

The mistletoes of Puketitiri and eastern Kaweka

Geoff Walls
6 Fitzroy Road
Napier

Published by
Department of Conservation
Head Office, PO Box 10-420
Wellington, New Zealand



This report was commissioned by East Coast Conservancy

ISSN 1171-9834

© 1998 Department of Conservation, P.O. Box 10-420, Wellington, New Zealand

Reference to material in this report should be cited thus:

Walls, G., 1998

The mistletoes of Puketitiri and eastern Kaweka. *Conservation Advisory Science Notes No. 214*, Department of Conservation, Wellington.

Keywords: Mistletoes, endangered plants, possum control, Kaweka Range, Maungaharuru Ecological District.

Summary

Four mistletoe species are known from the Puketitiri - eastern Kaweka area: *Il eostylus micranthus*, *Tupeia antarctica*, *Alepis flavida* and *Peraxilla tetrapetala*. All were much more common, both here and nationally, when the first Pakeha botanists arrived on the scene. Apart from habitat loss and deterioration, possum browsing is now by far the greatest threat. This has been amply demonstrated on site by the use of cages and bait station possum control since late 1991. The result has been a spectacular recovery of the mistletoes, rescued from the brink in the nick of time. However, there is still much to be done. More extensive sustained possum control is needed in the beech forests if a mistletoe population that is viable in the long term is to be restored. Deer control to prevent habitat deterioration is also needed. Predator control, to ensure healthy populations of the birds the beech mistletoes are dependent upon (tui and bellbirds), may be achieved indirectly if the right possum control regime is adopted. Meanwhile, survey of likely nearby habitat for more mistletoes, and continuation of the established monitoring programme, are strongly recommended. All this can be achieved through tapping into the skills and enthusiasm of local people, hunters and naturalists.

1. Introduction

When Augustus Hamilton walked to Puketitiri and climbed the Kaweka range from the east in 1882, he found masses of mistletoes in the forests within easy reach. That was before the deer arrived.

When brothers Rob and Bill Whittle hunted deer in those same forests 70 years later, they too saw the trees festooned with mistletoes, the beech trees ablaze with red or yellow flowers in summer out of reach of the deer. That was before the possums arrived. Within a decade, the summer lights had gone out and mistletoes were hard to find. A century after Hamilton's visit, only a few hard-chewed plants were still hanging on.

Rob and Bill, local farmers, were among the few who noticed and mourned the passing of the mistletoes. They collared host trees with metal sheaths, but the possums and deer kept getting to the vulnerable palatable mistletoes. Rob made repeated submissions, first to NZ Forest Service and later to Department of Conservation, in an attempt to get better protection done, but seemingly in vain.

That was until 1991. By then I had visited the area with Ashley Cunningham and Pat Grant, foresters who could also remember the colourful floral displays. I had yarned with Roy Peacock, who talked of the "thousand mistletoes along the bush edge" near Littles Clearing. I was encouraged to get involved and needed no second bidding.

Rob, Eddie Te Kahika of Puketitiri Field Centre and I visited Littles Clearing and Makahu Saddle in February 1991 to inspect the mistletoes that Rob knew of and to look for others. From my experience of beech mistletoes in the South Island, I realised the dreadful condition of this population, and the need for radical action. Over the next two years, I and Puketitiri Field Centre staff intensively searched the area for mistletoes. The staff built netting cages around the plants we found and set up a comprehensive possum control programme that persists to this day.

I began monitoring the beech mistletoes in earnest in January 1992, and have kept an annual regime up since. There have been numerous discoveries, notably *Alepis flavida* at Makahu Saddle, and masses of *Tupeia antarctica* at Ball's Clearing, Hartree Forest Covenant and William Hartree Memorial Scenic Reserve.

In only five years there has been a spectacular recovery of mistletoes in the area. The key has been intensive sustained possum control using bait stations, and caging of plants accessible to deer.

Now is a good time to document the achievements and hand the monitoring task over to the Puketitiri Field Centre and East Coast/Hawke's Bay Conservancy specialist staff.

