

Along with Peter Williams (Botany Division, Nelson) Roland Heine (Nelson), Jan and Arnold Heine (Lower Hutt) and Barry Spring-Rice (Rotorua), we were on an expedition to study the vegetation and flora of Bald Knob Ridge and the "Turks Cap". Range in North-west Nelson.

Bald Knob Ridge is some 9km long, narrow, north-south trending, and lies between the Owen marble massif to the east and the Mairi plateau to the west. It rises only a few hundred metres above a silver beech bushline and is composed of granite at its southern end and Tertiary sedimentary rocks at its northern end (mostly calcareous mudstone and sandstone, but with some limestone lenses also). Much of the surrounding country bears scars caused by the Murchison earthquake of 1929. Although the ridge itself is relatively gentle and easily traversed, access is not straightforward as there are no tracks leading to the tops.

On the first day, all except one of us (SC) had flown in by helicopter to the northern end of Bald Knob Ridge and established a base camp at the bushline. On the second day of the expedition we take up our separate stories.

(Tony Druce) The day dawned perfect on the tops but below us the whole of the Buller basin was filled with a sea of fog. Down there somewhere Shannel was sloggering his way up from the Owen Valley. We had arranged to meet late in the afternoon towards the southern end of the ridge. We slowly worked our way south, stopping at intervals to record and photograph the vegetation and plants. By mid-afternoon we were nearly at the end of the Tertiary rocks which were limestone at this point. Here three of our party waited while Peter, Jan and I descended some 200 metres to a saddle where the rocks changed to granite. On looking over the summit ridge I was relieved and delighted to see Shannel, heavily laden, slowly climbing up below us. (Little did I guess at this time that both Shannel and the other three had in their hands specimens of *Hebe mathewsii*.) When I met Shannel some 15 minutes later he wasted no time in producing a piece of a *Hebe*, unknown to either of us, that he had collected on the way up. Later, when the whole party had reassembled further north along the ridge, Roland casually asked me what a *Hebe* was that he had collected in the limestone area where the three of them had waited - he had seen only one plant and he didn't know what it was. There was no doubt about it - it was the same as Shannel's!

I don't remember exactly when I entertained the idea that this *Hebe* might be the long-lost *H. mathewsii* but it was some time after I returned to Wellington. I found out later that Shannel had independently had the same idea. I looked up *H. mathewsii* in Cheeseman's "Illustrations" and obtained on loan the type specimen from the Auckland Institute and Museum (AK 7955, Humbolt Mountains, Otago, H J Matthews). There seemed little doubt that the plants on Bald Knob Ridge belonged to this species.

The two pieces that had been collected were carefully looked after for the rest of the trip, lasting nearly a week, and used for cutting material when we got back - Roland in Nelson and myself in Pinehaven. When I last heard, Roland's had not rooted; but my two have, and are now (28.8.89) potted up and beginning to grow. Further cuttings will be taken as soon as these two plants have branched.

(Shannel Courtenay) While the rest of the party were travelling southwards along Bald Knob Ridge I made my way on foot to keep the rendezvous. My route started from the east branch of Johnston Creek, a tributary of the Owen River. I followed this up to a major headwater fork and from there took a leading spur to arrive at the bushline at 1250m (grid ref. M28 625568).

On the ridge, several metres above me, I noticed a small group of robust-

looking plants of a *Hebe* species I wasn't familiar with. They were wide-spreading, low-statured shrubs reaching a height of about 70cm. The leaves were dark green, shiny, fleshy, about 3cm long and elliptic-oblong in shape. Some secondary venation was evident on the leaves which were all twisted at the petiole into one horizontal plane, along the spreading branches. The distinguishing features of the plants were their stoutness, the semi-succulence, shininess and size of the leaves (relatively large for an alpine *Hebe*), and the absence of a sinus in the leaf-bud.

