MISTLETOES ON BANKS PENINSULA

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Some parasitic flowering plants are so specialised that they lack chlorophyll and thus depend totally on their hosts for nutrition. The root parasite *Dactylanthus taylori* (Family: Balanophoraceae) of the North Island is a good example. Mistletoes are also obligate parasites - they cannot live unattached to their hosts - but they do have photosynthetic green leaves and/or stems, and manufacture at least some of their carbohydrate requirements. Such plants are often termed hemi-, or partial parasites.

New Zealand mistletoes belong to two families, Loranthaceae and Viscaceae. The two are closely related and indeed some taxonomists have preferred to treat them as subfamilies of Loranthaceae s.l. (sensu lato, in the wide sense). Loranthaceae s.s. (sensu stricto, in the narrow sense) differs from Viscaceae in several features of the flowers, pollen and fruit of the species included.

Worldwide, the Loranthaceae contains about 850 species in some 24 genera and almost all are stem parasites. One very unusual member of the family is *Nuytsia* of Western Australia which is a shrub or small tree rooted in the ground but parasitic on the roots of a wide range of host plants. It has a dry, three-winged, wind-dispersed fruit, quite unlike the sticky, berry-like fruit of most other Loranthaceae and Viscaceae in which either the seeds are swallowed and voided, or stick to the beaks of birds feeding on them and are dispersed in that way. The flesh of such fruits is extremely viscid. *Nuytsia* is so aberrant that it is placed in a tribe of its own - the Nuytsieae - within the Loranthaceae, while all other members of the family belong in the tribe Lorantheae. Viscaceae comprise about 450 species in about 11 genera, grouped into four tribes. *Viscum album* is the European mistletoe.

While the Loranthaceae and Viscaceae are closely related to each other, their affinities with other families are a little obscure. Probably the families most closely related are the Santalaceae (our own partial root-parasite *Exocarpos* belongs here) and the Misodendraceae, a family of mistletoe-like partial parasites growing on the trunks and branches of *Nothofagus* in southern South America.

Most botanists currently recognise six New Zealand species of Loranthaceae in five genera (*Ileostylus, Tupeia, Peraxilla, Trilepidea, Alepis*) and three of Viscaceae, all in the one genus *Korthalsella*. A seventh species in the

Loranthaceae was recorded in the North Island last century as *Phrygilanthus raoulii* and *P. tenuiflorus* = *Muellerina celastroides*, a species of eastern Australia. The Flora of Australia (Vol. 22) suggests that the two specimens may have been collected in Australia and inadvertently mixed with New Zealand collections. Some New Zealand botanists think that the New Zealand record may be a valid one (Norton *et al.* 1994; B.P.J. Molloy pers. comm. July 1996). The New Zealand mistletoe tally is a small number, compared with the bewildering wealth of Australia, where Loranthaceae are represented by 70 species in 12 genera, and Viscaceae by 14 species in three genera (Barlow, 1984). But the New Zealand mistletoes are a fascinating lot. The two species of *Peraxilla,* and one of *Alepis*, are bird-pollinated, and have attractive, colourful flowers; so too does (or did) *Trilepidea adamsii* but this wonderful plant is now presumed extinct; it was last seen alive in 1954. Alas, the conservation status of all the native mistletoes is cause for some concern. The pattern of decline seems to be linked to the spread of possums which certainly like to feed on the plants, but Jenny Ladley and Dave Kelly (1995) suggest that the reduction of native honeyeaters (tui, bellbird, stitchbird) may have contributed to the diminishing of bird-pollinated species. Throughout much of the North Island it is now rare to see a mistletoe. The 1995 New Zealand Threatened Plant List registers no fewer than five of the nine native mistletoes: *Trilepidea adamsii* is presumed extinct; *Alepis flavida, Peraxilla tetrapetala* and *P. colensoi* are vulnerable, and *Tupeia antarctica* is rare. Fortunately mistletoes are still common in parts of the South Island.

Banks Peninsula is an interesting place for mistletoes: six of the nine New Zealand species are recorded from here. Several are still common. I believe that one of the main reasons why possums have not decimated Banks Peninsula mistletoes, nor other susceptible plants such as fuchsia and fivefinger, is because of the mosaic of bush and pasture here. Possums certainly do eat fuchsia, fivefinger and mistletoes on the Peninsula, but they are much more interested in clover, as stomach analyses have shown! The three mistletoes never recorded from Banks Peninsula are the two showy *Peraxilla* species, and *Trilepidea* which was only ever known from northern New Zealand.

