somewhat uncommon looper species - see Fig. 1. The second species represented by just a few individuals, was a well known Australian leafroller pest, the light brown apple moth (*Epiphyas postvittana*) (Lepidoptera: Tortricidae).

P. melochlora is widely distributed from mid-North Island to West Coast - Otago and is usually associated with native broom (*Carmichaelia* species). Thus it is perhaps not unexpected to see it on kakabeak but despite that the present record is the first known from this host. It is of some entomological, not to mention botanical interest that the caterpillars clearly took to the host with some vigour. The site consisted of about 20 six year old kakabeak planted on a roadside area of about 0.25 ha. Every plant was infested and damage progressed to near defoliation thus requiring an insecticide application to save the plants.

The second caterpillar species, the light brown apple moth, was somewhat incidental compared to *P. melochlora*. It is an Australian leafroller which has a very wide host range of both New Zealand native and exotic plants. The leafroller is well known to the horticulture and nursery industries with some crops, e.g. apples, requiring regular insecticide applications to produce blemish-free fruit. Thus it is no surprise to see a few of these on kakabeak.

Fig 1. *Pasiphila melochlora*

Larval and adult *P. meochlora* material has been lodged with the New Zealand Arthropod Collection, Landcare Research Ltd, Tamaki, Auckland.

New exotic plant records, and range extensions for naturalised plants, in the northern North Island, New Zealand

P J de Lange, T J P de Lange & F J T de Lange

Introduction

This article reports the naturalisation of 32 new exotic taxa from the northern portion of the North Island of New Zealand (that area roughly north of latitude 38ºS). Three families (Blechnaceae, Ginkgoaceae, Dilleniaceae), and ten genera are additions to the New Zealand Naturalised Flora (see Webb et al. 1988, Webb et al.1995; Heenan et al. 1998; Heenan et al. 1991; Heenan et al. 2002; Heenan et al. 2004; Sykes 1992, Sykes 2005). Of these 32 additions, only two species of *Oxalis* are regarded as fully naturalised.

We also provide range extensions for a further 24 vascular plant taxa that have been recorded as partially established in past weed listings (*ibid.*). Most of these records stem from urban habitats where they have arisen as garden escapes. Previously the distinction between naturalised species, casuals, garden escapes and discards has never been precisely defined in New Zealand literature. Some may not see a need to do this but we suggest that it is vital first-step toward understanding the processes of exotic plant establishment, and also to help provide some guide to determine whether control measures are needed. In our view the New Zealand flora is already well endowed with exotic plants which, had steps been taken to control them during their initial phase of establishment, they would not be the problem they are now. We have found that a useful guide toward the development of such a classification is the work of Clement & Foster (1994). We borrowed two of their terms, "Established" and "Casual", in more or less the sense they used them.

Proposed Classification

Established

These are, in our view anyway, taxa which are now as a rule, a permanent part of our day to day landscape. They have achieved this status through successful spread by sexual, asexual or a combination of both reproductive pathways, and their complete eradication now seems unlikely. There are many examples of plants which fit this definition, here we choose two, pampas grass *Cortaderia selloana*, and monkey apple (*Acmena smithii*). Both species are abundant, self reproducing, and are now fully integrated into the New Zealand landscape. The notable exception to this definition are those species with bird dispersed fruit which, while spatially uncommon, have the ability to spread rapidly, and often undetected for considerable lengths of time. A good example of this would be the Mickey Mouse plant (*Ochna serrulata*) which was regarded as "fully naturalised" by Heenan et al (1999), though at that time the authors noted that it was never common. Whilst still uncommon, it has now

spread over large parts of Auckland City in a variety of indigenous and urban habitats, because its vivid red fruits are highly palatable to birds.

Casual
We see these as "noise in the system", specifically these are plants which have succeeded in establishing themselves well beyond the probable point of introduction, but which, for whatever reasons, are as yet not sufficiently common to be considered fully naturalised. In some cases they may persist for several years before they die out. However, in many cases casuals are quite capable of becoming established, and the only constraint on many of them seems to be time, opportunity, and stochastic events. That is, we see that unless some measure of control is undertaken, many have the potential to become fully established weeds of the future flora of New Zealand. Some good examples of casuals discussed here that seem destined to fulfil that prophecy would be the grass *Briza uniolae*, tea tree (*Leptospermum polygalifolium* subsp. *polygalifolium*) and possibly, the apricot (*Prunus armeniaca*). While all are still uncommon, they now occur in widely scattered and sporadic populations throughout the region defined by this article. Casuals probably best fit the criteria used by Webb et al. (1988) for their ξ entries.

Cultivation Escape
The key distinction here is that such taxa are always found close to their probable point of introduction, that is, usually anyway, a garden or planting supporting the presumed parent plants. These taxa were not as a rule, included in Flora IV by Webb et al. (1988) and many botanists today would still not regard such taxa as part of the naturalised New Zealand flora. We beg to differ, offering the observation that naturalisation is usually a sequential process, starting first with successful self-establishment near source e.g., a garden, and then spread subsequent spread. The current flora treatment (see Webb et al. 1988) of what are, by our definition, established species is well stocked with plants whose original point of naturalisation started with Cultivation Escapes. So we feel that clear documentation of Cultivation Escapes is useful as an early warning of the potential of a species to achieve established status.

Garden Discard
We reserve this category for those species which have persisted but not spread sexually or asexually beyond their point of establishment. In practice it is hard to clearly define such species, though, we all should be familiar with the often illegal dumps of garden waste from which small pieces of plant have vegetatively persisted, or germinated (Fig. 1.). Although most of these fail to establish, some can be remarkably persistent, and these, given time, have the potential to establish further, so some documentation of their presence is merited. Some good recent examples of these types of plants would be the bamboo, *Bambusa multiplex* (Lour.) Schult. et Schult.f. and the crucifix orchid (*Epidendrum ibaguense* Kunth).

Figure 1. An example of an illegal rubbish dump of garden refuse on "No Mans land" between residential properties near Malvern Road, Mt Albert, Auckland City. Note the specimens of *Agave attenuata* Salm-Dyck thrown here in February 2005 which have now taken root and are beginning to make new growth.

One final observation is that most of the records listed below stem from locations within a few kilometres of our Mt Albert residence. Having small children has enforced a change in exploration habits of the senior author (Fig. 2), and this, in turn has resulted in many discoveries of new naturalisations growing, quite literally under his nose/feet. Clearly, there is much to be said for the old adage, "don't leave town till you have seen in the country", or in this case, "don't leave the city until you have seen the suburb"!

NEW RECORDS

PTERIDOPHYTA
Blechnaceae
Blechnum nudum (Labill.) Mett. et Luerss.
fishbone water fern

NEW RECORD: AK 291065, *P. J. de Lange 6541, T. J. de Lange & F. J. T. de Lange*, 9 Jul 2005, Auckland City, Morningside, MacDonald Street.

NOTES: Cultivation Escape. Occurring as a small patch protruding from several places out of the cracks of a basalt stone retaining wall. The plants were growing in a position which is damp and shaded for most of the

year. A street-side planting and the presumed source for this naturalisation occurs c.15 m away across the street beneath a lamp post, in a café-side planting. Plants at both locations were spreading by rhizomes and also producing fertile fronds.

Figure 2. The authors taking a temporary break from field work. *Photo*: R. O. Gardner.

GINKGOPHYTA
Ginkgoaceae
***Ginkgo biloba* L.**
maiden hair tree

NEW RECORD: AK 277194, *E. K. Cameron 4887*, 16 Mar 1988, Auckland City, Emily Place.

ADDITIONAL RECORDS: AK 289323, *P. J. de Lange 6336*, 23 Jan 2005, Auckland City, Western Springs, Auckland Zoo; AK 290572, *P. J. de Lange 6520 & T. J. de Lange*, 7 Mar 2005, Auckland City, Mt Albert, Selcourt Road, Mt Albert War Memorial Park.

NOTES: Cultivation escape. This is a dioecious species, and because of the nauseating smell produced by ripe fruit, female trees are generally less commonly cultivated than males. However, when females are grown they are usually in association with males, and in these situations viable fruit is abundantly produced. If this fruit is then left unharvested (admittedly now a rare event in Auckland City!) it will germinate, and the naturalisations reported here stem from plants that have arisen under trees where fruit is never harvested (e.g., Auckland Zoo), or from situations where it would appear that at least some fruit has gone undetected. At the zoo site, seedlings of varying size classes were abundant (Fig. 3).

Fig. 3 *Gingko biloba* seedlings at Auckland Zoo

ANTHOPHYTA
Dicotyledonae
Apiaceae
***Hydrocotyle umbellata* L.**
water pennywort

NEW RECORD: AK 294037, *P. J. de Lange 6583 & F. J. T. de Lange*, 18 Oct 2005, Auckland City, Mt Albert, Asquith Ave

NOTES: Cultivation escape. A small patch found growing amongst veldt grass (*Ehrharta erecta* Lam.) and *Bromus lithobius* Trin. in a small wash out on the margin of a footpath. Further specimens were seen several metres away where they were in cultivation within the front section of a series of flats. This species is grown by mainly Asian communities as a vegetable or salad herb. The very large, glossy, peltate leaves (Fig 4) and broad white petioles give off a very distinctive celery (*Apium graveolens* L.) smell when bruised. During November 2005 this population was eradicated by the adjacent landowner.

Bignoniaceae
***Pyrostegia venusta* Miers**

NEW RECORD: AK 290576, *P. J. de Lange 6523*, 16 Jun 2005, Auckland City, Mt Albert, Jesmond Terrace

NOTES: Garden Discard. Though commonly cultivated around Auckland, this winter flowering vine, with spectacular orange-red masses of tubular flowers, does not seem to set seed. However, it freely suckers, and pieces trailing across the ground will layer, thus there is limited potential for it to self-establish in the vicinity of garden plants. AK 290576, provides another possible means of spread, this collection comprises a single vine, which appeared some 20 m distant from a planted specimen. The wild plant could not have been a sucker for the distance seems too large, and its location, protruding 1 m up a basalt stone wall seems an improbable place for a sucker to emerge. The most plausible explanation is that the plant established from a small piece flung from a lawnmower, used by the senior author to mulch vine clippings in the immediate vicinity of the stone wall. Under these probable circumstances we regard the record as a garden discard. The observation that this species might establish in this manner, necessitates some caution with the regard to the disposal of its clippings.

