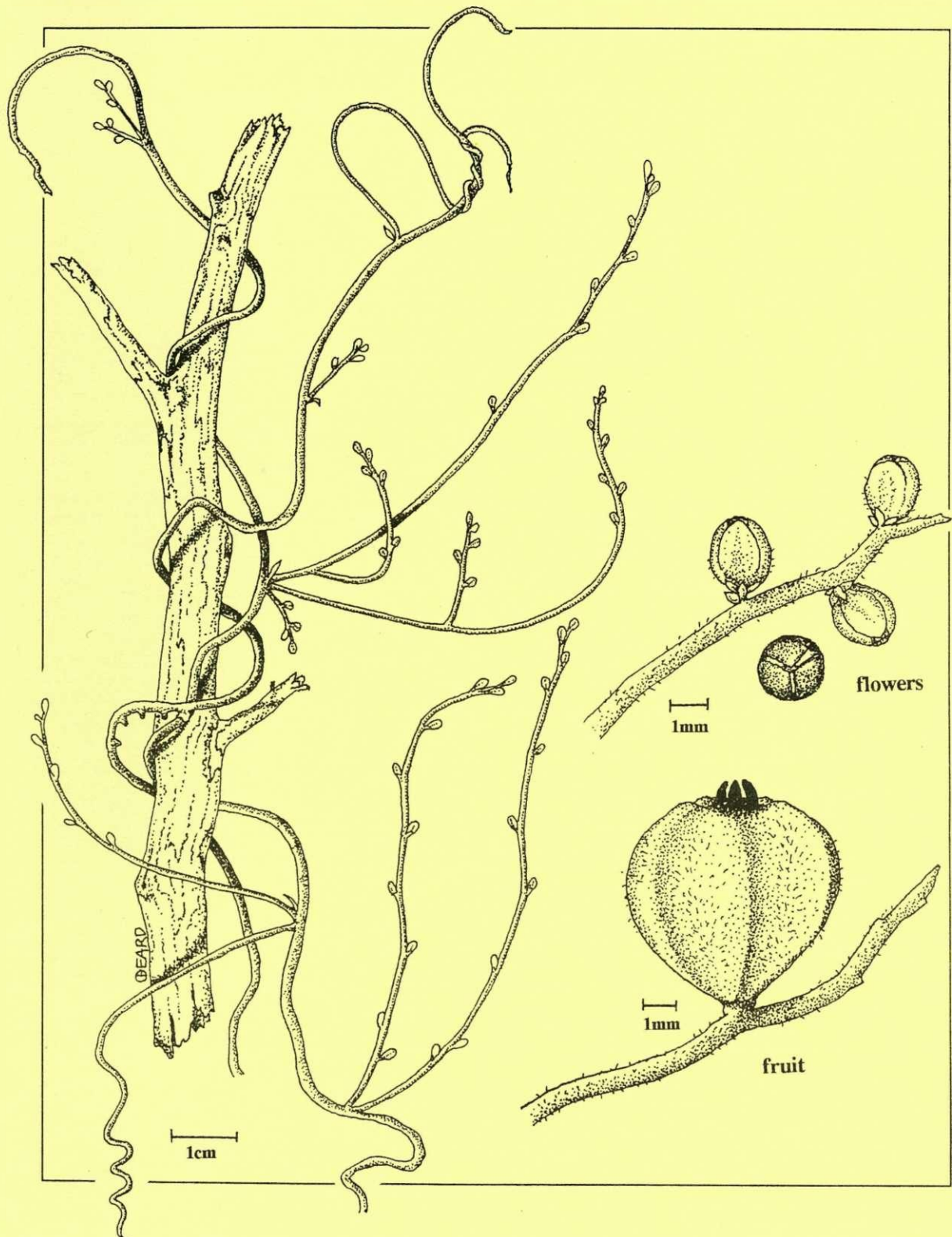


NEW ZEALAND BOTANICAL SOCIETY

# NEWSLETTER

NUMBER 42

DECEMBER 1995



## **New Zealand Botanical Society**

President: Jessica Beever  
Secretary/Treasurer: Anthony Wright  
Committee: Catherine Beard, Colin Webb, Carol West,  
Beverley Clarkson, Bruce Clarkson  
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## **Subscriptions**

The 1996 ordinary and institutional subs are \$14 (reduced to \$10 if paid by the due date on the subscription invoice). The 1996 student sub, available to full-time students, is \$7 (reduced to \$5 if paid by the due date on the subscription invoice).

Back issues of the *Newsletter* are available at \$2.50 each - from Number 1 (August 1985) to Number 41 (September 1995). 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 28 February of each year for that calendar year. Existing subscribers are sent an invoice with the December *Newsletter* for the next year's 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 March 1996 issue (Number 43) is 28 February 1996.

Please forward contributions to: Bruce & Beverley Clarkson, Editors  
NZ Botanical Society Newsletter  
7 Lynwood Place  
HAMILTON

Contributions may be provided on floppy disc (preferably in Word Perfect 5.1) or by e-mail (ClarksonB@Landcare.CRI.NZ).

NEW ZEALAND BOTANICAL SOCIETY  
**N E W S L E T T E R**  
NUMBER 42                      DECEMBER 1995

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**Cover illustration:**

*Cassytha paniculata* fruiting and flowering, pieces from separate plants at the southern side of the North Cape Scientific Reserve, 22 October 1995, drawn by **Catherine Beard**. The green-black fruit are from last summer's flowering; occasional plants were seen flowering at this early time of the year; perianth segments yellowish-green (see article by Ewen Cameron page 12).

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## NEWS

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### New Zealand Botanical Society News

#### ■ From the Secretary

Nominations received for 1996 Officers and Committee positions for the New Zealand Botanical Society were:

President	Jessica Beever
Secretary/Treasurer	Anthony Wright
Committee	Catherine Beard, Colin Webb, Carol West

As the number of nominations equalled the number of vacancies there was no need for a ballot and the above are declared elected.

We welcome Dr Jessica Beever as the new President and Catherine Beard as a Committee member. Grateful thanks are extended to our retiring president, Dr Eric Godley, and Committee member Sarah Beadel, who have served the society since the inaugural meeting in 1988.

Bev and Bruce Clarkson remain ex officio Committee members with their re-appointment as joint Editors of the *Newsletter*. We hope that you continue to support them with newsy and informative items. Many thanks to them both for this year's newsletters.

#### Subscriptions for 1996

Subscriptions for next year remain unchanged. Ordinary subscriptions are \$14 (reducible to \$10 if paid by the due date); student subs are \$7 (reducible to \$5 if paid by the due date). An invoice for 1996 subscription accompanies this issue of the *Newsletter*.

Anthony Wright, Secretary/Treasurer, New Zealand Botanical Society December 1995

### Regional Botanical Society News

#### ■ Nelson Botanical Society

##### September field trip: Wairoa valley remnants

A good turnout of 30 for a great day. The main target stand of the day, although of only a few hectares, contains a remarkable number of locally important and threatened species. The stand is dominated by matai and black beech with a scrubby fringe. New additions included *Adiantum diaphanum* and *Coprosma obconica* (must be close to its type locality here). Perhaps a key find for the locality was four adult *Pseudopanax ferox*. On the lower terrace *Scutellaria novae-zelandiae* was far less evident than at the last visit because of cattle browsing and took some relocating. Nearby well browsed *Brachyglottis sciadophylla* also took some spotting. The bamboo ricegrass (*Microlaena polynoda*) was found to be quite widespread as small plants but one good clump was seen on the rocky bluffs. Other plants of interest were a fine-leaved clematis, *Botrychium australe*, narrow-leaved lacebark (*Hoheria angustifolia*), some good clumps of *Ileostylus micranthus* on *Coprosma propinqua* and totara and hybrids of *Melicytus micranthus* and mahoe as well as both parents. The area has over 30 species of ferns and 45 trees and shrubs.

After lunch we travelled further across the farm to Chrome Creek. Here titoki and matai forest remains in the stream gorge. Interesting areas included stands of narrow-leaved lacebark and quite a spectacular area of large matai, totara, rimu, kahikatea and miro with a ground cover of *Arthropteris tenella* (unusually far inland) and *Phymatosorus scandens*.

##### October field trip: Brooklyn Scenic Reserve

Just 6 turned up, perhaps the rest of you were discouraged by the heavy rain overnight. It was quite an easy saunter up through the pasture overlooking the reserve and examining the forest from the outside. *Brachyglottis repanda* and *Olearia rani* were in full flower. Several species, including matai were added

to the list in this way. At the old dam we pushed into the forest along an old pack track. Divaricating shrubs included odd forms of *Pseudopanax anomalus* and other plants of interest being *Libocedrus bidwillii* at low altitude and a very shiny form of *Alseuosmia pusilla*. In the time available the area was not adequately explored and several odd species on the list still need to be checked out.

#### Labour Weekend Camp: Puponga Farm Park

The well attended camp had great fine weather. Saturday morning started with a walk to Totara Avenue, a sandspit covered in tall totara with many baches hidden away. In places *Phymatosorus pustulatus* is often huge and abundant and there are large patches of orchids, mostly *Corybas trilobus* (now in seed) and occasional *Acianthus sinclairii*. At the edge of the vegetation *Ileostylus micranthus* was quite abundant on tree lucerne, *Coprosma repens*, hawthorn and totara. The afternoon was occupied by a walk to Fossil Point across Puponga Farm. On the farm the highlights were native passionfruit (*Passiflora tetrandra*), whau (*Entelea arborescens*), *Peperomia urvilleana* and huge puka (*Griselinia lucida*) growing on rocks. On the beach the special plants included the coastal sowthistle *Sonchus kirkii* and on the cliffs, *Euphorbia glauca*.

On Sunday we headed out for moorlands south of Green Hills Beach to see the dwarfed manuka/ kanuka shrublands. Here orchids and herbs poke through the "canopy". In the herb turfs sea holly (*Eryngium versicolor*) and *Poranthera microphylla* were common. On the return journey we traversed the dune slack forests through carpets of the broad-leaved grass, *Oplismenus imbecillis* and patches of *Arthropodium candidum* in search of the perching orchid *Drymoanthus adversus*. We encountered a large population, almost in flower. Finally it was out on to the beach of Wharariki and for a brief foray in the windswept vegetation of one of the islands. Laurie Metcalf had the pleasure of a close encounter with a seal in the short shrubland! Here the main attraction was perhaps the abundance of the ferns, *Asplenium obtusatum*, *A. terrestre* var. *maritimum* and *Blechnum banksii*, all largely confined to coastal areas.

On Monday the first visit was to Pillar Point forest. From the carpark the walk was up through recently burnt (about 1987) shrublands with dwarfed shrublands on the ridges, sedgeland on the slopes and gorse or sedgeland in the gullies. Interesting plants here were the abundance of *Pimelea longifolia* in full flower, the local heath *Epacris pauciflora* and the huge tussocks of the sedge (*Baumea tenax?*). In the short shrublands we encountered *Caladenia catenata* in flower and budding plants of *Orthoceras novae-zelandiae*. In the forest tanekaha and kawaka (with prolific regeneration) are near their southern limit.

In the afternoon there was a compulsory visit to Puklowski's covenanted area. This is a truly interesting small (5.7 ha) area of mostly young kahikatea, kawaka, silver pine, tanekaha and rimu. In many places the poles are a few metres apart yet over 20 m tall. So dense that few plants grow underneath. The area also does have huge old northern rata and pukatea carrying a large load of epiphytes among which *Pittosporum cornifolium* is abundant. For its size the area has a high diversity and was a fitting end to the weekend camp.

#### November Field Trip: Trig K

The first walk of the day was from the Canaan Road to Trig K. The forest on granite was mainly of rata-quintinia forest with scattered cedar. For the first part of the walk we searched every cedar to find only a few scraps of *Hymenophyllum malingii*; but found some large patches near the track later. Scattered yellow silver pine (*Lepidothamnus intermedius*) and the odd silver pine (*Lagarostrobos colensoi*) caused much confusion but perhaps the greatest interest was in a patch of *Pterostylis venosa* just coming into flower. *Archeria traversii* was quite common in the understory but unusually had yellow rather than red buds and flowers. One puzzle which attracted much attention was a hybrid between *Pseudopanax simplex* and *P. anomalus*. After lunch part of the party took a "short cut" back to vehicle and were rewarded with seeing several large patches of *Hymenophyllum rufescens* and *H. lyallii* amongst patches of large rocks.

The second brief walk was to an old marble quarry. The gently sloping flat rock surface near the quarry had quite a variety of limestone plants such as *Asplenium trichomanes*, *Meliclytus obovatus* and an extensive population of *Coprosma obconica*. Other plants of interest were a prostrate form of *Corokia cotoneaster* and flowers of *Pterostylis oliveri*. Sadly it is one of a few places around Nelson where I have seen *Dryopteris filix-mas*.

#### Forthcoming trips

November 19	Trig K Caanan
December 17	Gordons Knob
January 21	Rainbow

February        Yet to be decided  
New Year        Branch/Leatham  
Aniversary      Cobb

Graeme Jane, 136 Cleveland Terrace, Nelson

#### ■ Rotorua Botanical Society

The new address for the Rotorua Botanical Society is:  
The Secretary, Rotorua Botanical Society, c/- The Herbarium, Forest Research Institute, Private Bag 3020,  
Rotorua.

