear a printed label with his handwriting (see Goulding 1980: 95), while others have only an AK label of the kind standard for the 1960s. I have not been able to determine whether the latter sheets might sometimes be duplicates of the former ones. Some sheets bear collecting numbers. These numbers generally run chronologically, but anomalies are not uncommon; furthermore, they start in the late 200s and reach into the 2000s but with many gaps. A partial answer to these problems might be that Cook discarded most of his (non-cyperaceous?) collections before giving them to AK.

As mentioned above, Goulding (1980) reproduced (in black and white) one of Cook's printed labels. This, as usual, bears his handwriting (which on the actual label is written in blue ink, by fountain pen), but is unusual in not having the "e" struck out in its heading "Herbarium of V.J. Cooke". I suppose there is the possibility that these labels were printed for him in the first half of his life, when he was using the traditional family-name spelling with the "e"; that is, his intention to make a personal herbarium may have begun slightly earlier than the 1939 collection of *Carex geminata* noted above.

Family history

Varner James Anthony Cook(e) was born in Stratford, New Zealand on 20 January 1901. His third personal name is recorded in his NZ Army files, but at that time and in later life he appears just to have signed himself with his first two initials. He died at Greenlane Hospital on 10 June 1969, aged 68. He is buried not in his parents' grave at Hillsborough but at the Mangere Lawn Cemetery; the name of his second wife Ida is also on this headstone.

In 1936 (place unknown) he married Edris Myra Molloy (1899–1955). She is buried at Waikumete Cemetery. He subsequently married Ida Gladys McKay (surname from FamilySearch.org, accessed 21 Jan '23). She died 7 Dec 1991, aged 88, and was cremated at Waikumete.

His father Robert Varner Cooke was born in Londonderry, Ireland in 1875. The birthplace of his mother, Jane Ellen Jackson (1875–1953) is not known. The dates of Cooke's arrival in New Zealand and his marriage are not known.

R. V. Cooke (he maintained this spelling throughout his lifetime) and family moved to Auckland in c. 1905. In the 1920s and '30s their home was at 83 St Andrews Road, Epsom. Cooke died on 20 March 1945, aged 70; the *Auckland Star* death notice on this day gives his home address as 21 View Road, Mt Eden. A brief obituary the next day (*Auckland Star*, 21 March '45 p. 3) noted that R. V. Cooke was a prominent Oddfellow, bandsman and bowler (member of the Mt Eden Bowling Club). He and his wife Jane Ellen are buried in Hillsborough Cemetery. R. V. Cooke's family consisted of five children: Varner, Robert, Esme, Winifred, and Oswald (*Auckland Star* 20 Mar '45 p. 1). Only Winifred's name appears on the headstone at Hillsborough.

Notes

Note 1 As far as an initial impetus to botanize goes, the closest we get to learning of such a thing is in Cook's first article, where he says that amateur Waikato botanist Athol Caldwell (see Eagle 1990) can be credited for having done much "to stimulate the author's interest in New Zealand plants". It seems possible that personal references to Cook might be found among the letters of his botanical associates (Caldwell, Harry Talbot and perhaps Michael Gudex of Hamilton).

Note 2 Cheeseman (1925) had recognized two taxa, *Scirpus maritimus* var. *fluviatilis* and *S. maritimus* var. *macrostachya* [sic]. The latter name is not accounted for by Moore & Edgar (1970) but Cook synonymized it with *Scirpus robustus*, a North American species not found in New Zealand.

Note 3 The epithet *caliginis* (cf. the obsolete English "caliginous") is a little-used one, being found in the names of only two other flowering plants, a *Lysimachia* and the other a *Rhododendron* (IPNI, accessed 19 Jan 2023). Among animals, the best known 'dusky one' would be the widespread earthworm *Aporectodea caliginosa*.

Acknowledgements

Mark Smale provided genealogical information and went the extra mile by locating the Waikokowai School planting. The New Zealand Department of Defence (Mr John Bin, NZDF Personnel Archives & Medals) replied very fully and promptly to a request for information about Cook. Dhahara Ranatunga (AK) consolidated the Cook collection data for me.

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PUBLICATIONS

■ Publications Received

Auckland Botanical Society Newssheet February 2023: Upcoming trips, ABS members honoured, new books, conservation status of Auckland plants, available grants, Norfolk Island pine.

Auckland Botanical Society Journal December 2022: Trip reports for Te Atatu and Waitakere Ranges, biodiversity survey of Waikereru Ecosanctuary, *Veronica cymbalaria*, Boston ivy reacting to climate change?, Ross G. Robbins.