Fig. 4 *Hydrocotyle umbellata*

Crassulaceae
Crassula arborescens* (Mill.) Willd. subsp. *arborescens

NEW RECORD: AK 291497, *P. J. de Lange 6548 & F. J. T. de Lange*, 17 Jul 2005, Auckland City, Morningside, MacDonald Street.

ADDITIONAL RECORD: AK 290711, *P. J. de Lange 6535*, 29 Jun 2005, Auckland City, University of Auckland, Symond Street Campus, Old Biological Sciences Building, southern side

NOTES: Garden Discard. The first gathering came from what is clearly *C. arborescens* subsp. *arborescens*, and occurred in the immediate vicinity of two planted specimens. The plants and the wildlings were found growing in a street side car park area within the industrial portion of Morningside, Auckland. Naturalisation had been effected by at least one vehicle (if not more) having driven over the plant specimens, thereby scattering vegetative pieces which have then rooted and established themselves. Although very uncommon, the wild specimens were flowering at the time of collection (Fig. 5). Seed did not appear to be formed although pollen stainability was high (>90 %).

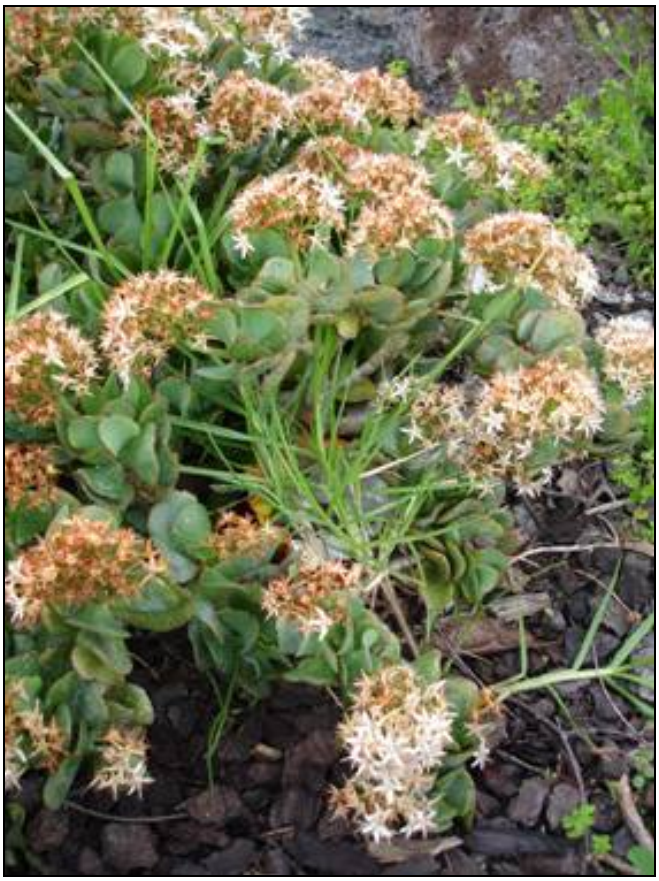

Figure 5. Wild plant of *Crassula arborescens* subsp. *arborescens* in flower in a car park bark garden near MacDonald Street, Morningside, Auckland City.

The second gathering was from a single plant established, presumably, from an accidentally discarded piece probably derived from a large planting of the same plant which occurs some 40 m away in a raised planter aside the Commerce "A" building at the University of Auckland. The naturalised plant was at the time of collection 0.8 × 0.9 m, and had first appeared four years ago as a small plantlet astride an iridaceous planting, since which time it has made rapid growth but has yet to flower. The presumed source of this plant is a large clump which is more spreading than tall, and has also not been observed to flower. An exact identity for this plant has yet to be made, though it matches an apparently shy-flowering form sold in New Zealand as *C. arborescens* which is currently under investigation (W. R. Sykes *pers. comm*. 2005). It is not *C. arborescens* s.s. though it is closest to that than it is to the only other large, shrubby *Crassula* species commonly cultivated in New Zealand, *C. ovata* (Mill.) Druce. *Crassula arborescens* characters are evident in the glaucous foliage and much broader leaves than is typically seen in the more usual clone of *C. ovata* cultivated in New Zealand. Possibly the University plant is a hybrid between both

species, which may account for its apparent inability to flower. Clearly further research is required before an exact name can be determined for this gathering.

Crassula dejecta Jacquinot

NEW RECORD: AK 292764, *P. J. de Lange 6554*, *T. J. de Lange & F. J. de Lange*, 4 Sep 2005, Hamilton, Hillcrest, Cobham Drive

NOTES: Cultivation escape. A small number of plants naturalised within cracks of an old, north-facing, roadside concrete block and mortar plaster retaining wall. The probable source for the wild plants was found growing above the wall. At least one of wild plants appears to have been a seedling, and viable seed was certainly being produced by the garden plant above the wall. *Crassula dejecta* is widely cultivated in northern New Zealand but is rather cold-sensitive. The Hamilton occurrence was thus, quite unexpected, as frosts are common in the Waikato. However, the exact site where the plants were is north-facing, and being at the top of a steep hill, is unlikely to pond cold air.

***Crassula muscosa* L.**

NEW RECORD: AK 289820, *P. J. de Lange 6475 & P. B. Cashmore*, 15 Apr 2005, Whakatane, Kohi Point Walkway

NOTES: Casual. We presume this gathering has casual status as no obvious garden plantings of this species could be found on a brief inspection of the area. It has also been reported from Whangaparaoa Peninsula (G. Smith *pers.comm*. 2005) but we have not seen specimens.

***Crassula dubia* Schönland**

NEW RECORD: AK 292767, *P. J. de Lange 6557*, *T. J. de Lange & F. J. de Lange*, 5 Sep 2005, Auckland City, New North Road

NOTES: Cultivation escape. This gathering is probably best regarded as a cultivation escape, although it was not observed in any gardens near the wild occurrence. A single sterile plant growing in a cracked asphalt foot path at the base of a combination wooden slat/concrete block wall, bordering a series of flats (this location had previously been a motel). This plant had an erect growth form with a woody trunk. The oblong to broadly ovate leaves were dark glaucous green to grey and densely covered in fine tomentum. Flowers were not seen. Often sold, in Auckland as propeller plant (*C. perfoliata* L.) which has much narrower lanceolate-falcate leaves & red instead of greenish white flowers.

Dilleniaceae

***Hibbertia scandens* (Willd.) Gilg.**
snake vine

NEW RECORD: AK 290710, *P. J. de Lange 6534*, 29 Jun 2005, Auckland City, Mt Albert, Jesmond Terrace

NOTES: Garden Discard. In similar circumstances to that described for *Pyrostegia venusta* one small plant of *Hibbertia scandens* had established within tall veldt grass at the base of a basalt stone wall. When prised from the ground and adjoining wall it seems clear that it had arisen from a small "clipping" that had succeeded in taking root. The presumed source of this plant is a planted specimen growing 15 m away. That plant never sets seed, though flowers are abundantly produced, the developing fruit soon withers and aborts. *H. scandens* is a fast growing vine with a remarkable capacity to root sucker, spread by layering, and it would now seem, by vine clippings taking root. However, even in Auckland it is cold-sensitive, and so it is not likely to be a serious future risk to the New Zealand flora, except possibly in the warmer, coastal parts of Northland

Droseraceae

***Drosera* ? *neo-caledonica* Hamet-Ahti**
condominium plant

NEW RECORD: AK 289986, *P. J. de Lange 6514*, 11 Nov 2004, Waitakere Ranges, Christian Road, Opanuku Pipeline Track, Watercare Filter Station Sludge Ponds

NOTES: Casual. Found growing in and around a partially overgrown sediment flocculation pond. Plants have established from seed and grow in flocculation sediment and adjacent damp clay with *Drosera capensis*, *Schoenus apogon* and *S. maschalinus*. The specimens are probably *D. neocaledonica* in that they show the distinctive mound forming habit caused by dead leaf retention which is typical of that species, and which is alluded to by the name "condominium plant". However, the leaves are notably wider than the dimensions of *bona fide* collections of this species housed in AK, and as AK 289986 is sterile, accurate identification is not possible.

***Dionaea muscipula* Ellis Venus fly trap**

NEW RECORD: AK 289680, *P. J. de Lange 6424 & T. J. de Lange*, 5 Apr 2005, Waitakere Ranges, Christian Road, Opanuku Pipeline Track, Watercare Filter Station, Sludge Ponds

ADDITIONAL RECORD: AK 289689, *S. Graham*, 6 Apr 2005, Clevedon, Creightons Road, Watercare Ponds (northwestern pond)

NOTES: Casual/Cultivation escape. The Christian Road plants are probably best classified as "casual", as no planted specimens occur at that site, though they have been planted there in the past (R. Maulder *pers.*

comm. 2001). Based on available evidence we can only assume that the Christian Road occurrences arose from a seed bank left by past plantings. Certainly specimens were only found in recently disturbed ground (i.e. within cut over scrub), in places they had not been observed several months before; none were very large, giving the impression they had only recently germinated, and the plants found were mixed in with other indigenous/adventive species common to that area (i.e. they were not present as discrete clearly planted plugs). The second occurrence may better qualify as a "Cultivation escape", because the plants occurred in the vicinity of other recently planted, flowering and apparently seeding specimens (S. Graham *pers. comm*. 2005). The exact process of naturalisation needs further study. For example, a plant that we have cultivated did not set seed when experimentally selfed. So we presume that several plants are needed for the species to set viable seed.

