

Metrosideros in cultivation: Rātā and other species

The second of a two-part series

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Part One of this series provided an introduction to *Metrosideros* species and cultivars and traced cultivar origins for two species – *M. excelsa* (pōhutukawa or New Zealand Christmas tree) and *M. kermadecensis* (the Kermadec pōhutukawa).

This second article updates information on pōhutukawa and traces cultivar origins for the remaining species – the rātā trees and vines and cultivars of non-New Zealand species.

Pōhutukawa updates

In Part One we mentioned naturalisations of *M. excelsa* and *M. kermadecensis* in other countries. Both species are also on Norfolk Island, where *M. excelsa* may be starting to naturalise (de Lange et al., 2005) and *M. kermadecensis* has naturalised (Green, 1994). Graeme Platt has seen *M. kermadecensis* well established at Ball Bay, Norfolk Island, where Green (1994) also recorded it.

The expedition to date the pōhutukawa growing at La Coruña in Spain has been postponed from late 2010 to probably mid 2011 (Jonathan Palmer, pers. comm.). We await the dating results from the forthcoming tree ring counts with interest.

Since publication of the first part of this article, Lawrie Metcalf informs us that the mature amenity trees of the yellow-flowered *M. excelsa* 'Aurea' growing at Sumner, Christchurch, were planted by the late Maurice John Barnett (Superintendent of Parks and Reserves, then Director of Botanic Gardens, Parks and Reserves, Christchurch) probably in the 1950s.

Jim Rumbal has uncovered some additional information on the pōhutukawa plantings on the Waitara River bank, Taranaki. As documented in Part One, selections from these early plantings were made by the late Felix Jury and gave rise to *M. excelsa* 'Fire Mountain' and *M. excelsa* 'Scarlet Pimpernel'. Blair Hortor, a long-retired groundsman and gardener of the former Waitara Borough Council (now the New Plymouth District Council), clearly recalls that these early plantings came from Duncan & Davies nursery and not from a Palmerston North Nursery as suggested in Part One. According to Blair (pers. comm.), all of the plantings in Waitara during his long tenure came from Duncan & Davies nursery. Some of these have vibrant orange-scarlet flowers, as exemplified by *M. excelsa* 'Fire Mountain'. Jim Rumbal is of the opinion that orangey flower colours may possibly have arisen through hybridisation between the usual red-flowered *M. excelsa* and the yellow-flowered *M. excelsa* 'Aurea'.

We can now confirm that the variegated selection *M. excelsa* 'Ohope' was named after Ohope Beach near Whakatane. This is possibly another selection made by Duncan & Davies nursery. Jim Rumbal has been assessing it for many years, and considers the thin white variegated margin to be quite attractive although the selection is not particularly vigorous. Only a few were propagated at Duncan & Davies nursery. Michael Sheerin (an employee of Duncan & Davies nursery and former work colleague

of Jim Rumbals') may have given a plant to his parents who had a beach bach at Ohope at that time. It may have been this plant that gave rise to the cultivar name.

M. excelsa 'Exotica':

for completeness we should mention *M. excelsa* 'Exotica', an early and illegitimate name "someone has put on the reverse form [of *M. excelsa* 'Variegata']" (Davies, 1968). This selection was not widely offered under this name. Other reverse-variegated pōhutukawa include *M. excelsa* 'Centennial' and *M. excelsa* 'Upper Hutt'.

M. excelsa 'Mini Christmas':

since Part One of this article was published, Murray Dawson has uncovered Australian records of a cultivar named *M. excelsa* 'Mini Christmas' (and *M. excelsa* 'Mini Xmas'). This low growing cultivar is said to attain 1 m tall (Curia Plants online catalogue, 2010) and is almost certainly a selection of *M. excelsa*.

M. excelsa 'Octopussy':

another new pōhutukawa cultivar has come to light. This cultivar, named *M. excelsa* 'Octopussy', has a distinctive weeping to spreading growth habit. It arose as an open pollinated seedling at the Naturally Native NZ Plants Auckland nursery in 2004. Although the original plant died, propagation material is maintained through cuttings. It is estimated that this cultivar will grow to 1.5–3 m tall and some plants are also being sold as standards (Esmé Dean, pers. comm.). New Zealand Plant Variety Rights has been applied for (Serra Kilduff, pers. comm.).

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M. excelsa 'White Caps':

Graeme Platt recently selected and named a white-flowered pōhutukawa. He discovered it at Piha Beach, west of Auckland City, during late December 2009. The parent tree was found planted in a reserve where it is thriving. It is a vigorous and healthy tree regardless of its unusual white flowers (Fig. 1A–B). The aerial roots running down the trunk have white tips (instead of the usual reddish-brown colour) that mirror the lack of pigmentation of its flowers. *M. excelsa* 'White Caps' is named after its flower colour and the sea wind blowing the tops of waves into whitecaps. It is currently under propagation with the purpose of introducing it into wider cultivation. Denis Hughes of Blue Mountain Nurseries was the first person to collect cuttings off the parent tree for commercial production.



Fig. 1 *Metrosideros excelsa* 'White Caps'. **A**, tree in flower. **B**, close-up of flowers. Photos: Graeme Platt.

Rātā trees

Metrosideros bartlettii (Bartlett's rātā)

Incredibly, this large tree (which can attain 25 m in height) escaped notice until 1977 when the late John Bartlett discovered it. Bartlett found it at Radar Bush, Te Pahi, in the far

north and John Dawson named it after him when formally describing it as a new species (Dawson, 1985). *M. bartlettii* is probably a specialised epiphyte under most circumstances in the wild but eventually grows into an independent tree (John Dawson, pers. comm.). It has distinctive whitish, tissue-paper like bark and dark green leaves up to 5 cm long in a dense canopy, with masses of small white flowers in October to November.

The conservation status of *M. bartlettii* is 'Nationally Critical' as it is only known from 29 adult plants in the wild (de Lange et al., 2010; New Zealand Plant Conservation Network website, 2010).

Although its natural habitat is swampy ground, *M. bartlettii* also grows well in average garden conditions in Auckland (Fig. 2A–B; Hobbs, 1992; Anon., 2001b). Graeme Platt believes that it has considerable potential as a street tree and that it may be more cold tolerant than most *M. excelsa* selections. Considering its rarity in the wild, this species should be grown more widely and is available from specialist native plant nurseries (e.g., Gaddum, 1997, 1999a, 1999b, 2001).



Fig. 2 *Metrosideros bartlettii*. **A**, tree in flower. Photo: Jack Hobbs. **B**, close-up of flowers. Photo: Naturally Native NZ Plants.

Metrosideros robusta (northern rātā)

In relatively undisturbed forest, northern rātā is a specialised epiphyte and can become a tall upright tree to 30 m. Like other specialised epiphytic *Metrosideros*, it can also grow on the

ground in sunny sites, often where a forest has been destroyed by fire. Northern rātā that establishes on the ground may not become as tall as those that are initially epiphytic (John Dawson, pers. comm.). The leaves of *M. robusta* are up to 5 cm or more long and crimson flowers appear mainly from November to January (Fig. 3A–B). This species occurs naturally on the Three Kings Islands, is scattered throughout the North Island where it used to be more widespread, and is abundant in the South Island in North-West Nelson and Westland south to near Greymouth (Allan, 1961; Simpson, 2005).