2. The mistletoes

There are four mistletoe species in the Puketitiri-Eastern Kaweka area. They are listed below, along with their Department of Conservation ranking (Molloy & Davis 1994; Dopson & Molloy in prep.) and their NZ Botanical Society (Cameron et al. 1995) ranking. They are:

<i>Il eostylus micranthus</i>	Common mistletoe	- /Local
<i>Tupeia antarctica</i>	Taapia, pirita, green/brittle mistletoe	B/Rare
<i>Alepis flavida</i>	Pirita, piriraki, yellow/golden mistletoe	B/Vulnerable
<i>Peraxilla tetrapetala</i>	Pirirangi, pikirangi, pirita, red mistletoe	B/Vulnerable

Alepis flavida and *Peraxilla tetrapetala* are beech mistletoes, in other words their hosts are almost exclusively beeches (in the Puketitiri-eastern Kaweka area red beech, *Nothofagus fusca*, and mountain beech, *N. solandri* var. *cliffortioides*). The other two mistletoes are less specific in their hosts, which are usually shorter-lived small trees and shrubs. All are classified as nationally threatened species (see above).

Details of each mistletoe follow.

***Ileostylus micranthus* Common mistletoe
(Map 1, Figure 1)**

A mistletoe with large oval yellowish leaves, small green flowers and yellow fleshy fruit. Found throughout the country on a range of hosts. Rare in Hawke's Bay, being recorded only from Little Bush (NZMS 260 V20/150034) and Te Wairere (V20/155061) in the Puketitiri vicinity, and from near Ongaonga. The rarest of the Puketitiri-eastern Kaweka mistletoes. Intensive survey of forest and shrubland remnants in the Puketitiri vicinity may turn up more.

At Little Bush and Te Wairere there are only a few known plants, hosted on horopito, *Coprosma rigida* and domestic pear! Rob Whittle keeps a close eye on the mistletoes, maintaining bait stations to deter possums. He has tried sowing seed to obtain progeny on many occasions, but without success.

It is recommended that a working relationship between Department of Conservation and Rob Whittle be established to ensure the continued long-term survival of this mistletoe species at Little Bush. Management must include sustained possum control and six-monthly monitoring.

***Tupeia antarctica* Taapia, pirita, green mistletoe, brittle mistletoe
(Map 2, Figure 2)**

A mistletoe with medium-sized kite-shaped green leaves, pale brittle stems, small green flowers and fleshy fruits that are generally white but can have a pink or purplish tint. It forms distinctive dense clumps on its host trees, which are usually putaputaweta or fivefinger in Hawke's Bay. Found throughout the country in scattered localities. In Hawke's Bay it is known from The Hanger at Tutira Station, White Pine Bush Scenic Reserve, Norsewood, McLean's Bush Scenic Reserve at Whangaehu and the Puketitiri area.

The Puketitiri area is this mistletoe's Hawke's Bay stronghold, and must also be a national stronghold for the species. There it is abundant at several sites:

- Balls Clearing Scenic Reserve and immediate surrounds, V20/117089, at least 25 plants on fivefinger;
- Simcox Covenant, V20/144054, several plants on fivefinger and putaputaweta;
- Hartree Forest Covenant, V20/135043, numerous plants on putaputaweta;
- Little Bush and immediate surrounds, V20/147035, many plants on fivefinger and putaputaweta;
- William Hartree Memorial Scenic Reserve, V20/186052, numerous plants on putaputaweta.

In all these places there has been a miraculous recovery of *Tupeia antarctica* in recent years, due solely to intensive sustained possum control using bait stations. The mistletoe has reappeared on the trunks and branches of trees

where it was chewed down to stubs for decades. Every leaf put out was eaten then, but now there are thriving bushes producing masses of fruits for dispersal by birds. Other plants of *Tupeia antarctica* were located during the Protected Natural Areas Programme survey of the Maungaharuru Ecological District (Townsend 1996), but these have yet to be checked out.

The possum control needs to be kept up in the key sites listed above, otherwise the situation will be reversed. A regime of regular monitoring of each of the major populations is required to check on the condition and trend of the mistletoes. Department of Conservation, as the only agency in the district with direct threatened plant conservation responsibility, should do the monitoring itself or coordinate it as a partnership with keen locals.

Alepis flavida **Pirita, piriraki, yellow mistletoe, golden mistletoe**
(Maps 3&6, Figure 3)

A cryptic apparently drab shrubby mistletoe that comes alive in summer, producing yellow flowers that turn gold and yellow-orange fleshy fruits that birds devour and disperse. This mistletoe, with its greyish leaves borne on weeping stems, can grow quite large: clumps can be two metres or more across. It grows only on beeches (red, black and mountain), is found in beech forests from the central North Island to Fiordland, and is now very rare in the North Island. It is usually found growing out on branches away from the host's trunk.