#### Editors

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## NOTES AND REPORTS

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### Plant records

#### ■ *Wilsonia backhousei* (Convolvulaceae) in New Zealand

##### Abstract

The discovery of *Wilsonia backhousei* R. Br. on Saxton Island, Waimea Inlet, Tasman Bay probably adds another indigenous species to the flora. The habitat there is consistent with those where it grows in Australia.

##### Keywords

*Wilsonia backhousei*; Convolvulaceae; Saxton Island.

##### Introduction

During a survey of Waimea Inlet in Tasman Bay, Nelson, in 1990 Shannel Courtney collected an unknown succulent from Saxton Island which was tentatively identified as *Spergularia rubra* (L.) Presl & C. Presl. In 1992 one of us (G.T.J.) encountered the same species and after discussion with Shannel agreed it was certainly not *S. rubra*, principally because of its bright green colour and closely prostrate growth form, so we then determined to collect the plant in flower. A visit in early November 1993 was too early to catch it flowering and one in late January 1994 revealed only a few shrivelled flowers, inadequate to determine the genus. Then several visits in November/December 1994 coincided with a massive flowering. From collections in November Rhys Gardner was able to identify it as *Wilsonia backhousei*, an Australian species in the family Convolvulaceae. By the second week of January 1995 most flowering had finished, but a thorough search then and subsequently resulted in no fertile seed or fruits being found.

Saxton Island covers a small area of about six hectares at high tide and is composed of a series of sand and gravel bars scarcely a metre above mean high spring tides. Much of the area shown on maps is covered in shrubland, but low-lying areas (recent additions?) are dominated by introduced grasses and fringed by the indigenous *Stipa stipoides* (Hook. f.) Veldk. The island has about six baches, some well hidden in the scrub and low forest. These areas are mainly dominated by wattle (*Acacia dealbata*), tree lucerne (*Chamaecytisus palmensis*), giant fescue (*Festuca arundinacea*), and salt-water ribbonwood (*Plagianthus divaricatus*).

*Wilsonia backhousei* grows on north-western and north-eastern shores and on three small sand bars connected to the main island in the south-east. The most extensive areas are in the north-east where this species occupies about 300 m of shoreline in two stretches. Altogether there are seven discrete populations and they mostly grow at prominent points. *W. backhousei* extends from around high neap tide level up into the *Stipa stipoides* grassland at high spring tide level. There it tolerates some shade from this fairly tall indigenous grass but a little further in, it appears unable to compete with introduced grasses such as giant fescue and marram, *Ammophila arenaria*. The plants generally grow in relatively stable areas with a gravelly substrate and in these places it can densely occupy a band up to 20 m wide on gently sloping shores. This substrate may be overlain by a thin veneer of shell or sand. In one place, as part of a much larger carpet of other herbs, it is found in quite deep sand, but there it appears yellowed and

stunted. It is absent from the loose gravel beach to the south west and from the soft mud which occupies much of the southern arc of the island.

One of us (G.T.J.) has examined nearby Oyster and Pig Islands for it. Oyster Island is generally too gravelly and no "suitable" habitat appeared to be present. On Pig Island suitable habitat appeared to be present but no plants were seen. Shannel covered all the other islands in the Waimea Inlet but did not record it elsewhere. Bells, Best and Rabbit Island are generally quite sandy and probably unsuitable for it. Some of the islets in the western part of the Waimea Inlet seem to be suitable but it does not grow there because they have been thoroughly explored. One of them contains two threatened species. A few places remain to be examined carefully but at present *W. backhousei* appears to be confined to the one island. In future the Waimea Inlet and its islets should be regularly monitored to see if *W. backhousei* will spread further.

The recent discovery and limited distribution of this species poses some interesting questions. How long has it been there? How did it arrive? Was it deliberately introduced or was it a hitchhiker on a bird, boat or some other plant brought to the island? Although it is widespread and well established on the island it does not appear to readily set seed suggesting its spread has mainly been vegetative, perhaps because a single seed arrived and the resulting plant is self-sterile. If it arrived by birds why isn't it more widespread? Perhaps it is a recent arrival.

*W. backhousei* seems to be a recent arrival because it is so restricted. It seems almost too much of a coincidence that the Australian *Atriplex cinerea* Poir. has its only modern New Zealand record at the opposite end of Waimea Inlet, and then only from one island. This island is hardly more than a shell bank used by nesting sea birds. In the last few decades several bird species have arrived from Australia and established here, including waders such as the Royal Spoonbill. The latter is a common sight in parts of the Waimea Inlet. White Herons have also been recently shown to regularly cross the Tasman Sea and are often seen around Tasman Bay. Not far away Farewell Spit also has a very large number of vagrants. The chances of a seed crossing the Tasman by birds may be quite high, especially for an estuarine plant such as *W. backhousei*, for propagules of wetland species are known to be carried on the feet and plumage of birds.

We considered the possibility that seed drifted to Saxton Island from Australia but it seemed to be a much less likely event, considering the topography of the whole Cook Strait region, than a chance arrival with a bird. Also, tolerance of prolonged immersion in salt water by the seeds is unknown although their small size could suggest that they might not survive such treatment. Even more unlikely seems to be the possibility of a seed arriving in a ship's ballast water. Therefore, we feel that it is most appropriate to treat this species as an addition to the indigenous flora of New Zealand.

#### Description of *Wilsonia backhousei* R.Br

Succulent herb or subshrub forming large dense mats reminiscent of *Selliera radicans* Cav. or *Suaeda novae-zelandiae* Allan. Branchlet systems flattened. Leaves to c. 13 x 4 mm, lanceolate, bright green (as in *Selliera* but in contrast to *Suaeda*), imbricate and curving forwards.

Flowers solitary and sessile. Calyx 5 - 6 mm long, tubular, with 5 tiny triangular lobes, which are fleshy and persistent. Corolla cream; tube 9-11 mm long, ampliate towards the apex and with a median constriction level with the calyx apex; lobes 5, 3-4 mm long, lanceolate, valvate. Stamens 5, inserted in upper part of tube and long exserted; anthers purple, twisted after maturity. Ovary bilocular, each cell containing 1 basal ovule; style long exserted, divided to c. two-thirds of its length; stigmas rounded at apex, green. Capsule enclosed by the accrescent calyx, not seen in New Zealand. Flowers in early summer. CHR 500066, Saxton Island, Waimea Inlet (Tasman Bay), *Jane*, Dec. 1994.

The habitat of *Wilsonia backhousei* on Saxton Island is consistent with its habitat in Australia. Although it is sometimes very common there it is often rare or absent in many apparently suitable habitats. Almost certainly destruction or modification of many coastal areas in modern times has greatly contributed to this decline and fragmented distribution. This has a parallel on tiny Saxton Island where the species has a restricted tolerance of the limited range of habitats and thus has a patchy distribution there also. Nevertheless, this salt-tolerant herb can form large dense mats close to high spring tide level, at least on Saxton Island.

#### Affinities of *Wilsonia backhousei*

The genus *Wilsonia* R.Br. is readily distinguished from any other member of the Convolvulaceae in the Australasian/Pacific region by its small succulent leaves combined with a tubular calyx which has lobes shorter than the tube. Within its family *Wilsonia* is probably most closely related to *Dichondra* Forst. &

Forst. f., at least within the New Zealand region. However, apart from obviously differing vegetative features, *Dichondra* species have a deeply 2-lobed ovary with 2 separate styles.

There are 3 species of *Wilsonia*, all of which occur along the coast in southern temperate regions of Australia from the south-west part of W. Australia to mid New South Wales and they sometimes grow inland in saline areas. *W. backhousei* has the widest range which encompasses the above two areas as well as Tasmania. It is easily distinguished from the other two species because of its narrow glabrous leaves and corolla tube 2 x calyx in length, whereas they have hairy and wider leaves and a corolla tube almost = calyx.

#### Acknowledgements

We are grateful to Shannel Courtney for his interest and advice and to Bryony Macmillan and Peter Heenan for useful comments.

G.T. Jane, 136 Cleveland Terrace, Nelson, and W.R. Sykes, Research Associate, Manaaki Whenua-Landcare Research, PO Box 69, Lincoln

#### ■ *Aphanopetalum resinosum* and other Cunoniaceae in New Zealand

##### Abstract

This note records an interesting new adventive for New Zealand. *Aphanopetalum resinosum* is the first member of the Cunoniaceae to be recorded as having this status. Other members of the family in this country are briefly reviewed.

##### Description of *Aphanopetalum resinosum* Endl.

*Aphanopetalum resinosum* is a liane forming a dense sprawling mass with long conspicuously lenticellate shoots. The opposite leaves are simple, unlobed (merely crenulate-serrulate), usually 4-7 cm long and elliptic, and the stipules are minute or absent. The inflorescence is usually a small cyme of tiny flowers which occasionally are solitary. The 4 green calyx lobes are 3-4 mm long but greatly increase (to c. 13 mm) in the fruiting stage, whilst the 4 petals are only c. 1 mm long and are cream. There are 8 stamens in 2 whorls, with very short filaments and unequal anther sacs. The 4-locular ovary has 4 ovules suspended from the top, above which are 4 free styles.

##### Discussion

*Aphanopetalum* Endl. has two species, both endemic to Australia. One is from West Australia and *A. resinosum* is indigenous to south-eastern Queensland south to southern New South Wales. In New Zealand neither species has been recorded in cultivation before as far as we are aware. The genus has several features which are unusual in the Cunoniaceae, particularly the lianoid habit, simple unlobed leaves, strongly accrescent (enlarging) calyx lobes and a 4 locular ovary with one ovule suspended from the top of each loculus. Of these four characters the first will easily distinguish *Aphanopetalum* from any other genus in the family because all the other 25-26 genera are upright trees and shrubs.

In New Zealand *Aphanopetalum resinosum* was planted in an old garden on St. John's Hill in Wanganui from whence it has spread vegetatively by layering (c. 25 m wide and 5 m upslope). Now it grows beyond this garden, having scrambled on to a roadside bank overhung with trees. In this situation it can be regarded as having the status of a casual adventive. *Aphanopetalum resinosum* apparently has not fruited in Wanganui although flowers are freely produced in summer and autumn and are represented in AK and CHR (Ogle 2596 & 2616) from Hillside Terrace, St. John's Hill, Wanganui, 2 May 1993.

##### Other Cunoniaceae in New Zealand

The short review of the family below outlines the status of the other members in this country which are indigenous and introduced into cultivation. In the second category several of the species are rarely grown, but three or four have been commonly planted in warmer areas. The commonest and most widespread member of this family in New Zealand is *Weinmannia racemosa* L.f., kamahi, often a dominant tree in our indigenous forests. The second species in this genus is *W. silvicola* A. Cunn., towai or tawhero, but this is confined to parts of the North Island north of Hamilton. The third indigenous member of the Cunoniaceae is *Ackama rosifolia* A. Cunn. whose natural range is even more restricted for it is confined to part of North Auckland. This species is treated by some modern authorities in the Chilean genus *Caldcluvia* as *C. rosifolia* (A. Cunn.) Hoogl. but there are distinct differences in wood, fruits and seeds between it and the single Chilean species. (Godley 1983, Webb & Simpson 1991).



*Weinmannia* with 190 species is the largest genus in the family and is widely spread across the Southern Hemisphere, northwards to Mexico and southwards to temperate Chile, where it is represented by *W. trichosperma* Cav., tinea. This is a small understorey tree in *Nothofagus* forests to c. 50°S. Vegetative features of this species are quite different to those of kamahi and tawhero whereas the inflorescence of all three species is similar. In addition, the flowers of *W. trichosperma* are fragrant. The Chilean species has pinnate leaves with 11-15-(19) pairs of small strongly dentate leaflets usually 2 cm long on flowering shoots, whilst between each leaflet pair is a broad tapering wing. *W. trichosperma* is occasionally cultivated in New Zealand.

The type genus of the family and its type species is *Cunonia capensis* L. from South Africa. This small tree has recently become fairly common in northern New Zealand gardens. It has large pinnate leaves with large pinkish-brown stipules and a large raceme of small, white, densely packed flowers. Superficially this inflorescence resembles the smaller kamahi inflorescence and indeed, the genera *Cunonia* and *Weinmannia* are closely related (Hufford & Dickison 1992). However, apart from its type, *Cunonia* with 17 species is confined to New Caledonia. This unusual disjunct distribution recalls that of the iridaceous genus *Dietes* which has five species in southern Africa and one on Lord Howe Island south of New Caledonia.

One of the commonest introduced species in the Cunoniaceae is *Ceratopetalum gummiferum* Sm., Christmas bush, from S.E. Australia. This ornamental shrub grown in more or less frost-free areas has attractive orange to red calyces which are strongly accrescent as in *Aphanopetalum*. The Australian timber tree, *C. apetalum* D. Don, coachwood, does not have highly coloured calyces and we have only very rarely seen it grown in New Zealand. Another Australian cunoniaceous plant grown here is *Callicoma serratifolia* Andr. from New South Wales and S.E. Queensland. The single species in this genus looks very different to any plant mentioned above. It forms a large shrub and has a large, simple, sharply-toothed leaf reminiscent of certain *Banksia* (Proteaceae) species, a further resemblance being the rusty-brown indumentum covering the young shoots and young leaves. The inflorescence of *Callicoma* is a dense globular head of flowers surrounded by involucre tracts. The white sepeloid flowers have prominently protruding stamens. As far as we are aware, the only genus in this family with these inflorescence characters is the New Caledonian *Codia* which also has simple leaves. We have not seen this in New Zealand. In having simple unlobed leaves *Aphanopetalum* resembles *Callicoma* and *Codia*, whereas all the other genera and species mentioned above except *Ceratopetalum apetalum* have compound or lobed simple leaves.