Fig. 3 *Metrosideros robusta*. **A**, botanical illustration (then as *M. florida*) in Curtis's *Botanical Magazine*, London, Vol. 75 (= Ser. 3, Vol. 5): Tab. 4471, 1849. Image courtesy Missouri Botanical Garden, www.botanicus.org. **B**, plant in flower. Photo: ©Paul Ashford, www.NZPlantPics.com.

M. robusta is commonly available through the nursery trade. Although not as wind hardy as *M. excelsa*, *M. robusta* is more cold tolerant (Bannister, 1990) and makes an excellent specimen tree with an upright growth habit for an exposed

site. When fully mature, *M. robusta* is a large tree in the wild, but it grows slowly and can be managed in cultivation where it takes several years to flower when raised from seed. A few selections have been made from this species:

***M. robusta* 'Kawa Copper'**: a new cultivar that arose in 2001 from a batch of otherwise uniform seedlings raised by Deane Keir (pers. comm.). It was selected for its unique form and foliage colour. It has a bushy stocky habit that can be trimmed. Mature leaves are dark green and shiny but the commercial potential of this selection lies in its attractive coppery-red-coloured new growth. This new growth is reminiscent of *Photinia* 'Red Robin' and *M. robusta* 'Kawa Copper' will be suitable as a hedging plant in a similar way to *Photinia*. *M. robusta* 'Kawa Copper' is cold hardy and flowers are expected to be dark red. It has been successfully propagated through cuttings and is currently on trial at the Naturally Native NZ Plants nursery at Tauranga. This selection is not yet available to the public and is subject to a New Zealand Plant Variety Rights (PVR) application (*NZPVR Journal*, No. 119, 14 October 2009).

***M. robusta* 'Krinkley'**: a cultivar with unusual twisted leaves that are dark green with a bright creamy-yellow central variegation held on bright red young stems (Fig. 4). This reverse-variegated cultivar was first published under the name *M. 'Krinkley'* (Hobbs, 1992) which, although never sold as that, takes priority. It was first marketed by Duncan & Davies nursery in 1996 under the name *M. robusta* 'Tane's Gold' (e.g., Plantlife Propagators online catalogue, 2010) and is also currently sold as *M. 'Twistie'* (e.g., Lyndale Nurseries online catalogue, 2010).



Fig. 4 *Metrosideros robusta* 'Krinkley', a cultivar with variegated and twisted leaves. Photo: Lyndale Nurseries.

***Metrosideros umbellata* (southern rātā)**

This shrub or small tree grows to 15 m or more and like other rātā trees can start life as an epiphyte (John Dawson, pers. comm.). It has narrow pointed leaves to 6 cm or more long and masses of small, usually red, flowers occurring sporadically from November to March. It is found mainly in high rainfall, lowland to montane, sometimes subalpine forests and shrubland of the South Island (west of the Main Divide), Stewart Island, and the Auckland Islands south of New Zealand. On the Auckland Islands it is the dominant tree in low coastal forest, whereas in the North Island it is rather uncommon and restricted to a few montane areas (Allan, 1961; Simpson, 2005). It is not on Campbell or the Snares islands even though Allan (1961) says it is (John Dawson, pers. comm.).

In cultivation southern rātā is relatively slow growing, has attractive dense foliage, and makes an excellent shrub and specimen tree. Plants can take many years to flower when grown from seed (Metcalf, 1987, 2000).

M. umbellata is best suited for growing in cool-climate gardens with moist soils rather than the warm and humid gardens of Auckland and many North Island areas. Several cultivars have been named and they are slower growing and more difficult to propagate than *M. excelsa*. For these reasons, *M. umbellata* cultivars are produced and sold in smaller quantities in New Zealand and their origins have not been as well documented. *M. umbellata* is successfully grown in milder parts of the UK where there is good potential to export and market further cultivars.

***M. umbellata* 'Christmas Dream' and *M. umbellata* 'St Nicholas'**

two selections made by Denis Hughes (pers. comm.) and named by the late Margaret Hughes of Blue Mountain Nurseries, Tapanui. Both were selected from trees growing wild at Lake Manapouri, Fiordland, in the late 1970s. They both have good red flower colours and are so named because they flower at Christmas time.

***M. umbellata* 'Fireball'**

discovered in 1993 by Deane Keir (pers. comm.) growing on the

Stockton Plateau in an area called the 'burning mine', an historic abandoned coal mine that has been on fire since the early 1900s. The original plant was noticed because of its round squat shape and very short internodal growth. The leaves are slightly smaller than is typical for the species and it produces bright crimson flowers. The parent plant was successfully propagated by cuttings in 1994. Many plants were sold by Deane Keir as growing-on lines to various wholesale nurseries around New Zealand between 1994 and 1998.

***M. umbellata* 'Firecracker'**

selected in about 1995 by Jeff Elliott, of Elliott's Wholesale Nursery, Amberley, from a plant growing wild at Whanganui Inlet, North-West Nelson. This selection has dark green leaves and a compact growth habit that forms a bun-shaped plant. It has medium-sized deep-red flowers and blooms heavily during November and December. *M. umbellata* 'Firecracker' has been available since about 2005 (Jeff Elliott, pers. comm.).

***M. umbellata* 'Harlequin'**

found in the early to mid-1980s in the wild as a variegated branch sport by Joe Cartman (pers. comm.) of Christchurch. He found the variegated side-branch on a fully mature tree on the roadside near Nugget Point in the Catlins and successfully propagated it from cuttings. Leaves are glossy green with conspicuous variegated yellow margins (Fig. 5). This cultivar had PVR protection from 1992 to 2009.



Fig. 5 *Metrosideros umbellata* 'Harlequin'. Photo: Chris Barnaby.

***M. umbellata* 'Gold Nugget'**

also raised by plantsman Joe Cartman. It arose around 1992 as a branch sport of *M. umbellata* 'Harlequin' (Joe Cartman, pers. comm.). This cultivar has golden-yellow new leaves with a thin red edge (Fig. 6). The gold colour

of these leaves persists for many months and the old leaves are the standard green colour. *M. umbellata* 'Gold Nugget' has PVR protection from 1996. It seems to be grown in the UK also under the name *M. umbellata* 'Lownug' (*RHS Plant Finder* online, 2010).



Fig. 6 *Metrosideros umbellata* 'Gold Nugget'. Photo: ©Paul Ashford, www.NZPlantPics.com.

***M. umbellata* 'Moonlight'**: arose at Pattersons Nurseries, Invercargill, about 2000–2001 as a vegetative side-branch mutation of *M. umbellata* 'Gold Nugget' which the nursery was growing under licence (Noel Patterson, pers. comm.). *M. umbellata* 'Moonlight' is a reversion to variegation, but (compared to *M. umbellata* 'Harlequin') is a reverse variegation with the cream, yellow and gold tones in the central part of the leaf. This cultivar also differs from *M. umbellata* 'Harlequin' in leaf colouration with an overall foliage appearance of lighter green and less yellow (Fig. 7; Chris Barnaby, pers. comm.). *M. umbellata* 'Moonlight' has PVR protection since 2004. This cultivar has also been grown in the UK under the name *M. umbellata* 'Lowmoo' (*RHS Plant Finder* online, 2010).