Here is some information on the six mistletoes of Banks Peninsula:

- *Ileostylus micranthus* (= *Loranthus micranthus*)

  Ileostylus does not have showy flowers - they are tiny and apparently pollinated by small insects - but the bushy clumps attached to host shrubs and trees are conspicuous enough. Their leaves are a bit like smallish *Griselinia* leaves and they stand out especially well when the host is a shrub with much smaller leaves, or a deciduous tree in winter (the mistletoe is

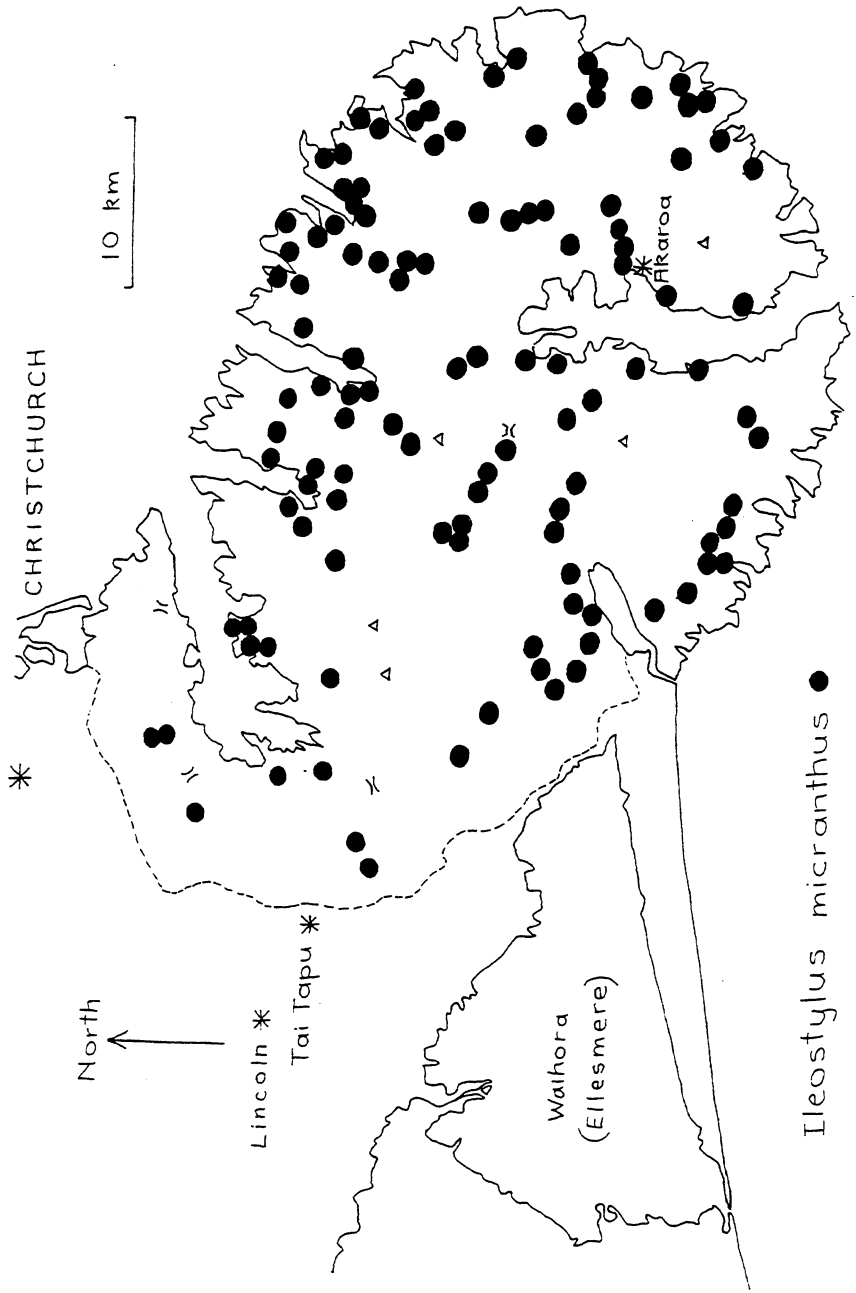

Fig. 1 Distribution of *Ileostylus micranthus* on Banks Peninsula

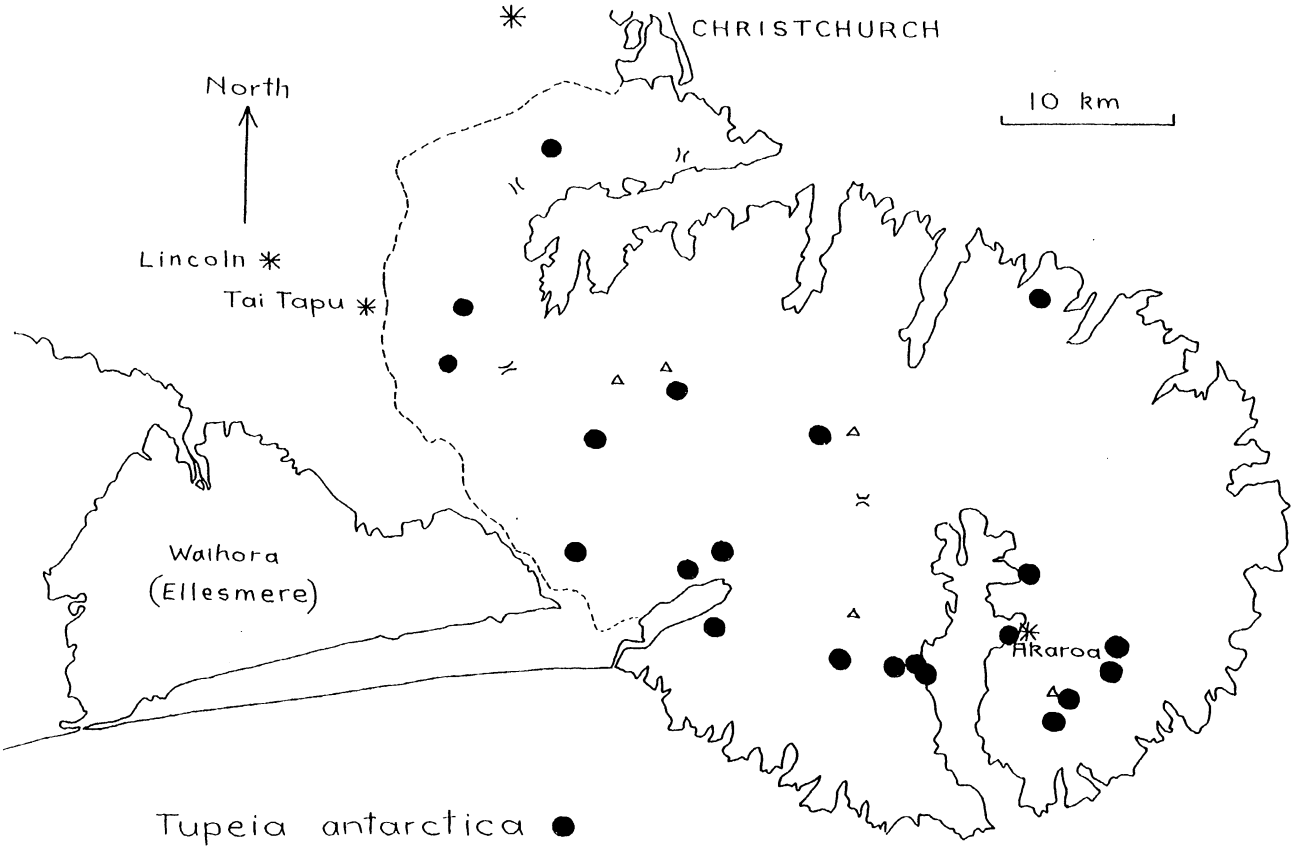

Fig. 2 Distribution of *Tupeia antarctica* on Banks Peninsula

evergreen). A tall *Robinia* on Rue Grehan in Akaroa, for example, is well laden with *Ileostylus* and can hardly fail to attract attention in winter. Also, the fruit are a rich golden yellow, and quite showy when they appear in abundance in the second half of summer and into autumn.

