



TRILEPIDEA

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Deadline for next issue:
Monday 15 September 2014

SUBMIT AN ARTICLE TO THE NEWSLETTER

Contributions are welcome to the newsletter at any time. The closing date for articles for each issue is approximately the 15th of each month.

Articles may be edited and used in the newsletter and/or on the website news page.

The Network will publish almost any article about plants and plant conservation with a particular focus on the plant life of New Zealand and Oceania.

Please send news items or event information to events@nzpcn.org.nz

Postal address:
P.O. Box 16102,
Wellington 6242,
NEW ZEALAND

Annual General Meeting

The 2014 Annual General Meeting of the New Zealand Plant Conservation Network will be held in Wellington on Tuesday 14 October at the Wellington Botanic Gardens Begonia House (adjacent to the Lady Norwood Rose Garden) commencing at 6.00 p.m. After the AGM and the presentation of the awards, there will be “The Mysterious Secrets of Uncle Bertie’s Botaniarium” followed by drinks and nibbles.

Request for information on plant translocations

I am looking at emergency translocations of threatened plants particularly associated with hydro-electric projects. I would be very interested in information on the following: (1) the number and types of plants rescued; (2) the type of translocation (for instance, were the plants to sites within the historical range or moved to locations outside historical range?); and (3) information on project implementation and post translocation monitoring and population management. Many thanks, Associate Professor Mike Maunder Florida International University (email: mmaunder@fiu.edu).

PLANT OF THE MONTH – *RANUNCULUS ACRAEUS*



Ranunculus acraeus. Photo: John Barkla.

Plant of the Month for August is *Ranunculus acraeus*. This is a beautiful endemic *Ranunculus* found growing only in coarse rock-fields of greywacke and non-foliated schist, high in alpine mountains in North Otago and South West Canterbury. It grows in patches up to 1 m across, with broad grey green reniform (kidney shaped) or orbicular leaves. In summer, striking yellow-green to green flowers appear; approximately 40–50 mm diameter.

Only named in 2006, the information about the status of *R. acraeus* is poor; it has been confused in past literature with other more common species. If you see it—record it. Unfortunately, at all sites plants are at risk from or are browsed by thar and chamois.

You can see the Network fact sheet for *Ranunculus acraeus* at: www.nzpcn.org.nz/flora_details.aspx?ID=2353

Another taxonomic opinion on *Kunzea ericoides* offered

Peter de Lange, Department of Conservation. pdelange@doc.govt.nz

Sometime in the spring of 1827, the French collected from what is now the Astrolabe Roadstead, Abel Tasman National Park, a flowering myrtaceous tree. I cannot say for certain who collected that specimen; it may have been Jules Sébastien César Dumont d'Urville (1790–1842) or it may have been René-Primevère Lesson (1794–1849). Either way the plant specimens from the second voyage of the Astrolabe (1826–1829) made their way to the Natural History Museum of Paris, where they were studied and eventually published on by Achille Richard (1794–1852). Richard was an exceptional botanist whose work, I feel, from a New Zealand perspective (lichens excepted) has largely been ignored. Nevertheless, he, it was, who described in 1832 the myrtaceous tree as *Leptospermum* (*Kunzea*) *ericoides*. Even by today's standards his description is excellent, noting amongst other things the new tree's resemblance to *Erica arborea* (hence the epithet '*ericoides*') and, significantly for my work, the fact that the branchlets are 'glabrous' (i.e., without hairs).



Kunzea ericoides s.s. Photo: Mike Wilcox.

I guess my story really starts—as any good taxonomy should—with the type. So it was that, in July 1999, I found myself walking beside the then Director of the Paris Herbarium Dr Philippe Morat along a gloomy, dusty corridor, carrying—of all things—a torch. At the time, I was back packing around Europe and more through my partner's creole French than mine, I had been granted access to Paris Herbarium. At that time, for various reasons too long and, well, 'French' to explain—the French Government had cut off the power supply to the building, hence the torch, but also the windows needed some serious cleaning, their grime adding much to the Cimmerian gloom into which I was now venturing. Torch in hand, we scaled a giraffe (French term for a ladder on wheels), and high up in a steel cabinet from which I was liberally showered in black dust, came the type suite of *Leptospermum ericoides*. It's hard to describe the feeling one has of seeing first hand a specimen that has been largely ignored by New Zealand people for 167 years. As far as I can tell, the only other New Zealander to have handled these same specimens was Dr Warwick Harris (Harris & Cadic 1998). For me, it was a defining moment. It was then that I realised that Dr Hellmut Toelken (South Australia Herbarium) was correct, the commonest *Kunzea* in New Zealand was not *K. ericoides* at all but an unnamed species. My PhD research had well and truly begun.

To say I was jubilant on my wandering through Paris to my roof top hovel in the Marais was an understatement. So alas was the nicely ironed white shirt my partner had impressed upon me to wear, stressing—accurately—that the French appreciate receiving nicely dressed visitors. My nice white shirt, thanks to dust and grime of the Paris Herbarium was now a very sad shade of grey; I resembled more a chimney sweep than a 'professional up and coming' and the way Parisians side stepped me on the street reinforced that.

Since that day, I have worked as and when my full-time job allowed on revising New Zealand *Kunzea*. Along the way, I have been amazed at how often other New Zealand botanists had almost got to my same point of view, only to be stomped on harshly at times by the likes of Joseph D Hooker (1817–1911) and Thomas Cheeseman (1846–1923). I guess my tale then is a tale of the perennial war between biosystematists that is waging daily via paper throughout the world. By that conflict you are either a 'lumper' or a 'splitter'. Having been firmly abused once in the streets of Wellington as a 'rabid splitter' by, of all people, an expert on New Zealand ducks (not much to split there), I am quite comfortable with the term. Science is about putting it out there anyway and, in taxonomy more than any other science, it's up to the end user to decide.

In the splitter camp for *Kunzea* I now sit with William Colenso (1811–1899), Donald Petrie (1846–1925), Harry Carse (1857–1930), Leonard Cockayne (1855–1934), George Simpson (1880–1952) and most especially Thomas Kirk (1828–1898)—all people who recognised and tried to describe or succeeded in describing segregates from what others have preferred to call *Kunzea ericoides*. In my work, I have been intrigued how much the influence of one man Joseph Hooker ran through this early rejection of classifying our endemic diversity. Hooker was, it transpires, a ‘lumper’—and, as Gillbanks (2014) argues for *Picris*, he did this because of his views of biogeography.



