Family: ***Myrtaceae***

Taxon: ***Metrosideros collina***

Synonym: *Leptospermum collinum J. R. Forst. & G. For*
Melaleuca villosa L. f

Common Name: vunga

Questionaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** EVALUATE
Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score** 3

101	**Is the species highly domesticated?**	**y=-3, n=0**	**n**
102	**Has the species become naturalized where grown?**	**y=1, n=-1**	
103	**Does the species have weedy races?**	**y=1, n=-1**	
201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**(0-low; 1-intermediate; 2-high) (See Appendix 2)**	**High**
202	**Quality of climate match data**	**(0-low; 1-intermediate; 2-high) (See Appendix 2)**	**High**
203	**Broad climate suitability (environmental versatility)**	**y=1, n=0**	**n**
204	**Native or naturalized in regions with tropical or subtropical climates**	**y=1, n=0**	**y**
205	**Does the species have a history of repeated introductions outside its natural range?**	**y=-2, ?=-1, n=0**	**?**
301	**Naturalized beyond native range**	**y = 1*multiplier (see Appendix 2), n= question 205**	**n**
302	**Garden/amenity/disturbance weed**	**n=0, y = 1*multiplier (see Appendix 2)**	**n**
303	**Agricultural/forestry/horticultural weed**	**n=0, y = 2*multiplier (see Appendix 2)**	**n**
304	**Environmental weed**	**n=0, y = 2*multiplier (see Appendix 2)**	**n**
305	**Congeneric weed**	**n=0, y = 1*multiplier (see Appendix 2)**	**y**
401	**Produces spines, thorns or burrs**	**y=1, n=0**	**n**
402	**Allelopathic**	**y=1, n=0**	**n**
403	**Parasitic**	**y=1, n=0**	**n**
404	**Unpalatable to grazing animals**	**y=1, n=-1**	**n**
405	**Toxic to animals**	**y=1, n=0**	**n**
406	**Host for recognized pests and pathogens**	**y=1, n=0**	
407	**Causes allergies or is otherwise toxic to humans**	**y=1, n=0**	**n**
408	**Creates a fire hazard in natural ecosystems**	**y=1, n=0**	**n**
409	**Is a shade tolerant plant at some stage of its life cycle**	**y=1, n=0**	
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y=1, n=0**	
411	**Climbing or smothering growth habit**	**y=1, n=0**	**n**

412	**Forms dense thickets**	**y=1, n=0**	**n**
501	**Aquatic**	**y=5, n=0**	**n**
502	**Grass**	**y=1, n=0**	**n**
503	**Nitrogen fixing woody plant**	**y=1, n=0**	**n**
504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**y=1, n=0**	**n**
601	**Evidence of substantial reproductive failure in native habitat**	**y=1, n=0**	**n**
602	**Produces viable seed**	**y=1, n=-1**	**y**
603	**Hybridizes naturally**	**y=1, n=-1**	
604	**Self-compatible or apomictic**	**y=1, n=-1**	**y**
605	**Requires specialist pollinators**	**y=-1, n=0**	**n**
606	**Reproduction by vegetative fragmentation**	**y=1, n=-1**	**n**
607	**Minimum generative time (years)**	**1 year = 1, 2 or 3 years = 0, 4+ years = -1**	**>3**
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**y=1, n=-1**	
702	**Propagules dispersed intentionally by people**	**y=1, n=-1**	**y**
703	**Propagules likely to disperse as a produce contaminant**	**y=1, n=-1**	**n**
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**y**
705	**Propagules water dispersed**	**y=1, n=-1**	**y**
706	**Propagules bird dispersed**	**y=1, n=-1**	**n**
707	**Propagules dispersed by other animals (externally)**	**y=1, n=-1**	
708	**Propagules survive passage through the gut**	**y=1, n=-1**	
801	**Prolific seed production (>1000/m2)**	**y=1, n=-1**	**y**
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y=1, n=-1**	
803	**Well controlled by herbicides**	**y=-1, n=1**	
804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y=1, n=-1**	
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	**y=-1, n=1**	

Designation: EVALUATE **WRA Score** **3**

Supporting Data:

101	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Is the species highly domesticated? No] No evidence
101	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Is the species highly domesticated? No] No evidence
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Species suited to tropical or subtropical climate(s) 2-high] "...examination of the available material in several herbaria indicates that the range of M. collina extends from the New Hebrides eastward through Fiji, Tonga, Samoa, the Cook, Austral, and Society Islands to the Gambier Islands and to Pitcairn in the Tuamotus"
202	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Quality of climate match data 2-high] "...examination of the available material in several herbaria indicates that the range of M. collina extends from the New Hebrides eastward through Fiji, Tonga, Samoa, the Cook, Austral, and Society Islands to the Gambier Islands and to Pitcairn in the Tuamotus"
203	2011. Plant this. Metrosideros collina var. villosa 'Tahiti'. http://www.planthis.com.au/plant-information.asp?gardener=18745	[Broad climate suitability (environmental versatility)? No] "Hardiness zones: 9-11"
204	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "...examination of the available material in several herbaria indicates that the range of M. collina extends from the New Hebrides eastward through Fiji, Tonga, Samoa, the Cook, Austral, and Society Islands to the Gambier Islands and to Pitcairn in the Tuamotus"
205	2008. Percy, D.M./Garver, A.M./Wagner, W.L./James, H.F./Cunningham, C.W./Miller, S.E./Fleischer, R.C.. Progressive island colonization and ancient origin of Hawaiian Metrosideros (Myrtaceae). Proc. R. Soc. B. 275: 1479–1490.	[Does the species have a history of repeated introductions outside its natural range? Unknown - ?] "Our analysis confirms that the Marquesan members of M. collina are closer to the Hawaiian taxa than to other M. collina from the Society and Austral Islands (Wright et al. 2001). The Hawaiian taxa were at one time included within M. collina as endemic Hawaiian subspecies (Rock 1917). However, it would be more appropriate to place the Hawaiian plus Marquesan taxa in a species separate from M. collina (i.e. M. polymorpha). The chloroplast data do not support the recognition of five distinct species in the Hawaiian Islands."
205	2010. Dawson, M./Hobbs, J./Platt, G./Rumbal, J.. Metrosideros in cultivation: Rata and other species. New Zealand Garden Journal. 13(2): 10-23.	[Does the species have a history of repeated introductions outside its natural range? Unknown - ?] "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."
301	2004. Waitakere City Council. Native to the West - A guide for planting and restoring the nature of Waitakere City. http://www.waitakere.govt.nz/cnlser/pw/greennetwk/pdf/NativeToTheWest.pdf	[Naturalized beyond native range? No] "Several plants native to other parts of New Zealand are not native to Waitakere. The following plants should not be grown as they can change the make-up or compromise the survival of local plant populations by hybridising with Waitakere species. This may result in a dramatic change to the local identity and ecology of Waitakere forests" [List includes Offshore pohutukawa, Tahitian (Metrosideros collina), and Kermadec (M. kermadecenis). Listed as undesirable, but no evidence of naturalization or invasiveness yet]
301	2006. Howell, C.J./Sawyer, J.W.D.. New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ www.nzpcn.org.nz	[Naturalized beyond native range? No] "Metrosideros collina...Casual"
302	2007. Randall, R.P.. Global Compendium of Weeds - Metrosideros collina [Online Database]. http://www.hear.org/gcw/species/metrosideros_collina/	[Garden/amenity/disturbance weed? No] listed as a "casual alien"