The colony was on a substrate of light, chalky, calcareous siltstone, and the site was quite open and dry. The community in which the *Hebe* plants grew was dominated by *Poa colensoi*. Associated small shrubs and herbs were *Gaultheria* sp. (unnamed), *Coprosma chryseumii*, *Cassinia leptophylla* var. (*C. vaucillier-vii*), *Cebastis spectabilis* var., *C. monroi* var., and sparse tussocks of *Chionochloa pallens* var.

A cursory scout in the general vicinity of the colony revealed no further plants to add to the three or four seen in this small area.

CONCLUSION

As far as we know, the original plants of *Hebe mathewsii* are no longer in cultivation in New Zealand. Mr L J Metcalfe, Director of Parks and Recreation, Invercargill, does not have any, but it is possible that some are still in cultivation in Dunedin Botanic Gardens. Linda Kristensen who has recently been in New Zealand from Denmark made enquiries for us as to whether the species was still cultivated in Europe and apparently it isn't. However, the British author, Douglas Chalk, in his book "Hebes and Parahebes", published in New Zealand by the Caxton Press in 1988, lists *H. mathewsii* as "mostly a border filling shrub", thereby implying that it is still in cultivation, at least in Britain.

The rediscovery of *Hebe mathewsii* in North-west Nelson, 370km north-east of the Humboldt Mountains, after a lapse of more than 83 years, leads us to expect that the species will eventually turn up somewhere in between. At present, though, we know of only some four or five adult plants in the wild, no seedlings, and two (perhaps four) rooted cuttings in cultivation. A search in the Humboldt Mountains could show whether the species still survives there.

Rangi's Bush, Pukerua Bay

Maggie Wassitjeff

INTRODUCTION

Rangi's Bush is a small (4.17ha) remnant of low kohekohe forest located just north of the Whenua Tapu cemetery (NZMS1, Sheet N160/414505; NZMS 260, Sheet R26/674157). The stand of forest occurs on a gentle slope of colluvium at the foot of hills that border the Pukerua Fault. The land is flat in the eastern sector, slopes gently down to a small stream that bisects the stand and rises gently to a smaller area west of the stream. The soils of the area are loessial loams and land surrounding the forest has been successfully converted to pasture. The altitude is 60m.

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Members of the Wellington Botanical Society visited Rangī's Bush in July 1983 and carried out a vegetation sampling exercise to gather information on the structure and composition of the forest.

HISTORY

The following information about Rangī's Bush was provided by Christina Carrad. The forest is part of Wairaka Farm which is jointly owned by K F Gray and J Carrad. Ken Gray reports that the area around Rangī's bush was once farmed by a hermit named Rangī Wall. The remains of a house including bricks and rubble are still evident on the eastern side of Rangī's Bush near the railway line.

Sheep and cattle grazed the forest until it was fenced in 1983.

METHODS

Seventy point intercepts were taken at four parallel transects at 10m intervals. The transects ran through the stand in a north-south direction, parallel to the nearby Main Trunk Railway. The intercept data were used to provide information on species contribution to canopy, understorey and ground cover. Species frequencies and their contribution to the stand's basal area were gained by measuring all stems greater than 30mm circumference at breast height in seventeen quadrats of 5 × 10m located through the stand.

All seedlings and saplings up to 2m in height were counted in 50 circular plots of 1m radius. In addition, circumference at breast height measures were made on 893 plants located in the eastern sector. These measures have been analysed for species frequencies only.

RESULTS

Vertical Structure of Stand (Table 1)

The stand has a closed canopy around 8m in height dominated by kohekohe but with lesser contributions from mahoe and tawa. The upper understorey (defined as vegetation below the canopy but above 2m) is mainly kohekohe. A lower understorey tier (defined as vegetation between 0.3 and 2m) is absent. The ground cover (any intercept below 0.3m) is mainly leaf litter. Ferns occur sporadically. The absence of an understorey tier and the paucity of the ground flora are a legacy of the browsing and grazing activities of stock that had access to the stand until early 1983.