One of the new species, *Kunzea robusta*, is the most common and widespread member of the genus in New Zealand.
Photo: Jeremy Rolfe.

He needed species to be the same world over if his views on their global spread were to be accepted. Either way, he ignored Colenso but, to be fair, even today many would ignore Colenso’s ‘species’. (Colenso was an extreme splitter, even at one stage naming a new fungus that was based on a spider web.) Hooker stomped down hard on Thomas Kirk, though there he met his match. Kirk fought back, admitting to our flora *Leptospermum (Kunzea) sinclairii*, and *Leptospermum ericoides* var. *linearis (Kunzea linearis)*. It’s a matter of some academic interest that Hooker privately agreed that *Leptospermum ericoides* could be segregated, it’s just that this didn’t suit his purposes (de Lange 2007). For whatever reason, Thomas Cheeseman continued Hooker’s lumping, firmly rejecting or casting doubt on postulated segregates in *Leptospermum (Kunzea) ericoides*, though—inexplicably—for *Leptospermum (Kunzea) sinclairii* he tried to have it both ways by having it illustrated and yet implying it was a dubious species (Cheeseman 1914). It did not help matters that Cheeseman also confused that species with another on the Three Kings—an unfortunate error that has led to the perpetual myth that the Great Barrier Island endemic *Kunzea sinclairii* also occurs on the Three Kings; it never did. Walter Oliver (1883–1957) took over where Thomas Cheeseman left off, though on examining *Leptospermum (Kunzea)* collections made by Harry Carse he admitted in a letter to Carse that he could see at least two distinct entities therein (and that Cheeseman got it wrong over *Leptospermum (Kunzea) sinclairii*) but then enforced the view that making new species would be wrong (de Lange 2007).

So, by the time of Allan (1961), the treatment for *Leptospermum (Kunzea) ericoides* recognised two ill-defined varieties—var. *linearis* Kirk and var. *microflora* G.Simps.—and another ill-defined *L. (Kunzea) sinclairii*. Beyond describing some of the variation in *L. ericoides*, Allan left it that way and so matters remained until an Australian revision of *Leptospermum* was well underway (Thompson 1989). For that revision, Thompson (1983) correctly recognised that four Australasian *Leptospermum* species were incorrectly placed in that genus, they were in fact *Kunzea*. Being pragmatic (her revision was not after all about *Kunzea*), she completed the necessary book-keeping by transferring these ‘not’-*Leptospermum* species into *Kunzea* and, as *Leptospermum ericoides* was the oldest available name, dumped the Australian endemics *L. phyllicoides*, *L. leptospermoides* and *L. peduncularis* along with the New Zealand *L. sinclairii* into her new combination *Kunzea ericoides* (A.Rich.) Joy Thomps. She admitted no varieties. From her perspective, problem solved! However, for our species it wasn’t, because, at the flick of a pen, our endemic species and varieties were now merged with very different Australian species and unnamed entities—most of which are very aggressive agricultural weeds. So overnight, *Kunzea ericoides* came to be considered as ‘one of the world’s worst weeds’ (de Lange et al. 2010). I have written about this before many times so only the salient points need covering here. First, Thompson’s move was an expedient measure to enable

her to complete her revision of *Leptospermum*, though she was correct that all those species were *Kunzea*, she was also incorrect in that they should never have been treated as the one species. One thing I have learned—and here’s mud in the eye for the lumpers’ out there—is that ‘bad taxonomy’ does kill: lump away by all means, its only global biodiversity that will suffer from your actions. Thompson’s decision was also badly mis-interpreted resulting in the excuse on both sides of the Tasman for the widespread clearance of “*Kunzea ericoides*” forests. It’s hugely ironic that the only paper I have ever seen describing the serious impact of *Kunzea ericoides* in the Yarra Valley, Victoria (Singer & Burgman 1999) is actually describing the ecology of the narrow-range Victorian endemic *K. leptospermoides* Miq! I am still waiting to see peer-reviewed literature that substantiates the widespread claim that our New Zealand endemic *Kunzea ericoides* is truly a serious weed!

Since 1999, I have worked closely with Hellmut Toelken, who is tasked with revising Australian *Kunzea*—our *K. ericoides* matter is merely ‘small toys’ to what is happening with *Kunzea* as a whole in Australia. In 1999, Hellmut handed me a rough draft in which he suggested the existence of up to 20 segregates in New Zealand *K. ericoides*—it was a great starting point. Over the last 15 years, I have collected New Zealand and Australian members of the *Kunzea ericoides* complex, grown the New Zealand members (and those of the Australian complex in cultivation here), counted chromosomes, examined the karyology, made countless experimental hybrids, been inducted into the world of DNA and phylogenetic reconstruction, and published a range of papers on the subject. Over that time, I have concluded that *Kunzea ericoides* is endemic and that it and its allies are part of a distinct eastern Australian–New Zealand clade Hellmut and I named the subgenus *Niviferae* (snow covered—alluding to their propensity to cover themselves in masses of white flowers) (de Lange et al. 2010).

Now, from my side of the ‘ditch’, I have finished my work publishing in the open access journal Phytokeys a monograph of the New Zealand *Kunzea ericoides* complex. I recognise 10 species, all endemic—fact sheets for these species have been placed on the NZPCN website, and with time will be accompanied by images to aid in their identification. As and when time allows an interactive key to the group will be prepared but for now be warned—to understand our *Kunzea* requires the same level of dedication as that employed for working out *Eucalyptus* species. At the very least, you will need a good hand lens; you will also need to be patient and on the look-out for hybrids—in your initial efforts to get to grips with *Kunzea* avoid sites of prolonged human disturbance, you will come to grief, I assure you, if you don’t.



Recognition of *Kunzea* species requires close inspection of such things as, from left, the arrangement of hairs on the leaves, indumentum on young stems and buds, the shape and arrangement of the sepals, the shape of the stigma and the position of attachment of anthers and filaments. *Kunzea triregensis*.