The small Australian genus *Bauera* Andr. has long been linked with Cunoniaceae although often segregated into a separate family, Baueraceae. However, recent phylogenetic studies indicate that this genus should be retained in the Cunoniaceae, for cladograms based on a number of vegetative and reproductive characters place *Bauera* close to *Aphanopetalum* (Hufford & Dickison 1992). In New Zealand *Bauera rubioides* Andr. and *B. sessiliflora* F. Muell. are commonly cultivated in all but the coldest areas of the country. They are both from S.E. Australia but the pedicellate-flowered *B. rubioides* is widespread there, whereas the sessile or subsessile-flowered *B. sessiliflora* is restricted to Victoria. Both have small opposite and sessile, trifoliate leaves which result in the shoots appearing to have whorls of 6 leaves, as well as small pink or rose flowers.

More aberrant in the Cunoniaceae than *Bauera* and therefore more controversially placed within the family is *Eucryphia* Cav. This genus is usually treated in its own family however Hufford & Dickison (1992) consider that it belongs to the Cunoniaceae although more distantly placed than *Weinmannia*. *Eucryphia* is a small genus of trees and shrubs with a distinctive Gondwanic distribution, two being from Tasmania, one is from mainland S.E. Australia and two are from temperate Chile. In addition, there are several cultivated hybrids and most taxa in this genus are sometimes cultivated in New Zealand. *Eucryphia* spp. and hybrids have pinnate or simple leaves, interpetiolar stipules, whilst the rather large flowers have a plurilocular ovary which develops into a tough leathery or even woody septical capsule. The evergreen *E. cordifolia* Cav. and deciduous *E. glutinosa* (Poepp. & Endl.) Baill., both from Chile, are the most likely to be seen.

Finally, it is appropriate to mention a "mystery plant" collected in the Urewera in 1983. The single plant was growing on a scree and no other plants have been subsequently found (Shaw, Beadel & Ecroyd 1989). Despite propagation and cultivation in several parts of New Zealand flowers have never been produced, but it seems that this little shrublet belongs to the Cunoniaceae (Garnock-Jones, Timmerman & Wagstaff in prep.) Furthermore, from the remoteness of the area where it was discovered it is presumed to be indigenous.

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## Acknowledgements

We acknowledge the original identification of *Aphanopetalum resinosum* by E.K. Cameron and R.O. Gardner at the Auckland Institute and Museum. We are also grateful to Professor P.J. Garnock-Jones of the School of Biological Sciences of Victoria University for useful advice.

W.R. Sykes, Research Associate, Manaaki Whenua-Landcare Research, PO Box 69, Lincoln, and C.C. Ogle, Department of Conservation, Private Bag 3016, Wanganui

## Research reports

### ■ The significance of *Empodisma minus* (Restionaceae) in mires of eastern Australia, with particular reference to the coastal marshlands of S.E. Queensland

In the coastal areas of Queensland from Bundaberg south behind a line of coastal dunes there is a vast low-lying predominantly flat area though with some degree of micro-relief. It is characterised by an acid, low-nutrient sandy soil, particularly deficient in nitrogen and trace elements, and a spectacular, distinctive vegetation rivalling rain forest in floristic diversity. The higher ground and sandy ridges are occupied by the Wallum, *Banksia aemula*, and other small trees; the flats have a heath vegetation interspersed with shallow lakes and peaty swamps drained by slow-flowing creeks. The climate of the region is subtropical with a wet season from mid-January to mid-May (late summer and autumn) and a dry season from June to September (winter and early spring) (Windolf 1985). As a result of the seasonal nature of the rainfall and the poor drainage, the lower areas become flooded in autumn and gradually dry out throughout the spring, although, since the water-table is permanently high, some shallow lakes and swampy areas persist except in extreme droughts. A similar type of terrain and vegetation extends southwards into NE New South Wales as far as Port Stephens.

One of these wetland areas, the Peregrian South Swamp (Fig. 1), provided the site of the present study made in July 1990 and October 1991. It occupies a depression at 26°29.9'S, 153°05.5'E with sloping sides approximately 1m high except at the southern end where it drains into Stumers Creek. The vegetation shows zonation according to the depth and permanence of the surface water and the ability of the plants to tolerate submergence. The floor of the depression, which normally contains standing water, is occupied by the reed-like sedges, *Lepironia articulata* and *Baumea rubiginosa*. On the lower part of the sloping sides, which remains flooded except during extreme drought, the vegetation is of a closed heath type up to 70cm in height, consisting of the shrubs *Leptospermum liversidgei*, *Pultenaea paleacea*, *Xanthorrhoea fulva*, *Boronia falcifolia*, etc. At a higher level there is a gradation to closed marshland which is only seasonally flooded. Here *Empodisma* plays a prominent part accompanied by such species as *Xanthorrhoea fulva*, *Sprengelia sprengelioides*, *Persoonia virgata*, *Boronia falcifolia*, etc., and a small amount of *Sphagnum australe*. At still higher levels, where the substratum is seasonally waterlogged for only short periods and at the time of our study was baked dry, the vegetation is a dry open heath-land type, 30 - 40cm in height, consisting of heath-type shrubs and a great variety of brightly flowering herbs.

One of the important plants in the marshland is *Empodisma minus*. It belongs to the Restionaceae, a predominantly southern hemisphere family, commonly known as jointed rushes or node rushes. The habit of the plant is illustrated in Fig. 2. *Empodisma* grows as clumps up to 0.3m high amongst other vegetation. In particularly favourable conditions it may reach a height of 1m. Its much branched, slender, straggling, wiry stems of diameter 0.5mm arch outwards over the surface of the ground and interlace with those of adjacent plants to form a more or less complete canopy varying in thickness but at times so dense that no light penetrates beneath. The leaves are represented by closely convolute sheaths, 6 - 8mm long, tightly enwrapping the stem and terminating in a green or brown subulate tip of length 2 - 6mm. Lying

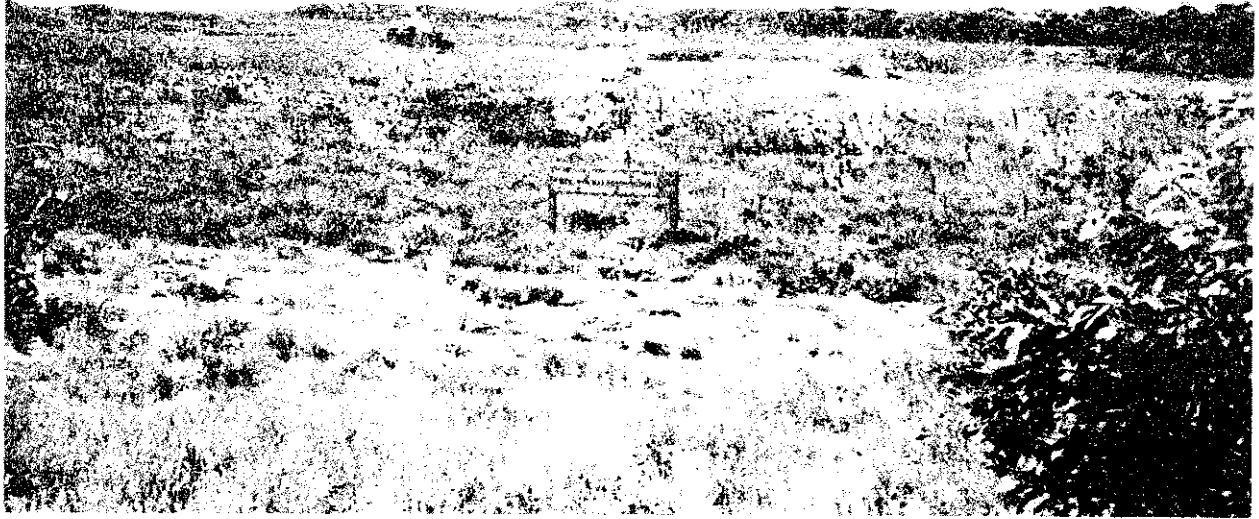


Fig. 1. View of the Peregian South Swamp

over the lateral bud and within the sheath is a membranous green scale 1mm long, margined along part of its length with crowded, filamentous, septate hairs which by their construction hold air between them and later lengthen to project as a white or tawny tuft from the top of the sheath. A more complete description of *Empodisma minus* is given in a paper by Johnson and Cutler (1973) and in several Floras, for example, Black (1960, as *Hypolaena lateriflora*), Willis (1962, as *Calorophus lateriflorus*), Moore and Edgar (1976, as *Calorophus minor*), Costin *et al.* (1979, as *Empodisma minus*).

However, it is the part of the plant below ground that is of greatest interest. By carefully separating out the clumps it can be seen that there is a stout rhizome some 5mm wide, usually lying more or less horizontally. Along the length of the rhizome there arise slender green shoots which grow upwards and tough roots, 0.5 to 1.5mm in diameter, many of which grow more or less horizontally and give rise to numerous fine roots, the finest of which are only 0.05mm in diameter. In addition, new shoots and roots may develop from lateral buds on partially buried stems, so extending the diameter of the clump. All the roots are covered throughout their length with closely crowded, persistent root hairs up to 1.0mm long, these being most conspicuous on the fine roots (Campbell 1964).

Under swamp conditions the fine roots are produced in great abundance (Fig. 2). Many of them grow erect, often vertically erect, above the surface of the ground and intertwine in a felted mat which in deep shade is white in colour but when exposed to light is pinkish. In deeply shaded areas they may form the sole cover to the ground surface (Campbell 1981). They build up around the stems of adjacent plants and grow over old *Empodisma* stems or any fallen twigs or leaves and engulf them.

The white mass of roots resembles *Sphagnum* moss in superficial appearance and in behaviour. It holds water like a sponge to fifteen times its dry weight, it creates acid conditions and its older parts are converted into peat (Fig. 3).

When the *Empodisma* roots are examined by sectioning, they show the presence of an aerating tissue which is lacking in the roots of adjacent sedges (Campbell 1964, 1981). The larger roots show an outermost piliferous layer bearing closely crowded persistent root hairs. A subepidermal layer consists of thin-walled cells, some of which may contain a magenta pigment giving the roots a pinkish tinge. The next four to six layers are of compact cells with slightly thickened, suberized walls of a yellowish-brown colour, and are

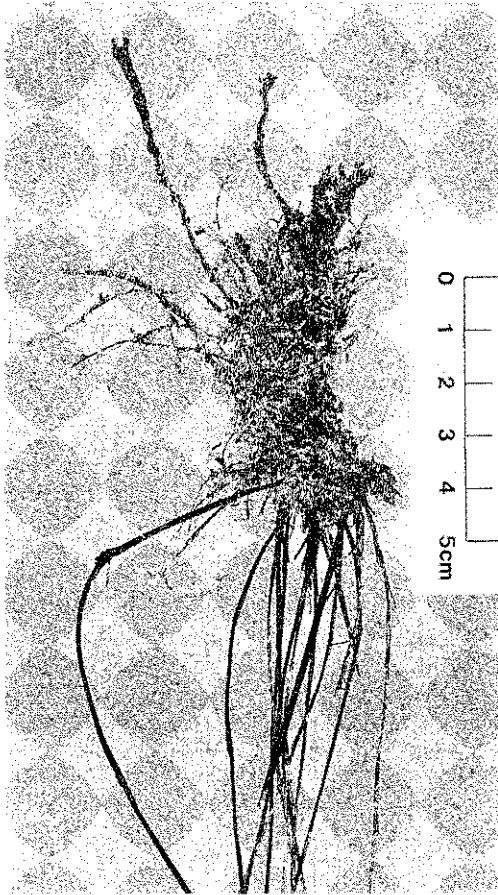


Fig. 2. Base of *Empodisma* showing root system

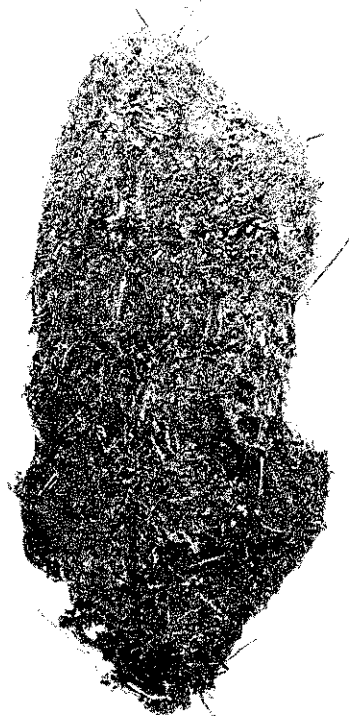


Fig. 3. Peat core from below an *Empodisma* plant

followed by a zone of aerenchyma, up to 17 cells deep, consisting of more or less spherical thin-walled cells interspersed with air spaces. The endodermis takes the form of scleroids with extremely thick, lamellated walls of an orange-brown colour. The central stele has a limited amount of conducting tissue and a ground tissue in the form of lignified, sclerotic cells. Fine roots differ in that the brown-walled zone of the cortex is 1 to 3 layers deep and is not suberized, the aerating tissue is only 1 to 2 cells in width, and the stele is progressively reduced in size until in the finest roots specialised conducting tissue is minimal and such ground tissue as is present is parenchymatous.

