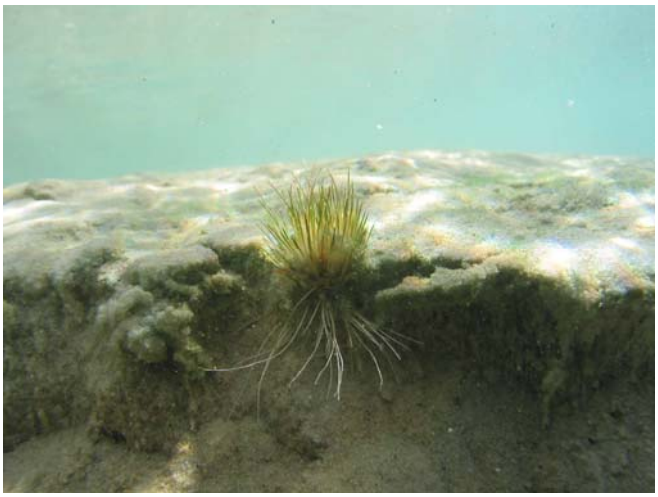

Fig. 1. *Hydatella inconcpicua* . Photo: Rohan Wells.

Over the next two days of exploring the Kai Iwi Lakes, south of Maunganui Bluff, I had plenty of time to become familiar with *Hydatella* and the conditions that favour its growth, as it is present in all three lakes. As Paul Champion pointed out to me, it grows best where water conditions are calm and still. Although it seems not to grow where there is a thick growth of sedges around the edge of the lake, it is often found where there is sparse growth, often of *Baumea arthrophylla.* In the clear waters of these lakes it can grow down to 2 m depth. I found the best way to locate it in shallow water was to gently polish clumps of blue-green algae with my bare toes, and if there was a little hummock beneath, then it was *Hydatella*.

As we moved down to the Pouto Peninsula, the unprepossessing Lake Rotokawau was visited. This lake has grazing down to the edge in some places, and pines growing to the edge in others, with very few emergent sedges and herbs. However, it is the stronghold for *Hydatella.* We had hardly left the vehicles before we noticed that there was a ring of tiny plants washed up along the shoreline. As I walked around the lake I saw, in many places, a sparse green fringe protruding from the water where it lapped the shore. This was the only lake where I saw the plant so close to the water's edge. This may be because the water level had lowered over the dry summer.

Paul informed us that new research had revealed that *Hydatella* was not a monocot as had always been presumed, but actually diverged from the main branch of flowering plants before the monocot/dicot split, and was more closely related to waterlilies. When I returned home I found that the botanical world was in a state of excitement over these findings.

Acknowledgements

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Hydatella inconspicua, New Zealand's most famous plant, phylogenetically speaking!

Graeme Hambly

As most of you know, genetic research has within the last 10 years dramatically changed our understanding of angiosperm relationships. In particular, the dicot-monocot split has been shown to be later in the origin of these plants, which leaves a diverse group of primitive angiosperms below this split. The most significant result is that *Amborella* from New Caledonia is basal (the term used is 'sister') to all current angiosperms species, with the water lilies on the second branch, and *Austrobaileya* (from tropical Australia) on the third branch. But the surprising news, some years after these results were first achieved, is that the second branch, the water lilies, has a new 'sister' below them, which is the Hydatellaceae (Saarela et al. 2007), a very small family of very small aquatic plants from Australasia (though a species has recently been discovered in India). In New Zealand, we have one species, *Hydatella inconspicua*, which for long was thought to be confined to some small fresh water lakes in Northland, though it has recently (1993) been discovered in the South Island.

The distinctive nature of these plants was first recognised over 30 years ago by U. Hamann (1976), before relevant genetic methods were developed. He provided a careful morphological analysis. At that time, these genera were included in the Centrolepidaceae. Hamann not only put them in their own family, but also in their own order – a very high level of taxonomic distinctiveness. In particular, he noted features that typify the most primitive

angiosperms, monosulcate pollen (famously shared with *Ascarina*, hutu, where it is identical to the earliest fossil pollen), and anatropic ovule orientation.