One last matter—I think it highly pertinent to point out that Maori also recognised the diversity in *Kunzea*. My field work often necessitated talking with iwi and, from many of their elders I learned that they long recognised distinct forms of *Kunzea*, which they distinguished by their growth habit, and wood. I therefore add below the names I obtained from iwi for the various species I recognise—

some of these names are now close to extinction and I hope by using them this will encourage their resurrection. Also note that none of the elders I spoke to ever used the name kanuka, they were emphatic on this point, the generic or universal name for *Kunzea* in New Zealand is manuka but other names were also used by different iwi for different races that I recognise here as species. Whilst insistence that we revert to using manuka for *Kunzea*, kahikatoa for *Leptospermum* and reject kanuka altogether is probably futile, I am grateful to iwi for having shared their kaupapa on these trees, especially as most of my informants have now passed on. Indeed, I now feel that it is my duty to publish these names so that this rich ethnobotanical history is not lost altogether.

I end this note with a short summary of the 10 species. The monograph on *Kunzea* is free to download at:

["A revision of the New Zealand *Kunzea ericoides* \(Myrtaceae\) complex" doi: 10.3897/phytokeys.40.7973.](https://doi.org/10.3897/phytokeys.40.7973)

Accepted species

Kunzea ericoides *manuoa, atitire, titire, manuka*

This is now re-defined as a northern South Island endemic. It is most common in North-West Nelson but it is the main *Kunzea* you will see north of the Wairau and Buller Rivers (there are a very few spot occurrences south of there). In past literature—and I am guilty of this as well (see de Lange et al. 1997)—this species has been confused with *K. linearis* on account of its narrow, linear leaves. Amongst many differences this species can be easily recognised in the field by the observation made first by Achille Richard; its branchlets do appear to be hairless—you will need a 20× hand lens to see the minute divergent hairs—and even then they are sparsely distributed, and deciduous.

Kunzea sinclairii



Kunzea sinclairii.
Photo: Peter de Lange.

To be fair to Cheeseman (1914), Kirk did a messy job of naming this species, doing it twice, initially as a variety (var. *pubescens*, Kirk (1869)) and then posthumously as a species *L. sinclairii* (Kirk 1899). Warwick Harris reinstated this species (Harris 1987). Despite the literature perpetuating Cheeseman's idea that this species occurs on Three Kings, and indeed other literature that says it is on the Poor Knights, this species is endemic to Aotea Island/Great Barrier Island, where it is virtually confined to the central highlands (de Lange & Norton 2004). In most cases, *Kunzea sinclairii* presents as a prostrate, silver-grey shrub but very rarely it can make a small tree up to 6 m tall. Although common on Aotea Island/Great Barrier Island it readily hybridises with two other *Kunzea* on that island (*K. linearis* and *K. robusta*) and less commonly with *Leptospermum scoparium* s.l.

Kunzea linearis

rawiri, manuka

Treated by Harris (1987) as a variety of *K. ericoides*, this plant is now elevated to species rank. Part of the problem over its status was caused by the somewhat unorthodox way that Kirk described it in his Forest Flora (Kirk 1889)—therein he admitted it almost as an afterthought with a scarcely adequate description, a poorly executed drawing, and he did not mention any locations where it grew (indeed the way it was described he did not even indicate it was found in New Zealand). Consequently, it's hardly surprising that no one seemed to know where this variety grew and that from time to time people collected it thinking they had found a new species, e.g., A.P. (Tony) Druce called collections he made of this species *K. "Ahipara"*. As I circumscribe it (de Lange 2014), *K. linearis* is virtually a Northland endemic ranging from its type locality Auckland North to



Kunzea linearis.
Photo: Jeremy Rolfe.

Te Pahi. It is also known from scattered sites in the northern Waikato—most gone now due to road works—and on the Coromandel Peninsula and some eastern Coromandel island groups, like the Aldermen Islands. One anomaly is a Tony Druce collection made from Mt Kupukore, the northernmost of the Taipo in the eastern Wairarapa. It has yet to be rediscovered there though hybrids between it and *K. robusta* have been collected from there by Featherston botanist Pat Enright.

New species

Kunzea amathicola* *rawiritoa, manuka

This species was actually recognised several times over. Northland iwi (Muriwhenua) already knew it as rawiritoa, a name they used to distinguish it from their rawiri (*Kunzea linearis*) and rawirinui (*K. robusta*), all which often grow together within their rohe. The first European botanist to recognise its distinctiveness was Harry Carse who collected it widely but due to Oliver's lack of enthusiasm discarded his idea of naming it. It was then 'rediscovered' by Geoff and Diana Kelly who collected it from Puponga, North-west Nelson in the 1960s—but again despite excellent herbarium specimens it was ignored until Hellmut Toelken 'found' it again at Puponga in 1989. This, as the species name suggests, is most commonly seen in sand country though, around Wellington and some parts of North-West Nelson, it also extends into clay country. This is one of two species possessing greatly elongated inflorescences such that the flowers almost appear to be solitary (i.e. monadic).



Kunzea amathicola. Photo: Peter de Lange.

Kunzea robusta* *manuka, manuka rauriki, rawirinui, kopuka

The most widespread and common of the New Zealand *Kunzea*, this is the species that has erroneously been called *K. ericoides* for so long. Amongst its many differences, is the fact that its branchlets are distinctly hairy—those of *K. ericoides* are not. However, even as treated by de Lange (2014), this remains a variable species and three races are described in my treatment but not formally named. In its typical state, this is a forest tree (the largest in the genus—occasionally reaching 30 m high with trunks up to 1 m d.b.h.) whose young branchlets are copiously covered in long, antrorse-appressed silky hairs but in some parts of its range these hairs can be much reduced, or can even occur in mixtures of antrorse-appressed and divergent. It will take a braver man than I to split it further.

Incidentally this was one of the species Colenso tried to convince Hooker about—Colenso of course was influenced by the *K. ericoides* he knew from the Bay of Islands, most of which is in fact *K. linearis*, so it's hardly surprising he thought his collections from the Pahaoa River Gorge were a different species.