In the swampy ground, the larger roots are resistant to decay, the suberized zone of the cortex and the lignified central zone being particularly resistant. Gradually the roots are converted to a fibrous peat (Fig. 3).

In the warm, humid conditions of the Waikato district in northern New Zealand *Empodisma* flourishes and peat accumulates in sufficient quantity to form a raised bog which in some parts is 12m deep (Campbell 1964). But in the Queensland marshlands suitable conditions for peat formation are present for only part of the year. Dry conditions during the remainder of the year check the growth of the roots and hasten the disintegration of the peat with the result that there is no great accumulation. At Peregian there was a depth of 5 - 10cm of peat overlain by 3 - 9cm of felted roots. It is considered that in the Queensland marshlands *Empodisma* plays an important part in retaining water in the soils for a longer period than would otherwise be the case, thereby enabling this type of vegetation to be maintained. Even in the record drought of 1991, the peat beneath the *Empodisma* was still saturated with water, being well protected and shaded by a deep mulch of old *Empodisma* stems and the tangled mass of the green leafy stems belonging to the living plants. Following a fire *Empodisma* soon rejuvenates by shoots arising from the underground rhizomes (Harrold 1987).

The roots of *Leptospermum liversidgei*, which were previously reported to be peat components (Connor & Clifford 1972, Campbell 1983), were found to show no unusual features.

*Empodisma* occurs also on acid humic soils in other parts of New Zealand besides the Waikato; as well as in New South Wales, Victoria, South Australia and Tasmania. Sometimes it plays a prominent role as in the drier parts of the Swamp Forest at Myall Lakes, New South Wales where it builds large hummocks and peaty islands which become colonised by Wet Heath species (Myerscough & Carolin 1986). Such a pattern occurs as far south as Sydney. It is also prominent on wet terraces in the Sod Tussock Grassland of the Eastern Highlands and in wet subalpine areas in Tasmania. At other times the plants are too small and scattered to play a significant role in peat formation, as in depressions on sandstone near North Head, Sydney and around water-holes built for fire-fighting purposes in high rainfall forest in Tasmania, while on the soft, structureless, humic soil of the Hartz Mountains in Tasmania the *Empodisma* plants have a limited root system with few, if any, root hairs.

A few other Restionaceae besides *Empodisma* have upward growing roots with prolific development of white or pinkish root hairs, notably a species of *Loxocarya* from southern West Australia and the rare endemic *Calorophus elongatus* from Tasmania, but the number of plants involved is small.

#### Acknowledgements

We thank the photographer at the Botanic Museum and Herbarium, Brisbane for taking the photographs for Fig. 2 and Fig. 3, and J.E. Beever for identifying the species of *Sphagnum*.

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#### ■ **Comments on *Cassytha* (Lauraceae)**

All members of the remarkable genus *Cassytha* are twining parasites, possessing scale-like leaves which lack chlorophyll. At maturity they are all rootless, chlorophyllous (stems), lack tendrils but attach to their hosts by small stem houstoria (Weber 1981).

#### *Cassytha paniculata* moving south?

The distribution of the Australasian *Cassytha paniculata* or mawhai in New Zealand (see cover illustration) was given by Hooker (1853) as "Northern part of the northern North Island". Cheeseman (1906) recorded it as "North Cape to Ahipara and Mangonui". This distribution has remained virtually unchanged in all subsequent New Zealand flora treatments and is still true today for the main distribution of *C. paniculata*. But there are now several more southern populations known (ranked from north to south):

\* 35°12'S. Moturoa Island, Bay of Islands: "large clump on tea tree" *Lovegrove*, 27 Oct. 1985 (AKU 14236); *Douglas* 89/9, 17 Jan. 1989 (CHR 460590); *Asquith*, 25 Jan. 1990 (AK 188630). Because over 12,000 plants

have been planted on this island to assist natural regeneration (Young 1991), *Cassytha* has probably been accidentally introduced on other plants imported to the island.

\* 35°25'S. Near Ngawha Springs, Borehole Road: "uncommon, parasitic on *Leptospermum*" *de Lange*, 31 Dec. 1987 (AK 178549); "over manuka and gorse" *Beachman*, 16 July 1992 (AK 220587 and 220590). The latter two specimens are rather hairy for *C. paniculata*. All specimens are sterile.

\* 35°46'S. Maunganui Bluff: *Church*, 20 Nov. 1931 (AK 99863). This sterile specimen is rather hairy for *C. paniculata*.

\* 36°22'S. North Kaipara, south-east corner of Lake Kanono: local on tea tree, appeared to be natural, Nov. 1991 (P.J. de Lange pers. comm., 1995).

\* 36°30'S. Woodhill Forest, near Pukitu: thinned pine plantation, single sprawling patch c. 15m x 15m, grazed native ground cover, *Cameron 8190*, 10 Aug. 1995 (AK 224349). Because it is known to parasitise *Pinus radiata* it was most likely introduced accidentally on pine seedlings from Northland.

\* 36°42'S. South of Albany, Cuthill by Platts Native Plant Nursery: G. Platt planted two kanuka containing *Cassytha* in 1978, obtained from the Hamiltons of Warkworth (provenance: Mangonui), the *Cassytha* spread onto various shrubs and trees and along the roadside for c. 120m, *de Lange*, 19 Aug. 1995 (AK 224054, and G. Platt to P.J. de Lange pers. comm., 1995).

\* 36°51'S. Auckland University, Symonds Street: J.E. Braggins transferred *Cassytha* on a host plant from north of Kaitaia to a glasshouse some 10 years ago. It has grown vigorously and requires frequent pruning. Although it flowers profusely each year no fruit have ever been produced (J.E. Braggins pers. comm.).

\* 36°52'S. Western Springs Park, Auckland: on about 12 planted manuka, 1-1.5m tall, *Cameron 1471*, 16 July 1982 (AKU 14236); on manuka brought from Northland, *Esler*, 18 Dec. 1982 (AK 161351); scrambling up an 8m tall *Leptospermum*, *Robertson*, Feb. 1990 (AK 190024); only on three kanuka, presumably restricted by Council staff, 26 Aug. 1995 (pers. ob.).

\* 36°57'S. West Auckland, Waima, 5 Ngaio Road: single patch spreading for c. 8m on roadside shrubs, including a pink flowering Northland manuka, *Cameron 8209*, 26 Aug. 1995 (AK 223758). It has been present at this site for more than four years (C. Souljé pers. comm., 1995). Presumably introduced on the pink manuka.

\* 41°10'S. Upper Hutt, Pinehaven, Druce property: grew out from material collected on the Surville Cliffs, allowed to spread but became so rampant that Druce soon regretted this decision and eradicated it with some difficulty (A.P. Druce to P.J. de Lange pers. comm., 1995).

Of the ten mentioned sites above, *Cassytha* has definitely been introduced to five of them, probably been introduced to two others (Moturoa Id, Woodhill) and possibly spread naturally to the other three (Ngawha Springs, Maunganui Bluff and North Kaipara). Apart from Moturoa Id, these latter three sites are the most northern of the 10 localities. The fruit of *Cassytha* is a berry, enclosed by a succulent perianth tube (Webb *et al.* 1988) and is dispersed in Australia apparently by birds and probably also by possums (Weber 1981: 199). Presumably birds and possums distribute the fruit in New Zealand as well. Weber (1981: 200) suggests insect or wind pollination because of the quite long flowering period for *Cassytha* spp. *Cassytha* flowers are reported to be hermaphrodite and Weber (*loc. cit.*) suggests that the introrse stamens and the small flower size may possibly achieve self pollination. Because fruiting has not been observed in any of the isolated populations above, I think it is most likely that *C. paniculata* is self-sterile. Note - fruit should be fairly obvious on a plant as it takes around one year to ripen.

#### *Cassytha pubescens*

Allan (1961: 138) recorded from Waipoua *Cassytha pubescens* on nursery stock, herbs and shrubs as a probable adventive species from Australia. The oldest dated *C. pubescens* specimens in AK and CHR were collected in October 1934 by Cranwell, Moore and McKinnon (AK 99866-70, CHR 9039) on Monterey pine and in exotic plantations. Note - Waipoua is 40'S of the main distribution of *C. paniculata* in New Zealand. I have only seen one specimen outside of Waipoua proper: 35°43'S just north of Maunganui Bluff, *Mitchell*, 16 December 1985 (AKU 19428).

Sykes in the most recent New Zealand Flora (Webb *et al.* 1988) recognises one naturalised (*Cassytha pubescens*) and one native (*C. paniculata*) species of *Cassytha* in New Zealand. This is despite Weber (1981) uniting these two species in Australia under their older name *C. pubescens*. The reason Sykes

(loc. cit.) maintains both species is because he found Weber's arguments are not entirely convincing and that the two taxa are easily recognisable in New Zealand. Examining the *Cassyltha* specimens in AK herbarium (these specimens were apparently not studied for the recent New Zealand Flora) the distinction between *C. paniculata* and *C. pubescens* in New Zealand is not as clear as is given by Sykes.

#### Results

By far the most hairy *Cassyltha* specimens are all from Waipoua and can easily be separated from all other New Zealand *Cassyltha* specimens. Several sterile specimens appear too hairy for *C. paniculata* but are not as hairy as the Waipoua *C. pubescens*. For example: between Scotts Point and Twilight Bay, Matthews, 11 Feb. 1924 (AK 99864); Maunganui Bluff, Church (AK 99863); Ngawha Springs, especially Beachman specimens (AK 220587, 220590).

Apart from hairiness, one of the other key characters used for separating *C. paniculata* and *C. pubescens* in the Flora of New Zealand is: flowers mostly crowded in short spikes, 0.5 - 1.5cm long (*C. pubescens*), vs. flowers distant in long spikes, 2-10cm long (*C. paniculata*). Some of the AK Waipoua *C. pubescens* specimens have spikes up to 6cm long, e.g. AK 71251 and 222743.

#### Discussion

*Cassyltha* requires further study to see if the recognition of the two species within New Zealand should be maintained. It would be useful to acquire fertile material from the three localities cited above which contained *Cassyltha* rather intermediate in hairiness.

The remaining nine cited southern *Cassyltha* sites should be monitored closely to see if they ever set fruit. If produced then *Cassyltha* could readily increase south of 35°S. This will cause a philosophical problem for conservationists and land managers on how to view some of these new populations - as a weed requiring eradication or as a native naturally extending its range? Currently three sites might be natural southern extensions. Also, although Sykes in the Flora of New Zealand treats *C. pubescens* at Waipoua as a naturalised species he notes that it could possibly be indigenous. Because of the relatively recent first collecting date for *C. pubescens* s.str. in New Zealand (1934), its localness and its first recorded host being pines, I think this taxon is most likely a relatively recent introduction to New Zealand, probably introduced on tree stocks, an option suggested in the Flora of New Zealand, vols. I & IV. Across the Tasman Sea is a long way for a bird to retain a seed in its guts!

People should avoid transplanting plants long distances from *Cassyltha* areas as this seems to be the source of several of the new *Cassyltha* sites. In the Western Springs Lakeside Park draft Management Plan (1995: 70) the Ecology Section includes "use plant material sourced from within the Tamaki Ecological District". Implementation of this type of policy should avoid accidental introductions of *Cassyltha* in the future, although it was written to retain genetic provenances within local taxa. Northern nurseries should avoid having *Cassyltha* growing near their plants as it parasitises a very wide range of host plants (especially manuka and kanuka) and it is not always obvious when it has attached to a host.

#### Some questions to consider:

- How long has *C. paniculata* been in New Zealand?
- How long has *C. pubescens* s.str. been in New Zealand?
- Is *C. pubescens* s.str. native or adventive in New Zealand?
- What is limiting the spread of these two taxa in New Zealand?
- Are they both self-sterile?
- What pollinates *Cassyltha* in New Zealand?
- How are the seeds dispersed?
- Should we follow most recent Australian floras and lump *C. paniculata* into *C. pubescens* s.lat.?
- If we do not lump, what about the intermediate forms?

I favour lumping the two species, but recognising the very hairy Waipoua forms are probably an adventive element. Separating parts of a species into adventive and native elements is not new in New Zealand (cf. *Calystegia sepium* and *Geranium solanderi*).

I would be interested in receiving information on any other *Cassyltha* sites south of 35°S.

#### Acknowledgement

I thank Catherine Beard for illustrating *Cassyltha* for me, Peter de Lange for his information regarding three *Cassyltha* localities, Chris Soullé for bringing to my attention the west Auckland site, John Braggins for information on his "pot plant", and Bill Sykes for comments on a draft of this article.

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## Herbarium Report

### ■ Auckland Institute and Museum Herbarium (AK) Report for 1 July 1994 to 30 June 1995

#### Caring for the collections

Herbarium work has again focused on the databasing of specimens, both new acquisitions and the existing collection. With the assistance of Lottery Board grant funding, 42% of the herbarium (over 93,000 specimens) is now databased on the AKILLES electronic collection management system. This work was carried out by contract staff Kathryn Howard, Douglas Rogan and Cecelia Street. All lichens and bryophytes and all native vascular plants except for two thirds of the native dicotyledons have now been processed. A start has been made databasing the algae by Juliet Herrick processing 350 Victor Lindauer algae exiccatae specimens held in the herbarium.

Backlog collections databased included a selection of R.C. Cooper's *Hebe* collection, half of the recently gifted A.E. Wright fern herbarium and 59 vascular plant specimens collected from Lord Howe Island in 1993 and gifted by Catherine Beard. This work was completed by contract staff Rhys Gardner and Marcel Smits.

