

The Non-vascular flora of Whakatiwai Regional Park stonefields

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Introduction

The Whakatiwai Regional Park stonefields are located about 4.5 km north of Kaiua on the eastern foothills of the Hunua Ranges. They are composed of a large flat area of greywacke cobbles of a range of sizes up to about 30 cm diameter which are interspersed with a few groves of trees. The geology of the area is well documented by Cameron et al. (1998). The area surveyed for this report is on the western side of East Coast Road in NZMS 260 map S12 Grid 143562. The majority of the non-vascular flora is lichens, with some small pockets of mosses and liverworts. The area was surveyed for about 4 hours in September 2000 by myself with 2 Auckland Regional Council staff: Alistair Jamieson and Shona Myers. The largest grove of trees is about 20 m diameter and consists of 6-8 m tall kowhai (*Sophora chathamica*) under which there is little else but smilax (*Asparagus asparagoides*) (see Figure 1).



Fig. 1. Kowhai grove showing dense *Asparagus asparagoides* growth.

Non-vascular flora

The non-vascular flora is primarily saxicolous (rock-inhabiting) crustose lichens but the areas around the groves of trees contain more foliose lichens and mosses and liverworts, due to the increased shading and nutrients in these areas (see Figure 2). This is particularly prevalent under the drip-line of the trees. The older kowhai trees are also well covered with mainly foliose lichens, suggesting that the trees have been very slow growing, which is likely given the habitat. In all 43 non-vascular species are recorded: lichens (35); mosses (5); and liverworts (3).

Neofuscelia verrucella (AK 250814). Galloway (1985) lists *Neofuscelia verrucella* as known from The Three Kings and Rangitoto Islands and Otago, on rock and both coastal and inland. Since then there have been a number of collections from around the Hauraki Gulf and this record adds to that distribution. This is

a relatively small (to 2 cm diameter), subcrustose, and very cryptic lichen growing directly on the cobbles which could easily be overlooked. During my survey there were only a few scattered plants observed to the southeast of the kowhai grove. Initial observations suggested this specimen may have been *N. minuta*, which is known only from the type collection (Mount Tarawera, 1966) and no more recent collections or accounts of it are known (D.J. Galloway pers. comm.).

There is a good chance that *N. minuta* does exist in this area but has yet to be discovered - the habitat appears suitable for it. *Xanthoparmelia ? mougeotina* (AK 250816). This species was recorded by Galloway (1985) as being present only from the South Island - "Nelson to Otago, east of the Main Divide, alpine and coastal. On rocks, s.l. to 2000 m." Since then, however, there have been a few of collections from the North Island from Rangitoto, Mount Kaweka,

and Little Barrier. This suggests that although this species is uncommon it is more widely distributed than was originally thought. It is probably present in

many exposed, rocky areas around the Hauraki Gulf but has been overlooked because of its relatively small size.

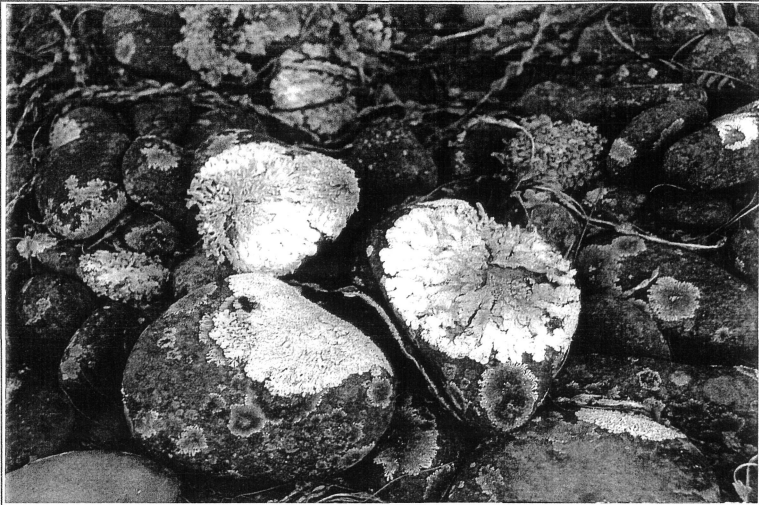


Fig. 2. Cobbles under kowhai drip-line (note kowhai seed pods) with profusion of foliose lichens.

Discussion

The lichen flora of this area is quite unique among Auckland's and New Zealand's lichen habitats in that there are few large expanses of rock which have remained relatively undisturbed for long periods of time and that aren't affected by factors such as snow, ice, or tides. This area is a treasure-trove for crustose saxicolous lichens and I'm certain that a longer and more detailed study would turn up a considerable number of additional records. Currently there are very few people working in this field in New Zealand but I would recommend preserving the stonefields as they provide a unique environment that has a rich and interesting lichen flora.

The kowhai are very slowly spreading outwards but seedling growth is being inhibited greatly by the smothering smilax. Parks staff are attempting to control the smilax by spraying 1-2 times per year with Round-up. They are also aiding the establishment of kowhai by actively spreading seed collected from the area and by erecting rabbit-proof cages around the smaller seedlings. Cattle were removed from the area some 7-8 years ago to aid kowhai regeneration. If kowhai is able to spread out and colonise the more open areas then it is likely that many of the saxicolous crustose lichens will get shaded out and replaced by the more faster-growing foliose lichens. This is a natural process though, with the crustose lichens performing their ecological role

as a primary coloniser and building up the organic matter for other plants which succeed them.