Kunzea tenuicaulis

This species is the same one as the geothermal *Kunzea* people thought was the one that had been described by George Simpson as *Leptospermum ericoides* var. *microflora*, which was reinstated at the rank of variety in *Kunzea* by Warwick Harris (Harris 1987). I have redescribed it at the rank of species using a new name and type because of the confusion surrounding the description of var. *microflora* by Simpson (1945). For that variety, Simpson used material collected from a garden plant grown by Norman Potts of Opotiki. Popular legend is that Potts collected his garden plant from Maungakakamea (Rainbow Mountain) near Waiotapu, Rotorua, and though this is probably correct, Simpson's description repeatedly stated that Potts's plant came from 'Rainbow Mountain, Nelson' (there is no Rainbow Mountain in Nelson). To make matters worse, the type specimen cited by Allan (1961) is—as far as I can see—a prefabrication (it bears no evidence that Simpson actually used it for his description); the actual type was found by accident in the Auckland Museum

Herbarium (AK) but was in such a poor condition that I decided it was better to start over—as one can under the International Code for Nomenclature for algae, fungi and plants (McNeil et al., 2012), describing this plant at a different rank using a new, unambiguous, wild collected type.

Kunzea tenuicaulis now has a very different circumscription from that people had used for what they thought was *K. ericoides* var. *microflora*. That past concept equated only with the dwarfed and/or prostrate shrubs found growing near active fumaroles. My research has shown that in most cases such plants, when transplanted, grow into small trees (note that some do retain the dwarf rambling habit), and that all these forms were unified morphologically, cytologically and also using the DNA markers I had employed in my studies. The past confusion by people also relates to the abundance of *Kunzea* hybrids found in geothermal areas—few of which have not been disturbed by humans—because in the vicinity of these one usually finds *Kunzea robusta* and *K. serotina*, with which *K. tenuicaulis* freely hybridises.

Kunzea toelkenii

This species was only recognised as a distinct species after it had been lost from 98% of its former range. A sand dune endemic of the Bay of Plenty, *K. toelkenii* was first noted as potentially distinct by Sarah Beadel (not, as I stated in my monograph, Derek Gosling). The ecology of the species was subsequently studied by Mark Smale who noted the peculiar nature of the vegetation association it formed at its main site near Thornton (Smale 1994).

Kunzea toelkenii has features suggestive of a hybrid origin between *K. robusta* and *K. tenuicaulis* but forms a stable true-breeding population that is well marked from either postulated parent by its propensity to produce widely spreading lower trunk suckers, and cryptic features of its branchlet indumentum. The suckering habit is unusual within New Zealand *Kunzea* but is seen in several of the Australian members of the complex, though those species also possess lignotubers (absent in the New Zealand species). *Kunzea toelkenii* is further distinguished by its habit of occasionally producing ‘male’ flowers toward the end of its flowering season.

Kunzea triregensis

This is the species Cheeseman (1914) thought was *K. sinclairii*. As the species epithet implies it is known only from Three Kings Islands where it is the dominant tree species on Manawatawhi/Great Island—it is otherwise known from North-East, South-West and West islands—though it is not common on these much smaller islands. Its abundance on Manawatawhi/Great Island is an artefact of the gross disturbance that island suffered from human occupation and the liberation of goats to feed castaways.

Kunzea triregensis has many features suggestive of a hybrid origin involving *Kunzea amathicola* and *K. linearis*—species which have yet to be found on the Three Kings. Notably, like *K. amathicola*, this species produces greatly elongated inflorescences so forming the impression it has a monadic flowering system. This is also the only allopatric *Kunzea* I distinguished; all the others grow (or once grew) sympatrically with at least one other species. Cheeseman evidently thought *K. triregensis* was the same as Kirk’s *Leptospermum (Kunzea) sinclairii* on account of the fact that when he visited Manawatawhi/Great Island (then crawling with goats), he saw it as small and/or prostrate shrubs whose leaves had distinctly hairy margins.

Kunzea salterae

This species is somewhat of an anomaly for, as described, this species is stated to be endemic to Moutohora (Whale Island) a 35,000 year old volcanogenic island off the eastern Bay of Plenty coast; an endemic to such a young island makes no sense. I suggested, therefore, that it either went extinct



Kunzea triregensis.
Photo: Jeremy Rolfe

on the adjacent shore line or had yet to be found there. It's always great to publish something and, less than a week later, admit you got it wrong. In my thesis, I suggested that *K. salterae* might be on Tuhua (Mayor Island) but that the material in herbaria was inadequate to be definitive. I should have stuck with that. In 2012, I went to Tuhua and collected *Kunzea*; I had also been sent material by DOC staff. In both cases, I decided that what I was seeing was the 'Eastern North Island variant' of *K. robusta* (Wilcox et al., 2012). Recently, whilst annotating *Kunzea* sheets in the Auckland Museum Herbarium, I came across my 2012 collection; I think I got it wrong and now believe that both *K. robusta* and *K. salterae* are on Tuhua—more work is needed.

In any case, *Kunzea salterae* was a late comer to my revision; I had long considered it a hybrid swarm involving *K. linearis* and *K. tenuicaulis*. Indeed, I had even made that hybrid (de Lange et al., 2005) and my artificial cross was a dead ringer for the Moutohora plants that I had been sent by DOC botanist Paul Cashmore. Imagine then, my surprise when I visited that island with Paul in 2005 and found only *K. salterae* and a small amount of *K. robusta* present. Further, despite what had been said by others, there was no *K. tenuicaulis* on the island; past records of that species stem, it transpired, from the widespread, erroneous belief that any flat *Kunzea* growing in geothermal areas was that species (as *K. ericoides* var. *microflora*).

Kunzea salterae at least morphologically, has much in common with *K. ericoides*, except that it is very hairy and has a smaller, more gracile growth habit. In *K. salterae*, the branchlet hairs come in two types, short, persistent, divergent and long, antrorse-appressed silky and deciduous. DNA data showed a relationship to *K. tenuicaulis* but also distinct differences and, morphologically, Moutohora plants did not place there, the differences led me to describe this as a distinct species. Now that it appears to be on Tuhua after all, people should look for it on the Aldermens and also on the eastern side of the Coromandel Peninsula.