Fig. 7 *Metrosideros umbellata* 'Moonlight'. Photo: Chris Barnaby.

***M. umbellata* 'Mt Augustus'**: a low-growing and cold hardy selection. It was selected in the late 1970s by Louise Salmond (pers. comm.) of Hokonui Alpines in Gore, from a

plant growing at Mt Augustus on the Stockton Plateau by an abandoned coal mine. The nursery has spelt the cultivar "*M. 'Mt Augusta'*" but it should be correctly spelt following the locality after which it is named. Because Hokonui Alpines is a small family-run nursery, few plants have been distributed.

***M. umbellata* 'Red Tips' and *M. umbellata* 'Silver Beacon'**:

both named after the colour of their new leaves and selected in the mid- to late 1990s by Les Cleveland (pers. comm.) from an island in Lake Wanaka, Otago. Both are very cold hardy.

Note that *M. umbellata* 'Red Tips' raised by Les Cleveland has different origins to the informally named *M. umbellata* red-tipped form selected by Deane Keir. Also, *M. umbellata* "silver tips" was an informal name used by Les Cleveland for his selection, but is sold as *M. umbellata* 'Silver Beacon' (Clive Wallis, pers. comm.).

***M. umbellata* 'Scarlet Beacon'**: a selection raised by Les Cleveland (pers. comm.) and chosen for its early flowering. *M. umbellata* 'Scarlet Beacon' has been available since about 2002, and like most of Les's selections is available from Wallis's Nurseries, Mosgiel.

***M. umbellata* 'Sparrow's Hybrid'**: first grown in May 1987 at the former Works Property Services (now Kiwiflora Nurseries) near Christchurch. It was named after a Mr Sparrow who was a customer of the nursery. He provided propagation material from a plant cultivated in Christchurch City, alongside the Avon River and between Madras and Manchester Streets (Janet Orchard, pers. comm.). It was commercially released at Kiwiflora Nurseries in May 1994 (Janet Orchard, pers. comm.) and is currently available in New Zealand (e.g., Gaddum, 1999a, 1999b, 2001; Plantlife online catalogue, 2010). Although the name *M. 'Sparrow's Hybrid'* suggests that it may be an interspecific hybrid, it is more likely to be a straight selection of *M. umbellata*. *M. 'Sparrow's Hybrid'* is similar to *M. umbellata* 'Firecracker' but more vigorous and taller growing (Lex Kenny, pers. comm.).

***M. umbellata* orange form:**

in January 1973, Dr Brian Molloy (pers. comm.) discovered an orange-flowered plant growing wild at Deer Spur Track, Peel Forest, Canterbury. Material was grown on via seedlings at the then Botany Division, DSIR, at Lincoln (Allan Herbarium specimen CHR 386491) but was not introduced into wider cultivation.

***M. umbellata* pink form:** a pink-flowered selection made from a large old tree that grows at Kaka Point, Otago. In the late 1990s, Denis Hughes (pers. comm.) of Blue Mountain Nurseries collected cuttings and has a limited number of plants available under the name *M. umbellata* 'Kaka'.

***M. umbellata* white form:**

discovered about 1937 as a single tree with lemon-cream coloured flowers from Soaker Hill, MacLennan Range, in the Catlins, Otago. It was discovered by employees of Latta Brothers Ltd, sawmillers of Papatowai while building a tramline for a local sawmill (Neil Jenks and Albert McTainsh, pers. comm.). Albert's father, the late Alexander Ernest McTainsh, was a local landowner and part of the bush tramway team who found it in flower by a bankside close to the tramline.

The original white-flowered tree in the Catlins is still alive and known by some of the locals. It is estimated to be less than 150 years old and is relatively slender (c. 70 cm diameter at chest height) and of low stature (c. 15 m). The leaf pigmentation is also a paler lemon-green when compared to typical red-flowering *M. umbellata* (Neil Jenks, pers. comm.).

Sometime in the 1980s propagation material was given (probably by a forestry worker at the then New Zealand Forest Service) to Les Cleveland, Diack's Nurseries, and Blue Mountain Nurseries. Blue Mountain Nurseries sell it under the name *M. umbellata* 'Alba' (Les Cleveland, Denis Hughes, pers. comm.). Greenish-yellow flowered forms are found elsewhere (as described below) but the Catlins tree has the palest flowers known in the wild.

***M. umbellata* yellow form:**

several yellow-flowered selections of this species have been available in cultivation.

An historic yellow-flowered variant is growing on the Denniston Plateau, Westland. This variant was first discovered by the residents of Denniston in the early 1900s and is reasonably well known locally. There are at least two yellow-flowered plants currently growing there and in 1995 Deane Keir (pers. comm.) made a concerted effort to propagate one of them and distribute material to interested parties. Many plants were grown on and given to charity groups or sold locally and nationally to people who had historical links to the town. Plants of this selection have light green leaves that are rather stiff and pointed, attractive lime-green yellow new-growth stems, black buds, and sulphur-yellow flowers. This selection is slow growing with short internodes and can be expected to reach 1 m² in five or more years. It has been referred to as *M. umbellata* 'Denniston Yellow'.

Two yellow-flowered plants of *M. umbellata* were recorded by Ruth Mason and Neville Moar (1955; CHR 80876A–B). These plants were growing near each other west of Burma Road, Stockton Plateau, Westland. However, with the continued mining activity at that site it is unlikely that they are still alive.

Another yellow-flowered plant, growing wild at Otira Gorge, was discovered by Peter Croft (Park Ranger, Arthur's Pass National Park). Cuttings of it were brought to the then Botany Division, DSIR, Lincoln (now part of Landcare Research), by botanist Fulton Fisher in February 1960 (Landcare Research garden records). A fine mature specimen was cultivated up to the mid-1990s at Landcare Research, Lincoln, before a building project encroached and an unsuccessful transplant attempt killed it. However, a mature yellow-flowered plant is still growing in the Christchurch Botanic Gardens (Metcalf, 1987, 2000). According to Lawrie Metcalf (pers. comm.), it was planted at the gardens by James Young sometime in the early 1920s and probably represents an early gathering of propagation material from the same tree that grew at Otira. This original tree was finally washed away by a landslide (Lawrie Metcalf, pers. comm.). The Christchurch Botanic Gardens

material will almost certainly be the same clone as material that was given to Les Cleveland in Otago. Les grew seedlings of it on to produce a better yellow flower colour, and cutting-produced plants of his best selection are sold at Wallis's Nurseries, Mosgiel, as *M. umbellata* 'Gold Beacon' (Les Cleveland and Clive Wallis, pers. comm.).

