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Rats – another mammalian browser of *Tupeia antarctica*?

Bec Stanley

Leafy Mistletoes in Auckland

Auckland has three extant native leafy mistletoes (of five extant leafy species in total native to NZ): *Peraxilla tetrapetala*, *Ileostylus micranthus* and *Tupeia antarctica* (de Lange, 1997). *Peraxilla tetrapetala* is now restricted to Hauturu (Little Barrier Island). *Ileostylus* is the only mistletoe we still have on the mainland of Auckland (see Cameron 2000). *Tupeia* was last reported in this Journal as extinct in Auckland (Stanley 1998), but has now been re-discovered on Motukino (Fanal Island) in the Mokohinau Island Group in the outer Hauraki Gulf.

Tupeia antarctica

Tupeia antarctica is a semi-parasitic shrub which grows to approximately 1m across. It has tiny yellow insect pollinated flowers and once pollinated has small white fruit with purple specks (hence the common name). *Tupeia* parasitises a number of tree species, most commonly *Pseudopanax* species, *Pittosporum* species and *Carpodetus serratus* (putaputaweta) but is known on about 50 different hosts (de Lange *et al.*, 1997).

Historical distribution of *Tupeia* in Auckland

Tupeia was known from the Titirangi district in the late 1800's (Cheeseman 1871), Maraetai in 1887 (from Cheeseman's field notebook cited in Stanley 1998), Kawau Island in mid-late 1800's (Buchanan 1875), Omaha in 1950 (Ward WAIK 9812) and Rewiti in 1886 (Ball, AK 261245, ex AKU 2384), and Lucy Cranwell (1981) notes "old records" from the Waitakere & Hunua Ranges.

Re-discovery in Auckland

Four years ago (April 2000) Department of Conservation ranger Phil Todd discovered *Tupeia* on Motukino. Initially Phil found one plant parasitic upon a coastal maire (*Nestegis apetala)* and sent a sprig to me for identification with a note saying "is this a mistletoe?". I took the sprig to Ewen Cameron (as no mistletoes had been recorded on Motukino before, I was a bit surprised) who confirmed it as *Tupeia antarctica*. Later that year Phil discovered three more coastal maire with *Tupeia* attached. Since then Jonathan Boow, Cameron Kilgour, George Wilson and myself have found more each year with the total now standing at 11 coastal maire trees with *Tupeia* parasitic on them.

The *Tupeia* are restricted to one valley on the island which is primarily filled with mixed coastal broadleaf forest including large puriri (*Vitex lucens*), houpara (*Pseudopanax lessonii*), tawapou (*Pouteria costata*), karaka (*Corynocarpus laevigatus*), kohekohe (*Dysoxylum spectabile*), mahoe (*Melicytus ramiflorus*), pohutukawa (*Metrosideros excelsa*), and parapara (*Pisonia brunoniana*).

All the host maire are large old trees. Most mistletoes are on the lower third of the host trunk centred around large blackened and rotting scars. A few mistletoes are on lateral branches which have hollowed. The mistletoes and the host truly look locked in a battle for survival – it really looks like the tree is trying to evict them!

Many of the mistletoes are merely 5cm tall sprouts emerging from the bark around a central rotted scar. A few *Tupeia* are larger more shrub-like plants up to 1m across.

Tupeia is dioecious and both male and female plants have been located (Jonathan Boow *pers. comm.*). However, in four years of monitoring, no fruit has been observed (they should be produced in Autumn). *Tupeia* is insect pollinated thus the spacing of the mistletoes may be too far (there is at least 30m between plants that have been observed in flower) for pollinating insects to fly between male & female flowers (Nick Singers *pers. comm.*).

Threats to *Tupeia*

The well-known threats to all our leafy mistletoes are: habitat loss through forest clearance; collecting by humans (botanists); decline in native birds which are required to distribute seed (and pollinate some leafy mistletoes but not *Tupeia* which is insect pollinated);

and browse by mammals – particularly this is blamed on possums.

On Motukino there are plenty of host maire, no botanists (most of the time!) and no possums. Kiore, which were once present on the island, would have reduced the number and densities of pollinating insects and fruit dispersing birds of the *Tupeia*. However – is this all that reduced this species to almost nothing on Motukino?

Rats – another mammalian browser of *Tupeia*?

I believe *Tupeia* has only recently been a visible element of the Motukino flora since kiore removal in 1997. Motukino was visited previously by several botanists (Esler 1978 , Wright 1980, Cameron & Wright 1990, and de Lange et al. 1995) who did not record *Tupeia* on the island. This is surprising considering the calibre of botanists, length of their stays and the close proximity of the campsite used in one trip to the *Tupeia* (de Lange *et al*. 1995). In fact Ewen Cameron (pers. comm.) and Peter de Lange climbed up many coastal maire trees while on the island looking for bryophytes. I believe that kiore directly ate *Tupeia* shoots reducing the mistletoe each year to its haustoria inside the trunks of the host. There are reports of *Tupeia* existing in a leafless state for decades (Sweetapple et al. 2002). Leafy mistletoes are regarded as semi-parasites i.e. they make their own food by photosynthesis, but take water (and some minerals) from their host. So how would *Tupeia* survive like this? There seems to be little research on this, however, *Tupeia* may have chlorophyll in its haustoria (Fineran cited in Sweetapple *et al.* 2002) which may enable it to remain alive despite having its leafy shoots browsed continually.

Based on these observations on Motukino it will be interesting to monitor forests which once had *Tupeia* that are now under rat control, and islands where rats are eradicated in the future, to see if *Tupeia* can re-appear again.

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Bischofia javanica (Euphorbiaceae) – A tropical forest tree recorded in Auckland

Mike Wilcox

Auckland has a rich flora of urban trees drawn from many different countries. New ones are regularly being recorded, the latest being *Bischofia javanica* Blume of the Phyllanthaceae. Examples of this tree have so far been located in Auckland – in Stack Street, Herne Bay (Figure 1); at HortResearch, Mt Albert; and in Glenvar Road, Long Bay.

Bischofia javanica is very widely distributed in the Pacific Islands, Malesia, SE Asia, southern China including Taiwan, southern Japan, Myanmar, and India. It is well-known in New Caledonia, Tonga, Rarotonga, Niue, Fiji (Smith 1981), Vanuatu, and Samoa and is a particularly dominant tree in some forests in Rarotonga, Cook Islands (W. R. Sykes, pers. comm.). The local name *koka* is widely used in Polynesia. Other names are *bishop wood*, *Java cedar*, *tuai* (Philippines), and *'o'a* (Samoa). It is thought that the plant is probably an aboriginal introduction in