QUADRAT ANALYSIS

The stand has an average density of 4900 stems/ha and a basal area of 63.8m²/ha. Kohekohe stems make the greatest contributions to these measures (Table 2). Although 81% of the stems are kohekohe their contribution to the stand's basal area is only 68%. This is a reflection of the numerous small-sized stems of kohekohe. There are fewer stems of mahoe but because many of them are in the larger size classes they make a significant contribution to the total basal area measure. The canopy cover contribution of other species bears more relation to their basal area measure than to stem frequency. This is because the few species, other than kohekohe and mahoe, that appear in the canopy are large trees in the main.

Results from the seedling and small sapling maple reveal a very poor tree seedling flora and the absence of any sapling in the 50 circular plots (Table 3). It would appear, therefore, that stock not only eliminated the understorey, but

TABLE 1:
Cover contribution of species to canopy, upper and lower understoreys, and ground layer of Rangī's Bush.

Species Name	Cover % (+/- Standard Error)		
	Canopy	Understorey upper	Understorey lower
<i>Dysoxylum spectabile</i>	40+/-6	71+/-5	1+/-1
<i>Melicytus ramiflorus</i>	27+/-6	1+/-1	
<i>Beilschmiedia tawa</i>	13+/-4	1+/-1	
<i>Elaeocarpus dentatus</i>	4+/-2		
<i>Melicope ternata</i>	3+/-2		
<i>Macropiper excelsum</i>		1+/-1	1+/-1
<i>Pennantia corymbosa</i>			1+/-1
<i>Coprosma thamnooides</i>			1+/-1
<i>Metrosideros diffusa</i>			1+/-1
<i>M. fulgens</i>	1+/-1		
<i>M. perforata</i>	3+/-2	3+/-2	1+/-1
<i>Muehlenbeckia australis</i>	1+/-1		3+/-2
<i>Ripogonum scandens</i>			1+/-1
<i>Rubus cissoides</i>			1+/-1
<i>Carex virgata</i>			1+/-1
<i>Uncinia uncinata</i>			1+/-1
<i>Hydrocotyle heteromeria</i>			1+/-1
<i>Stellaria decipiens</i>			2+/-2
<i>Blechnum filiforme</i>			1+/-1
Other ferns			4+/-2
Fungus			5+/-3
Adventive grasses			1+/-1
Other species	2+/-2		6+/-3
Litter			4+/-2
Soil			60+/-6
Gap	6+/-3	22+/-5	5+/-2

TABLE 2
Stem Frequency and % Contribution to Basal Area

Species Name	Frequency (%) (N=418)	% Contribution to basal area
<i>Dysoxylum spectabile</i> (live)	81	62
<i>Dysoxylum spectabile</i> (dead)	4	2
<i>Melicytus ramiflorus</i>	4	10.7
<i>Macropiper excelsum</i>	3	1.5
Other	8	22.3

TABLE 3
Seedling density (plants <300m tall)

Species name	Number/100m ²
Dysoxylum spectabile	160
Macropiper excelsum	49
Melicytus ramiflorus	26
Pennantia corymbosa	13
Hedycaarya arborea	9
Beilschmiedia tawa	6
Others	10

No saplings (0.3m - 2m height) were recorded.