Geraniaceae
***Geranium incanum* Burm.f.**

NEW RECORD: AK 229730, *P. D. Champion*, 24 Sep 2004, Tauranga, Mt Maunganui

ADDITIONAL RECORDS: AK 286004, *E. K. Cameron 12343*, 4 Apr 2004, Auckland City, Mt Eden, Balmoral, Thames Street; AK 288953, *P. J. de Lange 6294 & T. J. de Lange*, 19 Nov 2004, Auckland City, Mt Albert, Wairere Ave

Figure 6. *Geranium incanum* naturalised in street verge, Wairere Ave, Mt Albert.

NOTES: Cultivation escape. The first indisputably wild record from the region came from sand dunes where it was locally established amongst lupin (*Lupinus arboreus* Sims) and marram (*Ammophila arenaria* (L.) Link). This record is probably a casual, however, we prefer to classify this plant as a cultivation escape simply because the other two observed instances, from a garden, and roadside verge (Fig. 6), suggest that spread is still mainly limited to the vicinity of garden plants. We have also observed this species as a sporadically occurring weed of the cracked asphalt pavement of upper Asquith Ave, Mt Albert, Auckland, again near garden plants overhanging residential boundary walls. Here the species further spread is controlled by kerbside spraying by the Auckland City Council.

Lamiaceae
***Plectranthus argentatus* S.T.Blake**
silver plectranthus

NEW RECORD: AK 288840, *B. S. Parris 12613*, 17 Nov 2004, Bay of Islands, Kerikeri, James Kemp Place.

ADDITIONAL RECORD: AK 293298, *P. J. de Lange 6564*, 21 Sep 2005, Auckland City, Mt Albert, St Lukes Road.

Figure 7. Silver Plectranthus (*Plectranthus argentatus*) plants established from discarded pieces, within an illegal garden dump on St Lukes Road, Mt Albert, Auckland.

NOTES: Cultivation escape. The first record is from a gathering of seedlings self-sown in a garden. The other gathering comes from a clear cultivation discard which has then spread asexually (Fig. 7). This is a popular plant in cultivation which grows easily from seed and stem cuttings. It should be watched for further signs of spread.

Lauraceae
***Cinnamomum loureirii* Nees**

NEW RECORD: AK 289324, *P. J. de Lange 6337*, 24 Jan 2005, Auckland City, University of Auckland, Symond Street campus, near Registry Building.

NOTES: Cultivation escape. Three saplings growing in leaf litter accumulated under *Nestegis* Raf. plantings.

The parent tree was not located. However, specimens lodged at AK indicate that a fruiting adult was present at least until recently in this area. It is assumed that the saplings collected have arisen from a seed bank left by that tree.

Malvaceae
***Dombeya torrida* (J.F.Gmel.) Bamps**

NEW RECORD: AK 286742, *P. J. de Lange 6049*, Auckland City. Western Springs, Auckland Zoological Gardens

NOTES: Cultivation escape. Numerous seedlings appear in the compacted clay soil beneath and near adult plants growing near the hippopotamus (*Hippopotamus amphibus*) Enclosure of the Auckland Zoo. These probably would have established further but they are either trampled or weeded out. Recently (2005) the path alongside which the adult trees grow has been concreted, thus further confining the spread of this plant.

Myrtaceae
***Astartea fasicularis* Labill.**

NEW RECORD: AK 289042, *P. J. de Lange 6301 & T. J. de Lange*, 6 Dec 2004, Coromandel Peninsula, Whangamata, Port Road.

NOTES: Cultivation escape. A few seedlings and one shrub (2 × 2 m) naturalising in sand dunes from nearby bach planting. During August 2000 the senior author has also seen but not collected, this species naturalising in a private garden at Bastia Hill, Wanganui.

Leptospermum polygalifolium* Salisb. subsp. *polygalifolium

NEW RECORD: AK 184437, *R. O. Gardner 5610*, 4 Jan 1989, Auckland City, Glen Eden, Waikumete Cemetry.

ADDITIONAL RECORDS: AK 282212, *M. D. Wilcox*, 20 Sep 1999, Auckland City, Glen Eden, Waikumete Cemetry; AK 281155, *P. J. de Lange 5641*, 5 Mar 2003, Auckland City, Alten Street, near University of Auckland Marae; AK 288210, *P. J. de Lange 6106 & T. J. de Lange*, 5 Sep 2004, Auckland City, Western Springs, Meola Creek Road; AK 288302, *P. J. de Lange 6234*, 30 Sep 2004, Auckland City, Auckland Domain, corner Titoki/George Street.

NOTES: Casual. Probably because of past nomenclatural confusion by New Zealand botanists with the rather different *L. laevigatum* (Gaertner) F.Muell., the naturalisation of this species seems to have been overlooked in recent publications (Heenan et al. 2004a; E.K. Cameron *pers. comm.*, 2004). *Leptospermum polygalifolium* is commonly grown, at least in the North Island, where it has been confused with kahikatoa (*L. scoparium* J.R.Forst et G.Forst.). From that species it is easily distinguished by the glabrous, uniformly dark green, broadly lanceolate to ovate obtuse-tipped leaves, which, when crushed, smell of *Eucalyptus*, with a faint hint of lemon. Also the sepals are deciduous, glabrous, with the fruit valves delicately woody (Thompson 1989). The flowers are much larger than *L. scoparium* and uniformly greenish-white, with cream-coloured stamens (Fig 8), while the large, ovoid, grey-capsules are 5-valved. A further distinction, not noted by Thompson (1989), is that all New Zealand plants that we have seen possess a lignotuber, which is otherwise absent in New Zealand forms of *L. scoparium*. The very different *L. laevigatum* can be easily distinguished from *L. polygalifolium* by its glaucous, oval to ovate, rather thick leaves with distinctly broadly obtuse apices. When crushed the leaves smell of *Eucalyptus* only. It is further marked from *L. polygalifolium* and *L. scoparium* by the persistent sepals, non-woody fruit valves, and reticulate seeds. From *L. spectabile* Joy Thomps. *L. polygalifolium* is readily distinguished by its cream-coloured rather than dark red flowers. This species is now locally common in parts of Auckland, seed germinates readily, and once plants have established their lignotuber renders them very hard to remove from the soil. At the Auckland Domain the further spread of this species is controlled only by frequent lawn mowing, which periodically removes the young branchlets of seedlings and saplings. These then re-sprout from the lignotuber in time for the next mowing.

Fig. 8 *Leptospermum polygalifolium* subsp. *polygalifolium* flowers and fruits - wild tree on lava flow near Auckland Zoon, Western Springs. Has greenish flowers.

Fig. 9 A wild plant of *Leptospermum polygalifolium* subsp. *polygalifolium* growing on steep lava cliff with naturalised *Arthropodium cirratum*. *Leptospermum* measures 150 mm x 100 mm, and is flowering and seeding.

***Leptospermum spectabile* Joy Thomps.**

NEW RECORD: AK 286758, *P. J. de Lange 6022*, 1 Apr 2004, Northland, near Kaeo

NOTES: Casual. Scattered plants in scrub near roadside. Seed from this collection is viable. This collection matches well descriptions of this species by Thompson (1989) and Wrigley & Fagg (1993) except that the leaves are not especially hairy. Possibly this gathering may be a hybrid, *L. scoparium* × *L. spectabile* selections of which are now available from retail plant nurseries. *Leptospermum spectabile* belongs to the informally recognised *L. lanigerum* (Sol. ex Aiton) Smith Group of Thompson (1989) which is distinguished from all the other species noted here by their persistent sepals. From wild New Zealand forms of *L. scoparium* it can be immediately separated by this character and by its dark red flowers. From horticultural selections of *L. scoparium*, *L. spectabile* differs by its very large (≥ 20 mm diam.) flowers, which are single (never double) and pale green, persistent sepals

***Metrosideros collina* agg. cv. 'Tahiti'**

NEW RECORD: AK 289126, *P. J. de Lange 6316*, 29 Dec 2004, Auckland City, University of Auckland, Symond Street Campus, Thomas Building.

NOTES: Casual. A single, well established seedling growing from cracked mortar on a window ledge outside the top northern face of the Thomas Building, School of Biological Sciences, University of Auckland, Symond Street campus. This popular shrub seems to be primarily self incompatible, although very small amounts of viable seed are produced (e.g., AK 289125), and it has been deliberately, and successfully hybridised with pohutukawa (*Metrosideros excelsa* Sol. ex Gaertn.f.) by horticulturists (S. Benham *pers. comm.* 2002; P. J. de Lange *pers. obs.*). The specimen noted here was presumed to be of hybrid origin, but independent analysis of nrDNA External Transcribed Spacer (ETS) sequences, have shown this collection to be pure (D. J. Keeling & R. C. Gardner *pers. comm.* 2004). This is worrying, as this form of *M. collina* A.Gray is now widely grown, and we can only presume that the naturalisation recorded here has come from wind blown seed.

Onagraceae
***Oenothera fruticosa* L.**

NEW RECORD: AK 289118, *P. J. de Lange 6317 & T. J. de Lange*, 6 Dec 2004, Coromandel Peninsula, Whangamata, near Port Road.

NOTES: Garden Discard. A few plants were found growing amongst kikuyu grass (*Pennisetum clandestinum* Chiov.) at the back of sand dunes. Although we could not find it cultivated in any of the nearby bach gardens, our search was not exhaustive. As the dunes of Whangamata are littered with garden escapes and illegal garden dumps, we think it very likely that the plants we saw were derived from a nearby garden or a refuse dump. Notably material we took back from Whangamata to grow has thrived but does not set viable seed, further hinting that the naturalisation we observed is most likely the result of a vegetative discard from a nearby garden. It will be interesting to see if other records are made, as this species is now widely sold by nurseries in Auckland.

Oxalidaceae
***Oxalis chnoodes* Lourteig**

NEW RECORD: AK 237963, *P. J. de Lange 3829*, 13 Feb 1999, Waikato, Mt Pirongia, Ruapane Track

ADDITIONAL RECORDS: AK 288665, *P. J. de Lange 6275 & T. J. de Lange*, 6 Nov 2004, Auckland City, Mt Albert, Corner of Rossgrove Street and Martin Street; AK 289040, *P. J. de Lange 6300*, 30 Nov 2004, Auckland City, Symonds Street, near Liverpool Street junction; AK 292763, *P. J. de Lange 6553*, 3 Sep 2005, Hamilton, St Andrews, 9 Dover Road.