Most of the University of Auckland's herbarium is still temporarily stored within the Museum herbarium while a new room is built to rehouse their collection. Databasing of the University herbarium continues while it is in the Museum's care and is funded by the University.

#### Researching the collections and fieldwork

The annotated checklist of dicotyledon type specimens of New Zealand plants in the Museum herbarium by Juliet Herrick and Ewen Cameron was published in the *Museum Records*. The work was supported by a Lottery Board grant and covers 590 taxa. It is a fifth paper in a series and completes the documenting of New Zealand vascular plant types held in the Museum herbarium.

As part of the Department of Conservation survey of the Mokohinau Islands Nature Reserve, Ewen Cameron joined two Department of Conservation scientists and spent nine days camped on the remote Fanal (Motukino) Island. The last full botanical survey of the island was done by Anthony Wright in 1979. The work focused on vegetation and flora (especially threatened species), several permanent vegetation plots were put in, and the presumed damage by kiore was documented. A short visit to Tatapihi (Groper) Island was also included.

Ewen Cameron, Bruce Hayward and Anthony Wright, together with Bill Sykes from Manaaki Whenua - Landcare Research, spent seven days collecting plant specimens on Raoul Island in the Kermadec Group. These specimens complement the 1887 collections of T.F. Cheeseman and the 1956 collections of R.C. Cooper already held in the Museum herbarium and provide a further reference point in the documentary evidence of the distribution and conservation status of the Raoul Island flora against time.

Juliet Herrick spent four days on Stewart Island with Wendy Nelson from MoNZ learning techniques to collect and prepare algae herbarium specimens.

#### Acquisitions

Anthony Wright donated his private herbarium of New Zealand ferns to the Museum. The collection numbers 1354 specimens, mainly from northern New Zealand and was made between 1969 and 1980. The specimens are of a very high quality and make a valuable addition to the herbarium. Jessica Beever



donated her collection of 224 moss specimens from Waiheke Island collected in 1994. Waiheke Island is poorly represented in the herbarium. Over 300 new algae specimens have been collected by Juliet Herrick and Margaret Morley. This recent interest in algae is welcomed as they have been rather ignored in recent decades. Peter de Lange has made the biggest contribution of recent specimens, especially mistletoes and their hosts.

The Department's computer network was upgraded with two new machines and the network extended to the office and herbarium areas. The purchase of Index Kewensis on CD ROM has greatly aided the databasing of new taxa.

#### Volunteers

The Botany Department depends on its volunteers to mount and packet all new specimens. The weekly attendance of Charmaine Erb (3 months), Colleen Foster (since March), Kay Haslett, Vic May and Meryl Wright mounted nearly 4000 new specimens. Wendy Patterson completed gluing the 3311 donated A.E. Esler herbarium sheets onto standard sized herbarium sheets and proofed new AKILLES labels. Rhys Gardner assisted with difficult plant identifications and by mounting his Papua New Guinea specimens.

#### Visitors using the herbarium included:

I. Borowski, J.E. Braggins, A. Davidson, M.L. Fromont, N. Harcourt, M. Parsons, J. Salter from University of Auckland; K. Ford, W.R. Sykes from Manaaki Whenua - Landcare Research NZ Ltd; P.J. de Lange, S. Wotherspoon from Department of Conservation; M. Wedin, U. Swenson from Uppsala University; J.B.M. Browning, University of Natal; P. Champion, NIWA; J. Fuller, Waitakere City; M. Horricks, Environmental Science Research; A. Julian, Auckland Regional Council; T. Lumbsch, University of Essen; W.A. Nelson, Museum of New Zealand; B.S. Parris, Fern Research Foundation; J. Rapson, Massey University; S. Shoji, Tohoku University.

Private visitors: K. Boyer, J. Dyer, J. Espie, P.J. Matthews, P. Money, C. & S. Osborne, P. Paton, J. Petterson, L.D. Pryor, M. Reut, C. Stewart, A. Thomson and M. Wilcox.

Nine groups visited the herbarium, varying from 6 to 22 in numbers.

#### Donated specimens

Sarah Beadel, Catherine Beard, Jessica Beever, Alistair Jamieson, Peter de Lange, Rhys Gardner, Max Goodey, Gillian Crowcroft, Dan Hatch, Bruce Hayward, Lisa Forester, Margaret Morley, Graeme Taylor, Alan Tennyson, Anthony Wright and Maureen Young.

#### Staff

Curator	Ewen Cameron
Honorary Botanist	Lucy M. Cranwell
Honorary Research Associates	Rhys O. Gardner, Jeanne Goulding
Technician	Juliet Herrick
Technicians (contract)	Kathryn Howard, Shelley Mulhern, Douglas Rogan, Marcel Smits, Cecelia Street.

#### Statistics

New accessions		(1993-1994)
30 June 1995	222,950	
30 June 1994	<u>219,058</u>	
Increase	3,892	(7,865)

Records on AKILLES electronic database		
30 June 1995	93,136	
30 June 1994	<u>77,899</u>	
Increase	15,237	(20,005)

Exchange specimens		
Inwards 443 specimens from 5 institutions		(356 from 6)
Outwards 221 specimens to 8 institutions		(564 to 11)
Loan of specimens		
Inwards 35 [984 specimens] from 21 institutions		(20 [706] from 9)
Outwards 76 [1183 specimens] to 14 institutions		(79 [1956] to 15)
Total number of specimens out on loan = 5323		(5160)

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## BIOGRAPHY/BIBLIOGRAPHY

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### ■ Winifred Betts, pioneer New Zealand graduate in botany

Botanical science has helped provide the opportunity for women to enter into the scientific community in New Zealand. This aspect of women in science was referred to by Eric Godley in the Royal Society of New Zealand obituary to Lucy Moore (1).

Mary Winifred Betts (1894-1971, married name Aitken) had a notable scholastic career at the University of Otago and was a pioneer graduate with an M.Sc. in botany and is included in my study "New Zealand Women in Science". Winifred married Alexander Craig Aitken (1895-1967) in 1920. Alexander was to become a world-famous mathematician and Professor of Mathematics at Edinburgh University. Winifred and Alexander were an early husband and wife partnership in science where both had degrees; they are included in a compilation of notable husband and wife researchers in the above study.

Winifred was born in Nelson, the eldest child of Alfred and Ada Betts (née Grindley). She had three sisters and two brothers. Her father had a printing and stationery business, A.G. Betts & Sons (2) and the name is still used in Nelson though the business is not now owned by the Betts family.

Winifred was the only academic member in the family and began her education at five at a Convent School and then attended Nelson Girls' College where she won prizes each year and was good at mathematics and Latin (2). Winifred's daughter, Mrs Margaret Mott of Edinburgh records (2) an episode in her mother's formative years that emphasizes her interest in scholarly pursuits, "When she was 17 she won a scholarship to Otago University. Her father was very pleased and offered her the choice of jewellery or Webster's International Dictionary to commemorate the occasion; she chose the dictionary!". Mrs Mott relates that Winifred's first academic wish was to study medicine, "...but this was decreed to be 'unsuitable for a girl' by an influential aunt in Dunedin." Thus Winifred chose mathematics and it was in this class at Otago that she met Alexander Aitken. However, after one year she changed her mind, "...and from then on studied botany with single-minded and lasting enthusiasm" (2).

Winifred was an entrance Scholar at Otago and graduated B.Sc. and was Senior Scholar in botany (1915). She graduated M.Sc. in natural science (botany) with First Class Honours from Otago in 1917. She taught at Otago Boys' High School during World War I when the school adopted a policy of employing women in positions vacated by enlisted teachers (3). She was appointed Lecturer in botany at the University of Otago's Department of Biology in 1919 and remained in the Department until about 1924. It was in the days of Professor W.B. Benham (1860-1950) who was Head of the Department from 1898-1937.

Winifred published four research papers in Transactions (4,5,6,7) and the theme of her research was an attempt to relate the ecology of indigenous plants to their structure and anatomy, a research theme common at the time, and a topic for research for some other pioneer botany graduates. Winifred studied rosette plants at the Canterbury College Mountain Biological Station at Cass (6) and made pioneer studies on plants of the "mineral belt" near Nelson (4,5,7). There is an indication in the paper on rosette plants that further studies were contemplated by Winifred (6). However, as far as I know these are her only published items.

After their marriage, Winifred and Alexander moved to Edinburgh where Alexander studied mathematics. Alexander, like his wife, had a distinguished scholastic career at Otago and was Senior Scholar in Latin, pure mathematics, and applied mathematics and graduated M.A. from Otago (1919) with First Class Honours in Latin and French, and surprisingly, Second Class Honours in mathematics. He became Professor of Mathematics at Edinburgh University (1946-65). In addition to his ability at mathematics he was especially noted for his prodigious ability at mental arithmetic, and was also author of one of the most significant books about World War I, "Gallipoli to the Somme: Recollections of a New Zealand Infantryman" (8). Written in his war memoirs in 1917 (9), it was not published until 1963 and provides his own experiences as a New Zealand soldier. Alexander as a child is also accredited with the discovery of the royal albatross colony at Taiaroa Head (9), though the discovery which he made while living on the Otago Peninsula may have been a secondary albatross colony, closer to his home than Taiaroa Head (10).

The Aitkens had two children, Mrs Margaret Winifred Mott and Mr George Craig Aitken. Incidentally, George was in New Zealand in August 1995 to attend the Aitken Centennial Mathematics and Statistics Congress in Dunedin.

Winifred does not appear to have participated in botanical research after the mid-1920s, "...but devoted all her-considerable-energies to home and family" (2). However, up until 1929 she seems to have been associated in some way with the Royal Botanic Garden in Edinburgh because her address in the membership list of the Otago Institute between 1926 and 1929 is given as the Royal Botanic Garden, Edinburgh and Fenton (3) records that in Edinburgh Winifred taught at the University but soon gave up academic life.

#### Acknowledgements

I thank Mrs Margaret Mott of Edinburgh and Mr George Aitken of Coldstream, Scotland for kindly providing data about their mother. I also thank Mr Andrew Wallace for drawing my attention to the Aitken Centennial Mathematics and Statistics Congress in Dunedin in August 1995 which was attended by Mr George Aitken.

#### References

- (1) Godley, E.J. 1988: Lucy Beatrice Moore M.B.E., M.Sc., D.Sc. (Cantuar), F.L.S. 1906-1987. *Proceedings Royal Society of N.Z.* 116: 44-60.
- (2) Letter of 21 May 1995 from Mrs Margaret Mott to A.D.Thomson.
- (3) Fenton, P.C. 1995: "To Catch the Spirit: The Memoir of A.C.Aitken with a Biographical Introduction by P.C.Fenton". University of Otago Press. 123pp.
- (4) Betts, M. Winifred 1918: Notes on the autecology of certain plants of the peridotite belt, Nelson: Part I - Structure of some of the plants (No.1). *Transactions of the N.Z. Institute* 50: 230-243.
- (5) \_\_\_\_\_ 1919: Notes on the autecology of certain plants of the peridotite belt, Nelson: Part I - Structure of some of the plants (No.2). *Transactions of the N.Z. Institute* 51: 136-156.
- (6) \_\_\_\_\_ 1920: Notes from Canterbury College Mountain Biological Station, Cass. No.7 - The rosette plants: Part I. *Transactions of the N.Z. Institute* 52: 253-275.
- (7) \_\_\_\_\_ 1920: Notes on the autecology of certain plants of the peridotite belt, Nelson: Part I - Structure of some of the plants (No.3). *Transactions of the N.Z. Institute* 52: 276-314.
- (8) Aitken, Alexander 1963: "Gallipoli to the Somme: Recollections of a New Zealand Infantryman". Oxford University Press, London. 177pp.
- (9) Tee, Garry J. 1979: Alexander Aitken: master mathematician. *N.Z. Listener*, 6 January 1979.
- (10) Personal communication from George Aitken to A.D.Thomson, 6 September 1995.

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#### ■ Biographical Notes (20): Richard Henry Matthews (1835-1912)

R.H. Matthews was the son of Joseph Matthews (1808-1895) a catechist of the Church Missionary Society, who had arrived at Paihia, Bay of Islands, on 26 March, 1832. After a period at the Waimate North Mission Station, Joseph took up permanent residence at the Kaitaia Mission in October 1833; and on 16 December, 1833 he married Mary Ann, daughter of the Reverend Richard Davis of Waimate. The first of their 6 children, Richard Henry Matthews, was born at Kaitaia on 7 July, 1835. He was the second white child to be born there. Four days earlier William George Puckey had been born to Mary Ann's younger sister Matilda, and William Gilbert Puckey, Joseph's co-worker at Kaitaia (1).

On 21 December, 1835, the Beagle anchored in the Bay of Islands and remained until the 30th. On board was another missionary, Richard Matthews (1818-93), Joseph's younger brother. Fitzroy had planned to land Matthews on Tierra del Fuego with the three repatriate Fuegians whom he had taken to England on an earlier voyage, determined "to educate them and instruct them in religion at his own expense" (2). A station was begun at Wullaia on the Beagle Channel, but when Fitzroy returned from a surveying expedition "Matthews gave so bad an account of the conduct of the [local] Fuegians, that Captain Fitzroy determined to take him back to the Beagle; and ultimately he was left at New Zealand where his brother was a missionary" "I think we arrived just in time to save his life" (2).