Rare yellow-flowered plants are still to be found in the Otira area (Fig. 8A–B). In 1983, Dr Ian Payton of Landcare Research collected (CHR 550734) and photographed (Fig. 8A) a greenish-yellow flowered specimen and observed 13 trees in the wild with this flower colour on the east side of the Otira Valley between Otira township and Aickens Railway Station (Ian Payton, pers. comm.). In late January or early February 2010, Joe Cartman (pers. comm.) observed two yellow-flowered trees in the same area. One tree, far off in the distance, appeared to have bright yellow flowers (Fig. 8B) that seem more intense than the greenish-yellow-flowered plant introduced 50 and 90 years ago. Although Joe Cartman's new discovery has not been introduced into cultivation, it would be worth critically comparing it with Cleveland's *M. umbellata* 'Gold Beacon' for distinctiveness.



Fig. 8 *Metrosideros umbellata* from Otira, Arthur's Pass National Park. **A**, samples of yellow-flowered (left) and the usual red-flowered plant (right) collected from the wild. Photo: Ian Payton. **B**, one exceptionally yellow-flowered plant is readily visible (centre, arrowed) among a population of the usual red-flowered forms. Photo: Joe Cartman.

Metrosideros in the UK

A few species of *Metrosideros* are cultivated in milder regions of England, Scotland and Ireland (e.g., *RHS Plant Finder*, 2010; Gary Dunlop, pers. comm.).

Remarkably, fully mature trees of *Metrosideros excelsa* and *M. kermadecensis* are growing in the virtually frost free, equitable climate of the Tresco Abbey Gardens in the Isles of Scilly. Elsewhere, only the cold-hardy *M. umbellata* (and to a lesser extent *M. robusta*) are suited for growing unprotected outside in milder regions.

Boscawen (1923), Thurston (1930), Cox and Stoker (1938), and Arnold-Forster (2000) discuss *M. umbellata* (under its earlier name *M. lucida*), *M. robusta*, and a few other species growing at notable gardens in Cornwall, England. Johnson (2007) and Grimshaw and Bayton (2009) update these earlier references and also report that *M. umbellata* is thriving at Logan Botanic Garden in western Scotland and at Innacullin (Garnish Island), Ballywalter Park and Mt Stewart in Ireland (Fig. 9A–B).



Fig. 9 *Metrosideros umbellata* growing at Tir Na n'Og, Mt Stewart, County Down, Ireland. **A**, tree in flower. **B**, close-up of flower. Photos: Gary Dunlop.

Rātā vines

There are six climbing (lianoïd) species of *Metrosideros*. In cultivation they can be used as small shrubs or ground covers to cover a bank or wall. All species will form shrubs rather than climbers when propagated from cuttings taken off adult growth.

Metrosideros albiflora (large white rātā)

This species climbs to 10 m tall and has large, leathery leaves up to 9 cm long and large white flowers during October to March. It naturally occurs in the North Island from Te Paki to the Kaimai Range where it has a fairly local distribution and is mostly found in kauri forest (Allan, 1961). Graeme Platt has noted free-standing shrubby specimens growing amongst regenerating native vegetation on the ranges near Waima in Northland.

M. albiflora prefers a shady position and should be reasonably hardy in cultivation. Although this species is well worth growing, it is seldom available from plant nurseries (Metcalf, 1987, 2000; Gaddum, 1999a, 1999b, 2001).

Metrosideros carminea (crimson rātā)

When grown from seed this species grows into a climber to 15 m or more tall and when grown from cuttings of the adult foliage it becomes a small compact shrub. *M. carminea* has small shiny green leaves up to 3.5 cm long and bright carmine flowers that appear from August to October. This species naturally occurs in the North Island, from North Cape to East Cape and Taranaki (Allan, 1961).

The bright flowers are so prolific that when in full bloom little else can be seen of the plant – for this reason it is the best of the climbing rātā species to grow. It is frost tender and prefers a sunny position. A few cultivars grown from cuttings of the adult form (Fig. 10A–B) have been selected:



Fig. 10 *Metrosideros carminea*. **A**, plant in full flower. Photo: Jack Hobbs. **B**, close-up of flowers. Photo: Robert Lamberts.

***M. carminea* 'Carousel':** arose as a variegated sport of *M. carminea* 'Ferris Wheel' with leaves that have yellow margins. Being vegetatively propagated from the adult form of the species it is largely non-climbing and grows as a shrub (Metcalf, 1987, 2000). It was introduced by Duncan & Davies nursery in 1987 (Edwards, 1987b). *M.* 'Carousel' had PVR protection from 1983 to 2008.

***M. carminea* 'Ferris Wheel':** a non-climbing compact plant that flowers heavily (Metcalf, 1987, 2000). Duncan & Davies nursery first introduced it as *M. carminea* adult foliage in 1978–1980. When they first gave it a cultivar name several years afterwards, they mistakenly spelt it "Ferrous Wheel". This was quickly corrected to "Ferris Wheel", named after the American engineer, G.W.G. Ferris (Lawrie Metcalf, pers. comm.).

***M. carminea* 'Red Carpet':** imported from Australia by Naturally Native NZ Plants many years ago (Fig. 11) and is probably no different to *M. carminea* 'Ferris Wheel' or plants propagated from mature foliage of the species (Esmé Dean, pers. comm.).



Fig. 11 *Metrosideros carminea* 'Red Carpet'. Photo: Naturally Native NZ Plants.

Metrosideros colensoi (rātā)

This climber attains 6 m and has weeping branches that arch out and hang down with small hairy leaves up to 2 cm long. Flowers are whitish, sometimes pink, and appear November to January. *M. colensoi* occurs naturally in coastal and lowland forest where it is often (but not always) associated with limestone areas. Allan (1961) stated that *M. colensoi* occurs from latitude 35°S to 42°S with the northernmost occurrence based upon a historic record from the Bay of Islands. However, Graeme Platt's observations and current herbarium records indicate that it is mainly south of latitude 37°S in the North Island and in the South Island as far south as Greymouth and Kaikoura.

This species is not widely cultivated but is available from specialist native plant nurseries (e.g., Gaddum, 1997, 1999a, 1999b, 2001).

Metrosideros diffusa (white rātā)

This species climbs to 6 m tall and has small shiny leaves up to 2 cm or more. Flowers are white or pale pink occurring in October to January. This is the most common climbing rātā in the wild, found naturally in lowland forests throughout the North, South and Stewart islands (Allan, 1961).

Cultivated plants flower better in a sunny position. It is not widely grown but is available from specialist native plant nurseries (e.g., Gaddum, 1997, 1999a, 1999b, 2001).

An early nursery catalogue (William Martin and Son catalogue of plants, 25, 1906/07) listed a selection as *M. hypericifolia* variegata. The botanical name is a synonym for *M. diffusa* and the cultivar name may indicate that there was an historic variegated selection referable to *M. diffusa*.

M. diffusa 'Crystal Showers':

a variegated form of *M. diffusa* that has creamy margins around its leaves. It was discovered by Colin Beattie (pers. comm.) on Stewart Island sometime in the early 1990s. Colin Beattie was at that time an apprentice with Blue Mountain Nurseries at Tapanui. This selection is available at Blue Mountain Nurseries and erroneously sold in some North Island nurseries under the names *M. diffusa* 'Crystal' and *M. reflexa* 'Crystal' (Denis Hughes, pers. comm.).