NOTES: Established. Although *Oxalis chnoodes* was first reported for New Zealand by de Lange et al. (2005) this was without substantiating specimens. Here we provide the specimens on which that

literature record was based, and another, more recent gathering from Hamilton City. All New Zealand plants that we have seen match this species well, except that the leaves are not uniformly hairy. Outside the region covered by this article, this species has been collected once from Wanganui (AK 253772, *C. C. Ogle 3932*, Wanganui, base of Durie Hill, 22 Forres Street), suggesting that it is probably even more widespread. Past confusion with *O. corniculata* L. may be the reason that it has been overlooked. From that species it can be distinguished by the stout, woody taproot (however, *O. corniculata* can have a distinctly fleshy tap root C. C. Ogle *pers. comm.* 2005), white, tomentose stems (glabrescent in *O. corniculata*), petioles, petiolules, leaf undersides and laminal margins densely covered in hairs (glabrescent to hairy in *O. corniculata*), pale grey to light grey-green foliage (dark green, purple-green or red in *O. corniculata*), and inconspicuous, miniscule stipules with round distal portions, usually covered in dense hairs (very large, conspicuous, bluntly truncate, sparsely hairy to glabrous in *O. corniculata*).

***Oxalis radicosa* A.Rich.**

NEW RECORD: AK 290713, *P. J. de Lange 6536 & M. Ritchie*, 19 Jan 2000, Te Paki, North Cape Scientific Reserve, Surville Cliffs.

NOTES: Established. Though the collection cited here is somewhat scrappy it was abundant at this site and we suspect that it too, has been overlooked through confusion with *O. corniculata* and *O. rubens* Haw. From *O. corniculata*, and *O. exilis* A.Cunn., *O. radicosa* can be easily distinguished by its minute, inconspicuous, keeled, almost deltoid stipules, and stout, woody taproot. The stipules of *O. corniculata* are large, conspicuous, and bluntly truncate, while the rootstock of *O. corniculata* usually lacks a taproot and if this is present, it is fleshy, never stout or woody. Depauperate forms of *O. radicosa* could be confused with *O. exilis* (see de Lange et al. 2005), but that species always has conspicuous, truncate to rounded stipules. In New Zealand this species is most likely to be confused with the indigenous *O. rubens*. From which it differs by its retrorse rather than antrorse, spreading hairs on the stem and branches, and inconspicuous stipules. We suspect that *O. radicosa* is probably quite widespread in New Zealand, and that probably through confusion with the very common *O. corniculata*, and *O. rubens* it has been overlooked. Outside the area covered by this article we know of one other collection, one made from Wanganui City, near Durie Hill (AK 253771, *C. C. Ogle 3831*)

Proteaceae

***Grevillea* ?*alpina* Lindl. × *G. rosmarinifolia* A.Cunn.**

FIRST RECORD: AK 290574, *P. J. de Lange 6522 & F. J. T. de Lange,* 8 Jun 2005, Auckland City, Mt Albert, Mt Albert Motor Inn Carpark, Selcourt Road.

NOTES: Cultivation escape. Numerous seedlings were collected from two locations in poorly maintained bark gardens within the grounds of a motel. In one situation seedlings grew in and around a large planted specimen of what we identify as *Grevillea* cv. Gold Rush. This shrub has golden yellow flowers and is said to be an Australian raised hybrid cultivar between *G. alpina* Lindl. and one of the many forms of *G. rosmarinifolia* A.Cunn. (R. Makinson *pers. comm.* 2005). At the second site seedlings grew in the vicinity of a large *Grevillea* stump, presumably of the same cultivar, as seedlings from both locations were identical.

Rosaceae

***Alchemilla mollis* (Buser) Rothm.**

FIRST RECORD: AK 289121 & 290257, *P. J. de Lange 6312 & T. J. de Lange*, 25 Dec 2004, Auckland City, Mt Albert, Burch Street, Alice Wylie Reserve.

NOTES: Casual. One large plant well established in an old basalt retaining wall. Despite close searching this species was not evident in nearby gardens. The plant was destroyed during its collection.

Sarraceniaceae

***Sarracenia leucophylla* Raf.**
spotted pitcher

NEW RECORD: AK 285588, *E.K. Cameron 12313*, 13 Mar 2004, Waitakere Ranges, Christian Road, Opanuku Pipeline Track, Watercare Filter Station Sludge Pond

ADDITIONAL RECORD: AK 288730, *P. J. de Lange 6282*, 11 Nov 2004, Waitakere Ranges, Christian Road, Opanuku Pipeline Track, Watercare Filter Station Sludge Pond

NOTES: Cultivation escape. Both gatherings are from seedlings which occur in the vicinity of illegally planted and fruiting specimens.

Theaceae

***Oncoba spinosa* Forsk.**

NEW RECORD: AK 288949, *P. J. de Lange 6290 & T. J. de Lange*, 27 Nov 2004, Auckland City, University of Auckland, Symond Street Campus, near Thomas Building.

NOTES: Cultivation escape. Numerous seedlings of this distinctive shrub occur beneath and around a single planted specimen on the northern side of the Old Biological Sciences Building, University of Auckland. The only thing preventing their further establishment is their periodic removal by University grounds staff.

Oncoba is often placed in the Flacourtiaceae (see Mabberly 1997).

Valerianaceae
***Centranthus macrosiphon* Boiss.**
pretty Betsy

NEW RECORD: AK 288660, *P. J. de Lange 6273 & T. J. de Lange*, 7 Nov 2004, Auckland City, Mt Albert, Burch Street

ADDITIONAL RECORDS: AK 293299, *P. J. de Lange 6565*, 21 Sep 2005, Auckland City, Mt Albert, Exetor Street, AK 293300, *P. J. de Lange 6566*, 21 Sep 2005, Auckland City, Mt Albert, Asquith Ave.

NOTES: Cultivation escape. This is an annual species which has appeared during early summer over the last three years at Asquith Ave, Burch and Exetor Streets near the top entrance to the St Lukes Westfield Shopping Centre Car Park, Mt Albert. It is never common and usually grows within cracked pavement in or under hedges and fences near footpaths (Fig. 10). Further south we have also seen it naturalising under similar circumstances at Rangiriri in the Huntly Basin

Figure 10. Pretty Betsy (*Centranthus macrosiphon*) growing in crack pavement at Exeter Street, St Lukes Shopping Centre, Mt Albert, Auckland City

Monocotyledonae

Amaryllidaceae
***Clivia* x*cyrtanthiflora* (Van Houtte) Voss**

NEW RECORD: AK 288300, *P. J. de Lange 6232 & T. J. de Lange*, 28 Sep 2004, Auckland City, Mt Albert, St Lukes Road (just before Jesmond Terrace)

NOTES: Garden Discard. The exact circumstances surrounding the origin of this wild gathering are unclear. The senior author first observed this plant at this location some seven years ago, when small apparently seedling leaves were seen emerging from leaf litter under a roadside copse of "transit scrub" viz, bird dispersed taupata (*Coprosma repens* A.Rich.), and Transit New Zealand planted *Griselinia littoralis* Raoul. So the plant was assumed to have arisen from bird dispersed fruit. This plant has flowered twice in the last three years, and some viable fruit has been set at least once. However, the plants near association with obvious garden discards including *Monstera deliciosa* Liebm, spider plant (*Chlorophytum comosum* (Thunb.) Jacques) and ladder fern (*Nephrolepis cordifolia* (L.) C.Presl), suggest that the *Clivia* more probably came from the careless or deliberately clandestine disposal of garden waste. So we have taken the conservative approach and assign this gathering "Garden Discard" status. Aside from the occurrence of *Clivia* x*cyrtanthiflora*, reported here, we are aware of an unsubstantiated report of *C. miniata* naturalised on the basalt lava cliffs exposed above the Gillies Road motorway on ramp (B. G. Murray *pers. comm.* 2004).

Orchidaceae
***Dendrobium kingianum* Bidwell ex Lindl.**

NEW RECORD: AK 256159, *P. J. de Lange 5320 & G. M. Crowcroft*, 29 Sep 2001, Tauranga, Maungatapu, Rangataua Bay.

ADDITIONAL RECORD: AK 290632, *E.J. Ward*, 25 Nov 2004, Hauraki Gulf, Rangitoto Island.

NOTES: Cultivation escape. Although it is not clear whether the infrequently produced seed pods carry viable seed, the viviparous nature of this species ensures its asexual spread. At the Maungatapu site it was locally common on a cliff face under remnant pohutukawa (*Metrosideros excelsa*) forest below houses, and we presume the plants arose from a garden plant discarded from above by one of these houses. The Rangitoto specimen though without supporting collection information is clearly of a young plantlet. One further collection, AK 234359, *L. J. Forester*, 9 Sep 1997, Houto Mountain, north of Kirikopuni, may be a further naturalisation. The specimen remarks note that five plants were seen epiphytic on kohekohe (*Dysoxylum spectabile* Hook.f.), puriri (*Vitex lucens* Kirk) and mahoe (*Melicytus ramiflorus* J.R.Forst. et G.Forst.), on a trackside in a remote area said to be difficult of access. However, as plants were seen near a track, it was felt that they were probably planted.

Poaceae
***Briza poaemorpha* Henrard**

NEW RECORD: AK 226773, *P. J. de Lange & B. G. Murray*, 10 Jan 1996, Auckland City, University of Auckland, Symond Street Campus, by Thomas Building.

NOTES: Cultivation escape. Plants and seedlings of this species appeared in gutter gravel adjacent potted

plants of this species. It has not been seen since 1998 and is now presumed to have died out.

***Briza subaristata* Lam.**

NEW RECORD: AK 226775, *P. J. de Lange & B. G. Murray*, 10 Jan 1996, Auckland City, University of Auckland, Symond Street Campus, by Thomas Building.