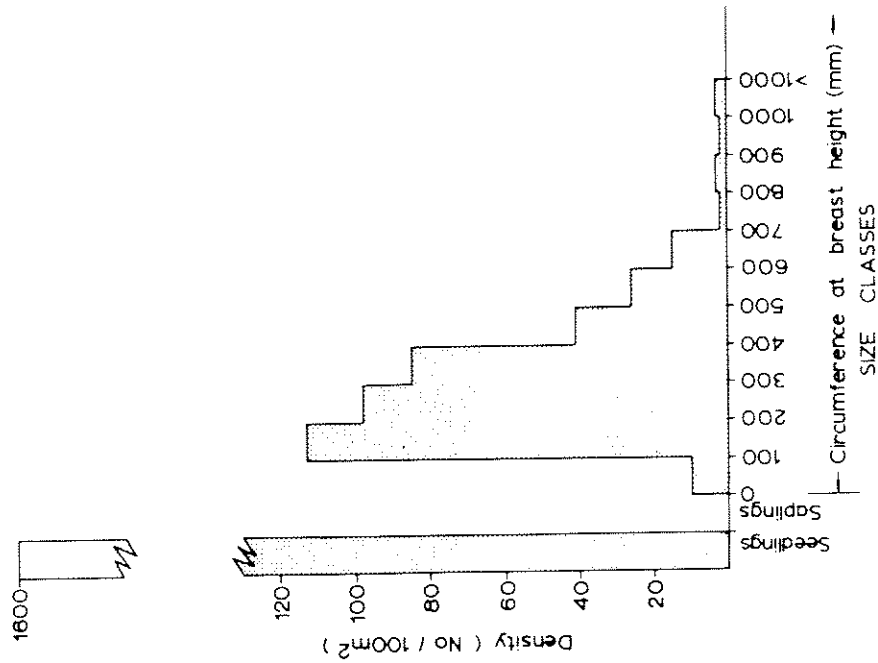


Fig. 1. Size-class distribution of kohekohe.

effectively prevented any regeneration for some considerable period prior to the study visit.

A size-distribution analysis of kohekohe shows that most stems occur between 110 and 400mm circumference at breast height. There are very few stems represented in the larger size classes (Figure 1).

Some distributional differences occur within the stand. A detailed sample from the eastern sector showed that here there was a greater concentration of mahoe and woody lianes, principally *Metrosideros perforata*, than elsewhere in the stand (Table 4).

TABLE 4
Stem Frequency in Eastern Sector

Species Name	Frequency % (N=893)
Dysoxylum spectabile	68
Melicytus ramiflorus	12
Macropiper excelsum	2
Lianes	8.4
Dead	3.6
Others	6

SPECIES LIST

The indigenous vascular flora consists of 62 species and 2 hybrids. Tree, shrub and herb species are poorly represented and a number of species present in a grazed-out coastal forest remnant 1.5km south-southwest are absent from Rangī's Bush. Colin Ogle has compiled a species list from this nearby remnant and it is interesting to note that it contains five podocarps (*rimu*, *kahikatea*, *totara*, *miro*, and *matai*) along with *kanuka*, *Leucopogon fasciculatus*, *ramarama*, *mapau*, *Olearia solandri*, *heketara*, *kohuhu*, *cabbage tree* and *nikau* palm. The herb layer is richer too, with 11 additional species.

The liane flora is fairly typical of disturbed kohekohe forest, but only mature specimens with woody stems hanging from the canopy are present. Such plants must have established at times when stock grazing was negligible or at a light level.

DISCUSSION

The stand appears to represent second-growth kohekohe of quite recent origin. The size distribution of kohekohe contrasts with the size class structure of the secondary kohekohe stand at Waikanae Scenic Reserve (Wassilieff 1985). At Waikanae most kohekohe stems were concentrated in diameter at breast height size classes of 110 - 300mm that correspond to circumferences between 346 - 942mm. No kohekohe with diameters greater than 1m were located at Rangī's Bush, although a few such trees are present at Waikanae Scenic Reserve. There are two large pukatea growing in Rangī's Bush with circumferences of 3.76m and 2.84m. They are most probably survivors from the original forest cover.