303	2007. Randall, R.P.. Global Compendium of Weeds - Metrosideros collina [Online Database]. http://www.hear.org/gcw/species/metrosideros_collina/	[Agricultural/forestry/horticultural weed? No] listed as a "casual alien"
304	2007. Randall, R.P.. Global Compendium of Weeds - Metrosideros collina [Online Database]. http://www.hear.org/gcw/species/metrosideros_collina/	[Environmental weed? No] listed as a "casual alien"
305	2000. Williams, J.A./West, C.J.. Environmental weeds in Australia and New Zealand: issues and approaches to management. Austral Ecology. 25: 425–444.	[Congeneric weed? Yes] "Despite being 'native' plants, weeds of indigenous origin can severely disrupt ecosystems. In Australia, examples are Leptospermum laevigatum, Acacia baileyana and Pittosporum undulatum (Mullett 1996). In New Zealand, examples are Metrosideros excelsa Sol. ex Gaertn. (Williams 1996), Muehlenbeckia australis (Forst.f.) Meissn. (Baars & Kelly 1996) and Pittosporum crassifolium Banks et Sol. ex A. Ln Cunn (Bellingham 1991)."
305	2006. Allen, R./Lee, W.G. (eds.). Biological invasions in New Zealand. Springer-Verlag, Berlin, Heidelberg, New York	[Congeneric weed? Yes] "Metrosideros excelsa, the 'New Zealand Christmas tree', names after its show of red flowers in December, has become a major weed of the floristically rich fynbos (fine bush, in Afrikaans) in the Western Cape, South Africa. It had been there since the 1940s, and by the 1980s was starting to spread and form dense thickets on sandy, nutrient-poor soils. After measuring the potential propagule pressure from established trees, Rejmanek et al. (2004) showed "wet" areas were more invasible by M. excelsa than "dry" areas. Efforts are underway to control its spread with the help of volunteer labor (Richardson and Rejmanek 1999). Interestingly, the exotic species that suppress M. excelsa in New Zealand are absent from the Western Cape."
401	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Produces spines, thorns or burrs? No] "Trees or shrubs 1-20 m high, the young parts and bud scales villose to sericeous or puberulent, soon glabrate; branchlets slender to comparatively stout (1-4 mm in diam distally), sub- terete or subquadrangular, sometimes slightly flattened at nodes, brownish in the ultimate nodes but becoming grayish below; petioles apparent, (2-) 3-12 mm long, flattened distally; leaf blades usually subcoriaceous to coriaceous, often copiously glandular-punctate, variable in shape, elliptic lanceolate to oblong- or obovate-elliptic, (2.5) 3-8.5 cm long, (0.8-) 1.2-6 cm broad, attenuate to acute or obtuse or infrequently rounded at base and there gradually or abruptly decurrent on the petiole, obtuse or rounded to abruptly acuminate at apex, slightly thickened and narrowly recurved at margin, the costa plane or slightly elevated above and prominent beneath, the secondary nerves numerous, 1-3 mm apart, prominulous on both sides, copiously interconnected by a veinlet reticulation, the marginal collecting nerve evident and 0.2-1.5 mm within the margin, sometimes paralleled by an inconspicuous outer nerve; compound inflorescences axillary in pairs adjacent to abortive branch apices, or axillary at the 1 or 2 nodes below, each consisting of a slender axis 3-30 mm long terminating in a dormant vegetative bud and bearing 3-5 decussate pairs of cymose"
402	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Allelopathic? No] No evidence
402	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Allelopathic? No] No evidence
403	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Parasitic? No] "Trees or shrubs 1-20 m high" [Myrtaceae. Not parasitic]
404	1995. Chimera, C./Coleman, M.C./Parkes, J.P.. Diet of feral goats and feral pigs on Auckland Island, New Zealand. New Zealand Journal of Ecology. 19(2): 203-207.	[Unpalatable to grazing animals? No] "The diets of feral pigs and feral goats shot on the main Auckland Island in 1989 are described from analyses of stomach and rumen contents. Feral goats ate at least 50 species of plants, but only three, Metrosideros umbellata, Chionochloa antarctica, and Durvillea antarctica made up over 50% by dried weight of the food eaten." [Metrosideros species generally palatable to introduced mammals]
404	2006. Kuhajek, J.M./Payton, I.J./Monks, A.. The impact of defoliation on the foliar chemistry of southern rätä (Metrosideros umbellata). New Zealand Journal of Ecology. 30(2): 237-249.	[Unpalatable to grazing animals? No] "Brushtail possums (Trichosurus vulpecula) tend to eat young canopy foliage in southern rätä (Metrosideros umbellata), and browsing tends to be concentrated on only a few trees." [Metrosideros species generally palatable to introduced mammals]
405	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Toxic to animals? No] No evidence of toxicity in Metrosideros species