Waikato Botanical Society Newsletter 51 December 2022: Talk summaries for Australian flora, Ecuadorian plants, *Welwitschia mirabilis*, canopy structure measurements, how to grow a forest, coastal erosion, Chedworth Gully project, upcoming talks and trips, endangered garden update, trip reports for Pakoka Scenic Reserve, QE2 bush block, Pukerimu Ecological Area.

Wellington Botanical Society Newsletter December 2022: Upcoming trips and talks, GWRC pest update, Shelagh Leary, updates from QE2 National Trust update, Percy Scenic Reserve and Ōtari-Wilton's Bush Reserve, climbing asparagus, trip reports for Kiripiti Scientific Reserve, Tuapaka covenant, Akatarawa Forest, Te Mārua Bush workbee, Saline wetlands and Lower Hutt rātā.

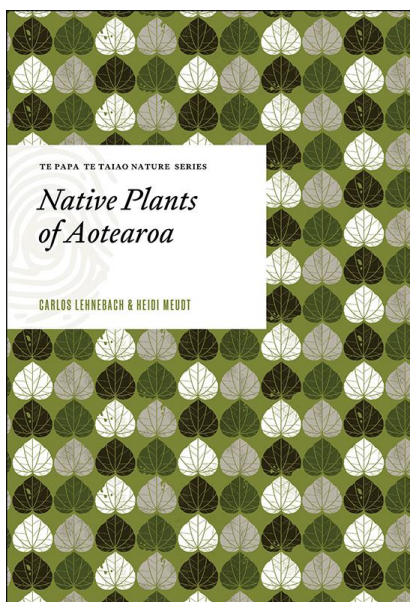
Nelson Botanical Society Newsletter Spring 2022: Talk summaries for plants of Te Taihū o Te Waka a Māui, plants of the Gibson Desert and the Allan Herbarium, trip reports for Maitai caves, Paremata Flats and Bishop Peninsula and Sherry Valley covenant, *Nemesia floribunda*, *Hypericum rubicundulum*, *Celmisia similis*, pollination in seedless plants, taxonomy notes and recently published species.

Nelson Botanical Society Newsletter Summer 2022-23: Trip report for Karamea Labour Weekend camp including Honeycomb Hill, Ōparara Arches, Nikau walk, Kohaihai to Scotts Beach, Lake Hanlon. *Pteris parkeri* – a new record for the South Island?, *Veronica senex*, leaf shape of small-leaved coprosmas, and some big picture news about land plants.

■ Book review – Native Plants of Aotearoa

By Carlos Lehnebach and Heidi Meudt
Published by Te Papa Press, October 2022
Hardback, B&W illustrations, 132 pages, 130 × 190 mm
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\$NZ27.00

Reviewed by Murray Dawson



The authors of this new book, Drs Carlos Lehnebach and Heidi Meudt, are Botany Curators at the Museum of New Zealand Te Papa Tongarewa (Wellington), and their taxonomic expertise is well respected by the botanical community.

It's pleasing to see that their book has a hardback cover, so it should last well. The cover design looks rather old-fashioned in my view, not that there is anything wrong with having a classic design aesthetic. The cover tells us that it is part of a Te Papa Te Taiao Nature Series. Although we are not told within this book what others of this series are, the Te Papa website says that this is a new natural history series with *Native birds of Aotearoa* (Szabo, 2022) being a second title (and sharing the same publication date and retail price).

The introduction of *Native plants of Aotearoa* (pp. 7–11) usefully overviews various features of the New Zealand archipelago and its flora and fauna, then devotes a couple of pages to the botanical collections at Te Papa.

Some of the estimates for the size of the New Zealand flora could have been made clearer. The stated “about 2,900” introduced plant species only counts those that are naturalised – if plants also in cultivation are included, the total number of exotic species is about ten times this figure. Also somewhat unclear, given the title of the book, is stating that the daisy family (Asteraceae/Compositae) comprises almost 600 species for New Zealand, without telling the reader that this counts both indigenous and naturalised species (and again, not including exotic species found only in cultivation).

A set of bullet points in the introduction describes distinguishing features of the native flora with some examples that appear later in the book under the main species profiles. These include alpine plants that have mostly white flowers (e.g., *Celmisia gracilentia*, the mountain daisy), the relatively few deciduous trees (*Fuchsia excorticata*, kōtukutuku or tree fuchsia), dioecious species (six species profiled in the book), juvenile and adult growth forms (*Pterocarpa racemosa*, kāmahi), divarication, and megaherbs of the subantarctic islands – although no examples of divaricate plants or megaherbs are profiled.

