Fig. 1. Marley Ford next to a 1.89 m pākauroharoha at Pae O Te Rangi Reserve. Photo: H.M. Smith, 14 June 2019.

on the streamside under regenerating rawirinui (*Kunzea robusta*) growing with swamp kiokio (*Parablechnum minus*) and hangehange (*Geniostoma ligustrifolium*).

The accurate reporting of plant dimensions (not recorded in formal treatments) is always useful. It helps us get a better documentation of just how variable our native plants can be. Of course, it is understandable that herbarium evidence on the full range of plant dimensions is often lacking, as it takes considerable dedication and effort to collect, press, and curate such specimens. Furthermore, large specimens take up considerable space to store, and their collection may result in the death of the individual seen.

So the advent of the easily reproduced digital image provides a way to circumvent this.

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The ferns *Gleichenia inclusisora* and *Hymenophyllum villosum* newly recorded for Great Barrier Island

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Introduction

Aotea, Great Barrier Island, has a rich indigenous flora with nearly 600 vascular plant species, which is about a quarter of New Zealand's total (Cameron et al. 2002; Cameron 2004; Wellington Botanical Society 2008). Among the special features of Great Barrier Island's vascular plants are two endemic species, 20 extant species at their northernmost geographic limits, and two species at their southernmost (Cameron 2005; E. Cameron pers. comm.). The ferns and lycophytes are notably rich, with some 120 species (Cameron 2004).

Although the vascular flora of Great Barrier Island is comparatively well-studied, there are still discoveries to be made, as we found during a walk on 29th June 2019 along Palmers Track from Aotea Road to Hirakimata, Mount Hobson.

Gleichenia inclusisora

The tangle fern *Gleichenia inclusisora* was described only in 2012 (Perrie et al. 2012). It is endemic to New Zealand, with a national conservation status of Naturally Uncommon (with the qualifiers of Data Poor and Range Restricted; de Lange et al. 2018). Its only confirmed site in the North Island is near the summit of Moehau in the northern Coromandel Peninsula, with a dubious early-twentieth century record from near Taupō (Perrie & Brownsey 2015).

With Moehau visible in the distance from Palmers Track, we did speculate that *Gleichenia inclusisora*

Fig 1. *Gleichenia inclusisora* from Palmers Track. The underside of the frond segments is comparatively flat and white, albeit dotted irregularly with reddish-brown, circular scales, while the sori are embedded in pits in the lamina. There are usually three sporangia in each sorus. See Perrie & Brownsey (2015) for more images of these distinguishing features. Photo: Jack Warden. All photos taken 29 Jun 2019.

Fig. 2. Habitat for *Gleichenia inclusisora*, under a taller canopy, on Palmers Track, Great Barrier Island. Photo: Lara Shepherd.

Fig. 3. Habitat for *Gleichenia inclusisora*, among shorter vegetation, on Palmers Track, Great Barrier Island. The *Gleichenia* in the foreground is mostly *G. inclusisora*. Hirakimata, Mount Hobson is in the background. Photo: Lara Shepherd.

might be present. Nevertheless, as LP outlined the distinguishing characters, it was a very pleasing surprise that JW immediately announced that he had a "flat white". The underside of the frond segments of *G. inclusisora* is comparatively white and flat, whereas it is green and flat in *G. microphylla*, and whitish and pouched or recurved in *G. dicarpa* (and obscured by scales in *G. alpina*). While colour and shape of the frond segments are useful initial field characters that signal a need for closer inspection, the unambiguous diagnosis for *G. inclusisora* is the sori embedded in lamina pits. Our plants had this feature, along with the orbicular, bullate scales on the lamina that are also peculiar among New Zealand *Gleichenia* (Fig. 1).

Gleichenia inclusisora was locally dominant along 350 m of track on a ridge at about 400 m elevation. It grew intermixed with *G. dicarpa* (group B; see Perrie et al. 2015) and *Lycopodium deuterodensum*, among stunted (mostly 1–2 m tall) vegetation whose woody component was principally *Leptospermum scoparium*, *Weinmannia sylvicola*, *Leionema nudum*, *Pseudopanax discolor*, and *Phyllocladus toatoa* (Fig. 2-3); *Kunzea sinclairii* and *Olearia allomii*, both endemic to Great Barrier Island, were also present. This was a hotspot for *Gleichenia*, with *G. microphylla* present where the scrub was taller, and the group D morphology of *G. dicarpa* also nearby. We did not survey extensively off the track, but suitable habitat for *G. inclusisora* extended perpendicularly perhaps a total of 50 m, making for an estimated area of 1–2 ha. We searched elsewhere along Palmers Track for more *G. inclusisora*, without success.

We also searched the Te Ahumata Track (elevation below 300 m; we did not do the side-track to the summit), finding plenty of *Gleichenia*, but no *G. inclusisora*. There are vast areas of *Gleichenia* on Great Barrier Island, but if there is more *G. inclusisora*, it is probably in areas of higher elevation, given that the Palmers Track site is at 400 m and the Moehau site is above 800 m.

Hymenophyllum villosum

As we made our way through the cloud forest toward the summit of Hirakimata, Mount Hobson, JW was searching among the *Hymenophyllum multifidum* and *H. sanguinolentum* for *H. bivalve*. The latter's northern limit was on Great Barrier Island (Brownsey & Perrie 2016) until it was recently discovered near Kaiwaka (Warden 2018). We did not see *H. bivalve*, but we did find *H. villosum*, with its untoothed lamina segments, abaxially hairy lamina, and uncrested, oval indusia (Fig. 4). In southern New Zealand, *H. villosum* is widespread and common, especially in upland or otherwise colder forests; it has a national conservation status of Not Threatened (de Lange et al. 2018).

Hymenophyllum villosum has not previously been recorded from Great Barrier Island. Brownsey and Perrie (2016) gave Moehau as the northern limit for *H. villosum*, but it has recently been found in the Waima Range (*Townsend et al.* [*Perrie 7900*], 27 Apr. 2018, WELT P029433).

Hymenophyllum villosum was seen on only one tree, as a trunk epiphyte, at about 500 m elevation. We did not search extensively for it after we had found it, but it would seem to be very uncommon.

Conclusions

Vouchers for both of these new records for Great Barrier Island are in the herbarium of the Auckland Museum, and additional photos are available from the iNaturalist website. The discovery of *Gleichenia inclusisora* adds yet another northern limit for the Great Barrier Island flora.

These are also the first records of *Gleichenia inclusisora* and *Hymenophyllum villosum* for the Auckland region (i.e., within the boundary of the Auckland Council). This is significant given that there is currently consideration of adapting the New Zealand Threat Classification System (Townsend et al. 2008) to make regional assessments (Jeremy Rolfe, pers. com., Department of Conservation). Applying the criteria of Townsend et al. (2008), *Hymenophyllum villosum* would qualify as Regionally Critical, albeit needing a Data Poor qualifier. *Gleichenia inclusisora* might be Regionally Naturally Uncommon, but with a Data Poor qualifier, because it would qualify as Regionally Critical if our brief survey overestimated its extent and it actually occupies less than 1 ha.

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Fig. 4. *Hymenophyllum villosum* from Palmers Track, showing the oval, uncrested indusia. Photo: Jack Warden.

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