***Metrosideros fulgens*
(scarlet rātā vine)**

This shrub or climber reaches 12 m or more in height. It has rather large leaves up to 6 cm (rarely up to 7.5 cm) and its flowers are usually bright orange or orange-scarlet. It generally flowers later than other species, with blooms occurring February to June (although it can also flower in spring according to John Dawson, pers. comm.). This species is found in coastal and lowland forest on the Three Kings Islands and in the North and South islands (Allan, 1961; as *M. scandens*).

In cultivation it is easily grown and reasonably hardy, preferring a warm, sunny position and shaded roots (Metcalf, 1987, 2000). It is suitable as a container plant. All cultivars of *M. fulgens* are small shrubs rather than climbers as they are propagated from cuttings of the adult form. Each cultivar was selected for flower colour.

***M. fulgens* 'Aurata'**: this plant is a colour break with golden-yellow flowers. Rare plants with this flower colouration have been found from Auckland to Collingwood. It was first discovered in the Collingwood district in 1890 by a Mrs S. Featon of Gisborne. She provided specimens to William Colenso who gave it the name *M. aurata* believing it to be a new species (Allan, 1961; Metcalf, 1987, 2000).

In the early 1990s Jenny Oliphant (of the former Cyclone Flora micropropagation laboratory in Auckland) collected cuttings of both yellow- and orange-flowering plants of *M. fulgens* from the Tairua-Whitianga Road on the Coromandel Peninsula. These cuttings were rooted and grown on at Lyndale Nurseries. When the plants were large enough explants were taken to Cyclone Flora and initiated into culture. After propagation they were returned to Lyndale Nurseries for deflasking and growing on. Lyndale Nurseries marketed the yellow-flowered selection from 2001 under the name *M. fulgens* 'Gold' (Fig. 12A–B; Anon., 2001c; Gaddum, 2001; Plantman online catalogue, 2010; Jenny Oliphant and Malcolm Woolmore, pers. comm.).



Fig. 12 *Metrosideros fulgens* 'Gold'. **A**, plant in flower and bud. Photo: Naturally Native NZ Plants. **B**, close-up of flowers. Photo: ©Paul Ashford, www.NZPlantPics.com.

***M. fulgens* 'Jaffa'**: this is the name of the orange-flowered cultivar (Fig. 13) selected by Jenny Oliphant from the Tairua-Whitianga Road in the early 1990s. It was named by Malcolm Woolmore and marketed by Lyndale Nurseries who first released it in 2001 (Cath Griffiths and Malcolm Woolmore, pers. comm.). It is currently available at several nurseries.



Fig. 13 *Metrosideros fulgens* 'Jaffa'. Photo: www.liddlewonder.co.nz.

***M. fulgens* 'Orange Princess'**: another orange-flowered cultivar released one year before *M. fulgens* 'Jaffa'. *M.* 'Orange Princess' was introduced by Duncan & Davies nursery in 2000 from material collected by Jim Rumbal from the Onaero River valley in North Taranaki.

***M. fulgens* 'Red Glow'**: with orange-red flowers, this selection is the more typical form of the species. We do not know who named it as a cultivar but this name has only been used by nurseries for a few years. It is available from several nurseries (e.g., Plantman online catalogue, 2010).

The following two cultivars are known from records in the late 1920s, apparently selected from *M. fulgens*, but lacking further details.

***M. fulgens* 'Magnifica'**: listed in a 1929 Duncan & Davies Nursery Catalogue (No. 12) as *M. scandens* var. *magnifica*.

***M. fulgens* 'Variegata'**: listed in Bailey (1928, p. 2045) as *M. florida* var. *variegata* but insufficiently described.

***Metrosideros perforata*
(small white rātā)**

This species is a shrubby climber to 15 m tall with small, rounded, dull green leaves up to 1.2 cm long. Flowers are white, sometimes pink, and appear January to March (Fig. 14A–C). It is found in coastal and lowland forest and forest margins on the Three Kings Islands, throughout the North Island, and in the South Island to Martins Bay on the west coast and Banks Peninsula in the east (Allan, 1961).

In cultivation this species flowers well in a sunny position. When grown from cuttings it makes an attractive shrub usually to 1.5 m but sometimes taller. Plants propagated from adult foliage should be more widely grown but it is only available from a few native plant nurseries (e.g., Gaddum, 1997, 1999a, 1999b, 2001; Plantman online catalogue, 2010).



Fig. 14 *Metrosideros perforata*. **A**, botanical illustration (then as *M. buxifolia (scandens)*) in *Curtis's Botanical Magazine*, London, Vol. 76 (= Ser. 3, Vol. 6): Tab. 4515, 1850. Image courtesy Missouri Botanical Garden, www.botanicus.org. **B**, plant in flower. Photo: Naturally Native NZ Plants. **C**, close-up of flowers. Photo: Naturally Native NZ Plants.

***M. perforata* 'Wee Willie Winkie'**: found in the late 1980s by Mark Dean of Naturally Native NZ Plants during a comfort stop in the Waioeke Gorge (Dean, 2001; Naturally Native NZ Plants online catalogue, 2010; Esmé Dean, pers. comm.). This selection has a compact growth habit and small green leaves that have distinctively variegated cream margins (Fig. 15A–B). In time it will climb up a support

but otherwise acts as a shrub and is well suited to growing in containers. It is available from Naturally Native and has had PVR protection since 1996. *M. 'Wee Willie Winkie'* is the only named cultivar of *M. perforata* that we know of.



Fig. 15 *Metrosideros perforata* 'Wee Willie Winkie'. **A**, plant in cultivation. **B**, close-up of variegated foliage. Photos: Naturally Native NZ Plants.

***Metrosideros parkinsonii* (Parkinson's rātā)**

This species is a bit of an oddball for New Zealand. Although it belongs in Subgenus *Mearnsia* with the rātā vines (*Metrosideros albiflora*, *M. carminea*, *M. colensoi*, *M. diffusa*, *M. fulgens*, and *M. perforata*) it is not a climber but instead a sprawling shrub or small tree to 7 m tall. It also has an unusual and restricted distribution in two widely separated areas of New Zealand. In the South Island it is found naturally in North-West Nelson and south to near Hokitika, and in the Hauraki Gulf it is confined to Great and Little Barrier islands.

Metrosideros parkinsonii grows in coastal to montane forest and has rather large leaves to 5 cm (rarely up to 7.5 cm) and long bright crimson flowers from November to January (Allan, 1961). It was named after Sydney Parkinson, the botanical artist on Cook's first voyage to New Zealand.

This species is mainly grown for its attractive flowers. Plants may need some pruning and training to achieve a good shape and it can be grown against walls or fences or

as a specimen plant. *M. parkinsonii* is quite hardy and best suited to cooler climates with ample soil moisture, where it requires shaded roots (Metcalf, 1987, 2000). Plants are available from a few native plant nurseries (e.g., Gaddum, 1997, 1999a, 1999b, 2001).

Cultivars of non-New Zealand species

A few *Metrosideros* cultivars are grown in New Zealand that are derived from Pacific Island species. These are all frost tender and most have long or sporadic flowering periods throughout the year, instead of a mass-flowering event once a year as is typical of New Zealand species. The correct names and identities of some have become confused but we confirm that most are selections of *M. collina* (Fig. 16), a species native to the islands of Fiji, the Marquesas, Samoa, the Society Islands and Vanuatu. Further work is required to conclusively state which varieties of *M. collina* the cultivars belong to.