NOTES: Cultivation escape. As with *B. poaemorpha* this species appeared for four or so years in gutter gravel adjacent to potted plants of this species. It has not been seen since 2000 and is now assumed to have died out.

***Briza uniolae* Nees ex Steud.**

NEW RECORD: AK 226779, *P.J. de Lange & B.G. Murray*, 10 Jan 1996, Auckland City, University of Auckland, Symond Street Campus, by Thomas Building.

ADDITIONAL RECORDS: AK 289068, *P. J. de Lange 6308 & B. G. Murray*, 13 Dec 2004, Auckland City, University of Auckland, Symond Street Campus, by Thomas Building; AK 286220, *P. J. de Lange 5162*, 5 Feb 2001, Auckland City, Albert Park; AK 289068, *P. J. de Lange 6308 & B. G. Murray*, 13 Dec 2004, Auckland City, University of Auckland, Symond Street Campus, University of Auckland grounds

NOTES: Casual. Now common in the University of Auckland, Symonds Street Campus grounds and adjacent Albert Park where it has every danger of becoming permanent. Plants grow readily from seed and have been inadvertently spread by the planting out of pot grown shrubs and border annuals into which *B. uniolae* plants have previously seeded. Although not especially aggressive, the plants are quick growing, and the harsh foliage does not seem to be particularly palatable to animals. Further spread of this grass in urban Auckland needs to be prevented.

RANGE EXTENSIONS

PTERIDOPHYTA
Pteridaceae
***Pteris dentata* Forssk.**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland City, University of Auckland (Heenan et al. 1999)

ADDITIONAL RECORDS: AK 248763 (see also AK 248765), *E. K. Cameron 10284a*, 22 Jul 2000, Auckland City, Epsom, Market Road; AK 288213, *P. J. de Lange 6111 & T. J. de Lange*, 20 Sep 2004, Auckland City, Waterloo Quadrant, University of Auckland, Law School Steps; AK 290581, *P. J. de Lange 6526*, 17 Jun 2005, Auckland City, Mt Albert, Wairere Ave; AK 290646, *P.J. de Lange 6531 & T. J. de Lange*, 22 Jun 2005, Auckland City, Mt Albert, Burch Street, Asquith Ave Flats; AK 289832, *P. J. de Lange 6486*, 11 Apr 2005, Hamilton, Hillcrest, University of Waikato campus grounds.

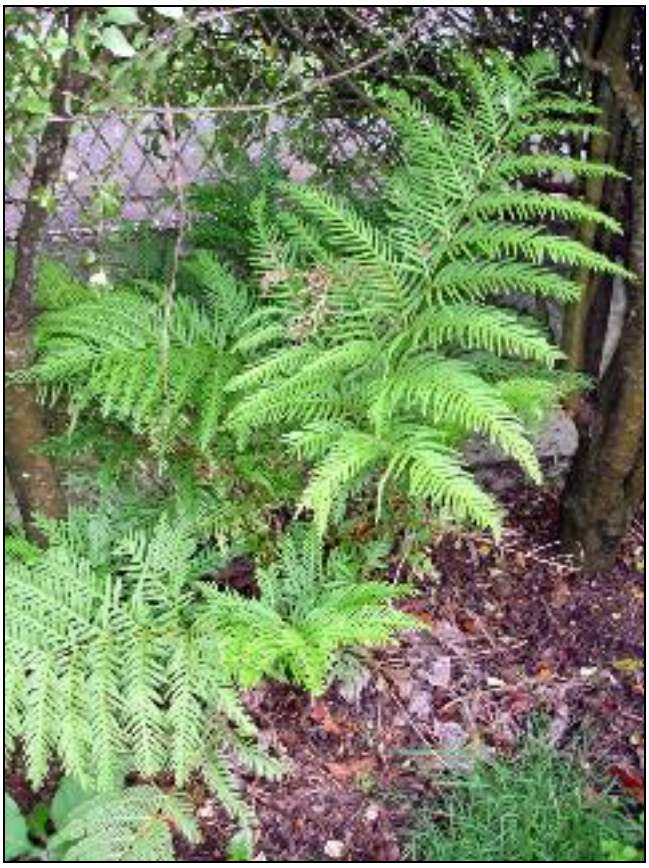

Fig. 11 Wild specimen of *Pteris dentata* growing under *Pittosporum tenuifolium* Sol. ex Gaertn. (recently trimmed), Wairere Ave, Mt Albert

NOTES: Casual. This species has had a long standing presence on the western margin of the Thomas Building, University of Auckland where it was first collected wild in 1979, and where plants still appear from time to time on a concrete block retaining wall. We gather that it has always been present in this area since at last the early 1970's (J. E. Braggins *pers. comm.* 2004) but by the late 1980's it had apparently died out. Last year we rediscovered it here, and not long after we found a few plants growing in the mortar of the nearby Law School steps. Outside this central city location, it has been collected wild in Epsom, at the former residence of the late Dr Laurie Millener (1914 - 2000), where it was assumed that the wild plants originated from deliberate plantings Millener had made using plants from the University of Auckland (J. E. Braggins *pers. comm.* 2005). However, recent discoveries of well established plants of this species from Mt Albert (Figs 11 & 12), and also from the campus grounds of the University of Waikato, suggest that it may be more widespread than believed, and that more than one introduction to the country may have happened. In this regard it is notable that Epsom and Mt Albert plants are somewhat unusual, in that they are distinctly rhizomatous, which, according to Dr

J. E. Braggins (*pers. comm.* 2005) is not typical of this species (indeed it is unusual in the genus), and is a character never seen in those plants growing wild at the University of Auckland. Because this species has a superficial similarity to the widespread, indigenous, and urban weed *Pteris tremula* R.Br. it is probably more common than these records indicate. From that species *P. dentata* can be distinguished by the distinctly pectinate 2(–3)-pinnate fronds, with the apices of the ultimate segments being finely but distinctly dentate.

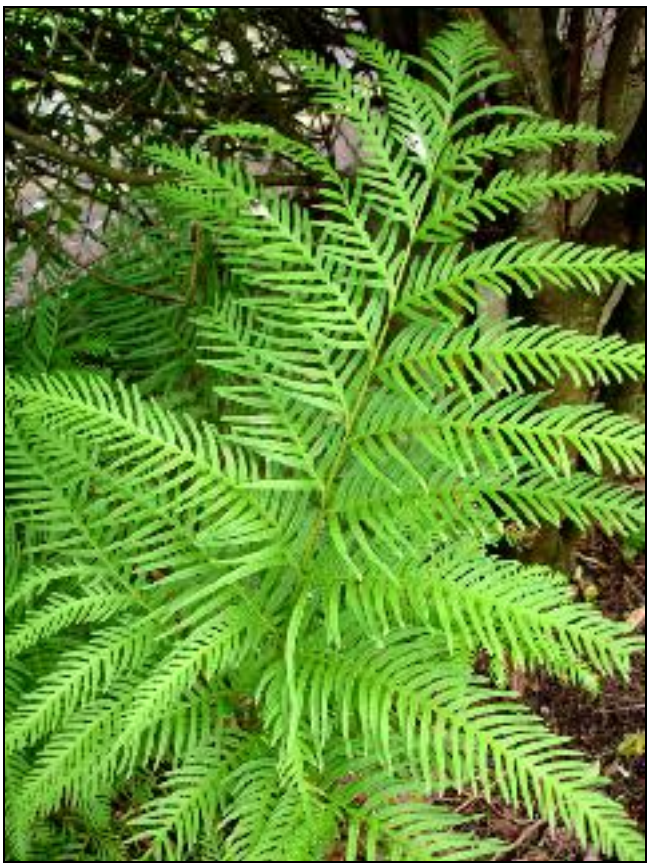

Fig. 12 Close up of *Pteris dentata* frond showing distinctive 1-3-pinnate fronds

ANTHOPHYTA

Dicotyledonae

Altingiaceae

***Liquidambar styraciflua* L. liquidambar**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland (Heenan et al. 1999), Bay of Plenty, Te Puke (Heenan et al. 2000)

ADDITIONAL RECORDS: AK 289210, *P. J. de Lange 6332*, 12 Jan 2005, Takatu Peninsula, Million Bay, Campbells Beach, Clinton Road; AK 289211, *P. J. de Lange 6333*, 13 Jan 2005, Auckland City, University of Auckland, Symond Street Campus, near Thomas Building; AK 289212, *P. J. de Lange 6334*, 13 Jan 2005, Auckland City, Queen Street and Karangahape Road Intersection; AK 285421, *P. J. de Lange 5899*, 21 Feb 2004, Hamilton City, Hamilton East, Grey Street

NOTES: Established. The naturalisation of this species has been thoroughly documented by Cameron (2004). We add here some additional Auckland City records, The University of Auckland location though mentioned by Cameron (2004) was not then substantiated with a voucher. Also we add an additional range extension for the species to the Takatu Peninsula, Kawau Bay. In all instances that we have seen, wildings occur in the immediate vicinity of parent trees.

Asteraceae

***Euryops pectinatus* DC.**

PREVIOUS RECORDED DISTRIBUTION: North Island, Northland, Hokianga Harbour, Opononi (Heenan et al. 2004a).

ADDITIONAL RECORD: AK 288434, *P. J. de Lange 6258 & T. J. de Lange*, 8 Oct 2004, Hamilton City, St Andrews, Warwick Ave, just before North Hamilton School Entrance

NOTES: Casual. Some uncertainty over the naturalised status of the Opononi record accepted by Heenan et al. (2004a) exists because of the possibility that it may have been planted at that site. Part of the problem is that this species was not known to produce viable seed in New Zealand (W.R. Sykes *pers. comm.* 1998). The recent discovery of a flowering plant growing within the mortar of a street side brick wall in Hamilton suggests that at least some plants are producing viable seed and that further naturalisations are likely. Outside the area covered by this article there have been unconfirmed reports of this species spreading in Wellington (P. B. Heenan *pers. comm*. 2004).