In Hawke's Bay it is known only from the Boundary Stream Mainland Island, where there are three tagged plants, and from Puketitiri-eastern Kaweka. At Puketitiri-eastern Kaweka there are two populations:

- On a small stand of red beech trees at the Whittle Road turnoff, on Bill Whittle's land (V20/120074). There are numerous mistletoes on four host trees, each sheathed with iron and protected with a possum bait station. There are apparently a few more plants on another tree nearby.
- At Makahu Saddle, where there are two known plants only, both on mountain beech trees. One is a healthy young plant on the tree nearest the door of Ngahere Station (020/044070) and is protected from possums by sheathing and a bait station. The other is a short way along the Kaweka Flats Track (020/039076). When discovered in April 1997 it was flourishing, and had produced much fruit that was being dispersed by birds. When inspected in late November 1997 it was a shattered relic: it had been browsed and bark-bitten so badly by possums during winter that almost nothing remained alive except one new shoot. It currently has no protection, but will recover if it is afforded the same treatment as the other plant. I suspect that both these plants are progeny from the other population, having been transported by the tui that regularly commute up and down.

This species should be made a showpiece at Puketitiri-eastern Kaweka. Because of its rarity, it deserves extra attention. A comprehensive survey of likely sites (Puketitiri red beech remnants, especially Hartree Forest Covenant,

and the Makahu Saddle vicinity) for more plants is justified. At Bill Whittle's site, the whole population is extremely vulnerable and could be knocked out by a single storm event. Red beech seedlings should be raised and planted inside the fenced area to ensure that there are young vigorous hosts available, as long-term insurance. Ripe fruit from the existing mistletoes should be gathered and "sown" in autumn on other red beeches in the vicinity, and also on beeches up at Makahu Saddle. They should be simply squashed onto small healthy twigs so that the seeds are cemented in place with their own glue.

Above all, the existing bait stations should be maintained assiduously, and new ones set out to protect the Kaweka Flats Track plant (see also *Peraxilla tetrapetala* below). In addition, monitoring inspections should be routine. This work falls clearly to Department of Conservation, but should be done as a close partnership with the Whittle and Hartree families.

***Peraxilla tetrapetala* Pirirangi, pikirangi, pirita, red mistletoe (Maps 4-6, Figures 4-7)**

This is the most spectacular of the mistletoes, bushy like *Tupeia antarctica* and *Alepis flavida*, but producing breath-taking displays of scarlet flowers at Christmas-New Year. Its fruit are, by contrast, greenish and almost invisible, though the birds find them. It is mainly found growing from the trunks of beech trees, despite starting life on twigs. Once abundant in the forests of both main islands, hosted mainly on beeches, this mistletoe has taken a radical decline at the hands of possums, and in the North Island is reduced to scattered fragments. In Hawke's Bay it is found only in the main ranges: the Kaweka Range, mostly in the east, and in a few localities in the Ruahine Range. Recent protection and monitoring work has seen a pleasing recovery of this mistletoe at Sunrise Track and No Mans Road in the Ruahine Range, and a wonderful renaissance in eastern Kaweka.

Prior to 1991, the only known *Peraxilla tetrapetala* in eastern Kaweka were a handful of hard-browsed plants on the side of Kaweka Road between Littles Clearing (U20/063090) and Makahu Saddle (U20/043074). They had hardly produced a flower in years, and looked doomed. Careful survey revealed that a small population still remained at Littles Clearing, mainly on the bush edge and exclusively on mountain beech, but it was in a perilous state. A possum control bait station programme was begun, and plants were caged with netting of mesh small enough to keep possums out but big enough to let bell-birds in. Monitoring of the mistletoe condition has been done regularly, as one of my appointed tasks. Tabulated results and monitoring examples are shown in Appendix 2.

Since 1991, the caged mistletoes have responded dramatically. They have rapidly multiplied in bulk and have produced increasingly glorious annual floral displays. There has been little fruit set though, and that may be due to the inability of tui, the main pollinators, to reach the flowers through the netting. More plants have revealed themselves too, able to grow and flourish within the zone of influence of the bait stations, and now there are more than 20 tagged plants in the area. Plants found latterly have been deliberately left uncaged, as a way of monitoring the success of the bait station possum control. Occasionally plants - even caged ones - have been attacked by possums,

but on the whole progress has been delightfully positive, a true success story for conservation. So long as the control and monitoring regime is kept up, this success will continue.