Besides kowhai the predominate vascular vegetation of the area is blackberry (*Rubus fruticosus*) and fennel (*Foeniculum vulgare*). While the blackberry has been present for some time the fennel has apparently only become noticeable within the last few years, primarily since cattle were removed some 7-8 years ago. The area was also sprayed for weeds some 5-6 years ago (pers. comm. K Floyd). If the blackberry and fennel are not controlled then they will most likely take over all of the open spaces in the area.

It is possible that the non-vascular flora could be considerably greater (in biomass and diversity) if the area hadn't been sprayed. Mosses and liverworts are more likely to be affected by this spraying as, perhaps surprisingly, limited studies have suggested that lichens are not particularly susceptible to herbicides (Gilbert, 1977 and Jensen et al. 1999). Although, from personal observations I would suggest that it can depend greatly on the lichen species involved as they have a particularly varied and diverse chemistry (Malcolm & Galloway 1997). There has been very little research on this subject so it would be wise to err on the side of caution when carrying out any weed control utilising spraying. I would recommend carrying out a trial

using weed sprays in a small area and monitoring any subsequent effects. It is, however, important to control the weeds as both blackberry and fennel have the potential to become the dominant vegetation of the area.

The moss and liverwort list below is certainly not definitive, as lichens were the main group concentrated upon and I am certain that with more searching there would be a considerably greater number of species reported.

Acknowledgements

I would like to thank Alastair Jamieson and Shona Myers for their company in the field, Alastair Jamieson for notes on the manuscript, Jessica Beever for identifying the mosses, and John Braggins and Matt von Konrat for identifying the liverworts.

References

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 Jensen, M., Linke, K., Dickhauser, A., Feige, G.B. 1999. The Effect of Agronomic Photosystem-ii Herbicides on Lichens. *The Lichenologist*. 31(1): 95-103
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Species Lists

Lichens on cobbles (26)
Buellia spp.

(at least 2 spp., probably more)

Dirinaria picta
Flavoparmelia soreliana
Hypogymnia ?lugubris
Lecanora spp.

(at least 2 spp., probably more)

Lecidea sp.
 ?*Lepraria*
Neofuscelia verrucella AK 250814
Parmotrema chinense
Pertusaria sp.
Physcia adscendens
Placopsis ?perrugosa
Placopsis sp.
Rhizocarpon geographicum
Rhizocarpon sp.

Rimelea reticulatum
Rinodina
Stereocaulon ramulosum
Usnea rubricaulis
Verrucaria maura
Xanthoparmelia ?australasica
Xanthoparmelia ?mougeotina AK 250816
Xanthoparmelia mexicana
Xanthoparmelia sp. AK 250815

Lichens on kowhai (11)

Graphis AK 250820
Lecanora sp.
Pannaria AK 250818
Psoroma ?leprolimum
Psoroma sp.
Punctelia subrudecta AK 250819
Ramalina celsa

Rimelea reticulatum
Teloschistes flavicans AK 250817
Xanthoparmelia ?australasica
Xanthoria parietina

Mosses (5)

Bryum ?campylothecium AK 250824
Hypnum cupressiforme AK 250825
Sematophyllum contiguum AK 250821
Syntrichia princeps AK 250823
Thuidium furfurosum AK 250822

Liverworts (3)

Chiloscyphus semiteres
Frullania solanderiana
Frullania squarrosula



**Remembering Phil Gardener
 1 January 1928 - 13 October 2000**

Enid Asquith

This wiry 72 year old "bare foot" botanist was man of so many talents and achievements. His passion for plants was so infectious, and I feel fortunate to have shared some happy hours in his company.

Phil started his interest in plants at a young age and as a fourth-former in 1943 received a prize for his fern collection. His love of tramping and mountaineering gave him the opportunity to study and collect native plants throughout New Zealand. In 1953 he was a member of the second New Zealand mountaineering expedition to go to the Himalayas; while there he collected plants for the British Museum, including several new species. In 1987 Phil also collected in the Cook Islands. This collection is now at the Landcare Herbarium and being used by Bill Sykes who is working on the flora of the Cook Islands. Phil was a nurseryman for many years. He completed his PhD in 1981, doing his research in rose viral diseases.

Phil and his wife Georgie relocated to the Waikare inlet in the early 1980s, in the Bay of Islands. This was an isolated property accessed only by boat. Over a period of 13 years they carried out research into new sub-tropical fruit propagation suitable for Northland. They worked with macadamia, cherymoya, casimiroa, loquat, tropical guava, bananas, feijoa, persimmon and other less known fruits.

After three years on the road in a campervan, Phil and Georgie retired to Ruakaka. They looked for a bungalow needing minimal care, with a small garden – they ended up buying a house and another empty section! Once again they established a very beautiful and thriving garden.

Phil's funeral service was held in this garden. He was wearing his familiar tartan shirt, holding his lens and botanising note book.

"I have never done a day's work – it was all pleasure."