

Both *Peraxilla* species averaged almost one browsing attack per year and in over half these attacks more than 50% of the plant was defoliated. On average, *P. colensoi* plants decreased slightly in size but *P. tetrapetala* exhibited a dramatic decrease. By comparison, six unbrowsed plants of *P. colensoi* and seven of *P. tetrapetala* on the same transect averaged 35% and 20% increases in size respectively.

It was also found that flowering, and hence the availability of seed for dispersal, is markedly reduced by the small size of plants which had been browsed persistently. Even with fewer than two possums per hectare, which is four or five times lower than in some more diverse forests of New Zealand (Clout and Gaze 1984), the Mt Misery area is undergoing a marked decline in mistletoes.

Waitutu forest

During a survey of wildlife in Waitutu State Forest in January 1984, members of the Wildlife Service party were impressed by the variety and abundance of large mistletoe plants throughout western parts of the forest (Elliott and Ogle 1985). However, only one of the four survey teams working east of the Wairaurahiri River saw mistletoes, and it seems that in this part of Waitutu mistletoes have, at the best, a patchy distribution, and many have been reduced in numbers and range. Possums are common to the east of Wairaurahiri River, but are almost unknown to the west. New bridges build across the Wairaurahiri and other rivers is probably helping the spread of possums westward.

In Waitutu, *Peraxilla (Elytranthe) colensoi* was the most showy species. Its presence on tall silver beech (apparently its only host tree there) was often indicated by fallen scarlet flowers carpeting the ground. The flowers contain nectar, and bellbirds, silvereyes, and, unexpectedly, since it is regarded as an insectivore, a yellowhead were seen feeding in them (Kath Walker pers. comm.). It is possible, of course, that the yellowhead was taking insects from the mistletoe flowers. Less abundant, but still widespread, was the smaller scarlet mistletoe, *P. tetrapetala*. It was more common on higher altitude mountain beech and silver beech, *P. colensoi* being absent above 600 m.

Because it grows on low spreading branches of mountain beech along lake edges and forest clearings, the plants of *Alepis flavida* with their yellow-range flowers were the most readily seen *in situ* at Waitutu. On the eastern shore of Lake Poteriteri, between the two unnamed rivers on either side of Poteriteri hut, a count of mountain beeches showed that of 212 beech trees, 55 bore one or more plants of this mistletoe.

By January the fourth mistletoe seen at Waitutu, *Ileostylus micranthus* had finished flowering but small, green fruits were seen. While its flowers are insignificant when compared with *Peraxilla* and

Alepis, its ripe fruits are yellow, 5–8 mm in diameter. Most remarkable at Waitutu was the abundance of this species and its ability, unlike the other species of mistletoe there, to use a wide range of host plants. The 19 different host species recorded included mountain totara, pink pine, six species of small-leaved *Coprosma*, horopito, tree fuchsia, southern rata and the liane, *Rubus schmidelioides*.

South Westland and Fiordland

Some mistletoe species are still abundant in parts of South Westland. Possums are known there, but according to Less Pracy there were very few before 1960, and even now they are in very sparse, scattered populations south of Paringa to Jackson Bay. He believes they were spread deliberately, including very recently into the Lake Ellery and Haast Road regions.

During a search of beech forest adjacent to the road from Paringa River to Haast Pass in February 1984, PRW noted that *Peraxilla colensoi* was abundant, and, on average, in much larger clumps than in the Nelson Lakes study area. Peter Gaze reports that *Alepis* was quite widespread in forested areas he visited during 1984 between the Karangarua and Paringa Rivers. It was mostly growing on the outer branches of *Coprosma propinqua* bushes.

Over the first week of January 1985, while touring South Westland and Fiordland, Rowley Taylor found that *P. colensoi* was plentiful, in large clumps and in heavy flower, from Paringa to Haast; on both sides of Smoothwater River; at Cascade River on bush edges around Smiths Ponds and Colin Creek and through the forest canopy on surrounding country; from Haast to the Gates of Haast; and, with *P. tetrapetala*, at Haast Pass. Possum numbers in these areas still appear to be too low to have any noticeable effect on mistletoes.

Taylor notes there were many fewer mistletoes in the parts of Fiordland that he visited than in South Westland. From west of The Divide to Milford, where possums were liberated before the turn of the century (Pracy 1974), Taylor found only six *P. colensoi* plants, all large and in flower. On 5 January, he found *P. tetrapetala* on silver beech in the Eglington Valley, four plants at Lake Gunn and one, past flowering, at Knobs Flat. However, at the latter site about 10 days earlier both *P. tetrapetala* and *P. colensoi* were reported by Kath Walker and Graeme Elliott to be common, but heavy rain destroyed many of the flower buds and open flowers. Possums were in the Eglington Valley by 1960 (Pracy 1980).

The contrasting observations on mistletoes at Knobs Flat highlight several problems in assessing the abundance of mistletoes, particularly when an abundance rating is made from sightings of flowering plants. Different observers, varying climatic conditions, and precise time of year can all give apparent differences in mistletoe numbers at a given

site, or between sites.

Furthermore, individual bushes of mistletoe which are browsed but not killed can recover if browsing pressure is reduced. Les Pracy reports that near Lake Wanaka in the Makarora Valley up to Camerons flat, mistletoes were severely defoliated by possums by 1950, but that in 1961 he observed some regrowth, and by 1978 mistletoe plants were again quite commonly seen. In other areas, too, reported gains or losses of mistletoes might sometimes be the result of changes in size and flowering state of plants rather than from the establishment of new plants or death of older ones.

Korthalsella mistletoes

Although possums browse leafy mistletoes, little is known about their effect on the three species of tiny, almost leafless, *Korthalsella* mistletoes. All occur in areas infested with possums, and the rarity of reported sightings of *Korthalsella* probably reflects the difficulty of seeing the plants. Nevertheless, since all are species of scrub and shrublands, *Korthalsellas* are likely to have suffered from extensive clearance of their habitat in the past few years.

K. salicornioides occurs on the majority of older bushes of manuka and kanuka in an area on the west shore of Lake Wairarapa, but it takes careful searching to spot it. Near Taihape, the flat-stemmed *K. lindsayi* is similarly difficult to see where it grows on *Melicope simplex*.

There are only two records of the third *Korthalsella*, *K. clavata*, in the North Island, so that it may have always been a rare plant there, but it occurs locally in parts of the South Island. Hugh Wilson (1978) reports it as being fairly common on *Coprosma*, mountain wineberry, matagouri, and kohuhu in Mount Cook National Park.

Mistletoe conservation

There remain many unanswered questions about New Zealand's mistletoes. For example, how important were they to indigenous wildlife for nectar and fruit, and, conversely, how important were birds to mistletoes for pollination and seed dispersal? Until recently there were few answers, but in 1985 in South Westland, Colin O'Donnell's study revealed tuis and kakas taking nectar of both red mistletoes, and silvereyes, bellbirds and blackbirds feeding on fruits of *Peraxilla colensoi*. PRW found bellbirds eating *Alepis* fruits on D'Urville Island. Many beech forests are poor sources of nectar and fleshy fruits, the more so since deer, possums and other browsers have depleted plants such as fuchsia, broadleaf, *Pseudopanax* species, and large-leaved *Coprosma* species. One can still study bird/mistletoe relationships in South Westland and in Waitutu forest but this may change rapidly as possums spread.

Why are mistletoes not more common on certain islands with suitable host plants but without possums? If possums