In that time, too, I have discovered a remarkable population of *Peraxilla tetrapetala* in venerable red beech forest along the Kaweka Flats Track (Map 6). At the time of writing, only four plants have been found, but they are all in the same immediate vicinity and are clearly ancient. They are growing from the trunks of large red beeches that must be at least two centuries old, and on the assumption that the mistletoes became established on young twigs they themselves now have to be a century or more old. The largest mistletoe has a holdfast like that of a bull kelp where it attaches to the host tree: I suspect it is very old indeed. Rob Whittle found another plant on red beech about 3 km to the NE in 1991.

This mistletoe population in the red beech has no ongoing protection from possums. It is indicative of the population the hunters and naturalists found in the past, stretching right around the plateau to the north to Kaweka Flats, Middle Hill and Makino. That another plant has recently been found near Middle Hill bears this out. This area is the highest priority for mistletoe survey.

This red beech area (Map 7) is also now the highest priority ecosystem for conservation in Hawke's Bay:

- it has the mistletoes, that would respond very fast to adequate protection;
- it has the best remaining wild North Island brown kiwi population left in Hawke's Bay;
- it has resident North Island kaka, NZ falcon and yellow-crowned kakariki, rare elsewhere;
- it still has a strong population of the landsnail *Wainuia urnula*;
- it is an important resource area for long-tailed bats, as revealed by recent Manaaki Whenua research;
- it is equally important for the vibrant population of tui and bellbirds in the Puketitiri-eastern Kaweka system - they commute to and fro, both daily and seasonally, also using the Puketitiri reserves that contain podocarps and broadleaved trees. As already outlined, these birds are vital for the mistletoes, and the mistletoes are highly valuable for the birds.

Possums are the most serious threat to all these ecosystem components, as predators and competitors. A sustained regime of control - preferably using bait stations - is the only way of protecting them. In the short term, at the very least, bait stations should be set out along the Kaweka Flats Track as far as Boulder Stream (Map 7). There is a bird monitoring line along this part of the track, and the mistletoes should be monitored at the same time.

Sika deer are also a significant ecosystem threat in that they are impeding the growth of fruit-bearing trees and shrubs and young red beeches in the understorey and keeping the forest floor more open than it should naturally be. Anything done to decrease their numbers would help the forest system.

The other major ecosystem threat is that posed by predators of birds: rats and mustelids especially. With the use of the right possum control regime (sustained poisoning with bait attractive to rodents as well as possums, and a systematic coverage), these predators can be kept in low numbers.

3. Summary of management recommendations

Ileostylus micranthus

Survey:	Puketitiri forest and shrubland remnants, especially edges of remnants near Little Bush and Te Wairere.
Monitoring:	Known plants, twice each year.
Threat management:	Ongoing possum control (bait stations) at known plants. Exclusion of domestic stock from forest and shrubland remnants.
Partnership:	Department of Conservation and Rob Whittle, in conjunction with adjacent landowners.
Priority:	High.

Tupeia antarctica

Survey:	Sites indicated as having this mistletoe in the Maungaharuru Ecological District Protected Natural Areas Programme survey report (Townsend 1996).
Monitoring:	Selected readily accessible plants in Balls Clearing Scenic Reserve, Simcox Covenant, Hartree Forest Covenant, Little Bush and William Hartree Memorial Scenic Reserve, to check on population condition and trend twice a year.
Threat management:	Sustained bait station possum control in the key sites (above). The current regime is working well.
Partnership:	Department of Conservation has to coordinate the effort, but partnership is required with the owners of the land not in Crown custodianship.

Priority: Very high.

Alepis flavida

Survey: 1. Red beech trees and forest remnants around Puketitiri, especially Hartree Forest Covenant.
2. Forest edges around Makahu Saddle.

Monitoring: All known plants, at least twice a year, to check on condition and trend.

Threat management: 1. Sustained bait station possum control at all known plants. At present, control is adequate for all except the plant on the Kaweka Flats Track: bait stations should be positioned to protect this and the *Peraxilla tetrapetala* plants along the track as far as Boulder Stream.
2. Planting of red beech seedlings inside the fenced area at Bill Whittle's site, to provide new hosts.
3. Sowing of seeds on beech trees and saplings at Puketitiri and Makahu Saddle.
4. Interpretation and public awareness, on site and in media.

Partnership: Department of Conservation, with the Whittle and Hartree families.

Priority: Very high.