Facelis retusa* (Lam.) Sch.Bip. subsp. *retusa

PREVIOUS RECORDED DISTRIBUTION: North Island, Northland from Te Paki to Hokianga and Whangaroa Harbours (Webb et al. 1995).

ADDITIONAL RECORDS: AK 251145, *P. J. de Lange 4452*, 19 Sep 2000, Auckland City, Symond Street, near Thomas Building; AK 281000, *T. Hatch*, 25 Nov 2002, Great Mercury Island, Stony Bay, near Boulder Beach; AK 289047, *P. J. de Lange 6305*, 6 Dec 2004, Coromandel Peninsula, Whangamata, Gillian Street.

NOTES: Established. This species was first collected from New Zealand in 1989 (Webb et al. 1995) since which time it has spread rapidly, or, rather, been gathered widely, throughout Northland. South of here on the Coromandel Peninsula, at Whangamata this asteraceous weed is now well established in kerb side lawns and grassed public access ways to the beach but it is apparently not otherwise known from the Peninsula proper, However it has been collected from the Great Mercury Island. These occurrences strongly suggests that it must be present elsewhere on the peninsula and it should be looked for. In Auckland, the

sole record came from a cracked pavement near the loading bay of the Thomas Building, School of Biological Sciences, University of Auckland. That plant may have arisen from seed lodged on vehicles coming from Northland.

***Helichrysum argophyllum* DC.**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland, Waitakere Ranges (Heenan et al. 2004).

ADDITIONAL RECORD: AK 292766, *P. J. de Lange 6555, T. J. de Lange & F. J. de Lange*, 4 Sep 2005, Hamilton City, Hillcrest, Cobham Drive

NOTES: Cultivation Escape. This gathering was made from plants found growing along the junction between a cracked asphalt foot path and an old concrete mortar retaining wall, above which was a large, clearly planted garden specimen. This species was well established at this site, through, we presume, the vegetative spread of a nearby garden plant followed by fragmentation caused by wind abrasion, and human trampling. In cultivation this species layers readily and it can spread very quickly in suitable conditions. We have seen no evidence that it forms viable seed. Although notes on the first record for this species (AK 250324, *R. O. Gardner 8501*!) state that there were "seedlings and juveniles".

Bignoniaceae
***Radermachera pentandra* Hemsl.**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland, Meadowbank (Heenan et al. 1999).

ADDITIONAL RECORD: AK 293242, *P. J. de Lange 6558, T. J. de Lange & F. J. de Lange*, 10 Sep. 2005, Hobsonville, Monteray Model Village.

NOTES: Cultivation Escape. A single seedling found growing in a cobbled area above a small artifical stream draining a "model village" setting. A single fruiting adult tree was located within a hedge some 5 m away. This tree is commonly cultivated around Auckland City, where it flowers and appears to set viable seed freely. The herbarium specimens on which the first occurrence is based (AK 232174-76!), were made from a property at St Johns Road, Meadowbank, where there were numerous seedlings and saplings. Further wild occurrences are probable and this species should be watched.

Brassicaceae
***Brassica rapa* var. *chinensis* (L.) Kitam.**
pak choi, Chinese cabbage

PREVIOUS RECORDED DISTRIBUTION: North Island, Waikato, Hauraki Plains, Turua (Webb et al. 1995 as *Brassica chinensis* L.), South Island, Canterbury Plains (Heenan et al. 2004b).

ADDITIONAL RECORD: AK 288221, *P. J. de Lange 6119*, 13 Dec 2003, Hamilton City, Flagstaff, Colleraine Street

NOTES: Established (South Island, Canterbury only). Primarily an opportunistic escape from agricultural land, where it is primarily grown as a seed crop (Heenan et al. 2004a). North Island occurrences are also from roadsides and farmland recently cleared and subdivided for urban expansion. Presumably, in the latter situation pak choi has either been a contaminant of topsoil spread over subdivisions, or has been part of the recently exposed soil seed bank.

Crassulaceae
Crassula alata* (Viv.) A.Berger var. *alata

PREVIOUS RECORDED DISTRIBUTION: North Island, Wanganui Area, Santoft Forest near Bulls (Heenan et al. 2004a).

ADDITIONAL RECORD: 15 April 2005, AK 289819, *P. J. de Lange 6474 & P. B. Cashmore*, Whakatane, Whakatane River, Wharf.

NOTES: ?Casual. An uncommon weed in muddy ground near the Whakatane Wharf. This miniscule weedy species is easily confused with the indigenous *C. colligata* Toelken and *C. sieberiana* (Schult. et Schult.f.) Druce and is best distinguished from both by the (1-)3(-4) lobed calyx and corolla, 2-seeded follicles and by the distinctive marginal flange of the basal portion of the stem. Though the Santoft record is the first to be recognised for the country, it is probably more widely established, as it seems to have first been collected from near Taupo in 2000 (AK 254666, *R. O. Gardner 10214A*, 17 Oct 2000, Taupo, south end of town at lake edge). Because it is so small, and annual, it is easily overlooked.

***Crassula ovata* (Mill.) Druce**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland City (Mt Albert), Wellington (Sykes 2005)

ADDITIONAL RECORDS: AK 290582, *P. J. de Lange 6527*, 17 Jun 2005, Auckland City, Point Chevalier, Meola Creek; AK 290645, *P. J. de Lange 6530, T. J. de Lange & F. J. T. de Lange*, 19 Jun 2005, Auckland City, Mt Albert, Sutherland Road near Nova Street junction; AK 294019, *P. J. de Lange 6577*, 19 Oct 2005, Mangere, Auckland Domestic Airport Carpark, Tom Pearce Drive.

NOTES: Cultivation Escape/Garden Discard. While these additional records do not extend the distribution as reported by Sykes (2005) their documentation provides further evidence that this species is rapidly naturalising in inner Auckland. Though viable seed is produced the main means of dispersal and naturalisation seems to be vegetative (Sykes 2005).

Here we record the first clear evidence of seedling recruitment (AK 290645 which comprises a mix of rooted vegetative pieces and seedling specimens). Though frost-tender this species is popular in cultivation throughout the warmer parts of the country. Because it fragments easily, sets viable seed, and mature leaves can sprout young plants, further spread is anticipated. It should be watched out for in northern coastal situations. Mercifully it is slow growing. Although well outside the geographic area specified by this article, we think it worth noting that *C. ovata* has also been collected naturalised on the Waitangi Beach front, on the main Chatham Island (AK 291558, *P. J. de Lange CH 361*!)

***Crassula pubescens* subsp. *radicans* (Haw.) Toelken**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland City (Mt Albert), Wellington (Hataitai) and Banks Peninsula (Charteris Bay) (Sykes 2005)

ADDITIONAL RECORD: AK 293265, *P. J. de Lange 6562, T. J. de Lange & F. J. de Lange,* 4 Sep 2005, Hamilton City, Hillcrest, Hillcrest Motor Lodge.

COMMENTS: Cultivation Escape/Casual. Common in the fine gravel along the margins of the main motel area car park. Numerous plants were seen cultivated in adjacent gardens. This species grows readily from detached stems and leaves – the latter of which soon produce plantlets. Viable seed does not appear to be produced.

***Plectranthus ornatus* Codd**

PREVIOUS RECORDED DISTRIBUTION: North Island, Waikato River, Ngaruawahia (Webb et al. 1995)

ADDITIONAL RECORD: AK 285246, *P. J. de Lange 5840*, 17 Feb 2004, Auckland City, Panmure, Mt Wellington, near Moyes Motors; AK 290871, *P. J. de Lange 6538*, Mangawhai, Molesworth Drive

NOTES: Garden Discard. The original gathering reported by Webb et al. (1995) came from a riverside bank where garden refuse had been dumped. At that site it has not persisted. The two new records reported here came from a basalt wall near Mt Wellington and scattered plants growing in sandy ground along a roadside at Mangawhai. At the later site naturalisation had been clearly assisted through fragmentation by vehicles of roadside plantings. This species is immediately distinguished from the other naturalised and indigenous species of *Plectranthus* in New Zealand by its semi-succulent habit, rather pungent, vile-smelling foliage, and comose inflorescences. This species has recently become popular in cultivation, where it is often sold, incorrectly (W. R. Sykes *pers. comm.*, 2005) under the name *P. neochilus* Schltr. From *P. ornatus*, *P. neochilus* differs by its longer and narrower inflorescence, and spaced verticals at flowering, and it is probably not present in New Zealand (W.R. Sykes *pers. comm*. 2005). *P. ornatus* is now widely grown, particularly in coastal situations. Although seed does not seem to be formed, detached pieces root freely, so further naturalisations are likely.

***Westringia fruticosa* (Willd.) Druce**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland, Glen Eden, Waikumete Cemetery (Heenan et al. 1998 as *W. rosmariniformis* Sm.)

ADDITIONAL RECORDS: AK 233882, *C. R. McCain*, 22 May 1997, Greenhithe, Tauhinu Road, Tauhinu Pa Site; AK 290708, *P. J. de Lange 6532, T. J. de Lange & F. J. T. de Lange*, 24 Jun 2005, Auckland City, Mt Albert, Burch Street.

NOTES: Cultivation Escape/?Casual? Some doubt remains about the naturalised status of this dioecious shrub (E. K. Cameron & R. O. Gardner *pers. comm.* 2005) which was first recorded as probably wild in 1987. That gathering was not accepted for Flora IV by Webb et al. (1988) and not treated by Webb et al. (1995). However, it was accepted by Heenan et al. (1998). Although the additional records provided here do not extend its known distribution outside Auckland we add them here because they add further evidence that this species can spread, possibly by seed or vegetative material. At the Tauhinu Pa site was it was described as "Numerous, clearly naturalised" but E. K. Cameron (*pers. comm.* 2005) could not find it there when he looked and nor could we. The Mt. Albert, Burch Street specimen, can only have been a self-established plant because it grew within a basalt lava flow, which required the use of a rock hammer to extract the specimen. So we think it rather unlikely that it was planted there, though we did note that this species is commonly cultivated nearby. During 1998 the senior author and Dr P. B. Heenan had observed one plant that we thought was naturalised, growing on a large basalt lava outcrop at the eastern end of the main lake at Western Springs, near the Museum of Transport and Technology boundary fence. However, no specimen was obtained, and that plant has since died out due to trampling by rock climbers. With respect to its dioecious breeding system as the main reason to refute its presumed naturalisations, *Westringia* is not that singular as other dioecious lamiaceous plants, occurring as single-sex isolated individuals, e.g., *Tetradenia riparia* (Hochst.) Codd., have been recorded, and accepted as naturalised elsewhere in New Zealand (Heenan et al. 2002). However, we will feel more convinced when fruiting specimens of *Westringia fruticosa* bearing viable seed are finally seen.