On learning of Richard's arrival, Joseph must have gone across to Waimate, because Darwin met him there, and wrote: "some of the New Zealand forests must be impenetrable to an extraordinary degree. Mr Matthews informed me that one forest only thirty-four miles in width, and separating two inhabited districts, had only lately for the first time been crossed. He and another missionary, each with a party of about fifty men, undertook to open a road; but it cost them more than a fortnight's labour." (2).

Richard Matthews was to teach at the Kaitaia Mission until he went to the Mission at Wanganui in 1840 (3), while Joseph remained at Kaitaia all his life. In 1844 he was ordained deacon, and in 1859, after theological studies at St. John's College, Auckland, he was ordained priest by Bishop Selwyn. At last his flock could receive Holy Communion without waiting for a priest from Waimate (1).

As for Richard Henry's education, Matthews & Matthews (1) wrote: "Education for their growing families had been a problem to the missionaries, as both parents in each case had their hands too full to give the regular attention necessary, though the elder children had been taught to read and write. They were, however, fortunate enough to secure the services of Mr C. Davis (in no way related to R. Davis, Waimate), a Cambridge man, and in February, 1843, a school was opened, with three children in attendance - Richard H. Matthews, William G. Puckey, and Walter Puckey. — When the primary course had been completed, Mr Davis added Euclid, mathematics, Latin and Greek and later, botany. Matthews took the Greek classes, and was reputed to be strict and thorough". And Joseph wrote in his diary: "we gave him two years extra schooling under a good and faithful tutor and he learnt Latin and Greek and could read the Greek Testament well -". In fact Richard Henry hoped to be ordained (4,5). But that he was also a first-rate observer with a scientific bent is shown in his recollections of the great shark-fishing festival on Rangaunu Harbour in January, 1855 (TNZI 43, 1911). This extremely valuable and well-written account (which also includes notes on pigeon snaring and hawk trapping) shows what a talent lay unfostered in Kaitaia. If only Matthews had met someone like Hooker early in life we could have had another Colenso.

In 1860 Matthews married Clarissa Isabella Dunn, daughter of the Rev. C.B. Dunn of Oruru, near Mangonui. Family responsibilities now made theological studies at St. John's College impossible, but land was available. On 22 October, 1844, Joseph Matthews had been granted 1400 acres at Kaitaia, and this became 1170 acres on 15 February, 1859, under the Land Claims Settlement Act, 1856 (6). The northern boundary was the Awanui River, on the northern outskirts of present-day Kaitaia. In 1860, Ralph Pickmere (a forebear of Mrs Katie Reynolds, born Pickmere, of Whangarei) wrote: "Mr Matthews's eldest son Richard has a fine sheep and cattle run, and the second [Robert Noble] Herbert, is just going to locate on his, at Aurere River, about six miles from Mangonui..."(1). In the first Electoral Roll (1865-1867) Joseph Matthews's property is described as: "Kaitaia; farm known as Mangawhero in occupation of R.H. Matthews". And for Richard Henry the entry is: "Summerville (or Mangawhero) near Kaitaia". Similar entries are made until Joseph's death in 1895. The name "Summerville" was given by Richard Henry to the brick house that he built on a rise overlooking Kaitaia (now Vegar St.) using clay from the river bank nearby. This dwelling is photographed in (7). In 1905 Richard Henry and his sons built the still-existing wooden house next door, which is photographed in (5).

As well as the farm, Matthews ran the first Kaitaia Post Office in a verandah room at his house. In 1864 he was appointed superintendent of the native schools from Mangonui north, but after 5 years these were closed due to lack of attendance. In 1870 he went to the Thames for about 2 years in search of gold. Another venture was an unsuccessful flax mill. Indeed Joseph Matthews wrote in his diary on 9 March, 1876: "Well, our eldest son never had any taste for worldly business or farming - NOT THE LEAST -" (4). Yet Richard Henry was to become a successful builder, while at the same time giving long service on committees of all kinds - church, school, A & P and local body. He was also a J.P. and an interpreter at the court (5,7).

In April, 1893, when Richard Henry was 58, a new and exciting period began for him. A new teacher, Harry Carse (1857-1930) was appointed to the Kaitaia School (4), and although Carse was 22 years younger than Matthews, they became good friends and developed a mutual interest in plants. Unfortunately they did not meet Thomas Cheeseman, Curator of the Auckland Museum, and James Adams, Headmaster of the Thames High School, who passed through Kaitaia on their botanical expedition to the North Cape District. The botanists landed at Mangonui in late December, 1895, tramped westward, and descended to the mouth of the Awapoko River at the head of Doubtless Bay. Here, as Cheeseman wrote, they met "the Messrs Matthews who own a grazing run of considerable size in the vicinity" (TNZI 29, 1897). But these were Ludolph Joseph and Herbert Bismarck Matthews, sons of R.N.H. Matthews (see above) who died in 1881; and the run is still in their family (6). Next day, Kaitaia presented "a pretty and picturesque scene, well calculated to make the traveller linger on his way. But the time at our disposal was limited - We therefore passed on in the direction of Ahipara -". In any case we know that Richard Henry went to Kawakawa on New Years' Day, 1896 (6) and Carse would probably be on holiday.

By 15 December, 1896, however, Matthews was writing the first of his 113 letters to Cheeseman, and enclosed a specimen for identification - "I believe it is an orchid". He also stated that he and Mr Carse "have collected over 80 varieties of ferns within a radius of about 4 miles" and gives a list. On 10 October, 1898, Cheeseman described *Corysanthes matthewsii* to the Auckland Institute, and wrote: "I have pleasure in dedicating this pretty little plant to its discoverer to whom I am indebted for much interesting information respecting the botany of his district" (TNZI 31, 1899) Matthews's second important discovery was identified by Cheeseman (TNZI 33, 1901) as the Australian orchid, *Chiloglottis formicifera* - "a most interesting and unexpected addition to our flora".

In his early letters Matthews describes himself as not a botanist and not acquainted with the botanical names of many of the plants. He is "like a person groping in the dark" but takes considerable interest in collecting flowering plants. He asks Cheeseman for reference specimens and for advice on drying paper. And on hearing that Cheeseman is to "complete the new edition of Hooker's New Zealand flora" asks him to accent the botanical terms and names of trees and shrubs to show how they are pronounced. Cheeseman obliged with books, reprints, and specimens.

Matthews's isolation was not helped by the fact that from 1898 to 1891 Carse was teaching at Maungatapere, west of Whangarei, and then Mauku, south of the Manukau Harbour. However Carse visited Matthews in the summer holidays, and in August, 1901, he took Matthews to the Bald Hills and Waikato River. They were reunited in 1902 when Carse resigned from teaching and began dairy-farming near Fairburn just east of Kaitaia.

Matthews continued to send specimens to Cheeseman, extending the northern limits of *Lepyrodia (Sporadanthus) traversii*, *Pittosporum obtordatum* (TNZI 39, 1907) *Myrtus pedunculata* (TNZI 40, 1908), *Myrtus ralphii*, *Pseudopanax ferox*, *Microlaena polynoda* (TNZI 42, 1909), and *Melicactus micranthus* (TNZI 43, 1911). The records of 2 veronicas from Otago in TNZI 40, 1908, are clearly misprints for H.J. Matthews, no relation.

But Matthews concentrated most on orchids, and extracts from his letters to Cheeseman on this topic (and others) have been published by Hatch (8). In 1911 Cheeseman described *Thelymitra matthewsii* (TNZI 43) "dedicated to its discoverer who has added more to our knowledge of New Zealand orchids than any other observer of late years". And Carse, writing *On the Flora of Mangonui County: orchids* (TNZI 43, 1911) summed up this achievement as follows. "Botanists are greatly indebted to Mr R.H. Matthews of Kaitaia for the careful and useful work he has done in this section of botany. To Mr Matthews is due the discovery in the Mangonui district of *Bulbophyllum tuberculatum*, *Thelymitra ixioides*, *T. intermedia*, *Pterostylis micromega*, *P. barbata*, *Caleana minor*, *Calochilus paludosus*, *Caladenia minor* var. *exigua*, *Chiloglottis formicifera*, *Corysanthes cheesemanii*, *C. matthewsii* and *Gastrodia sesamoides*".

In his last letter to Cheeseman, on 27 March, 1912, Matthews gave information on the use of taraire and hinau fruits, and added: "Am in a parlous state, heart given out, dropsy from toes to breast, helpless. Kindest regards, R.H. Matthews." He died on 25 May, 1912, aged 76 (9) and is buried in the Anglican churchyard, Kaitaia.

Although his interest in plants was late to flower, Richard Henry Matthews is our first New Zealand born botanist. His work was carried on by his eldest son, Henry Blencowe, and by Harry Carse; and forty-nine years after his death Richard Henry was commemorated anew in a native forget-me-not, *Myosotis matthewsii*, based on his collections near Kaitaia in November and December 1898, 1899 & 1900 (10).

I am very grateful to Malcolm Matthews (Kaitaia) for help with this note, and also to Ewen Cameron (AK) for assistance with the Matthews letters.

(1) S.C. & L.J. Matthews *Matthews of Kaitaia*, 1940; with a portrait of R.H. Matthews and W.G. Puckey as old men, and a portrait of R.H. Matthews as a young man mislabelled R.N.H. Matthews; (2) C. Darwin *Journal of Researches* illustrated edition, 1890; (3) G.H. Scholefield *Dictionary of New Zealand Biography* 1940; (4) Ian F.N. Matthews *Kaitaia School, A History, 1875-1975*; (5) Florence Keene *Kaitaia and its People* 1989; (6) Malcolm Matthews *pers. comm.*; (7) *Cyclopedia of New Zealand* 2, 1902; (8) E.D. Hatch *Auckland Bot. Soc. Newsletter*; July, 1989; Jan, 1990; (9) Death Certificate; (10) L.B. Moore *FNZ*, 1961.

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## PUBLICATIONS

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### ■ Journals received

The New Zealand Native Orchid Group Journal 57  
(December 1995; ISSN 1170-4543). Edited by Ian St George. 40 pp.

CONTENTS  
Editorial:

- 2. Back to basics: I - Jurassic Park;
- 4. Back to basics: II - evolution and structure;
- 9. Back to basics: III - abnormal structures;
- 12. Back to basics: IV - the structure of the orchid flower in New Zealand. ED Hatch.
- 14. *Gastrodia cunninghamii* and *Gastrodia orobanchoides*.

Field trips:

- 17. More curious capers recorded by the *Corybas* crawlers' columnist. Eric Scanlen:
- 17: 1. Ngunguru, *Corybas rotundifolius* and all that.
- 20: 2. The Menzies/Talbot *Corybas cryptanthus* expedition.

Close relations:

- 23. *Thelymitra ixiooides* drawn by GV Scammell.

Notes:

- 24. Ecology of dust seeds. Insect pollination of *Thelymitra longifolia*.
- 25. Notes from China. Notes from Kai Iwi.
- Is *Corybas carsei* the same as *C. fordhamii*? Dan Hatch, Peter de Lange.

Orchid artist:

- 26. Norman Bruce Harvey

Australian notes:

- 29. Comparative reproductive biology of two sun-orchids; the vulnerable *Thelymitra circumsepta* and the widespread *T. ixiooides* [Orchidaceae]. MA Sydes & DM Calder.
- 32. Receptiveness to pollination. SA swamp orchids. *Pterostylis tasmanica* in SA.
- 33. The *Thelymitra venosa* complex in Victoria. Orchid seeds.
- 34. The influence of bush fires on seed germination. Orchids in Adelaide in August.
- 35. A list of the New Zealand Orchids.
- 38. *Pterostylis nutans* in New Zealand again.

Canterbury Botanical Society Journal 29

(1995; ISSN 0110 5892). Edited by Colin Burrows. 87pp.

CONTENTS

- 1. Information about the Society.
- 2. *Pseudopanax* on Banks Peninsula by Hugh Wilson.
- 3. The last kanuka landscape on the Canterbury by Colin Meurk, Peter Bellingham & Bryony Macmillan.
- 4. The Cass fire (27-28 May 1995) and its effect on vegetation by Dave Kelly.
- 5. Pollination and fertilization in the maidenhair tree, *Ginkgo biloba* by Brian Molloy & Bill Sykes.
- 6. *Schizeilema colensoi* in Canterbury: a new southern record by Kevin Platt.
- 7. A mighty silver beech by Warren Jowett & Ron Close.
- 8. Of cabbage trees and rhododendrons by D.F. Robinson.
- 9. *Aciphylla*: some smaller species by Neil O'Brien, Anne Acton-Adams & Neroli O'Brien.
- 10. List of locations of summer camps run by the Canterbury Botanical Society 1977-95 by Neil O'Brien.
- 11. Sawmill Road Bush, Bowyers Stream, Staveley mid-Canterbury by Colin Burrows.
- 12. Totty's Bush revisited by Neil O'Brien & Colin Burrows.
- 13. Desmids - jewels of the bogs by Paul Broady.
- 14. A visit to "The Island" - Lake Coleridge by L.E. Burrows.
- 15. Further germination experiments on the seeds of native plants by Colin Burrows.
- 16. Some localities for pygmy mistletoes in Canterbury by Colin Burrows.
- 17. The moss collector by Phyllis Thompson.
- 18. Errata.
- 19. Environment 2010 strategy: a submission by the Canterbury Botanical Society on the statement of Government policy on the environment by Roger Keey.
- 20. Maori customary use of native birds, plants and other traditional materials: a submission by the Canterbury Botanical Society in response to the position paper issued by the Conservation Authority by Roger Keey.
- 21. Canterbury Botanical Society (N.Z.) Inc. Forty-second Annual Report 1995.