Peraxilla tetrapetala

Survey: 1. Red beech forests around Makahu Saddle, especially along Kaweka Flats Track, and in the red beech along Kaweka Road as it climbs the Black Birch Range.
2. Beech forests in the Middle Hill-Makino plateau country.

Monitoring: The tagged plants at Littles Clearing, Makahu Saddle and Kaweka Flats Track. There is already a comprehensive monitoring system in place, which needs to be monitored twice a year.

Threat management: *In the short term:* 1. Sustained bait station possum control at all known plants. At present, control is adequate for all except the plants on the Kaweka Flats Track: bait stations should be positioned to protect this and the *Alepis flavida* plant along the track from Makahu Saddle at least as far as Boulder Stream (Map 7).
2. Positioning of some of the bait stations in the area off the ground so they continue to work during heavy snowfalls.

3. Sowing of seeds on beech trees and saplings at and near Makahu Saddle.

4. Interpretation and public awareness, on site and in media.

In the longer term: 1. Extension of the bait station possum control both southwards along the flanks of the Black Birch Range and (more urgent) northwards to cover the beech forests of the plateau country to Middle Hill and Makino (Map 7).

2. Intensification of deer control in Eastern Kaweka to allow recruitment of host trees.

Partnership: Department of Conservation as lead agency, with NZ Deerstalkers Association, Forest & Bird and local people for pest control, survey, monitoring and interpretation.

Priority: Top.

4. References

- Cameron, E.K.; de Lange, P.J.; Given, D.R.; Johnson, P.N.; Ogle, C.C. 1995. New Zealand Botanical society threatened and local plant lists (1995 revision). *New Zealand Botanical Society newsletter 39*: 15-28.
- de Lange, P.J.; Norton, D.A. (eds) 1997. *New Zealand's loranthaceous mistletoes*. Department of Conservation.
- de Lange, P.J.; Norton, D.A.; Molloy, B.P.J. 1997. A revised checklist of New Zealand mistletoe (Loranthaceae) hosts. *New Zealand Botanical Society newsletter 44*: 15-24.
- Dopson, S.; Molloy, J. In preparation. The conservation requirements of New Zealand's nationally threatened plants. Department of Conservation.
- Eagle, A. 1975. *Eagle's trees and shrubs of New Zealand*. Collins, Auckland.
- Ladley, J.J.; Kelly, D. 1995. Mistletoes: how these showy specialists and honeyeaters need each other. *Forest and bird 278*: 16-21.
- Ladley, J.J.; Kelly, D. 1996. Dispersal, germination and survival of New Zealand mistletoes (Loranthaceae): dependence on birds. *New Zealand journal of ecology 20*: 69-79.
- Ladley, J.J.; Kelly, D. 1997. A guide to hand-planting of New Zealand mistletoes (Loranthaceae). *New Zealand Botanical Society newsletter 49*: 16-19.
- Ladley, J.J.; Kelly, D.; Robertson, A.W. 1997. Explosive flowering, nectar production, breeding systems, and pollinators of New Zealand mistletoes (Loranthaceae). *New Zealand journal of botany 35*: 345-360.
- Molloy, J.; Davis, A. 1994. Setting priorities for the conservation of New Zealand's threatened plants and animals. Department of Conservation.
- Poole, A.L.; Adams, N.M. 1990. *Trees and shrubs of New Zealand*. DSIR Field Guide.
- Townsend, A.J. 1996. Maungaharuru Ecological District: survey report for the Protected Natural Areas Programme. Department of Conservation.
- Walls, G.Y. 1997. Threatened plants of Hawke's Bay. Contract report prepared for Department of Conservation, East Coast/Hawke's Bay Conservancy, December 1997. 88 pages (35 maps).

5. Appendices

5.1 MAPS OF PUKETITIRI-EASTERN KAWEKA MISTLETOES

Map 1 <i>Ileostylus micranthus</i>	Common mistletoe
Map 2 <i>Tupeia antarctica</i>	Taapia, pirita, green/brittle mistletoe
Map 3 <i>Alepis flavida</i>	Pirita, piriraki, yellow/golden mistletoe
Map 4 <i>Peraxilla tetrapetala</i>	Pirirangi, pikirangi, pirita, red mistletoe
Map 5 Little's Clearing mistletoes (<i>Peraxilla tetrapetala</i>)	
Map 6 Makahu Saddle mistletoes (<i>Peraxilla tetrapetala</i> , <i>Alepis flavida</i>)	
Map 7 Recommended area for extension of animal control programme	

Map 1 *Ileostylus micranthus* Common mistletoe