The comment that divarication in many of New Zealand's plants is believed to be a defence against browsing by moa tells only half the story; the other credible theory, not mentioned, is that divarication may be an environmental adaptation to dry, windy or frosty climates.

Following the bullet points are a couple of paragraphs on threats facing our native flora, including habitat destruction and browsing. We are told that “almost half of our vascular flora is considered to be of conservation concern” which is an important message to convey.

The section on Te Papa's botanical collections, and the history behind them, was an interesting read. After the introduction, there are a couple of pages describing the book (pp. 12–13). We are told that fifty plant species were chosen by the authors and arranged with ferns first (represented by one species, *Asplenium flabellifolium*), followed by 15 herbaceous species, four vines, and the remaining species are shrubs and trees.

The main section (pp. 15–115) profiles each plant species, devoting the left-hand page to an illustration and the right-hand page to text about that species. This arrangement works well. The botanical illustrations are sourced from historic field sketches of Sydney Parkinson (drawn 1769–1770), completed by five artists following his death from malaria on his return journey to England on the *Endeavour*. These botanical illustrations provide good consistency, considerable historical interest, and is in keeping with the classic design of the book. A few of these illustrations seem to have been cropped to fit within the margins and I suspect their relatively small size of reproduction has made the finely spaced shading lines of the originals blend into one another to give a dark and smudgy appearance to some of the features illustrated (such as leaves). This is not helped by the choice of off-white paper to provide an aged look to the pages.

The text is well-written and recent research has been nicely woven into the stories of some plants. I would have liked to have seen more of these interesting stories about each species, better consistency in explaining how many other species of the genus are present in New Zealand and elsewhere, and less attention devoted to the descriptions, which, despite the authors' efforts, remain in my view too technical for a general readership. Instead of botanical descriptions of each species, notes on recognition would have been less rigid and more useful. Place names throughout are bilingual (Te reo Māori followed by English), which is culturally appropriate (and politically correct nowadays) but verbose. Botanical names are fully up to date including the recent genus level changes for kohekohe to *Didymocheton spectabilis* (was in *Dysoxylum*) and for kāmahi to *Pterophylla racemosa* (was in *Weinmannia*).

Few errors were encountered in this book. However, on p. 21 *Aciphylla squarrosa* (taramea or speargrass) is stated to occur throughout the North and South Islands when in fact it only occurs as far north as Mt Hikurangi and south to the Marlborough Sounds or perhaps the Kaikoura Ranges. Similarly, p. 111 incorrectly states a North and South Island distribution for *Sophora tetraptera* (kōwhai). Following Peter Heenan's taxonomic revision in 2001, *S. tetraptera* was found to naturally occur only in the North Island (eastern North Island, Taupo and Waikato River). The authors could also have pointed out that the *Sophora* seed pods illustrated in the drawing (p. 110) should hang down rather than stick up.

Native plants of Aotearoa concludes with a useful Glossary (pp. 118–121), References (pp. 122–125), Image Credits (p. 126), Acknowledgements (p. 127), Index of Species (pp. 128–130), and About the Authors (p. 131).

So, who is this book for? It is not a field guide (like, for example, John Dawson and Rob Lucas's *Field guide to New Zealand's native trees*, or Alan Mark's *Above the treeline*), as there is no particular regional, ecological, or plant group focus to the fifty species chosen for *Native plants of Aotearoa*. It's also not a book about gardening with native plants (like Fiona Eadie's *100 best native plants for New Zealand gardens*, or Lawrie Metcalf and Roy Edwards' *New Zealand native ground cover plants*).

Paraphrasing the 'About this Book' section, the authors write that their book aims to be a practical guide to plants that can be commonly encountered throughout Aotearoa New Zealand, accompanied by interesting stories about them, and beautiful botanical illustrations. I think that this book largely succeeds in these aims, and also provides a sampler to the diversity of New Zealand's native flora, to encourage those wanting to learn more. I don't think it is intended to be a purely scientific work, although (because of the authors' research backgrounds) a lot of technical language has bled through into this book, which could be off-putting to a non-professional readership.

This review includes informal feedback from several of my botanical colleagues.

References

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■ Book review – Ōtari Two-hundred years of Ōtari-Wiltons Bush.