Fig. 16 Botanical illustration of *Metrosideros collina* in *Curtis's Botanical Magazine*, London, Vol. 146 (= Ser. 4, Vol. 16): Tab. 8846, 1920. Image courtesy Missouri Botanical Garden, www.botanicus.org.

***M. collina* 'Crimson Glory' and *M. collina* 'Red Baby'**: two selections made by Terry Keogh of Unique Plants at Victoria Point, Queensland, Australia. Both cultivars are protected by Australian Plant Breeder's Rights (*Plant Varieties Journal*, 2009, Vol. 22, No. 3). They were first sold in Australia

in November 2007 and are marketed under the name Aussie Winners®.

The Aussie Winners website (www.aussiewinners.com.au) currently states that they were both bred from “crosses of *M. collina* from Hawaii with *M. villosa* from the islands of New Zealand and selected from the progeny then back crossed to get the smaller growing varieties as we have in the ‘Firebird’ series.” This is confusing as *M. collina* is not native to Hawaii and *M. villosa* is not a currently accepted name – it is a synonym of *M. kermadecensis* (Allan, 1961) and *M. collina* var. *villosa* (Smith, 1973).

The Australian Plant Breeder’s Rights (PBR) database (http://pericles.ipaustralia.gov.au/pbr_db/search.cfm) is more authoritative in giving the parentage of both selections as controlled crosses between *M. collina* ‘Spring Fire’ (maternal parent) and *M. collina* ‘Tahiti’ (paternal parent). According to the PBR database, seeds of this cross were collected and germinated, about 120 plants were planted, and in 2001 two were selected as medium growing forms compared to small and tall parental types. These were named *M.* ‘Crimson Glory’ (Fig. 17A–B) and *M.* ‘Red Baby’ (Fig. 18A–B).



Fig. 17 *Metrosideros collina* ‘Crimson Glory’. **A**, plant in flower. **B**, close-up of flowers. Photos: Edward Bunker of Aussie Winners.



Fig. 18 *Metrosideros collina* ‘Red Baby’. **A**, plant in flower. **B**, close-up of flowers. Photos: Edward Bunker of Aussie Winners.

Both cultivars have recently been imported into New Zealand by Elliott’s Wholesale Nursery of Canterbury and are subject to New Zealand Plant Variety Rights applications (Jeff Elliot and Chris Barnaby, pers. comm.).

***M. collina* ‘Little Dugald’:** a new selection raised by Terry Keogh and named after his young grandson, Dugald Keogh-Dalley. *M. collina* ‘Little Dugald’ is the result of a cross between *M. collina* ‘Fiji’ and *M. collina* ‘Spring Fire’. After six years it has grown to less than two metres (Terry Keogh, pers. comm.). This cultivar has been accepted for PBR protection in Australia. It is currently sold in Australia (Aspley Nursery online catalogue, 2010, as *M.* ‘Little Dugald’).

***M. collina* ‘Explosion’:** a variegated side-branch sport of *M. collina* ‘Spring Fire’, selected and raised in 1997–1998 by W. John Wearmouth of Kauri Park Nurseries, Northland (Laurie Wearmouth, pers. comm.).

The leaves of *M. collina* ‘Explosion’ have a well-defined bright-gold central variegation with a green outer edge. It has the same growth habit and free-flowering characteristics as its parent, *M. collina* ‘Spring Fire’.

Although the New Zealand Plant Variety Rights journals do not state which species this selection belongs to, there is current PVR protection (*NZPVR Journal*, No. 116, 14 January 2009; No. 120, 14 January 2010) and *M. collina* ‘Explosion’ is available from nurseries.

***M. collina* ‘Fiji’:** this plant was introduced into New Zealand by Os Blumhardt who collected it in Fiji. Ballard (2006) states that Os’s plant collections were made in the highlands of Taveuni and Viti Levu in July 1985. This is the most likely date and places where he collected the parental stock.

M. collina ‘Fiji’ is probably the correct name for this selection, not the other variants it has been known as in the nursery trade (including *Metrosideros* ‘Fiji’, *M.* ‘Fiji Fire’, *M. collina* var. ‘Vitiensis’, *M. collina* var. *vitiensis* ‘Fiji’, and *M. vitiensis* ‘Fiji’). The variety *M. collina* var. *vitiensis* is no longer current as it is a synonym of *M. collina* var. *collina* (Smith, 1973). However, specimens would need to be critically identified by an expert to confirm which of the three Fijian varieties this cultivar belongs to.

M. collina ‘Fiji’ is mainly grown for the burgundy new growth of its young leaves and branchlets that contrast well with the mature dark green foliage. It has a compact habit suitable for border planting, hedging or growing in containers. The flowers are small and orange-red. It is sold under its various names in New Zealand (e.g., Gaddum, 1999a, 1999b, 2001; Lyndale Nurseries online catalogue, 2010; Plantlife Propagators online catalogue, 2010; Plant Production online catalogue, 2010) and Australia (e.g., Redlands Nursery online catalogue, 2010).

***M. collina* ‘Spring Fire’:** the correct name and origin of this cultivar (Fig. 19) has become extremely confused and although we can be sure of some details, its raiser and place of origin remain unknown. It is definitely not a selection of *M. excelsa* as stated by Gaddum (1997, 1999a, 1999b).



Fig. 19 *Metrosideros collina* ‘Spring Fire’. Photo: Lyndale Nurseries.

Edwards (1990d) tried to resolve its origins and suggested that it may have been selected by Ben Swane of Swanes Nurseries, NSW, Australia. However, Ben Swane did not raise it and although more widely known in Australia, Swan's Nurseries suggests that it may have originally been selected in New Zealand, perhaps in the 1970s (Noel Deakin and Ben Swane, pers. comm.).

The plant was originally named *M. 'Thomasii'* and in the late 1980s, Lyndale Nurseries imported cuttings from Swan's Nurseries (and probably reintroduced it) into New Zealand. They renamed it *M. villosa* 'Spring Fire' because their plants first flowered in August (Jan Velvin, pers. comm.) and they currently market it under that name (Lyndale Nurseries online catalogue, 2010). However, the species name used by Lyndale Nurseries, *M. villosa*, is not currently accepted and is a synonym of *M. collina* var. *villosa* (Smith, 1973). Edwards (1990d) confirmed that the cultivar has been formally identified as *M. collina* and stated that the new growth is very tomentose (with dense matted hairs) which may indeed indicate variety *villosa*.

It has since been reimported into Australia under its later name, *M. 'Spring Fire'* (e.g., Redlands Nursery online catalogue, 2010), and material should be identical to plants still sold there as *M. 'Thomasii'*. However, to further complicate matters, Edward Bunker of Redlands Nursery in Queensland apparently also grows another form of *Metrosideros* 'Thomasii' (Noel Deakin and Ben Swane, pers. comm.). Because plants under the name *M. 'Thomasii'* have a long history of cultivation through cuttings, tissue culture and probably seed, it is certainly possible that there are now two forms grown.