***Kunzea serotina* makahikatoa, manuka**

This is another species that Colenso picked up and tried to convince Hooker to name. Long known to Central North Island iwi as makahikatoa, *K. serotina* was also briefly mentioned by Allan (1961) as a 'thicket forming' race of the Marlborough Mountains. Horticulturists have also long recognised that the Central North Island 'kanuka' was distinct, but it was left to Hellmut Toelken to 'rediscover' it. *Kunzea serotina* in the North Island at least is very much a species of the Central Volcanic Plateau, main axial ranges and frost flats. It was probably more wide ranging than this since there are occasional pockets of it in eastern Wairarapa and it has left its footprint in hybrids along the Hawke's Bay side of the Ruahine and Kaweka Ranges and within the Rangitikei River catchment.

In the South Island, it is more widespread, especially along the eastern side of the Southern Alps, extending down across the Canterbury Plains, where it is replaced by *K. robusta* in the north, south and on Banks Peninsula. It also occurs within Central Otago and, together with *K. robusta*, is the most southerly occurring of the New Zealand species (none of which by the way extend to Stewart island, which has no naturally occurring *Kunzea*).

Kunzea serotina is easily recognised by its distinctive columnar growth habit (lost only in very old specimens), characteristic papery bark which sheds in masses reminiscent of the way *Fuchsia excorticata* does, so leaving piles of 'wood shavings' in carpets under the trees and often hanging loose in the branch axils. It also has distinctly small rather coriaceous leaves and yellow pigmented oil glands in the flower petals.



Kunzea serotina.
Photo: Jeremy Rolfe.

Acknowledgements

Fifteen years is a long time, during which of course I have worked with and been in the field with many people. I have not the space here to thank them all, and so again refer people to my PhD thesis, which must surely rate up there as having the longest acknowledgements of any thesis. Here I wish to thank my PhD supervisor Brian Murray for believing in me, Brian Molloy for his wisdom and a fair trial at my *viva*, Peter Wilson (NSW Herbarium Australia) for his sage advice and fair critique of my work, Hellmut Toelken for freely sharing his knowledge and notes on New Zealand *Kunzea*, Josh Salter for her incredible depictions of the *Kunzea* species published in the PhytoKeys paper, and Jeremy Rolfe for wading first through my thesis—which he type set—and then my monograph, which he edited, as well as fixing all those bloody maps and images I gave him to ‘look at please’. Without these people and those others unmentioned here, this work would never have been completed. I wish also to thank the New Zealand Plant Conservation Network for sponsoring my paper so that it could be published online open access. Their kindness and willingness to support my work is greatly appreciated.

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eFlora of New Zealand mosses has been published online

Peter Heenan Landcare Research (heenanp@landcareresearch.co.nz)

A milestone has been achieved in New Zealand botany with the publication of six family treatments for the Flora of New Zealand, Mosses. The newly published family treatments are for the Amblystegiaceae, Buxbaumiaceae, Encalyptaceae, Entodontaceae, Ephemeraceae, and Erpodiaceae. Dr Allan Fife, author of these treatments, commented: “Some 18 months ago, Peter Heenan, Ilse Breitwieser, Aaron Wilton, Jessica Beever, and I concluded that progressive publication of individual family treatments, as part of the eFlora, would be an effective way to move the Moss Flora project to completion. The six ‘fascicles’ recently published are the initial outcome of that decision. The Amblystegiaceae, a predominantly aquatic family, is the most taxonomically challenging among this cohort of families. The members of this family are conspicuous, often dominant, plants of wet habitats such as wetland pools, lake and stream margins, and roadside ditches. Like many water-loving plants, they are morphologically variable, making their taxonomic interpretation exceedingly difficult. The treatments of the other five families posed less taxonomic difficulty. We hope that this incremental publication will simultaneously make more manageable the task of completing the Moss Flora, expedite the distribution of taxonomic and associated data on the large New Zealand moss flora, and encourage greater feedback from users of the Flora.”

The publication of these six families heralds an innovative new way of delivering information on the New Zealand flora through the online eFlora. There are 68 families of mosses in New Zealand and over the next three years these will be progressively published in the eFlora, with each family being published as a separate fascicle. In the next few months, Allan Fife’s treatments of moss families Bruchiaceae, Bryaceae, Cyrtopodiaceae, Fabroniaceae, Hylocomiaceae, Hedwigiaceae, Leptodontaceae and Meesiaceae will be published as part of the eFlora. Also, Dr Jessica Beever’s treatment of the Fissidentaceae is now completed and ready for publication in the eFlora.

The eFlora makes available these new moss family treatments initially in two ways. First, they have been produced as a downloadable pdf (<http://www.nzflora.info/publications.html>). Secondly, they are available electronically online within the eFlora (<http://www.nzflora.info/index.html>) by searching for a taxonomic name. The eFlora moss treatments include keys, accepted names and synonyms, descriptions, etymological, distributional, habitat, and other notes. Each species is illustrated by line drawings prepared by Rebecca Wagstaff. In the future, we hope to produce other profiles that will be tailored to various user requirements.

Considerable resources have gone into the eFlora, which was conceived by Dr Aaron Wilton and developed in collaboration with his informatics colleagues Bavo de Pauw and Margaret Watts. We are delivering this next generation of New Zealand Floras as a dynamic resource: a resource that is both up-to-date and engages a wide range of users. This involves changing the Flora creation process to develop an information system that allows integration of data from a range of sources, and to extend the concept of a Flora to include its delivery via a variety of tailored products—the first being a version delivered via the internet, and now, our newest product, the time-stamped pdfs. Central to achieving this is the development of processes that allow the capture and analysis of granular, highly linked data to ensure that data used to create the Flora are up-to-date. This creates a number of technical challenges such as efficient processes to capture data linked to specimens, and the development of processes to analyse these data, as well as social and legal challenges such as changing working practices by scientists and the recognition of authorship and copyright.

The production and delivery of Allan Fife’s and Jessica Beever’s new eFlora moss treatments involved a large team of people. Some of the key tasks have included: eFlora editorial standards and guidelines (Ilse Breitwieser, Patrick Brownsey, Peter Heenan, Aaron Wilton); reviewing and editing manuscripts (Rod Seppelt, Jessica Beever, Sue Gibb, Bill Buck, and Christine Bezar); updating names and literature in the Ngā Tipu o Aotearoa - New Zealand Plants database (Sue Gibb); drawing and preparing images (Rebecca Wagstaff, Rod Seppelt, and Kate Boardman); and uploading and formatting text (Katarina Tawiri and Sue Gibb).