Although somewhat patchy in distribution (on my Banks Peninsula Botanical Survey my 1260 gridded samples hit *Ileostylus* four times) this mistletoe is widespread across Banks Peninsula (Fig. 1) and often abundant, on an extraordinarily wide range of hosts. Indeed, it is recorded from no fewer than 38 host species and two hybrids on the Peninsula, 12 of them exotic. A favourite host genus is *Coprosma* (11 species and one hybrid) but overall the host list includes such widely divergent taxa as *Sophora, Myoporum, Podocarpus, Citrus* and *Corylus* (hazel). As well as shrubs and trees, vines such as *Rubus* are parasitised.

- *Tupeia antarctica*

Rather similar in appearance but much less common than *Ileostylus* on Banks Peninsula (two hits), there are a few places where this mistletoe could be described as abundant. Curiously, one of its favourite hosts is the introduced tree lucerne or tagasaste (*Chamaecytisus palmensis*). Sometimes *Tupeia* is parasitic on *Ileostylus* which in turn is parasitic on *Chamaecytisus*! In all, *Tupeia* is recorded from eight host species on Banks Peninsula, six of them native (*Ileostylus, Myrsine australis, Pseudopanax arboreus, Olearia paniculata, Pennantia corymbosa* and *Pittosporum tenuifolium*) and two exotic (*Chamaecytisus, Hedera helix*) (Fig. 2).

- *Alepis flavida* (= *Elytranthe flavida*)

Specimens at Auckland provide certain evidence that this yellow-orange flowered bird-pollinated mistletoe was growing in S.E. Banks Peninsula beech stands at least until the 1970's. Anyway, Brian Molloy recorded it from *Nothofagus solandri* on the Otanerito side of the Cabstand about the same time or not long afterwards (B.P.J. Molloy, pers. comm. July 1989) - he collected no specimen because his policy is to avoid collecting rare mistletoes unless absolutely necessary. Since 1990 I have searched for *Alepis flavida* on and near Hinewai Reserve, so far without success. David Norton (pers. comm.) judged from herbarium specimens New Zealand-wide that 85% of *Alepis* records were on *Nothofagus solandri*, 7% on *N. fusca*, 3% on *N. menziesii* and 2% on *N. truncata*. Only the first two grow on Banks Peninsula (and on Hinewai), and *N. solandri* is far less common than *N. fusca* (red beech). Very rarely *Alepis* is recorded on hosts other than

Nothofagus. Of these, *Coprosma propinqua* and *Pseudopanax colensoi* grow naturally in the Hinewai area.

I remain optimistic that *Alepis flavida* will be located again here. Indeed, I offer the prize of a large Akaroa ice-cream to anyone who can lead me to a living plant! Brian Molloy says it should be looked for on the outer branchlets of mature trees on forest edges - it does not attach to older limbs and trunks as *Peraxilla* does. Fallen flowers lying on the ground might alert a searcher to its existence on branchlets above one's head. Allan (1961) gives the flowering time as December to February.

- *Korthalsella salicornioides*

Easily overlooked, this dwarf mistletoe (Fig. 5) seems to be rather local and uncommon on the Peninsula (Fig. 3). I have seen it on only two hosts here, mostly on kanuka (*Kunzea ericoides*) and occasionally on *Coprosma rhamnoides*.

- *Korthalsella lindsayi*

Reasonably common, and a wee bit more noticeable than *K. salicornioides*, *K. lindsayi* occurs on a wider range of hosts, all native: *Melicope simplex, Lophomyrtus obcordata, Myrsine australis, M. divaricata, Coprosma areolata, C. rotundifolia, C. virescens, C. crassifolia, C. rhamnoides* and *Sophora microphylla* (Figs. 4 and 5).

- *Korthalsella clavata*

Ruth Mason collected a specimen of *Korthalsella* in October 1971 near Stony Beach between Okains Bay and Little Akaloa (she called the place Stony Bay, but her grid reference makes it clear that the location is not the Stony Bay near Hinewai Reserve) (Fig. 3). The dwarf mistletoe was parasitic on *Melicope simplex*, and she called it *Korthalsella lindsayi*. In 1976 Brian Molloy looked at Ruth Mason's specimen and concluded that it matched *K. clavata* rather than *K. lindsayi* He added a note to the herbarium sheet: "First record for Banks Peninsula" (Fig. 5).