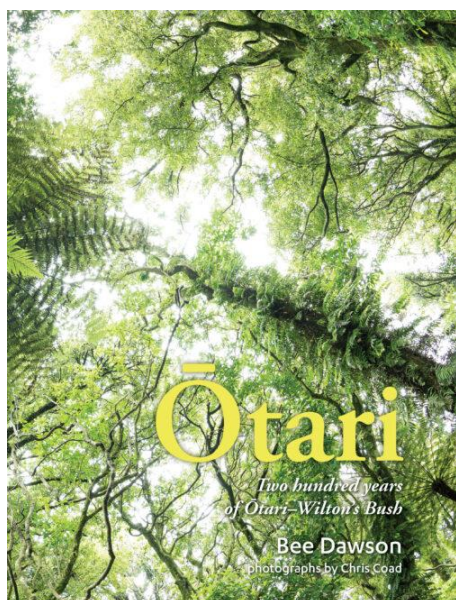
By Bee Dawson.

Published by the Cuba Press, Wellington, 2022.

228pp. NZ price: \$80.00 (free postage for NZ Bot Soc members – email treasurer@owbt.nz to order).

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Reviewed by Bec Stanley.



This is the story of Aotearoa's only botanic garden dedicated solely to native plants, told chronologically starting with Ngati Tama and the first European owners up to the present public facility managed by Wellington City Council as part of the Wellington Gardens network. Dawson is the author of the *History of Gardening in New Zealand* so is an appropriate choice by the Ōtari-Wilton's Bush Trust who commissioned this book.

Each chapter outlines the management and development of Ōtari through layering stories of the history, plants and people in an easy and entertaining read. The book is illustrated throughout by beautiful photos from the present by Chris Coad and embellished by many small Nancy Adams watercolours and historic photos. It's a book you can dip in and out of, with plenty of sidebar vignettes such as biographies and memories as well as additional information such as historic lists, reports and plans. One example is a stocklist from 1948, it is surprisingly familiar and most tools listed will be found today in a public gardens tool-shed. This is a popular history aimed at

a wide audience but will appeal to botanists and plant lovers who will appreciate the separate botanical index of scientific and common names.

The book starts as Wellington city was being developed. I can imagine Ōtari as a sanctuary from muddy streets and poor sewerage systems and many day trips and picnics are illustrated from the early days. I enjoyed the chapter on "the first collections" including a wonderful photo of the handwritten accession book where Andy McKay (the custodian of the reserve at the time) had documented 606 alpine plants acquired for the garden. A garden isn't technically a botanic garden unless it has a documented register of its plants, today in the form of an electronic database. Plant labels are also expected in a botanic garden and I felt a connection back in time to those gardeners, as a former botanic garden curator, to read of visitors stealing and removing plant labels – clearly that is not a new phenomenon!

So, while the book starts out showing the important role Ōtari plays through time starting with picnics and leisure (and this remains a critical role for public gardens and reserves) it was interesting to read the conservation role is not so recent. It was the original mission of John Gretton (JG) MacKenzie and Leonard Cockayne to show the flora "at a glance" in the one place, display plants in their ecological communities, show how native plants could be used in home garden and restore the existing forest. The book details how over the past century this conservation role has burgeoned to volunteer led pest and weed control, collections of threatened plants, to seed banking and propagation research in the relatively new Lion's Plant Conservation lab.

Stories of the present day particularly resonated with me, giving a behind the scenes tour that articulates what modern Botanic Gardens are – centres of conservation excellence – a role often overlooked by scientists and unseen by the general public. I enjoyed reading about the horticulturalists, who usually like to stay 'behind the scenes', profiled and celebrated for their knowledge, skills and contribution to a city's environment. Old Mac was the gardener when the area was private land in the early 1900's, who walked to town using a garden fork as a walking stick, and up to the present gardeners who work at Ōtari today.

The book ends with lively stories of the most recent work at Ōtari, including a chapter on revegetation, highlighting the numerous volunteers integral to the garden and particularly their involvement in pest and weed control. On my last trip to Ōtari, while walking along the treetops walkway, a flock of kereru exploded out from the trees as a karearea flew into their sights. It is a credit to all committed to restoration of Ōtari (and the wider Wellington city) that visitors can experience this. I am sure all the curators and gardeners through time would have been very satisfied with where Ōtari is and where it's going. This book is a credit to the Ōtari-Wilton's Bush Trust ensuring the history of Ōtari is recorded and I hope it inspires other public gardens in New Zealand to share their stories.