The cultivar name "Spring Fire" is sometimes changed to "Springfire" (e.g., Plant Production online catalogue, 2010; Plantman online catalogue, 2010; Redlands Nursery online catalogue, 2010).

M. 'Thomasii' is an illegitimate name according to the International Code of Nomenclature for Cultivated Plants (ICNCP) as it is a Latinised name published after 1 January 1959.

M. collina 'Spring Fire' is legitimate and is the name that should be used.

M. collina 'Spring Fire' is very free flowering with orange-red flowers and well suited as a container plant.

***M. collina* 'Tahiti'**: the origin of this cultivar is documented by Edwards (1990e) with additional information supplied here by John Dawson (pers. comm.).

The late Isobel Morice of Wellington was plant collecting in Tahiti in the 1970s and saw plants of *M. collina* that ranged from shrubs to small trees on a high mountain ridge. She gathered specimens for John Dawson at the Botany Department of Victoria University of Wellington. He germinated some seed from capsules of the imported material and grew on plants which eventually flowered.

The late George Rainey of Auckland visited John Dawson because he had heard of his research on *Metrosideros*. John Dawson showed him the plants and gave him a couple. George Rainey propagated material from cuttings, named it *M. collina* 'Tahiti', and introduced it onto the New Zealand market (Fig. 20).



Fig. 20 *Metrosideros collina* 'Tahiti'.
Photo: Lyndale Nurseries.

Plants are often sold without a species name and have also been incorrectly offered in New Zealand as *M. villosus* 'Tahiti' (Gaddum, 1997) and *M. villosa* 'Tahiti' (Edwards, 1990e; Gaddum, 1999a, 1999b, 2001). This cultivar is also sold in Australia (e.g., Redlands Nursery online catalogue, 2010). Redlands Nursery (2010) incorrectly stated its origin as "a selection from *Metrosideros villosus* (syn. *M. kermadecensis*) coming from the Kermadec islands of New Zealand". In Australia it has also been incorrectly called *M. polymorpha* 'Tahiti'.

Pacific island populations of *M. collina* often have a mixture of glabrous (lacking hairs) and pubescent (hairy) leaved plants (John Dawson, pers. comm.). *M. collina* 'Tahiti' is a pubescent plant with silvery new foliage that matures to grey-green. As such it probably is a selection of *M. collina* var. *villosa*. It is compact and low-growing (to 1 m tall) and produces orange-red flowers throughout the year. *M. collina* 'Tahiti' is well suited to small coastal gardens and is also ideal as a container plant in frost-free climates.

M. collina 'Tahiti' is widely available (e.g., Lyndale Nurseries online catalogue, 2010; Plant Production online catalogue, 2010; Plantlife Propagators online catalogue, 2010; Plantman online catalogue, 2010).

Jack Hobbs has successfully hybridised *M. collina* 'Tahiti' with a selection of *M. excelsa* that was growing near the main entrance of the Auckland Regional Botanic Gardens. This cross was made in 1992 and resulted in more than 100 seedlings. Two of these were selected for further evaluation and are growing near the botanic garden's visitor centre, Huakawaka. One is also growing at Ayrilies, Bev McConnell's Whitford garden. Neither hybrid has been named or is commercially available.

***M. collina* 'Tahitian Sunset':**

a variegated mutation of *M. collina* 'Tahiti' with cream and green leaves and pinkish young shoots. Like its parent (*M. collina* 'Tahiti') it has a low growing spreading habit (1×1 m), strongly pubescent (hairy) leaves and red flowers. This cultivar was raised by Robert Bett, formerly of Lyndale Nurseries Auckland. New Zealand PVR was applied for in 2007 and this cultivar is currently under test with a decision likely early 2011 (Chris Barnaby, pers. comm.). This cultivar is currently listed in the New Zealand Plant Finder online database (as *M. 'Tahitian Sunset'*).

***M. nervulosa* 'Lord Howe':**

sold in limited quantities by Lyndale Nurseries under the informal name *Metrosideros* "Lord Howe" (Malcolm Woolmore, pers. comm.). The species to which this selection belongs is *M. nervulosa* (erroneously listed by Gaddum 2001 as *M. nervosa* and Gaddum 1999a, 1999b, 2001 as *M. rugosa* 'Lord Howe Is').

The original material was given to Graeme Platt and to Lyndale Nurseries by Bret McKay, who collected seed from Lord Howe Island and brought it to New Zealand in the mid-1980s (Bret McKay, pers. comm.). This selection should be referred to as *M. nervulosa* 'Lord Howe'.

Bret has also raised some interspecific hybrids using *M. nervulosa* as a parent. He crossed *M. nervulosa* pollen onto *M. excelsa* 'Vibrance' flowers and the resultant hybrids more closely resemble *M. nervulosa* than *M. excelsa*. These hybrids are not commercially available.

***M. polymorpha*:** the most abundant native tree on Hawai'i where it occurs from near sea level to 2600 m. This remarkable species is the first to colonise lava flows (an attribute shared with *M. excelsa*). As its name suggests, *M. polymorpha* is highly variable (polymorphic) and ranges from prostrate shrubs to tall trees with leaves that vary greatly in size, shape and hairiness. Like *M. excelsa* of New Zealand, *M. polymorpha* has flowers that are usually red but sometimes range from salmon, pink, yellow, orange and white. Some selections are propagated in Hawai'i for their flower colours but we do not know of any named cultivars. Although there are a few specimen trees of *M. polymorpha* grown in New Zealand, it is not commercially sold here.

Although eight or more botanical varieties of *M. polymorpha* have been listed (Friday and Herbert, 2006), a morphological and molecular study does not support this treatment (James et al., 2004).

Notes on cultivation

As discussed, many species including *M. carminea*, *M. excelsa*, *M. kermadecensis*, and particularly the Pacific Island selections are frost tender, especially when the plants are young. Others such as *M. robusta* and *M. umbellata* are cold hardy and can withstand some frost once established.

Metrosideros are tolerant of a wide range of soil conditions, but most prefer well-drained sites, reasonably rich soil, and an open position. All species are suitable for growing in containers, at least for the first 10–15 years.

Climbing species will tolerate some shade and can be used as ground covers that will cover a bank or wall, or trained up fern and tree trunks. Some of the named cultivars are small shrubs rather than climbers.

Pruning to maintain a desired shape and for dead wood removal should be done just after flowering. In gardens where space is limited, tree species are best grown on a single trunk allowing branching at about 2 m in height. This requires frequent removal of side-branches for the first few years.

All species can be grown from seed, which is produced abundantly and germinates readily. However, cultivars and selected forms will come true to type only if propagated vegetatively by grafts, air-layering, cuttings or tissue-culture. Most of the cultivars that used to be sold by Duncan & Davies nursery were propagated by grafting to produce plants on a commercially viable scale that were more vigorous and flowered sooner than cutting produced plants.

Cuttings are best made from the previous season's growth in autumn (as semi-hardwood cuttings). Some species have a juvenile growth stage and can take many years to flower when grown from seed. Vegetative propagation of adult growth circumvents this problem and results in plants that will flower freely from an early age.