Malvaceae
***Hibiscus syriacus* L.**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland, Motutapu Island, Motuihe Island, Coromandel (Heenan et al. 1999; Heenan et al. 2002).

ADDITIONAL RECORD: AK 289795, *P. J. de Lange 6450 & P. B. Cashmore*, 13 Apr 2005, McLaren Falls Road.

NOTES: Cultivation Escape. A commonly cultivated shrub which readily spreads from seed within gardens. Though the number of records have greatly increased its known geographic range this species is probably still a cultivation escape because all of the gatherings made (including the one reported here) occur within the close proximity to planted specimens. The McLaren Falls Road plants were locally common over a short distance of roadside bank, and were flowering and fruiting. Planted specimens were present nearby as part of a hedge defining a kiwi fruit (*Actinidia deliciosa* (A.Chev.) C.F.Liang et A.R.Ferguson) orchard.

Myrtaceae
***Agonis flexuosa* (Willd.) Sweet**
river peppermint
PREVIOUS RECORDED DISTRIBUTION: North Island, Mangawhai, Auckland City, New Plymouth, Wanganui City (Heenan et al. 2002).

ADDITIONAL RECORDS: AK 292590, *P. J. de Lange 6551 & J. Salter*, 30 Aug 2005, Kaipara, Rimmer Road, near Woodhill Forest Beach access, AK 292591, *P. J. de Lange 6552 & J. Salter*, 30 Aug 2005, Kaipara, Rimmer Road, near Woodhill Forest Beach access.

NOTES: Casual. With the exception of the Wanganui record where numerous seedlings had appeared in sandy soil (C. C. Ogle *pers. comm*. 2005), all the other occurrences reported by Heenan et al. (2002) are of isolated specimens. These new records from Rimmer Road are from a site where numerous seedlings, saplings, sub adults and adult specimens were present along a 100 m stretch of north-facing, roadside bank cut into the apex of a deeply weathered, Pleistocene-aged dune system. The presumed source for this infestation is a series of very large, planted trees which grow above the roadside bank on private property. *Agonis flexuosa* is a popular, and widely cultivated street tree in New Zealand, so more naturalisations are anticipated.

***Tristaniopsis laurina* (Sm.) Peter G.Wilson et J.T.Waterh.**

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland and near Athenree (Heenan et al. 2004a).

ADDITIONAL RECORDS: AK 286104, *P. J. de Lange 5995*, 13 Apr 2004, Auckland City, Mt Albert, Selcourt Road, AK 289723, *P. J. de Lange 6429 & T. J. de Lange*, 7 Apr 2005, Glen Eden, Waikumete Cemetry, Gaden Stream; AK 289722 & 290497, *P. J. de Lange 6428 & T. J. de Lange*, 7 Apr 2005, Glen Eden, Waikumete Cemetry, Amber Crescent; AK 288211, *P. J. de Lange 6110 & T. J. de Lange*, 10 Sep 2004, Hamilton City, Te Rapa Straight

NOTES: Cultivation Escape/Casual. These records expand on the reported distribution for Auckland City given by Heenan et al. (2004a) and increase this species known range from Athenree in the northern Bay of Plenty west to Hamilton in the Waikato. In the majority of wild instances seen, seedlings only seem to appear when the parent trees have been cut down.

Ochnaceae
***Ochna serrulata* (Hochst.) Walp.**
Mickey Mouse plant

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland (Heenan et al. 1999)

ADDITIONAL RECORDS: AK 282772, *A. P. McCluggage*, 1 Nov 2001, Whangarei, Hall Ave; AK 289500, *P. M. Brown*, 1 Mar 2005, North Shore, Devonport, Fort Takapuna reserve; AK 254775, *E. K. Cameron 10616*, 21 Sep 2001, Auckland City, Auckland Domain; AK 288220 *P. J. de Lange 6118 & T. J. de Lange*, 6 Jan 2004, Auckland City, Mt Albert, Mt Albert War Memorial Park, near Asquith Ave; AK 289129, *P. J. de Lange 6319*, 26 Dec 2004, Auckland City, Mt Albert, Mt Albert (Owairaka) Cone; AK 289132, *P. J. de Lange 6321 & F. J. T. de Lange*, 28 Dec 2004, Auckland City, Mt Albert, Maybeck Street; AK 289129, *P. J. de Lange 6319*, 26 Dec 2004, Auckland City, Mt Albert, Mt Albert (Owairaka); AK 289130, *P. J. de Lange 6320 & B. Ng*, 27 Dec 2004, Auckland City, Kohimarama, Whytehead Road; AK 288919 (see also AK 288922), *J. Feffery*, 17 Nov 2004, Coromandel Peninsula, Kuaotunu Beach property; AK 289147, *P. J. de Lange 6327*, 5 Jan 2004, Tauranga, Tauranga Harbour, Motuopuhi (Rat) Island.

NOTES: Established. Listed as fully naturalised by Heenan et al. (1999) on the basis that its fruits are bird-dispersed, and so it could potentially turn up anywhere in urban or indigenous habitats bordering urban areas. As the above records show, this species is certainly spreading through inner Auckland, where at least in the situations that we know, it is now rather common. It was described as abundant at the sole Coromandel location, which was within a garden, while at Tauranga a single plant grew on a small near shore island in the Harbour. *O. serrulata* was abundant in the gardens on the adjacent mainland. Often *Ochna* plants appear near or under hedges or under tall trees, presumably because these are used as perching spots for birds that have then voided seeds. As the plants seem equally to thrive, flower and seed in shade or

sun, the species is very likely to establish in forested habitats.

Platanaceae
***Platanus* ×*acerifolia* (Aiton) Willd.**
plane tree

PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland (Webb et al. 1988).

ADDITIONAL RECORD: AK 285420, *P. J. de Lange 5898*, 21 Feb 2004, Hamilton City, Hamilton East, Grey Street

NOTES: Casual. Now well naturalised in inner Auckland, such that many people would not even realise that the street side trees were, in fact, seedlings some 20 years ago. The Hamilton occurrence is the second gathering we are aware of made outside the Auckland area. The first, made outside the geographic area of this paper, was made from Wanganui by C. C. Ogle in December 2003 (CHR 568435). The naturalisation of *Platanus* ×*acerifolia* is discussed in detail by Sullivan et al. (2002). All occurrences that we have seen are always in the vicinity of planted specimens.

Proteaceae
Banksia ericifolia* L.f. var. *ericifolia
PREVIOUS RECORDED DISTRIBUTION: North Island, Auckland (Heenan et al. 2002).

ADDITIONAL RECORD: CHR 573468, *P. B. Heenan & P. J. de Lange*, 1 Apr 2004, State Highway 1, near Taratara, Whangaroa

NOTES: Casual. Numerous seedlings, saplings and adults, established for some 10 or so metres along a roadside verge. The presumed source is a large shrub in an adjacent golf course. Concerns over the potential risk posed by *B. integrifolia* to the New Zealand indigenous vegetation have already been raised (Cameron 2000), and we advise that *B. ericifolia* needs to be watched as well. The location reported here brings to two, the known number of sites where this species has been found wild. Although that may not seem significant, it is clear that this species is much faster growing than *B. integrifolia*, and becomes reproductive sooner, even saplings less than 1 m tall, and 2-3 years old can flower and form viable seed. At the Auckland site the species had become thoroughly established in gumland scrub and regenerating forest. However, we are pleased to say that prompt action by the Auckland Regional Council is now confining its spread and the task of eradication is almost complete (J. Boow *pers. comm.*, 2005). Nevertheless because this species is commonly cultivated, further occurrences, especially in the warmer coastal areas it seems to favour are likely.

Ranunculaceae
***Thalictrum minus* L.**
wall rue

PREVIOUS RECORDED DISTRIBUTION: Wellington City, Karori Cemetery (Webb et al. 1988).

ADDITIONAL RECORDS: AK 235066, *E. K. Cameron 9267*, 27 Feb 1997, Auckland City, Epsom, Manukau road (see also AK 235064); AK 289145, *P. J. de Lange 6325*, 5 Jan 2005, Auckland City, Mt Albert, Burch Street (toward Asquith Ave roadside).

NOTES: Cultivation Escape. Both occurrences were made from specimens found in the immediate vicinity of cultivated plants. The Epsom, Manukau Road record came from a garden while the Mt Albert, Burch Street gathering was made from a street side basalt rock wall.

Rosaceae
***Fragaria* ×*ananassa* Rozier**
strawberry

PREVIOUS RECORDED DISTRIBUTION: South Island, Canterbury, Mt Cook, Stewart Island, Port William (Webb et al. 1988)

ADDITIONAL RECORD: AK 289123, *P. J. de Lange 6313 & T. J. de Lange*, 25 Dec 2004, Auckland City, Mt Albert, Burch Street, Alice Wylie Reserve.

NOTES: Casual. Two plants established near base of basalt (scoria) stone wall. Largely on molecular evidence strawberry has been referred to *Potentilla*, as *P.* ×*ananassa* (Rozier) Mabb., a move which, on morphological grounds we do not favour. At Burch Street strawberry was not cultivated nearby, so we presume those plants arose from discarded fruit or bird dispersed seeds. Webb et al. (1988) also note that *Fragaria* ×*ananassa* has been collected as a "persistent garden relic" in the North, South and Campbell Islands.