406	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Host for recognized pests and pathogens? Possibly] "Pests recorded Insects: Xyleborinus saxesenii (fruit-tree pinhole borer) Xylosandrus crassiusculus (Asian ambrosia beetle)"
407	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Causes allergies or is otherwise toxic to humans? No] No evidence of toxicity in Metrosideros species
408	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Creates a fire hazard in natural ecosystems? No] No evidence
409	2011. Blerick Tree Farm. Metrosideros collina - Tahiti. http://www.onlinetrees.com.au/p/4788348/metrosideros-collina---tahiti.html	[Is a shade tolerant plant at some stage of its life cycle? Possibly No] "Plant in sunny locations in well draining soils with moderate irrigation."
409	2011. Plant this. Metrosideros collina var. villosa 'Tahiti'. http://www.planthis.com.au/plant-information.asp?gardener=18745	[Is a shade tolerant plant at some stage of its life cycle? Possibly No] "Sunlight: hot overhead sun"
409	2011. Water Corporation. Waterwise Plants for Western Australia - Metrosideros collina. http://www.watercorporation.com.au/w/waterwise_plants_detail.cfm?id=1928	[Is a shade tolerant plant at some stage of its life cycle? Possibly No] "Light requirements - Sun"
410	2011. Plant this. Metrosideros collina var. villosa 'Tahiti'. http://www.planthis.com.au/plant-information.asp?gardener=18745	[Tolerates a wide range of soil conditions? Possibly Yes] "Soil Moisture: dry between watering to constantly moist Soil: ordinary soil, enriched soil, mildly acidic to mildly alkaline" [Acidic to alkaline]
410	2011. Water Corporation. Waterwise Plants for Western Australia - Metrosideros collina. http://www.watercorporation.com.au/w/waterwise_plants_detail.cfm?id=1928	[Tolerates a wide range of soil conditions? Possibly Yes] "Soil type - Sand, Loam"
411	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Climbing or smothering growth habit? No] "Climbing or smothering growth habit"
412	1996. Meyer, J.-Y./Florence, J.. Tahiti's Native Flora Endangered by the Invasion of Miconia calvescens DC. (Melastomataceae). Journal of Biogeography,. 23(6): 775-781.	[Forms dense thickets? No] "About 70% of the endemic plants of Tahiti are located in the montane cloud forest (above 300 m on the windward coast, and above 600m on the leeward coast) and in the subalpine forest (>1500m elevation) (Fig. 2). The dense short-stature cloud forest or mossy forest (7-10 m tall) contains a few dominant canopy trees; Metrosideros collina (J.R. & J.G. Forster) A. Gray (Myrtaceae, Tahitian name: ‘pua rata’), Weinmania parviflora J.G. Forster (Cunoniaceae, ‘aito moua’), Alstonia costata (J.G. Forster) R. Brown (Apocynaceae, ‘atahe’)."
501	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Aquatic? No] "Trees or shrubs 1-20 m high" [Terrestrial]
502	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Grass? No] Myrtaceae
503	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Nitrogen fixing woody plant? No] Myrtaceae
504	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Trees or shrubs 1-20 m high"
601	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Produces viable seed? Yes]

603	2008. Percy, D.M./Garver, A.M./Wagner, W.L./James, H.F./Cunningham, C.W./Miller, S.E./Fleischer, R.C.. Progressive island colonization and ancient origin of Hawaiian Metrosideros (Myrtaceae). Proc. R. Soc. B. 275: 1479–1490.	[Hybridizes naturally? Unknown] "The evocation of earlier, ancient hybridization events followed by introgression and incomplete lineage sorting, such as that proposed for Eucalyptus (McKinnon et al. 2004) would also be required."
604	1976. Carpenter, F.L.. Plant-Pollinator Interactions in Hawaii: Pollination Energetics of Metrosideros Collina (Myrtaceae). Ecology 57(6): 1125-1144. 57(6): 1125-1144.	[Self-compatible or apomictic? Yes] "Red-flowered individuals are partially self incompatible, but yellow-flowered individuals are totally self-compatible. The yellow flowered morph may be evolving autogamy. At this stage its breeding system seems to be intermediate between autogamy and outbreeding. Yellow flowered individuals have a floral structure that may facilitate transferral of pollen to stigmas in the same inflorescence by means of small pollinators, or even without the aid of a pollinator...Profuse flowering in M. collina results in lowered fruit-set per inflorescence apparently because of decreased outbreeding, but the total number of fruits set per tree is high because of partial self-compatibility in most individuals. Thus, the M. collina system does not help explain profuse flowering in mainland tropical species that are totally self-incompatible. Partial selfcompatibility in M. collina permits dependable high seed production, adaptive in colonizing species." [Study refers to what is now classified as M. polymorpha. Presumably M. collina shares some degree of similar reproductive traits]
605	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Requires specialist pollinators? No] "filaments and style usually bright red or scarlet, occasionally orange … var. villosa … filaments and style orange-pink to yellow, less commonly red … var. collina … filaments and style usually yellow, less commonly red … var. fruticosa" [Filaments commonly red. Assumed to share a similar suite of pollinators as M. polymorpha]
605	1976. Carpenter, F.L.. Plant-Pollinator Interactions in Hawaii: Pollination Energetics of Metrosideros Collina (Myrtaceae). Ecology 57(6): 1125-1144. 57(6): 1125-1144.	[Requires specialist pollinators? No] "The predominant flower color in the population, the dimensions of floral parts, and copious nectar secretion adapt this species to bird pollination. However, insects effect moderate amounts of pollination and fruit-set" [This study refers to what is now classified as M. polymorpha. M. collina, with similar floral morphology, is assumed to be pollinated by a similar suite of birds and/or insects]
606	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Reproduction by vegetative fragmentation? No] No evidence
606	1998. Mueller-Dombois, D./Fosberg, F. R.. Vegetation of the tropical Pacific islands. Springer-Verlag, New York	[Reproduction by vegetative fragmentation? No] No evidence
607	2011. Blerick Tree Farm. Metrosideros collina - Tahiti. http://www.onlinetrees.com.au/p/4788348/metrosideros-collina---tahiti.html	[Minimum generative time (years)? 4+] "Growth rate: Slow" [Metrosideros species generally have a slow growth rate]
701	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Propagules likely to be dispersed unintentionally? Unknown] "The small seeds of this complex readily become airborne and can survive both the low temperatures of high air currents and soaking in sea water" [Small seed size creates potential for inadvertent dispersal]
702	2010. Dawson, M./Hobbs, J./Platt, G./Rumbal, J.. Metrosideros in cultivation: Rata and other species. New Zealand Garden Journal. 13(2): 10-23.	[Propagules dispersed intentionally by people? Yes] "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."
703	2011. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? Probably No] no evidence of the species being grown in or around seed crop fields.
704	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Propagules adapted to wind dispersal? Yes] "The small seeds of this complex readily become airborne and can survive both the low temperatures of high air currents and soaking in sea water"
704	1985. Smith, A.C.. Flora Vitiensis Nova: A New Flora of Fiji (Spermatophytes Only). Volume 3. National Tropical Botanical Garden, Lawai, HI	[Propagules adapted to wind dispersal? Yes] "seeds linear, much longer than broad, sometimes winged, the fertile ones fewer than sterile ones, the embryos straight, the cotyledons adaxially appressed."