Two other new eFlora treatments have been published electronically and as pdfs: an updated Hypericaceae treatment by Peter Heenan and a new treatment of Centrolepidaceae by Kerry Ford.

For further information on the eFlora please contact the project Editor-in-Chief Dr Ilse Breitwieser (breitwieseri@landcareresearch.co.nz) or Allan Herbarium research leader Dr Peter Heenan (heenanp@landcareresearch.co.nz); for information on the moss treatments contact Dr Allan Fife (fifea@landcareresearch.co.nz).

NZIFSB Dunedin Seed Collector Training Workshop 10–12 November

The second South Island seed collector training workshop for the New Zealand Indigenous Flora Seed Bank (NZIFSB) will be held at the Dunedin Botanic Garden. This workshop will cover the appropriate methods and protocols for collecting seed for the New Zealand Indigenous Flora Seed Bank. Attending a workshop is a requirement for anyone wishing to be involved in this project as a collector. Numbers for the workshop will be capped at 25 people. The workshop will be led by the NZIFSB Project Leader, Mr Craig McGill. The first day of training will cover theory and the second and third days, the practical side of collecting through expeditions into the surrounding forest parks. Full details are:

- Date and time: Monday 10 November – Wednesday 12 November (9.00 a.m. – 4.00 p.m. each day)
- Venue: Dunedin Botanic Garden
- Refreshments for morning and afternoon tea will be provided.
- There is no workshop registration fee but you will need to bring your own lunch, or food can be purchased from the Croque-O-Dile Café (which is open from 9.30 a.m. to 4.30 p.m. and is located in the lower garden beside the Information Centre), or food can be purchased from the Gardens shopping centre which is a 5 minute walk from the training room.

Please register your interest early to avoid disappointment! To register or for further information, please contact the Seed Bank Coordinator, Mrs Jessica Schnell at (06)356 9099 Ext 83236 or email: J.L.Schnell@massey.ac.nz by Wednesday 5 November 2014.

Planting at Ohinetahi Reserve

Anne Kennedy, Summit Road Society (www.summitroadsociety.org.nz)

Ohinetahi Reserve is owned and maintained by the Summit Road Society and covenanted with the QEII Trust. The Society acquired the 150 hectares in three stages between 1992 and 1998. The reserve clings to the upper slopes inside the ancient Lyttelton volcano above Governors Bay on the Port Hills, Christchurch.

The first two stages of the purchase were mainly bush with two main areas of grassland. The boundaries were adjacent to other bush or farmland and, except for the occasional clean-up along some boundaries, these have not been a problem. The bush has been left to regenerate. The final (Titoki) block that was purchased bordered residential land and it was necessary to rigorously control the gorse and broom on our boundaries. Plan A was to fence off the bush on this block and put in sheep to encourage tussock grassland and keep the weeds down to a manageable level. The fence was built but the arrangement with the sheep owner fell through and the gorse flourished. So we went to Plan B.

Plan B involved clearing the boundaries to 10 m and then planting this land with local native species and leaving the rest of the grassland to look after itself. We soon learnt it was best to stick with the basic colonising trees (see Table 1) and, once these were established, other species such as kaikomako, pigeonwood and fuchsia self-introduce from the adjacent bush. This plan has worked well and we now have a bush cover along these boundaries and only have to spend about one day a year clearing out gorse.

Table 1: Species used in the Ohinetahi Reserve regeneration

| Species generally planted | Less commonly used species | Reason why not much used |
|--------------------------------|-----------------------------|---|
| <i>Coprosma robusta</i> | <i>Hoheria augustifolia</i> | Does not provide rapid cover |
| <i>Coprosma lucida</i> | <i>Plagianthus regius</i> | Does not provide rapid cover |
| <i>Pittosporum tenuifolium</i> | <i>Cordyline australis</i> | Does not provide rapid cover |
| <i>Pittosporum eugenioides</i> | <i>Sophora microphylla</i> | Very slow growing |
| <i>Olearia paniculata</i> | <i>Myoporum laetum</i> | Frost tender |
| <i>Kunzea robusta</i> | <i>Aristotelia serrata</i> | Temperamental |
| <i>Pseudopanax arboreus</i> | | Something chewing the plants almost to oblivion over the last 5 years |
| <i>Griselinia littoralis</i> | <i>Hebe salicifolia</i> | |



Some of the trees that self-introduce after planted species have established: (from left) pigeonwood, kaikomako, fuchsia. Photos: Jeremy Rolfe.

We source most of our plants from the Department of Conservation nursery at Motukarara and we plant only eco-sourced species. One of our work party members, Robin, likes to spend a few extra hours working in the reserve. He takes seedlings growing on the sides of the tracks and plants them in his vegetable patch at home. The loose cultivated soil encouraged the plants to develop a good root system and, after a year, the plants are taken bare-rooted and planted in the reserve. Last year, we dug some plots in the reserve for growing these trackside plants so Robin now has room in his garden to grow his Christmas potatoes. These trees taken from the bush are quite tender and need to be hardened off before being planted in the open. The grassland in the Titoki block, called The Twitch Patch, is now about 80% planted in trees and the gorse patches are mature enough to allow seedlings (mainly mahoe) to push through.

Another area, about 50 m × 50 m, at the entrance to this block in Governors Bay was cleared of gorse and broom and planted out to give a tidy entrance to the reserve. We have named this area Gordon's Garden in memory of Gordon Kirk who was the driving force in the acquisition of Ohinetahi Reserve. The initial planting of these two areas would comprise about 2000 trees.

Further plantings have taken place where weedy growth has been a problem. Continual cutting back or spraying is a no-win situation. It makes more sense to remove problem plants and plant with desirable native trees. For example, blackberry and gorse were encroaching on an area of an old four wheel drive track and it was a continual chore to keep the track clear. So, two years ago, we cleared it and planted trees there. Over time, we hope for a canopy to cover this piece of track and ease our workload in track clearing.

