

# The Pacific face of fynbos?

*Metrosideros angustifolia* is one of the most ordinary looking of shrubs in the fynbos, but is apparently derived from weird plants on Pacific islands such as bog bonsais, woody creepers and forest stranglers.

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ABOVE: The seed bearing capsules of *Metrosideros angustifolia* resemble tiny fragile versions of those of *Eucalyptus* betraying the fact that this is the only indigenous member of the Myrtaceae in the Fynbos Biome of the Western Cape. Photo: Anthony Mills.

Mainland floras, such as the ancient and stable continent of Africa, combine many lineages of plants in a plethora of orders, families and genera. Hence we have the floristic richness of the south-western Cape, where not only are fynbos and succulent Karoo extremely diverse within themselves, but several distinct floras (fynbos, Karoo, forest, thicket, and even savanna) can share a single mountain range. Oceanic islands, by contrast, have relatively few lineages. This is because only a few lucky plants manage to cross the vast barriers of the sea, drawing on their genetic plasticity to fill the vacant niches offered by isolated mountains erupted from the ocean floor. Or, at least, so we learn from textbooks...

*Metrosideros* (Myrtaceae family) is a classic example of an island genus, having radiated widely in the Pacific. Yet *Metrosideros angustifolia* pops up in what seems to be the most unlikely of places. It is an integral part of the Fynbos Biome - as far as possible from the Pacific, and where every niche of shrubs seems already to be filled by diverse orders, families and genera.

*Metrosideros angustifolia*, restricted entirely to the western part of South Africa, is a nondescript shrub. Although called 'lance-leaf myrtle,' it remains anonymous among the many narrow-leaved, sclerophyllous evergreens of the Fynbos Biome. The distribution of this species is unaccountable for a genus otherwise restricted to Pacific islands: it

occurs along the streams of the south-western Cape, with an outlying population on the Gariep River. We have no idea how *Metrosideros* reached Africa, or why it succeeded among the hundreds of shrub genera already crowding the Western Cape.

Apart from our species, all of the fifty-odd species of *Metrosideros* originate from New Zealand, New Caledonia, New Guinea and the Philippines in the west to the Marquesas and Hawaii in the east. Even Australia lacks any native member of this oceanic genus, although this island continent borders the Pacific and is dominated by various Myrtaceae. Most species of *Metrosideros* are at home on volcanic soils. By contrast, *M. angustifolia* is unknown from the

volcanic parts of South Africa, preferring wet, acidic soils in the form of the sandstone stream gravel of the Western Cape.

Gardeners in South Africa know *Metrosideros* not as our indigenous shrub, but as an eye-catching tree, *M. excelsa* (pohutukawa). The red bottlebrushes attract sunbirds in South African gardens. But how many readers appreciate that it is not only birds, but also geckoes (*Hoplodactylus*) that pollinate *M. excelsa* on its islands of origin in New Zealand? There, it can grow so close to the shore that its roots are bathed in seawater.

The species most famous among botanists is *Metrosideros polymorpha*, which dominates the natural forests of some of the most remote of islands. This Hawaiian species shows the remarkable plasticity of form in *Metrosideros*, shape shifting to fill otherwise empty niches. *Metrosideros polymorpha* is one of the most variable species of plant on Earth. It can be a stunted shrub colonizing fresh lava-flows, a rounded cushion only 15 cm high in montane bogs, an epiphyte or the dominant tree (up to 25 m high) in tall forests - with accordingly variable leaves over the full range of altitudes on Hawaii and its associated volcanic islands. *Metrosideros polymorpha* can survive being buried in lava, regenerating its roots once the volcanic ash has cooled.

Other species of *Metrosideros* are creepers. *M. perforata* clings tightly to bark by means of sucker-roots as it climbs trees in the form of a delicate ivy. Then the same species lets it all hang down when mature, as an unrecognisably different woody liane of thick 'monkey ropes.'