Allan (1961) treated *K. clavata* as a variety of *K. lindsayi*, but earlier and later botanists have concluded that it is a distinct species (cf. Stevenson, 1934; Burrows, 1995).

Fig. 5 illustrates *K. salicornioides, K. lindsayi* and Ruth Mason's specimen, all from Banks Peninsula. Ruth's single specimen (CHR 225279) is the only

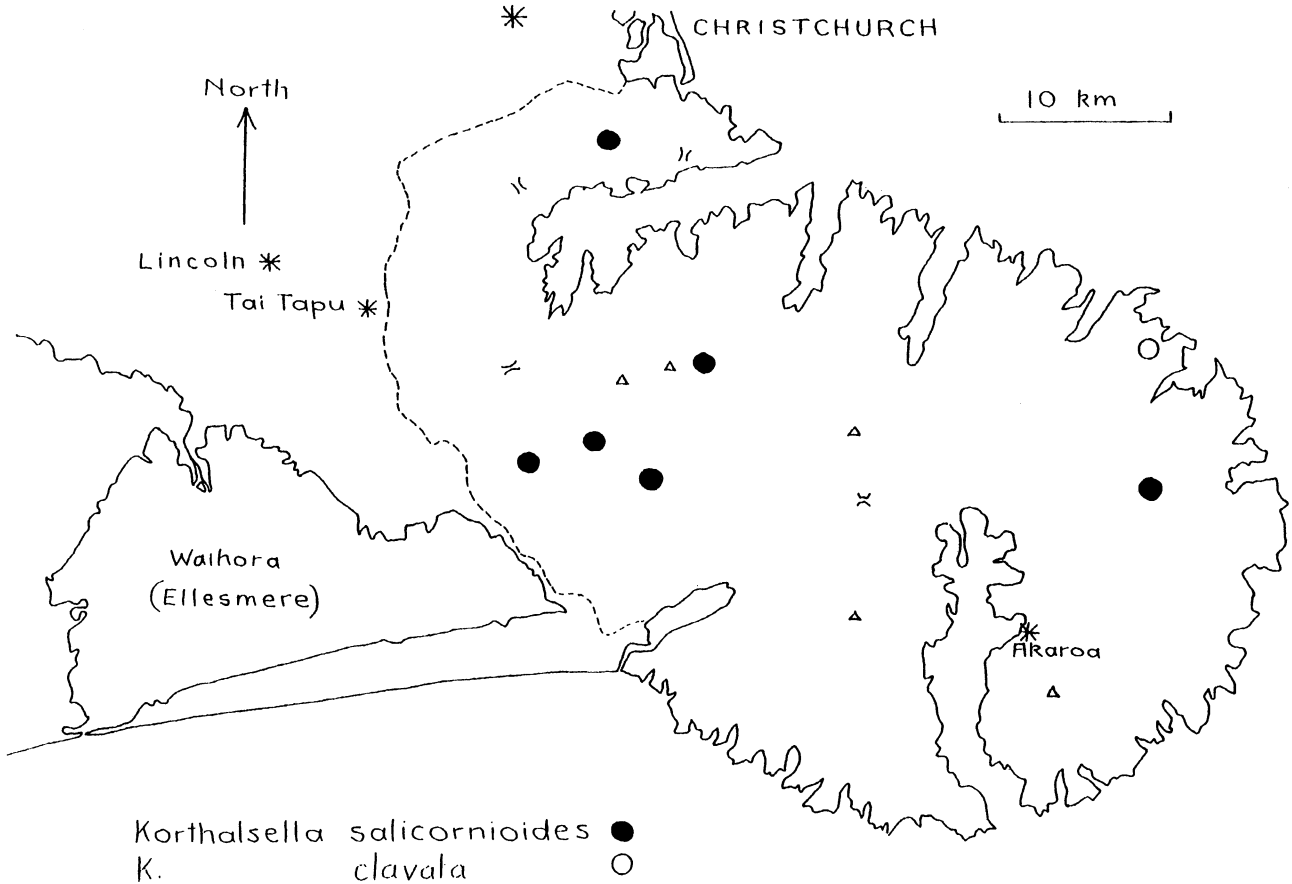

Fig. 3 Distribution of *Korthalsella salicornioides* and *K. clavata* on Banks Peninsula