This year we are planting kanuka around a broom area that is threatening to become invasive and though we may have to spend a few years keeping the broom at bay we are hoping to win the long term battle. The broom will provide shelter for the young trees from the easterly wind, which blows straight up the harbour onto this site.

We will also plant another length of boundary, which is not a problem at the moment, but which is a point where there are good views of the harbour. We shall plant mainly toetoe, flax and *Hebe*

strictissima, which is native to Banks Peninsula and the Port Hills. These plants will not grow too tall to hinder the view.

Generally, we are letting natural regeneration take place. This we know will take some time but we are already seeing some good results. In 1977, a fire destroyed an area of the reserve and it has been interesting to watch the regeneration of this area. The first species to appear were *Coprosma robusta* and *Hebe salicifolia* followed by *Pittosporum tenuifolium* and *Pseudopanax arboreus*. Now kowhai, *Pittosporum eugenoides*, *Olearia paniculata* and *O. avicenniifolia* are making a good showing and even a totara has appeared.

On Cass Ridge, there is an open grass area that had sheep on it until about four years ago. Since their removal scattered flowering currant bushes (*Ribes sanguineum*) are providing shelter for numerous young seedlings. We shall let these seedlings grow until they top the currant bushes and then cut out the currant because it tolerates low light and would persist in future bush.

Mid January to mid April is usually spent working in the established bush removing invasive weeds such as old man's beard, passion vine, cherry, spindleberry, barberry, etc. These weedy plants are greater problem in the Titoki block, no doubt because of its proximity to a residential area. Our method is to cut the weeds off as low as possible to the ground and paint with Tordon mixed at 20:1. There are some quite large elderberry trees present and they will probably be our next target weed.



Olearia paniculata is one of several species that have naturally regenerated after a fire in 1977.

Photo: Jeremy Rolfe.

***Anisotome patula*—some observations on a declining South Canterbury endemic**

Philip Smith O2 Landscapes (p.smith@o2landscapes.com)

As part of writing work that I carry out for *Landscape Architecture* magazine, and the development of my own website (as well as a considerable personal interest), I like to observe plants first hand in the wild. The full range of benefits of this do not need to be explained to this audience, although one reason that pertains to my work is to better understand how to use certain rare species within horticulture (those that have been previously introduced to cultivation by nurseries such as Oratia Native Plant Nursery).

On occasions when I have gone to see rare species in the wild, I have asked several members of the Network for advice on where I could find good specimens to photograph. At other times (especially on impromptu trips), I have had to make educated guesses based on old botanical reports and habitat information (such as on the NZPCN website).

For the O2 Landscapes website, I have a special interest in providing information about rare and unusual species that are poorly represented or entirely absent from popular literature, such as *Myosotis pansa*, *Olearia adenocarpa*, *Pimelea mimosa* and *Coprosma dodonaeifolia*. We have trialled a great deal of these plants in gardens (and use many in considerable numbers within designs), with the hope of playing some role in advocacy for our threatened flora. One of the multitude of plants to which I have been introduced by Oratia NPN is a pretty, blue-leaved herb from South Canterbury limestone, *Anisotome patula*.

I planted this within a garden that I have developed at Lake Tekapo, partially on account of a historical record (whether or not that is a genuine record of this species or not, I do not claim to be an expert) from Burkes Pass. The delicate nature of this plant is a refreshing detail for native plantings that attempt to represent the many layers of our native ecologies (including the more ephemeral or less robust characters). I also hold an interest in the potential of umbellifers within gardens, as refined, connective elements within plantings (such as the way in which *Anisotome haastii* elegantly sits within natural planting associations). *Anisotome patula* has performed

admirably within the dry, difficult position in which I planted it at Tekapo, belying its somewhat frail appearance.

On a trip to Timaru 2 years ago, I decided to try to see this little character in the wild and headed for the area around Pareora. With little more than the NZPCN habitat and distribution descriptions (and personal experience of having seen other species associated with limestone, like *Carmichaelia hollowayi* and *Lepidium sisymbryoides*, in the wild), I marched up to some limestone bluffs to try my luck. After 30 minutes of fruitless searching, I decided that I would just go up another 10 metres to an unpromising patch of rough grass before leaving.



Anisotome patula.

I had assumed that *A. patula*, like many delicate herbs, would require very bare ground to be able to grow, but on this ledge overhanging a small limestone bluff I spotted a small clump of fine, blue foliage poking out of the rough grass. Upon moving around the ledge, I started noticing more and more plants of *A. patula*, many growing directly out of the sward of fine grass (I'm afraid I've never ventured to guess what the grass species was). It was also growing on the bare faces of limestone where the bluff dropped away, including in shaded aspects (which also surprised me).

About 3 or 4 metres back from the edge of the bluff, the fine grass in which *A. patula* grows gives way to rank agricultural species from the neighbouring paddock. Obviously, the drought-prone nature and mineral makeup of the rendzina soils that overlie the limestone bluff maintain a sufficiently fine-leaved sward (although still appreciably dense) that *A. patula* is able to grow. It was pleasing to observe that this chronically threatened species (At Risk – Declining (de Lange et al., 2013)) was germinating in a variety of spots in a significantly modified habitat, and I found several fruiting specimens.

As is so often the case, viewing wild plants of this rare species altered my view of it considerably (particularly with regard to its shade tolerance and ability to withstand some competition). It was also an object lesson in not giving up on a habitat that I was beginning to think was too rough to hold such an interesting and delicate species.

Reference

de Lange, P.J.; Rolfe, J.R.; Champion P.D.; Courtney, S.P.; Heenan, P.B.; Barkla, J.W.; Cameron, E.K.; Norton, D.A.; Hitchmough, R.A. 2013: Conservation status of New Zealand indigenous vascular plants, 2012. *New Zealand Threat Classification series 3*. Department of Conservation, Wellington.

The Australian Network for Plant Conservation's orchid conservation programme

This programme has partnered with the Royal Botanic Gardens Melbourne. Funds are now urgently needed to 'fit out' a conservation laboratory to propagate and reintroduce threatened orchids now and into the future. The programme is currently leasing laboratory facilities and equipment but needs to set up its own laboratory facilities including tissue culture capability to ensure the long term future for the conservation programme. By donating towards this cause you will directly contribute to the purchasing of tissue culture equipment, growth rooms, microscopes and incubators that will be used to continue this invaluable orchid conservation work. Help make this dream a reality.