The regeneration capacity of the forest is hard to assess from the present data. Kohekohe is the only tree, shrub or liane which appears to have an adequate supply of seedlings for future replacement. However, the recorded seedling density is at least an order of magnitude less than that recorded in kohekohe

stands on Kapiti Island which are now possum-free (Stephen Fuller, pers. comm.). The hard, trampled forest floor with a very shallow litter layer is a poor substrate for successful kohekohe germination and establishment. Court and Mitchell (1988) reported that optimal conditions for the germination and early establishment of kohekohe seeds occur when the seeds are buried beneath a deep (40mm) litter layer.

With the exclusion of stock there will be a chance for the ground flora and understory to develop. Kohekohe, mahoe, kawakawa and hangehange are shade-tolerant species which are likely to become important in the understory. A number of dead kohekohe saplings and small trees were observed; it is unclear whether they have succumbed to possum browse or have died from other causes. All the larger kohekohe appeared to be in good health and kohekohe should continue to dominate the canopy for the foreseeable future.

There are enough local examples of grazed coastal forests standing in a sea of pasture for us to be confident that, without fencing, Rang's Bush would have continued to deteriorate in structure and composition. It is to be hoped that stock exclusion will permit the recovery of the forest interior. The stand will be worthy of a re-sampling visit within the next 10-15 years.

ACKNOWLEDGEMENTS

Permission to visit Rang's Bush was given by the joint owners K F Gray and J Carrad, Christina Carrad kindly provided information about the history of the area. Members of the study group were: Len Bruce, Vicky Froude, Henry James, Rodney Lewington, Colin Ogle, Penn Smith, Susan Timmins and Ted Williams. Henry Papuni drafted Figure 1.

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APPENDIX 1 - LIST OF INDIGENOUS VASCULAR PLANTS OF RANG'S BUSH, WHENUATAPU, PUKERUA BAY

Colin Ogle

(unc = uncommon - one or several plants only)

Dicot Trees and Shrubs

- Alectryon excelsum*
Beschermetia tava
Brachyglottis repanda (unc)
C. rhamnoides
Dysoxylum spectabile
Elaeocarpus dentatus
Fuchsia excorticata (unc)
Gentostoma rapense
Griselinia lucida
Hedycarya arborea (unc)
Laurelia novae-zelandiae
Lepidospermum scoparium (unc)
Macropiper excelsum
Melicope ternata
Melicotus ramiflorus

- Myoporum laetum*
Pennantia corymbosa
Pseudopanax arboreus (unc)
P. crassifolius (unc)
Suaeda banksii (unc)
Urtica ferax

Dicot Lianes

- Clematis paniculata* (unc)
Metrosideros diffusa
M. fulgens (unc)
M. perforata
~~*Muehlenbeckia australis*~~
Parsonia heterophylla
Rubus cissoides (unc)
- Dicot Herbs
Cenella uniflora
Epilobium nummulariifolium
Graphalium gymnocephalum (unc)
Hydrocotyle heteromeria
Oxalis exilis
Panicum debilis
Ranunculus reflexus (unc)
Stellaria decipiens

Monocot Liane

- Ripogonum scandens*

Grasses

- Cortaderia tetoe* (unc)
Microlaena stipoides

Sedges

- Carex dissita* (unc)
C. flagellifera
~~*C. virgata*~~
Cyperus ustulatus
Scirpus prolifer
Uncinia uncinata

Rushes

- Juncus australis*
J. gregiflorus

Ferns

- Asplenium hookerianum*
A. obtusifolium (unc)
A. flaccidum × *A. sp.* (*A. bulbiferum* or *A. gracillimum*) (unc)
A. hookerianum × *A. sp.* (*A. bulbiferum* or *A. gracillimum*) (unc)
Blechnum chambersii (unc)
B. filiforme
Cyathea dealbata (unc)
C. medullaris (unc)
Hypolepis ambigua
H. lactea (unc)
Lasireopsis giabella (unc)
Pellaea rotundifolia s.s.
Phymatosorus diversifolius (unc)
P. scandens
Pneumatopteris pennigera (unc)
Pyrrhosia elegnifolia
- (62 spp. and 2 hybrids)