Editors

## ■ New Zealand botanical reference books

Botanical research relies on the work of dedicated people and a resource of good reference texts. In New Zealand we have many books that, over time, have become the standard works for this part of the world. Changes in the New Zealand science sector this decade, however, have not made it easy for the book buyer to find stocks of some of these.

In 1993 Manaaki Whenua - Landcare Research inherited many of these books, including those previously published by the Government Printing Office and DSIR. Furthermore, there was the prospect of several new science texts being completed, with a need for someone within Manaaki Whenua to publish them. For these reasons, Manaaki Whenua Press was formed in August 1993 to publish and market science publications from the work of the Institute, and promote those already held. These include the *Flora of New Zealand* series, the old *DSIR Field Guide* series, and other reference works published by various institutions over the years. Here is a small sample of the titles:

*Flora of New Zealand*, Volumes I to IV;  
*Flora of New Zealand Lichens*, Galloway, 1985;  
*Flora of New Zealand Desmids*, Volume I to III;  
*Trees & Shrubs of New Zealand*, Poole & Adams, 1990;  
*Wetland Plants in New Zealand*, Johnson & Brooke, 1989;  
*Threatened Plants of New Zealand*, book by Given & Wilson, 1989;  
*New Zealand Threatened Plants*, a new poster by Malcolm & Johnson, 1995;  
*Poisonous Plants in New Zealand*, book by Connor, 1977;  
*Poisonous Plants in New Zealand*, poster by Brooke, Sykes & Webb, 1989;  
*Flowering Plants of New Zealand*, Webb, Johnson & Sykes, 1990;  
*New Zealand Beeches*, Wardle, 1984;  
*Vegetative Cover of New Zealand*, Newsome, 1987, including two maps.

Manaaki Whenua Press holds many more, including some new specialist texts. These are listed in our free catalogue of over ninety titles. The catalogue is also available via the Internet on the World Wide Web (see URL address below).

Several new botanical texts of interest to members are expected to be released over the next few years. *Flora of New Zealand Volume V - Grasses* is currently the work of Elizabeth Edgar, Henry Connor, Sue Gibb and staff at the Landcare Research Herbarium, while Colin Webb and Julie Shand are preparing a seed atlas of New Zealand. Bryony Macmillan has a checklist of mosses of Banks Peninsula ready to go to the printers, and a flora of New Zealand mosses is planned for completion in approximately seven to eight years by botanist Alan Fife. Also nearing completion is a list of current scientific names of taxa of dicotyledons and monocotyledons (except grasses) found wild in New Zealand, with standardised authorities, and an abbreviated reference. Features of the list include: synonyms since the relevant current Flora volume; common and Maori names as listed in the Flora volumes; reference to a current Flora volume if appropriate, with new or additional references; and a general statement on distribution within New Zealand for each taxon. The list is the work of Murray Parsons, Bryony Macmillan, Pauline Douglass, and other staff, and is expected to be published during 1996.

We operate a free-delivery mail order service on retail orders and can accept payment by VISA or Bankcard/Mastercard. Please note that all Bot Soc members will receive a 20% discount off orders placed before 1 April 1996.

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Most of our books are on display at the Canterbury Agriculture and Science Centre in Lincoln, so if you are in Christchurch, please come and visit us.

**Greg Comfort**, Manager, Manaaki Whenua Press, PO Box 40, Lincoln

### ■ New names, combinations or comments from the journals (3)

'A critical examination of the status of *Pernettya* as a genus distinct from *Gaultheria*' by D.J. Middleton & C.C. Wilcox: *Edinb. J. Bot.* 47(3): 291-301 (1990). It was concluded that *Pernettya* is not sufficiently distinct from *Gaultheria* to be maintained as a separate genus (most New Zealand botanists would strongly support this!). Two new names and fifteen new combinations within *Gaultheria* are given. The New Zealand ones are: *G. macrostigma* (Colenso) Middleton (syn. *Pernettya macrostigma*); *G. nubicola* Middleton (syn. *P. alpina*); *G. parvula* Middleton (syn. *P. nana*).

'A new combination in *Pomaderris* (Rhamnaceae) in New Zealand' by N. Walsh: *N.Z. J. Bot.* 30: 117-118 (1992). A new combination is made for the North Island endemic taxon formerly known as *P. oraria* var. *novae-zelandiae*. The new name is *P. paniculosa* F. Muell. ex Reisseck subsp. *novae-zelandiae* (L.B. Moore) N.G. Walsh.

'The identity of *Abrotanella christenseni* Petrie (Asteraceae)' by U. Swenson: *Compositae Newsl.* 23: 3-6 (1993). Swenson sinks Petrie's endemic New Zealand taxon into the Australian *Solenogyne gunnii* which is a naturalised species in New Zealand.

*Picris burbidgei* S. Holzapfel is described as a new native species for Australasia by S. Holzapfel & W. Lack: *Willdenowia* 23: 181-191 (1993). Five species of *Picris* native to Australia and one subspecies, are described as new. The new taxon *P. burbidgei* generally replaces the northern hemisphere name *P. hieracioides* in Australasia, but in Australia *P. hieracioides* is also present as a naturalised species which did not become permanently established.

'A revision of the genus *Picris* (Asteraceae, Lactuceae) s.l. in Australia' by S. Holzapfel: *Willdenowia* 24: 97-218 (1994). The genera *Picris* and *Helminthotheca* are revised for Australia (and New Zealand). 13 spp. are recognised, of which *Helminthotheca echioides* (oxtongue), *Picris altissima* and *P. hieracioides* are considered introduced. The other 10 spp. are considered endemic to Australia, with the exception of *P. burbidgei* which extends to New Zealand. Since this publication the Australian taxon, *Picris angustifolia* DC. subsp. *merxmulleri* Lack & S. Holzapfel, has also been recorded in New Zealand (see *New Zealand Botanical Society Newsletter* 39: 22; 1995).

'Notes on Davalliaceae II, a revision of the genus *Davallia*' by H.P. Nooteboom: *Blumea* 39: 151-214 (1994). Nooteboom accepts the Three Kings Islands endemic, *D. tasmanii*, but notes it resembles very much *D. canariensis*. "As a matter of fact, the only constant difference is the rhizome not being white waxy. Further research is needed to know whether this is derived from an early introduction."

'Checklist of pooid grasses naturalised in New Zealand. 2. Tribe Triticeae' by H.E. Connor & E. Edgar: *N.Z. J. Bot.* 32: 409-413 (1994). Twenty-one taxa of the tribe Triticeae are reported as naturalised in New Zealand.

A new species of *Drymoanthus* (Orchidaceae) from New Zealand, typification of *D. adversus*' by B.P.J. Molloy & L.M. St George: *N.Z. J. Bot.* 32: 415-421 (1994). A new species of orchid, *Drymoanthus flavus*, is described. It is known from the central North Island to Stewart Island.

'Taxonomy and typification of New Zealand *Geum* (Rosaceae)' by B.P.J. Molloy & C.J. Webb: *N.Z. J. Bot.* 32: 423-428 (1994). The new combination *G. cockaynei* is made and *G. parviflorum* s.str. is thought to be confined to South America; within New Zealand, plants previously known under that name comprise *G. cockaynei* and three other entities that require further taxonomic assessment.

'The status of names in *Hebe* published by Professor Arnold Wall in 1929' by P.B. Heenan: *N.Z. J. Bot.* 32: 521-522 (1994). In 1929 Wall published 14 new combinations in *Hebe*, which are accepted as being legitimate transfers for names previously placed in *Veronica*. Seven of these are no longer an issue as six are now placed in *Parahebe* and another is in *Heliohebe*. Three others are commonly grown garden hybrids.

The older name *Baumea arthropphylla* (Nees) Boeck. is being used in Australia [*Flora of NSW*, vol. 4 (1993); *Student's flora of Tasmania*, part 4B (1994)] for the Australasian sedge previously known as *B. huttonii* (Kirk) Blake.

'New combinations in North American *Schoenoplectus*, *Bolboschoenus*, *Isolepis* and *Trichophorum* (Cyperaceae)' by S.G. Smith: *Novon* 5: 97-102 (1995). Smith considers *Schoenoplectus*



*tabernaemontani* and *S. validus* are definitely conspecific. The older name is *S. tabernaemontani* (C.C. Gmelin) Palla and is considered native to the boreal to tropical zones of most of Eurasia and North America, the Caribbean, parts of Africa and temperate South America, Hawaiian and other Pacific Islands, Australia and New Zealand.

'*Chionogentias* (Gentianaceae), a new generic name for the Australasian 'snow-gentians' and a revision of the Australian species' by L.G. Adams: *Australian Systematic Botany* 8(5): 935-1011 (1995). 14 species and 10 subspecies are recorded for Australia, of which 12 and 8 respectively are newly described. New combinations are made for 27 Australasian species originally described under *Gentiana* (25 of these new combinations are for New Zealand species). Adams acknowledges that the New Zealand taxa are in need of further investigation and states that it would be premature to transfer all the published New Zealand *Gentiana* to *Chionogentias*. From *chion* (Gr.) - snow, hence the vernacular 'snow-gentian'.

*Fuchsia procumbens* is placed in a new section, *Procumbentes*, within the genus by E.J. Godley & P.E. Berry: *Ann. Missouri Bot. Gard.* 82: 473-516 (1995). *F. procumbens* earns this separation because of its basal position in the clad of South Pacific fuchsias and its large suite of unique characters. The four species of *Fuchsia* that are not native to the New World, three occurring in New Zealand and the fourth in Tahiti, are discussed in detail.

'New Zealand species of *Deyeuxia* P. Beauv. and *Lachnagrostis* Trin. (Gramineae: Aveneae)' by E. Edgar: *N.Z. J. Bot.* 33: 1-33 (1995). This revision recognises three new species: *Lachnagrostis ammobia*, *L. elata*, *L. uda*; two new subspecies: *L. littoralis* subsp. *salaria*, *L. pilosa* subsp. *nubifera*; and makes four new combinations: *L. glabra*; *L. littoralis*, *L. pilosa* and *L. tenuis*.

'Checklist of pooid grasses naturalised in New Zealand. 3. Tribes Bromeneae and Brachypodieae' by M.B. Forde & E. Edgar: *N.Z. J. Bot.* 33: 35-42 (1995). Twenty taxa of tribe Bromeneae and three taxa of tribe Brachypodieae are reported as naturalised in New Zealand.

'*Lepidium naufragorum* (Brassicaceae), a new species from Westland, and notes on other New Zealand coastal species of *Lepidium*' by P.J. Garnock-Jones & D.A. Norton: *N.Z. J. Bot.* 33: 43-51 (1995). The new species *L. naufragorum*, is described and it is compared with *L. flexicaule*, with which it had previously been included.

'Two new species of *Leucogenes* (Inuleae: Asteraceae) from New Zealand, and typification of *L. grandiceps*' by B.P.J. Molloy: *N.Z. J. Bot.* 33: 53-63 (1995). Two new species, *L. neglecta* from north-west Marlborough and *L. tarahaoa* from mid-Canterbury, are described.

'Checklist of dicotyledons, gymnosperms and pteridophytes naturalised or casual in New Zealand: additional records 1988-1993' by C.J. Webb, W.R. Sykes, P.J. Garnock-Jones & P.J. Brownsey: *N.Z. J. Bot.* 33: 151-182 (1995). 117 taxa are reported as additional or newly substantiated records for the weed flora of New Zealand during the six-year period 1988-1993. That is an average of 20 new naturalised species per year (excluding monocots)! One additional species, *Eremophila debilis* (syn. *Myoporum debile*) previously considered indigenous is now accepted as part of the naturalised flora.

'*Manoao* (Podocarpaceae), a new monotypic conifer genus endemic to New Zealand' by B.P.J. Molloy: *N.Z. J. Bot.* 33: 183-210 (1995). The monotypic genus *Manoao* is erected to accommodate *Lagarostrobos colensoi*, because the character states of *L. colenso* and those of Huon pine, *L. franklinii*, are so divergent as to warrant treatment as separate genera distinct from *Dacrydium*, *Halocarpus* and *Lepidothamnus*.

'Systematics of *Abrotanella*, an amph-Pacific genus of Asteraceae (Senecioneae)' by U. Swenson: *Plant Systematics and Evolution* 197: 149-193 (1995). 18 species are recognised, three new species are described including *A. fertilis* Swenson from New Zealand (southern North Island and South Island).

'*Danhatchia*, a new genus for *Yoania australis*' by L.A. Garay & E.A. Christenson: *The Orchadian* 11(10): 469-471 (1995). This new monotypic genus honours Dan Hatch who originally described *Yoania australis* in 1963.

**E.K. Cameron**, Auckland Institute & Museum, Private Bag 92018, Auckland

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## DESIDERATA

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### ■ Request for alpine species

Several species are required to complete a Masters thesis on weed invasions in an alpine National Park: seed (50) or young seedlings (30, less than one week old) of one or more of the following species - *Podocarpus nivalis*, *Coprosma pseudocuneata*, *Cyathodes pumila*, *Pentachondra pumila*, *Lepidothamnus laxifolius*, *Chionochloa flavescens*, *C. pallens* and *Raoulia grandiflora*.