704	2002. Bullock, J. M./Kenward, R.E./Hails, R.S. (eds.). Dispersal Ecology: 42nd Symposium of the British Ecological Society. Cambridge University Press, Cambridge, UK	[Propagules adapted to wind dispersal? Yes] "Metrosideros has very light seeds which are lofted by wind speeds of only 10 km/h or so, and thus the dispersal probably involves rare passage through the upper atmosphere, possibly helped by Pleistocene wind patterns." [Describes colonization of Metrosideros species throughout the Pacific]
705	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Propagules water dispersed? Yes] "The small seeds of this complex readily become airborne and can survive both the low temperatures of high air currents and soaking in sea water"
706	1985. Smith, A.C.. Flora Vitiensis Nova: A New Flora of Fiji (Spermatophytes Only). Volume 3. National Tropical Botanical Garden, Lawai, HI	[Propagules bird dispersed? No] "seeds linear, much longer than broad, sometimes winged, the fertile ones fewer than sterile ones, the embryos straight, the cotyledons adaxially appressed."
707	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Propagules dispersed by other animals (externally)? Unknown] "The small seeds of this complex readily become airborne and can survive both the low temperatures of high air currents and soaking in sea water" [Small seed size creates potential for dispersal by adhering to fur or mud on feet]
708	2011. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? Unknown] Unlikely to be consumed
801	1973. Smith, A.C.. Studies of Pacific Island Plants. XXVI. Metrosideros collina (Myrtaceae) and its Relatives in the Southern Pacific. American Journal of Botany. 60(5): 479-490.	[Prolific seed production (>1000/m2)? Unknown] "Trees or shrubs 1-20 m high…" [Larger trees may probably produce high seed densities, as with other Metrosideros species]
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown]
803	2011. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on found on herbicide efficacy for or chemical control of this species
804	2011. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown]
805	2011. Carnegie, A.J./Lidbetter, J.R.. Rapidly expanding host range for Puccinia psidii sensu lato in Australia. Australasian Plant Pathology. DOI 10.1007/s13313-011-0082-6: .	[Effective natural enemies present locally? Possibly] "On 13 August a survey of a nursery not previously surveyed, but in close proximity to IP3, identified P. psidii s.l. on Metrosideros collina...On M. collina, symptoms included purple flecks and spots with both old and fresh pustules on leaves, as well as fresh pustules on new shoots…" [Presence of P. psidii in Hawaiian Islands may negatively impact M. collina]