Insect pests include thrips, sap-sucking insects (psyllids), tortricid caterpillars, the native bronze beetle (*Eucolaspis brunneus*) and the pōhutukawa leaf miner (*Neomycta rubida*). Insecticides and spraying oil can be used to help control these pests. Bergin and Hosking (2006) and others argue that the damage caused by insects is relatively minor and seldom long-lasting compared to the destruction caused by possums. However, *Neomycta* can be a real problem to cultivated pōhutukawa in the Auckland area.

New Zealand species and cultivars that we consider distinct or outstanding are listed in Table 1, along with their horticultural attributes. An asterisk denotes those cultivars we consider to be particularly exceptional.

Table 1 Outstanding species and cultivars of New Zealand *Metrosideros*.

Cultivar	Distinguishing features
* <i>M. carminea</i> 'Ferris Wheel' / <i>M.</i> 'Red Carpet'	floriferous, brilliant carmine flowers
<i>M. excelsa</i> 'Aurea'	yellow flowers
<i>M. excelsa</i> 'Kopere'	floriferous, vibrant orange-red flowers, glossy green foliage
<i>M. excelsa</i> 'Manukau'	floriferous, orange-red flowers
<i>M. excelsa</i> 'Plus Four'	floriferous, bright true-red flowers, rounded foliage, upright growth form
<i>M. excelsa</i> 'Sunglow'	golden young foliage
* <i>M. excelsa</i> 'Tamaki'	large bright orange-red flowers, large leaves
* <i>M. excelsa</i> 'Titirangi'	floriferous, large bright scarlet-red flowers, upright growth form
<i>M. excelsa</i> 'Variegata'	variegated foliage
* <i>M. excelsa</i> 'Vibrance'	floriferous, brilliant flowers, upright growth form
<i>M. fulgens</i> Jaffa' / <i>M.</i> 'Orange Princess'	orange flowers
<i>M. fulgens</i> 'Aurata' / <i>M.</i> 'Gold'	golden yellow flowers
<i>M. kermadecensis</i> 'Variegata'	variegated foliage
<i>M. robusta</i> 'Kawa Copper'	coppery red young growth, compact growth habit, cold hardy
<i>M. umbellata</i> 'Gold Nugget'	golden-yellow new leaves, cold hardy, compact growth habit
<i>M. umbellata</i> 'Gold Beacon'	golden-yellow flowers, cold hardy, compact growth habit

Threats to pōhutukawa and rātā

Unfortunately pōhutukawa and rātā are seriously threatened by the introduced brushtail possum. Browsing of the foliage and buds by possums reduces both tree growth and flowering and is responsible for the death of many thousands of trees throughout New Zealand (e.g., Bergin and Hosking, 2006).

Grazing on the seedlings by domesticated animals (such as cattle and sheep) and feral animals (particularly goats) also prevents natural regeneration. Regeneration is further prevented because the fine seed cannot germinate through thick layers of introduced grasses such as kikuyu (*Pennisetum clandestinum*).

Pōhutukawa are also threatened by damage and root disturbance from coastal development, land clearing, fires, road widening, and other human impacts. These threats are more fully explained by Bergin and Hosking (2006).

Gordon Hosking estimated that more than 95% of pōhutukawa forest has been eliminated (Simpson, 1994). In 1990, the Project Crimson Trust was formed in an effort to halt the decline and hopefully increase numbers of pōhutukawa and rātā in the wild. Project Crimson encourages the planting and protection of pōhutukawa and rātā through sponsorship of community projects (www.projectcrimson.org.nz).

People can help by trapping or shooting possums in their areas and controlling invasive weeds. Although the species and cultivars listed in this article are suited for garden and amenity use, local eco-sourced stock should be used when planting in or near any areas where *Metrosideros* occur naturally. This stock should be propagated from seed collected from naturally occurring plants. Plants should never be removed from the wild.

As discussed in Part One, *M. kermadecensis* (Kermadec Island pōhutukawa) and *M. excelsa* (pōhutukawa) have the capacity to hybridise. To avoid any chance of genetically tainting natural populations of *M. excelsa*, it may be wise not to plant *M. kermadecensis* or Pacific Island species and cultivars in sensitive areas where pōhutukawa occur naturally.

Summary

We have comprehensively documented origins for all *Metrosideros* cultivars known to us. Few remain for which we have no in-depth information of their status or origins (e.g., *M. excelsa* 'Jester' and *M. excelsa* 'Springtime'). Some of the relatively recent names for which we lack details are from overseas (e.g., *M. excelsa* 'Beoley Gold', *M. excelsa* 'Mini Christmas', *M. kermadecensis* 'Cream Ridge' and *M. kermadecensis* 'Gala') and may be new selections or established cultivars that have illegitimately been renamed.

We have determined the correct identities and cultivar names for non-New Zealand species; most belong to *M. collina* although we have not identified which variety each cultivar belongs to. Further research and critical comparisons of plant material are needed to help resolve any remaining uncertainties.

Final comments

Murray Dawson and Peter Heenan are compiling a register of *Metrosideros* cultivars. This register will become available on the RNZIH website (www.rnzih.org.nz/pages/cultivars.html). In the meantime, a checklist for *Metrosideros* without a bibliography follows this article in the *New Zealand Garden Journal*.

We leave the last words to Bob Edwards:

"Congratulations to Murray, Jack, Graeme and Jim for bringing us the update articles on *Metrosideros* and for the thoroughness of the research and data recording.

The selection of hybrids and cultivars now in circulation is indeed impressive and the reports of new selections suggest we shall be seeing even more impressive cultivars becoming available in the near future. The cultivar performance notes are useful and historically these will become extremely important.

In the last few years there has been little information published. The selection of *Metrosideros* hybrids and cultivars in garden centres has 'dumbed-down' considerably which is disappointing especially when you consider the fabulous range available. This has resulted in some cultivars becoming difficult or impossible to obtain and some are in danger of being lost to horticulture.

The importance and heritage of the species and cultivars to New Zealand landscapes provide great opportunities for showing them off to the large number of international tourists now visiting these shores. Those who have seen the avenue planting of *M. excelsa* 'Vibrance' in full bloom at the Auckland Botanic Gardens in December will confirm their exceptional flowering performance year after year.

It is reported that 13,000 eco-sourced pōhutukawa and rātā were planted in 2008. I cannot fathom why we continue to plant thousands of seedlings annually in public places when such magnificent high-performance cultivars are now readily available.

With the wide palette of form and flower colours available from existing cultivars, the wide range of species from New Zealand and overseas, and the knowledge that interspecific hybrids can occur, there are great opportunities for formal breeding work.

It is a great pity that there are no large-scale breeding programmes, national *Metrosideros* collections, or formal assessment trials of their cultivars. In addition to breeding ornamental cultivars, other initiatives could include production of cultivars with high nectar flows suitable for native bird and gecko

feeding programmes, honey production, and cultivars selected specifically for specialty timber such as boat building.

This would not be a task for the impatient; when raising *Metrosideros* crosses from seed it can take many years for them to develop mature growth forms and to flower before they can be fully evaluated."

Bob Edwards

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