***Prunus armeniaca* L.**
apricot

PREVIOUS RECORDED DISTRIBUTION: North Island, Hauraki Gulf, Rangitoto Island, (Heenan et al. 1999), South Island, Christchurch (Webb et al. 1988), Lake Wanaka (Heenan et al. 1999)

ADDITIONAL RECORDS: AK 289209, *P. J. de Lange*, 12 Jan 2005, Takatu Peninsula, Million Bay, Campbells Beach Road, Clinton Road; AK 285900, *J. Boow*, 24 Jan 2004, Hauraki Gulf, Motutapu Island, above Gardiner Gap; AK 290631, *R.H. Ball,* 2 Feb 2005, Hauraki Gulf, Rangitoto Island.

NOTES: Casual. These records expand on the previous recorded distribution of this species (Webb et al. 1988;

Heenan et al. 1999). Previously from this region it had been recorded once from the summit of Rangitoto Island, the additional record reported here from that island came from near the wharf. As naturalisations stem from seed thrown by people one could regard this species as a garden discard.

Monocotyledonae

Commeliniaceae

***Tradescantia cerinthoides* Kunth**

inch plant

PREVIOUS RECORDED DISTRIBUTION: North Island, Hauraki Gulf, Rangitoto Island (Sykes 1992)

ADDITIONAL RECORDS: AK 251147, *P. J. de Lange 3546 & G. M. Crowcroft*, 28 Jul 1998, Waitakere Ranges, Destruction Gully; AK 282166, *P. J. de Lange 5575 & O. Urseam*, 27 Jan 2003, Laingholm, Deidre Place; AK 290635, *R.J.M. Fuller*, Hauraki Gulf, Rangitoto Island, Islington Baches; AK 293610, *P. J. de Lange 6568*, 28 Sep 2005, Auckland City, Mt Albert, Malvern Street; AK 293611, *P.J. de Lange 6567 & P. B. Heenan*, 5 Oct 2005, Hamilton City, Hillcrest, Edinburgh Street.

Figure 13. Inch plant (*Tradescantia cerinthoides*) established on a concrete wall, Malvern Road, Mt Albert. It is common in the adjacent garden.

NOTES: Probably best regarded as a cultivation escape (Fig. 13) or garden discard, as at the Rangitoto Island, Auckland and Hamilton city sites inch plant was in cultivation nearby, while the Waitakere and Laingholm gatherings were made from roadsides where they grew in association with other long persistent "weedy" species typically associated with garden refuse dumps, e.g., Sod's balsam (*Impatiens sodenii* Engl.), busy lizzie (*I. walleriana* Hook.f.), spider plant (*Chlorophytum comosum*) Jacques) *Plectranthus ciliatus* E.Mey., *P. ecklonii* Benth., *Crocosmia* ×*crocosmiiflora* (Nicholson) N.E. Brown, and ladder fern (*Nephrolepis cordifolia*). Outside the region covered by this article, inch plant has also been collected as a cultivation escape on Somes (Matiu) Island in the Wellington Harbour (AK 223886, *P. J. de Lange s.n.*, 7 Nov 1995).

Cyperaceae

***Carex pendula* Huds.**

PREVIOUSLY RECORDED DISTRIBUTION: South Island, Canterbury (Healy & Edgar 1980)

ADDITIONAL RECORD: AK 288301, *P. J. de Lange 6233 & T. J. de Lange*, 29 Sep 2004, Auckland City, Western Springs, bottom of Bullock Trail near Western Springs Stadium

NOTES: Casual. A large clump growing in a small swamp at the bottom of the Bullock Trail has been observed over the last two years, when it first appeared as a seedling, which we could not then accurately identify. This species is frequently sold by garden centres in the Auckland region (sometimes erroneously as *C. geminata* Schkuhr), and is widely planted, often in the belief that it is indigenous. Such appears to be the case at the nearby Western Springs Park where several patches of it can be found in "indigenous" plantings near the Museum of Transport and Technology side of the springs. Possibly the wild plant arose from seed dispersed from there. Now that we have identified the species we have taken the step of eradicating it. However, since it is commonly cultivated in Auckland, further naturalisations are likely. Indeed C.C. Ogle (in litt.) has recently (2005) reported it naturalised in Wanganui and Palmerston North.

Orchidaceae

***Epidendrum ibaguense* Kunth**

crucifex orchid

PREVIOUS RECORDED DISTRIBUTION: North Island, Hauraki Gulf, Rangitoto Island (Sykes 1992 as *E. cinnabarinum* Lindl.)

ADDITIONAL RECORDS: AK 255343, *B. Waller*, 2 Dec 2001, Northland, Parekura Bay, eastern Te Uenga, south side of Manawaora Road; AK 228945, *C. R. Veitch*, 1 Apr 1996, Hauraki Gulf, Little Barrier Island; AK 224436, *P. J. de Lange s.n.*, 3 Nov 1995, Hauraki Gulf, Rangitoto Island, Islington Bay; AK 218960, *P. J.*

de Lange 2352, 1 Nov 1993, Hauraki Gulf, Rangitoto Island, Islington Bay.

NOTES: Cultivation Escape. The exact identity of the commonly cultivated crucifex orchid in New Zealand, as elsewhere would seem to be problematic. Sykes (1992) used the name *E. cinnabarinum* Lindl. but we, and also Dr Mark Clements of CSIRO (*pers. comm.* 1995) doubt that the Rangitoto Island plant is that species, which is a Brazilian species very uncommon in cultivation. In some respects the New Zealand plants match the hybrid *Epidendrum* ×*o'brienianum* Rolfe (also known as *E. radicans* var. *o'brienianum* (Rolfe) Tadgell), which is a commonly cultivated hybrid between *E. ibaguense* and *E. radicans* Lindl, and which can naturalise due to its viviparous nature (e.g. Wagner et al. 1990). However, on the specific advice of Dr Mark Clements and Mr David Jones (*pers. comm.* 1995) we use the name *E. ibaguense* for all the plants represented by these collections, because our plants are a closer match for that species than anything else. With regard to its naturalisation in New Zealand, most (if not all) instances result from detachment of "pups" from the parent plant, and so spread is virtually confined to the vicinity of planted individuals. However, in places such as Rangitoto Island, human traffic has spread the plant many metres from the garden relic described by Sykes (1992), presumably through the sampling of flowers, and deliberate and accidental removal of "pups" which are then often discarded along track sides. However, sexual spread is also possible as the senior author has succeeded in raising seedlings from Rangitoto Island plants.

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References

Cameron, E.K. 2000: The naturalisation of *Banksia integrifolia* in New Zealand; time for action! *New Zealand Botanical Society Newsletter 59*: 15-18.

Cameron, E.K. 2004: Liquiambar (*Liquiambar styraciflua*) beginning to move? *Auckland Botanical Society Journal 59*: 56-58.

Clement, E.J.; Foster, M.C. 1994: Alien plants of the Bristich Isles. Torquay, The Devonshire Press.

de Lange, P.J.; Gardner, R.O.; Sykes, W.R.; Crowcroft, G.M.; Cameron, E.K.; Stalker, F.; Christian, M.L.; Braggins, J.E. 2005: Vascular flora of Norfolk Island: some additions and taxonomic notes. *New Zealand Journal of Botany 43*: 563-596.

Healy, A.J.; Edgar, E. 1980: Flora of New Zealand. Vol. II. Government Printer Wellington.

Heenan, P.B.; Breitwieser, I.; Glenny, D.S.; de Lange, P.J.; Brownsey, P.J. 1998: Checklist of dicotyledons and pteridophytes naturalised or casual in New Zealand: additional records 1994-1996. *New Zealand Journal of Botany 36*: 155-162.

Heenan, P.B.; de Lange, P.J.; Glenny, D.S.; Breitwieser, I.; Brownsey, P.J.; Ogle, C.C. 1999: Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 1997-1998. *New Zealand Journal of Botany 37*: 629-642.

Heenan, P.B.; de Lange, P.J.; Cameron, E.K.; Champion, P.D. 2002. Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 1999-2000. *New Zealand Journal of Botany 40*: 155-174.

Heenan, P.B.; Fitzjohn, R.G.; Dawson, M.I. 2004: Diversity of *Brassica* (Brassicaceae) species naturalised in Canterbury, New Zealand. *New Zealand Journal of Botany 42*: 815-832.

Heenan, P.B.; de Lange, P.J.; Cameron, E.K.; Ogle, C.C., Champion, P.D. 2004: Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2001-2003. *New Zealand Journal of Botany 42*: 797-814.

Sullivan, J.; Cameron, E.K.; Armstrong, T.; Murray, B.G. 2002: The puzzle of wild London plant trees (*Platanus* ×*acerifolia*) in downtown Auckland. *Auckland Botanical Society Journal 57*: 99-101.

Sykes, W. R. 1992: Succulent plants on Rangitoto Island. *Auckland Botanical Society Journal 47*: 6-16.

Sykes, W.R. 2005: Notes on *Euphorbia* and *Crassula* with a revised key to the latter wild in New Zealand. *New Zealand Botanical Society Newsletter 79*: 8-16.

Thompson, J. 1989: A revision of the genus *Leptospermum* (Myrtaceae). *Telopea 3*: 301-449.

Wagner, L.W.; Herbst, D.R.; Sohmer, S.H. 1990: Manual of the flowering plants of Hawai'I. Vol. 2. Bishop Museum Special Publication. Honolulu, University of Hawaii.

Webb, C.J.; Sykes, W.R.; Garnock-Jones, P. J. 1988: Flora of New Zealand. Vol. IV. Christchurch, DSIR Botany Division.

Webb, C.J.; Sykes, W.R.; Garnock-Jones, P. J.; Brownsey, P. J. 1995: Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 1988-1993. *New Zealand Journal of Botany 33*: 151-182.

Wrigley, J.; Fagg, M. 1993: Bottlebrushes paperbarks and tea trees – and all other plants in the *Leptospermum* alliance. Sydney, Angus & Robertson