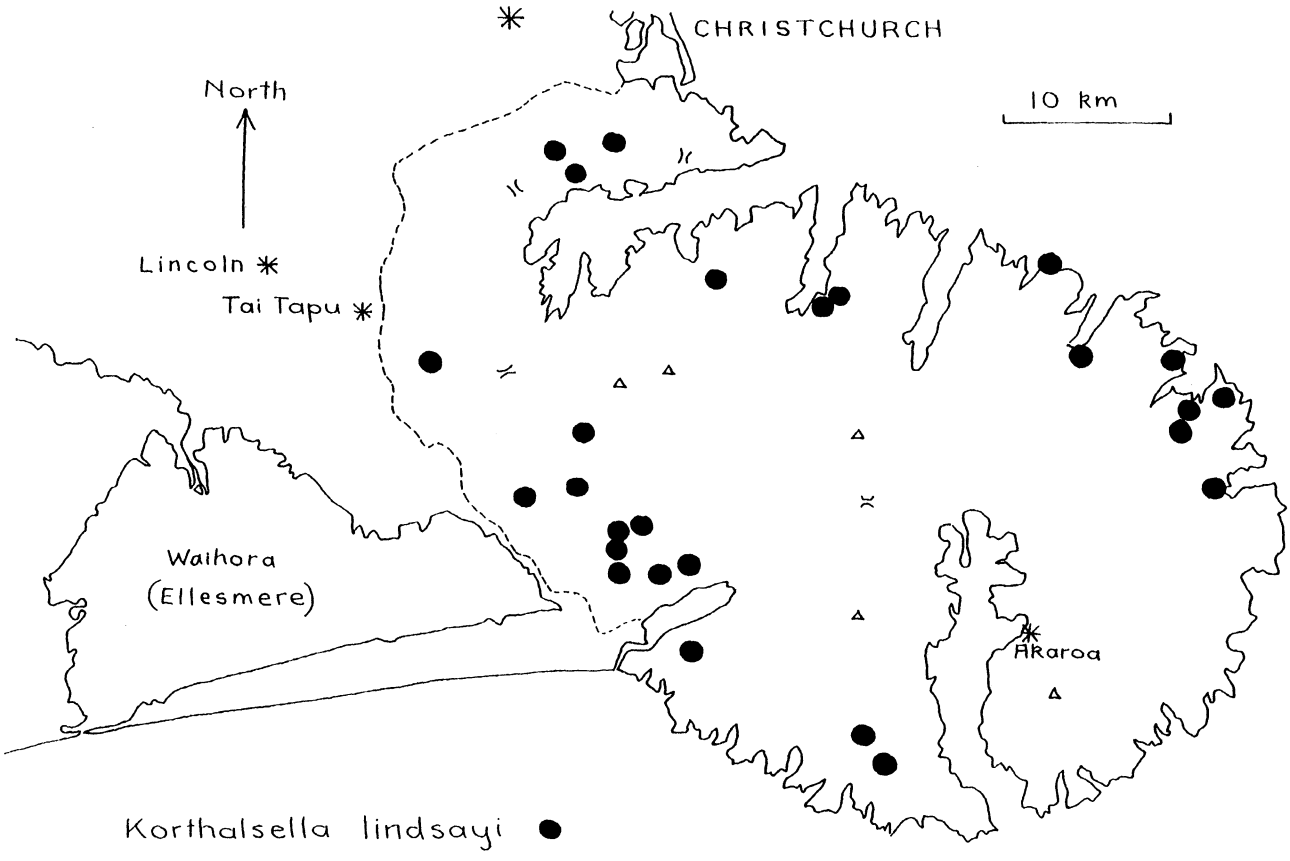

Fig. 4 Distribution of *Korthalsella lindsayi* on Banks Peninsula

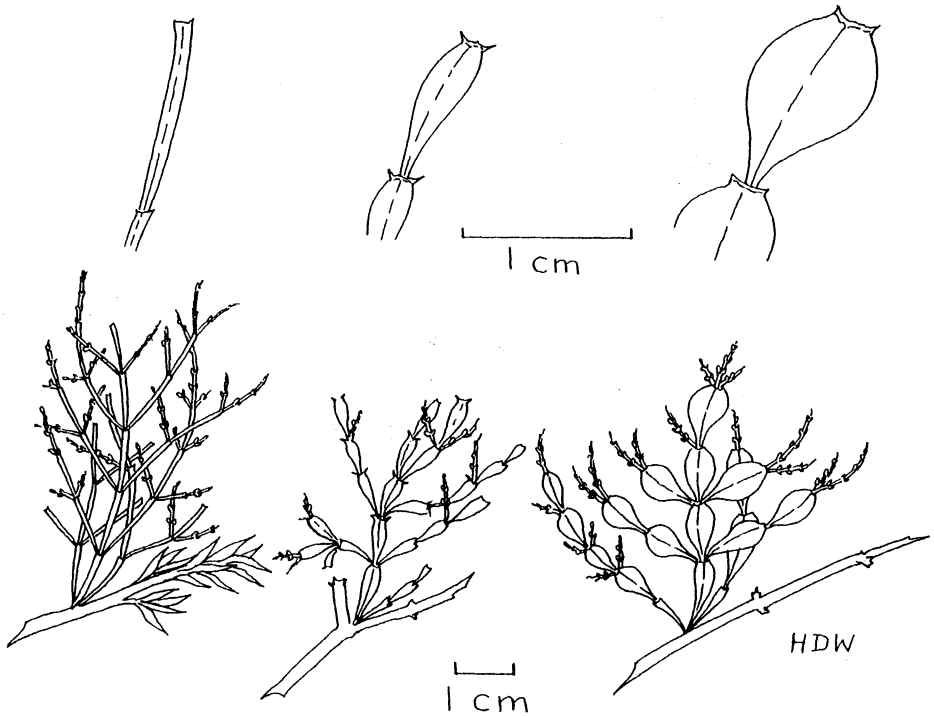

Fig. 5 *Korthalsella salicornioides* (left), *K. clavata* (middle) and *K. lindsayi* (right) drawn from Banks Peninsula material

Korthalsella known from Banks Peninsula that matches *K. clavata*, so it is worth delving a little deeper into its identity.

K. clavata differs from *K. lindsayi* s.s. mainly in the considerably narrower internodes, also in the narrower and nearly always solitary flower "spikes"; in *K. lindsayi* the terminal "spikes" are often paired or even in threes, and quite often branched. Although Allan saw only herbarium material, *K. clavata* is quite common in the mountains of Canterbury and forms more or less uniform populations (see Burrows, 1995). I have not seen *K. lindsayi* and *K. clavata* growing side by side, but Brian Molloy assures me that they do, even on the same host plant! Two closely related species occupying an identical niche might cause some taxonomists to wonder what was going on, but it seems clear that one can at least distinguish two entities.

Three possible explanations come to mind:

1. The species are distinct and Ruth Mason's specimen may represent a relict survival, or a rare dispersal of seed on to Banks Peninsula from a *clavata* population to the west. (Brian Molloy points out that the occurrence of *Ileostylus micranthus* on Norfolk Island must represent an impressive feat of dispersal for a mistletoe, so a dispersal of *Korthalsella clavata* across the Canterbury Plains is credible enough.)

2. Ruth Mason's specimen is a rare hybrid between *K. lindsayi* and *K. salicornioides*. (Maybe the *clavata* populations further west are a stabilised true-breeding taxon of hybrid origin.)

3. *K. lindsayi* and *K. clavata* might be simply two forms of one species. Maybe the form with narrow branchlets (*clavata*) is selected for by the harsher inland environments, although any population might also throw up a few individuals of the other form, hence Ruth Mason's specimen from among a wide-branchletted (*lindsayi*) population. Maybe the polymorphism arose through hybridisation in the first place, with introgression by *salicornioides* genes into *lindsayi* populations. Incidentally all three taxa have the same chromosome number (2n = 28).

Of the three possibilities, I think number 3 might be the most far-fetched! Two things could throw more light on the situation. First would be for Botanical Society members to find more *clavata*-like plants on Banks Peninsula. Second might be for a scientist to apply modern DNA and molecular techniques to the taxonomy of *Korthalsella*. But these days it might be difficult to find funding for this. Tiny mistletoes, virtually invisible to most people, and parasitising wild shrubs and trees, are unlikely to be seen as significant to the national economy!

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