**Charlie Palmer**, Plant and Microbial Sciences Department, University of Canterbury, Private Bag, Chch (Phone 03-364 2889 (day), 03-366 6762 (evening); e-mail c.palmer@botn.canterbury.ac.nz)

### ■ Request for seeds of *Lepidium oleraceum*

As part of our ongoing research into the taxonomy and conservation of New Zealand coastal *Lepidium* we are interested in obtaining seed from *Lepidium oleraceum* from as wide a range of localities within New Zealand (including the Chathams, subantarctics and other offshore islands) as possible as a basis for establishing a living collection.

Because *Lepidium* seed has short-term viability it is important that seed is sent as soon as possible after collection. Seed should be stored in paper bags (not plastic bags as the seeds are prone to mildew) with the collection details written on the outside of the bag. Please include details of location (including grid reference) and condition of population. We would also appreciate a photo of both the population (site) and a typical plant and if there is sufficient material in the wild also a small voucher including basal leaves where possible.

**David Norton**, School of Forestry, University of Canterbury, Private Bag 4800, Christchurch

### ■ Regional variation in mistletoe pollination rates

Readers of the Botanical Society *Newsletter* may have seen our recent article in the November 1995 issue of *Forest & Bird* magazine about the need for bird pollination of *Peraxilla* mistletoes. For those who did not, briefly, the two *Peraxilla* species (*P. tetrapetala* and *P. colensoi*) have large, bright red flower buds up to 4-5 cm long. These buds are unable to open themselves when ripe; on ripening they change colour from having a dark stripe to a uniform pink colour and sit there as buds. When a suitable honeyeater comes along (tui and bellbirds are the main pollinators, with a few references in the literature to kaka), the bird seeks out ripe buds rather than open flowers, which are ignored. On finding a ripe bud, the bird twists the top with its beak, which causes the flowers to spring open under turgour pressure in less than a second. The bird then inserts its beak into the flower and drinks the nectar, also hopefully transferring pollen to the stigma at the same time. Other birds such as silvereyes are seen around the flowering plants, but only tui, bellbirds and kaka seem to know how to open the buds. If buds are not opened, eventually the petals fall off the ovary still fused at their tips in a characteristic "octopus" shape. These flowers are called "explosive" and are common in mistletoes in Africa and occasional in India and south-east Asia, but have not been reported in Australasia before. The same sort of mechanism is also seen in other plant groups such as mangroves. What is relatively uncommon about the *Peraxilla* mechanism, even among explosive flowers, is that they will almost never open if an animal does not come along; many of the overseas flowers are explosive when the buds first ripen, but will later self-open if not visited.

This leads to the question of what happens if a bird does not open a particular bud? Both species of *Peraxilla* are capable of self-pollination inside the bud, but fruit set rates under these conditions are low (c. 15-20%) compared to the fruit set rates when adequate pollen is supplied to the flower after opening (50-80%). This means that seed set rates may be depressed if pollinator numbers are too low in an area, which is why we want to (indirectly) measure the pollination rates across the country. Adequate fruit set is necessary for the maintenance of mistletoe populations, as old plants are continually dying when their host branch or plant dies.

Normally, measuring bird-pollination rates would require time-consuming direct observation of plants in flower. Because of the unusual non-opening buds, however, it is possible to determine after the event how many bird visitors have been on a *Peraxilla* plant. If a bud has never been visited, it will not have opened; if it has been visited, the petals will have been sprung and will be bent back (see diagrams). There is regional variation in the fraction of flowers which have been opened in different parts of the country, as

explained in the Forest & Bird article. For example in Eastbourne where we had a single isolated *P. tetrapetala* plant, very few of the buds had been opened; at Waipori Gorge south of Dunedin only about half the *P. colensoi* buds were opened. At our main study sites (Craigieburn and Wakefield near Nelson), nearly all the buds were being opened. Suzan Dopson from Victoria University has been working on these species in the Central North Island. At Suzans Mt Ruapehu study sites, few buds were opened in her first year of field work, but the past summer the opening rates were quite high, as though the birds had got the hang of it all.

Therefore, we would welcome the help of readers of this *Newsletter* in gaining a better picture of regional variation in pollination visitation rates to *Peraxilla* species. We have drawn up a survey form which we would like completed by anyone who has a patch of mistletoe plants nearby which they could observe over the coming flowering season (flowering occurs over about three weeks sometime between early December and late January, depending on the site and species). As well as information about the flowering of *Peraxilla*, we would also be grateful for information about flowering times or fruiting times for the other species of native mistletoe, although these are not the main focus of our research at present. The form and some explanatory notes follow. Depending on the species of mistletoe, not all sections of the form will be relevant, but any help you could offer would be most appreciated. In return, we will send back to all contributors a summary of the national picture that we are able to build up from the information we collate.

**Dave Kelly and Jenny Ladley**, Botany Dept, University of Canterbury, Private Bag, Christchurch, and **Alastair Robertson**, Ecology Dept, Massey University, Private Bag 11222, Palmerston North

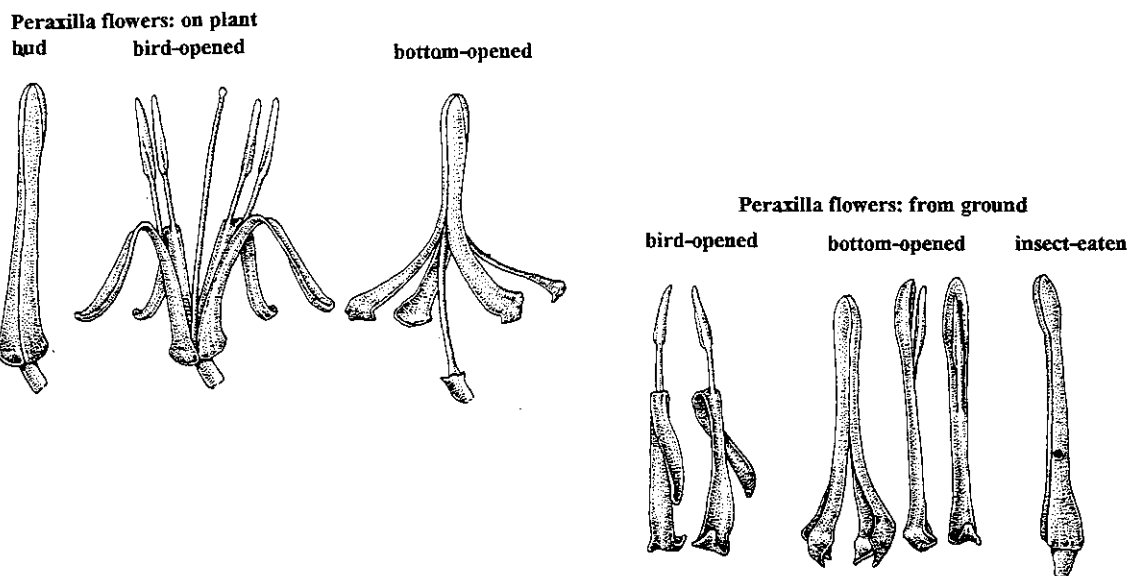
Explanatory Notes to accompany Mistletoe Survey Form

A. Site Information

We may wish to revisit the site in future years so grid references are best - otherwise a detailed description of how to find the site is needed.

B. Flowering Stage

The point of this section is to give an idea of geographic trends of flowering time as well as information on how well the plants are pollinated by birds. From the proportion of flowers that are still in bud, opened (requires a bird in *Peraxilla*), or opening from the bottom (birds failed to open: see diagram), we get information on flowering time and on whether the plants are being regularly pollinated. The three classes of flower are easily recognised and can even be done with binoculars if the plants are moderately high in the canopy.



C. Flowers off the ground (*Peraxilla* only)

This needs to be done a week or two after the flowers first appear. Typically, the flowers break into the four petals as they fall to the ground. However, the petals retain features that enable them to be classified into bottom opened, bird opened, or insect damaged. Flowers opened by birds have the top part of the petal reflexed back 180 degrees or even more (see inset). Bottom opened

flowers reflex only about 90 degrees or less. Insect damaged flowers shown signs of chewing such as circular exit holes, particularly near the base, or copious frass inside the bud, and cannot be classified into bottom-opened or bird-opened and so should be put into a separate category.

**D. Fruiting time**

We are interested in when fruits become ripe. Each species starts green and goes through a characteristic colour change as the fruit matures; all species except for *P. tetrapetala* also swell and become very soft.

Species	Colour of Mature Fruits
<i>Peraxilla colensoi</i>	yellowish orange
<i>Peraxilla tetrapetala</i>	skin softens, fruit becomes dark green, particularly at the apical end where a dark ring may develop
<i>Alepis flavida</i>	red or yellow
<i>Tupeia antarctica</i>	white with purple flecks
<i>Ileostylus micranthus</i>	yellowish cream

<b>Mistletoe Flowering and Fruiting Survey</b>	
<p><i>When completed please return to Alastair Robertson, Ecology Department, Massey University, Private Bag 11222, Palmerston North, or fax 06-350 5623</i></p>	
Observer's name	_____
Contact address	_____ _____
Phone number	_____
<b>A. Site Information (all species)</b>	
Mistletoe species	_____
Date	_____
Site	_____ Grid Ref _____
Altitude	_____
Approximate number of mistletoe plants in vicinity	_____
<i>If flowers present, complete parts B and C; if fruits present, complete part D.</i>	
<b>B. Flowering stage</b>	
Visual estimation on a typical plant of proportion of:	
Buds (%)	_____
Open flowers (%)	_____
Bottom open flowers ( <i>Peraxilla</i> only, %)	_____
Birds observed on flowers? Name bird species	_____
<b>C. Flower visitation rate (<i>Peraxilla</i> only), Flowers off the ground (record number in each category)</b>	
Bottom opened	_____ petals plus _____ complete flowers
Top opened	_____ petals plus _____ complete flowers
Insect damaged	_____ petals plus _____ complete flowers
<b>D. Fruit ripening stage (all species)</b>	
Estimated % fruit ripe	_____

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## FORTHCOMING CONFERENCES/MEETINGS

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### ■ Australasian Mycological Society, and a Mycological Conference

All those with an interest in fungi, be it amateur or professional, are invited to join the recently formed "Australasian Mycological Society". The Society, soon to be incorporated in Canberra, has as its main function "to promote the study of fungi". President is Jack Simpson, Forest Pathologist, State Forests of New South Wales. Current membership of AMS is about 75.

The Society produces a quarterly newsletter with articles including local mycological news, new records, reports on collecting trips, notices of conferences and forays, and conservation issues. The newsletter began as the Australian Mycological Newsletter in 1990. Contributions are welcome from all members.

Membership of the Society is through nomination by an existing member. Nomination forms are available from Peter Buchanan, NZ representative on AMS Council. Subscription is AUS\$20.00 per annum.

The Society's first meeting will be held in conjunction with two commemorative botanical conferences at Melbourne Botanical Gardens, 30 September - 5 October, 1996. At least one day is planned for a Mycological Conference, plus a day's post-conference field trip (dates yet to be finalised). Dr David Hawksworth, Director, International Mycological Institute, U.K., is among several invited guests. For further information on the Conference and field trip contact the Society secretary:

Tom May, National Herbarium of Victoria, Birdwood Avenue, South Yarra, VIC 3141, AUSTRALIA. fax. 0061-3-9252 2350

The botanical conferences celebrate the 150th anniversary of the founding of the Melbourne Botanical Gardens, and the 100th anniversary of the death of Baron Ferdinand von Mueller, a leading early Australian botanist.

**Peter Buchanan**, Manaaki Whenua-Landcare Research, Private Bag 92170, Auckland (ph. 09-849 3660; fax. 09-849 7093)

### ■ Tenth New Zealand Fungal Foray

Outdoor Pursuits Centre, Hunua Falls evening of Monday 6 May to morning of Friday 10 May 1996.

The Outdoor Pursuits Centre is in the Hunua Ranges, about 45 minutes south of Auckland City. The Ranges include areas of coastal forest, regenerating *Leptospermum/Kunzea* dominated forest, as well as small patches of *Nothofagus truncata*. The variety of forests should provide great collecting (depending of course on the weather ...). A limited number of microscopes, driers, etc will be provided.

Depending on demand, a pre-foray visit (on Monday May 6) to the *Metrosideros* forests on the lava flows of Rangitoto Island may be arranged.

The cost for the lodge style accommodation will be approximately \$10 per night. There is an additional cost for food, which will be prepared by our famous, long-term resident chef. You will need to provide your own pillow case, sleeping bag or sheets and blankets. A limited number of grants toward the daily cost and/or transport to the foray are available for students. More information is available from Peter Johnston.

Space is limited, if you would like to attend, please register your interest as soon as possible (see form over leaf).

**Peter Johnston**, Manaaki Whenua-Landcare Research, Private Bag 92170, Auckland (Email: johnstonp@landcare.cri.nz; phone: 09-849 3660; fax: 09-849 7093)

**Registration for Fungal Foray, Hunua, 6-10 May 1996**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Number attending: \_\_\_\_\_ Deposit (\$30/person) enclosed: \$ \_\_\_\_\_

I require assistance with transport from Auckland City: \_\_\_\_\_

I am interested in the pre-foray visit to Rangitoto Island: \_\_\_\_\_

*Acknowledgements: Thanks to Antoinette Nielsen and Ewen Cameron who produced the camera-ready copy for the printer.*