To donate to this exciting campaign, please go to:

<https://www.chuffed.org/project/save-our-threatened-orchids>

The Orchid Conservation Programme focuses on the *ex-situ* growth and reintroduction of many of south eastern Australia's threatened orchids, and is currently the only means by which these orchid species can be propagated in sufficient numbers to significantly reduce the threat of them becoming extinct in the wild. Please share this campaign with your friends and networks.

UPCOMING EVENTS

If you have important events or news that you would like publicised via this newsletter please email the Network (events@nzpcn.org.nz):

10th Australasian Plant Conservation Conference (APCC10)

Conference: 11–14 November 2014. Hobart, Tasmania. The four sub-themes are: Securing biodiversity, Prioritising actions, Animals in plant conservation, Engagement and communication in the modern world. You are invited to submit an abstract.

More information: <http://www.anbg.gov.au/anpc/conferences/2014/index.html>.

Australasian Systematic Botanical Society Conference

Conference: 24–28 November 2014. Massey University campus, Palmerston North. The theme is 'Next-generation Systematics.'

Information and registration details: www.massey.ac.nz/~jtate/ASBS2014NZ.htm

Auckland Botanic Gardens

Workshop: Wednesday 10 September, 1.00 till 2.00 p.m. on 'Low impact design walk devices' with Bec Stanley. Venue: 102 Hill Rd, Manurewa; no bookings necessary.

More information: Botanic.Gardens@aucklandcouncil.govt.nz

Auckland Botanical Society

Field trip: Saturday 16 August to North Waikato/South Auckland. Leader: Jenni Shanks.

Contact: Maureen Young, email: youngmaureen@xtra.co.nz.

Meeting: Wednesday 3 September at 7.30 p.m. for the Lucy Cranwell Lecture is to be given by Dr Peter Bellingham and is titled New Zealand's native forests: driven by natural disturbances, now influenced by invasive plants and animals

Field trip: Saturday 20 September to Waiheke Station, Waiheke Island. **Leader:** Peter Maddison.

Contact: Maureen Young, email: youngmaureen@xtra.co.nz.

Meeting: Wednesday 1 October at 7.30 p.m. for a talk by Mark Large. **Venue:** Unitec Building 114, Room 2001.

Contact: Maureen Young, email: youngmaureen@xtra.co.nz.

Kaipatiki Project

Community planting day: Saturday 6 September at Upper Eskdale Reserve, Glenfield. **Time:** 9.30 a.m.-12.30 p.m. **Cost:** free; enjoy the great outdoors planting native trees; bring your family, school, club, church or workmates. Free BBQ for all planters - please bring a spade if you have one.

More info: www.kaipatiki.org.nz/volunteer

Bush walk & talk - HERITAGE series: Sundays 21 September and 5 and 12 October, 9.30 till 11.30 a.m. **Where:** Glenfield and Birkenhead. **Cost:** \$15 for all three guided walks.

For locations and to book online: www.kaipatiki.org.nz/courses

Rotorua Botanical Society

Field trip: Sunday 7 September to the Poroporo/White Pine Bush covenant. **Meet:** the car park, Rotorua, 8.00 a.m. or White Pine Bush Scenic Reserve car park at 9.00 a. m. **Grade:** moderate.

Leader: Wayne O'Keefe,
ph: 07 315 7556 or 0210 238 5608;
email: wayneokeefe@yahoo.co.nz.

Wellington Botanical Society

Field trip: Saturday 6 September to East Harbour Regional Park. **Meet:** at Eastbourne bus terminus 10.00 a.m.

Co-leaders: Mick Parsons,
ph: 04 473 1142 / 027 249 9663;
Gavin Dench ph: 04 387 9955 /
027 405 2987.

Meeting: Monday 15 September at 7.30 p.m. for a talk by Lara Shepherd, Te Papa, titled 'Māori cultivation of New Zealand native plants'.

Venue: VUW Lecture Theatre
M101, Murphy Building ground
floor, west side of Kelburn Parade.

Nelson Botanical Society

Field trip: Sunday 21 September to Inches' Wairoa Valley. **Meet:** at Church Steps at 9.00 a.m. and bring weeding tools.

Please register with the Leader:
Shannel Courtney,
ph: 03 546 9922.

Meeting: Monday 22 September at 7.30 p.m. for a talk by Cathy Jones titled 'Alpine plants'.

Venue: Jaycee Rooms Founders'
Park, Nelson.

Canterbury Botanical Society

Meeting: Friday 5 September at 7.30 p.m. for a talk by Michelle Lambert titled 'The ecology and conservation of two contrasting *Olearia* species: *Olearia lineata* and *Olearia bullata*.'

Venue: Upper Riccarton Library
community meeting room, 71
Main South Road.

Field trip: Saturday 13 September to the of Anthony and Julia Holcroft near Tuahiwi and Ian Platt and Rose Kirk in Woodend to see native plantings.

Te Ara Kakariki Greenway Canterbury Trust

Canterbury Plantout 2014: planning for the 2014 Canterbury Plantout is underway. The lower catchment event will be held on 6 September, with the upper catchment event on 20 September.

Information about upcoming events: register@kakariki.org.nz.

Botanical Society of Otago

Meeting: Wednesday 10 September at 6.00 p.m. for the 13th Annual Geoff Baylis Lecture to be given by Peter Johnson, Landcare Research and titled 'Long leaves and fat roots'.

Venue: Castle 1, University of
Otago (drinks and nibbles start
from 5.15 pm in the concourse)

Workshops: Saturday 13 September from 10.30 a.m. to 3.30 p.m., moss, liverwort and lichen walks and workshops. **Meet:** at the Dunedin Botanic Garden Information Centre. Please register by Wednesday 10 September.

Contact: Allison Knight,
ph: 03 4878265,
email: alli_knight@hotmail.com.

Field trip: Saturday 4 October to Waianakarua Arboretum. **Meet:** at the Botany car park at 8.30 a.m. or at 9.30 a.m. at the intersection of State Highway One and McKerrow Road, south Mill House, Waianakarua.

Contact: John Steel,
ph: 021 2133170, email:
john.steel@botany.otago.ac.nz