*Metrosideros robusta* (northern rata) of New Zealand is a strangler, an island re-invention of the strangler figs (*Ficus*) of tropical mainlands. It germinates as an epiphyte in the canopies of trees such as *Podocarpus*, the Pacific relatives of African yellowwoods. It then sends down aerial roots that eventually reach the ground, coalescing on the way to form a hollow bole that gradually extirpates and replaces the host tree. John Dawson and Rob Lucas illustrate the reptilian demeanour of this growth on page 49 of their new book *The nature of plants: habitats, challenges and adaptations* (CSIRO Publishing, Melbourne, 2005). Once it becomes a freestanding tree, *Metrosideros robusta* itself becomes festooned with various non-strangling epiphytes. Such 'hang-

ing gardens' are typical of New Zealand, which had few arboreal herbivores before the introduction of the Australian brush-tailed possum (*Trichosurus vulpecula*). *Metrosideros* has not penetrated the most similar habitat in Africa: the island-like patches of yellowwood forest found from Knysna northwards to Ethiopia. I can only speculate that this exclusion has been owing to the presence of baboon, tree hyrax and elephant.

Stranglers are not parasitic in the sense of mistletoes. They grow from the canopy down, not from the ground up, and initially absorb nutrients from dust by means of aerial roots. They produce wood as these roots grow down the host's bole, consolidating and merging as the plant finally finds a rooting medium in the ground. It may be unremarkable that figs fashion a bole of their own in this way, because their wood is so soft that the distinction between root and stem is academic. However, nobody understands how *Metrosideros* manages to form hard, dense heartwood within the initially cylindrical bole formed by roots encompassing the host tree. After all, the name is derived from the Greek *metra* (heartwood) and *sideron* (iron).

*Metrosideros excelsa* is not an epiphyte or a strangler but, for unknown reasons, produces aerial roots when it becomes a mature tree. This and other species of *Metrosideros* often sport the genetic mutations of variegated leaves. Further evidence of genetic plasticity is that variegated trees in gardens often revert to the normal green colour on individual branches - as if in control of the mutation.

*Metrosideros umbellata* (southern rata), although rarely a strangler, is also weird. Near Auckland, forests of this species present a 'chaotic spectacle of gnarled, leaning trunks... Massive branches twist, dip and wind for metres. Trunks may rise a short distance from the surface, bend at a right angle to extend parallel to the ground for 5-10 m and then grow vertically to reach the canopy. Serpentine trunks loop along the ground' - in the words of scientists Matt McGlone and John Hunt.

The only odd aspect of the South African species is that it has reverted to normality. *Metrosideros angustifolia* gives no hint of its genetic legacy as a creeper, epiphyte, strangler or bearer of aerial roots. Not in evidence is the dwarfism seen in the bonsai-like shrubs, or the gigantism seen in the tall or stout trees of Hawaii and New Zealand. Even

the showy, bottlebrush-like blooms typical of *Metrosideros* and many other members of the Myrtaceae family have been lost, which is surprising in a land of proteas and sugarbirds. Instead, *M. angustifolia* has dull flowers pollinated by insects. Conforming to the unremarkable shrubs such as *Myrica* (now *Morella*), *Brabejum*, *Brachylaena*, *Rhus* and *Freylinia* sharing its streamside scrub among the Cape mountains, the genus has used its remarkable genetic plasticity to abandon weird growths and pretend to extreme ordinariness.

Many plant species introduced by humans from other lands are now invading South Africa as if they belong here. Botanists see these as triffids, and respond with the chainsaw. However, what if such colonizations have always been business-as-usual in the fullness of ecological time? Although *Metrosideros* is capable of being a tall tree, it has descended to the common denominator of the fynbos shrub. Accepted as not only indigenous but actually endemic, it is taken for granted by the Working for Water project as part of the solution, not part of the problem. Am I being over-optimistic by choosing to see, in *M. angustifolia*, the pacific face of problem plants? These seem threateningly alien at first, but are perhaps destined to assimilate as welcome variegations in the olive-green tapestry of the future South Africa. 🌿



ABOVE: A Pacific interloper, masquerading as an indigenous shrub? Few botanists give a second thought to *Metrosideros angustifolia* as a native of South Africa, but the other 50-odd species occur in the Pacific, and this genus is absent from islands in the Indian or Atlantic Oceans as well as all other continents. Photo: Anthony Mills.