It is perhaps worth saying a word about the wider significance of this family. For many decades, evolutionary thinking about angiosperms was dominated by the 'strobilar theory of floral evolution', that the flower originated from a juvenilised gymnosperm (pine-like) cone. This gives a picture of sporophylls (seed leaves) spiralling around an axis, and indeed the magnoliids (including our *Pseudowintera*) fit this picture very well in a number of ways. But 20 years ago, P. Endress alerted botanists to a growing discrepancy between the theory and the fossil record, that the oldest fossil types had living correlates in plants which though recognised as primitive, still had what the strobilar theory would view as very highly reduced or evolved flowers (*Ascarina* is an excellent example of this). He divided the primitive angiosperms into three groups, a group including *Austrobaileya*, another including *Amborella* and *Ascarina*, and a third with *Pseudowintera*, and left the question of priority open. Now genetic research has confirmed his doubts. The magnoliids are today put, not on the first, but the fourth or fifth branch. But on the first branches, 'reduced' flowers are very well represented. Hydatellaceae adds to the weighting. In its case, the reduction can be explained by a submerged habitat. But that such reduction could apparently occur so early still raises questions.

I think Bot Soc president, Mike Wilcox, best captured the excitement of this discovery. In an e-mail to me, he said, "It is now a star plant like *Amborella* – perhaps we could say New Zealand's most famous plant, phylogenetically speaking. It is not a monocot!" Remarkably, Mike is a friend of the researcher who led this discovery, Sean Graham at the University of British Columbia, Canada. Unsurprisingly, Mike met Sean *Amborella*-hunting in New Caledonia.

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In pursuit of *Pittosporum pimeleoides*

Maureen Young

One of the pleasures of botanising in Northland is to occasionally come across the small shrub, *Pittosporum pimeleoides,* (Pittosporaceae). This species consists of two subspecies – *P. pimeleoides* R.Cunn. subsp. *pimeleoides*, and the North Cape endemic, *P. pimeleoides* subsp. *majus* (Cheeseman) R.C.Cooper (Fig. 1). The latter has gone through a number of name changes, beginning with Cheeseman's *P. pimeleoides* var. *major* Cheeseman, then *P. michiei* Allan, and then *P. pimeleoides* subsp. *major* (Cheeseman) R.C.Cooper, (the epithet of which is corrected to "*majus*" though "*maius*" is also acceptable to some) before settling on the present designation. It grows only on the serpentine Surville Cliffs of North Cape, and is an almost vine-like plant with obovate-elliptic leaves, which scrambles for support through the surrounding vegetation. Cheeseman first found it on his visit to North Cape in 1896, and it wasn't seen again until located by Ross Michie in 1945 (Michie 2007).

David Given (1981) estimated that there may then have been fewer than 100 plants of *P. pimeleoides* subsp. *pimeleoides* left in Northland, but subsequent searching has revealed that there are in fact, many thousands. It is a very variable species. It can have narrow leaves not much more than 1 mm wide and ranging up to over 20 mm in width. Katie Reynolds from Whangarei (Reynolds 1983) wrote that it is look-alike to several other species, e.g. mairehau (*Leionema nudum*), mingimingi (*Leucopogon fasciculatus*), kanuka (*Kunzea ericoides*) and the small, narrow-leaved *Alseuosmia linariifolia*. In its "mairehau" form, people sometimes mistake it for *P. pimeleoides* subsp. *majus*, and Tony Foster (1998) from Totara North wrote that he had found this species at Waitaruke on the shores of the Whangaroa Harbour. I have seen these plants; they grow up to 1 m. tall, and have leaves well within the range of *P. pimeleoides* subsp. *pimeleoides*. In fact, many of the Whangaroa Harbour plants are from the wide-leaved end of the range. The narrow-leaved form can look so like young kanuka plants that it takes a very experienced eye to differentiate between the two. The bark on the slender stems of the *Pittosporum* is shiny and dark brown, compared to the lighter coloured, more textured bark of kanuka. If all else fails, the aromatic scent of crushed kanuka leaves will settle the argument.

The distribution centres on the Bay of Islands, Whangaroa Harbour, Mangonui, Taipa, and north and east of Kaitaia (Fig. 2); there are no records from the Aupouri Peninsula. Kevin Matthews from Awanui showed me the one plant that he has found on the Karikari Peninsula. There are occasional outliers at Waipoua Forest, Ngawha and Titoki. Many of the old records, particularly those of R.H. Matthews, H. Carse