

Family: *Myrtaceae*

Taxon: *Leptospermum scoparium*

Synonym: *Leptospermum nichollsii* Dorr. Sm.

Common Name: manuka
broom teatree
New Zealand teatree

Questionnaire :	current 20090513	Assessor:	Patti Clifford	Designation: H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Patti Clifford	WRA Score 20
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	y
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	y
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs		y=1, n=0	y
402	Allelopathic		y=1, n=0	
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	
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	y

411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
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	y
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
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	
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
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	
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
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	n
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 20

Supporting Data:

101	2011. WRA Specialist. Personal Communication.	[Is the species highly domesticated? No] No evidence of domestication that reduces invasive traits.
102	2011. WRA Specialist. Personal Communication.	[Has the species become naturalized where grown? NA]
103	2011. WRA Specialist. Personal Communication.	[Does the species have weedy races? NA]
201	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"? High 2] Native to New Zealand, Tasmania and Australia.
201	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"? High 2] Native range: AUSTRALASIA Australia: Australia - New South Wales [s.e.], Tasmania, Victoria [w.] New Zealand: New Zealand - Chatham Islands, North Island, South Island, Stewart Island
202	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Quality of climate match data? 2 High] Native to New Zealand, Tasmania and Australia.
202	2011. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database Index]. National Germplasm Resources Laboratory, Beltsville, Maryland. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Quality of climate match data? 2 High] Native range: AUSTRALASIA Australia: Australia - New South Wales [s.e.], Tasmania, Victoria [w.] New Zealand: New Zealand - Chatham Islands, North Island, South Island, Stewart Island
203	1995. Sunset. Western garden book 6th edition.	[Broad climate suitability (environmental versatility)? Yes] USDA hardiness zones: 14-24.
203	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Broad climate suitability (environmental versatility)? Yes] Naturalized on Hawaii, primarily in disturbed mesic to wet forest and areas of forestry plantings, 330-1,220m, at least on Kauai, Oahu, and Lanai.
203	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Broad climate suitability (environmental versatility)? Yes] Kaua'i, at 1,100-3,900 ft (335-1,189 m) elevation. O'ahu, large dense stands in the Poamoho and Kawaioloa areas at about 1,800- 2,200 ft (549-671 m) elevation, other infestations found along Waimano and Manana trails, also at Mt. Ka'ala Natural Area Reserve, incipient population found in or near disturbed areas. Lana'i, cultivated and now naturalized, primarily in disturbed mesic to wet forest and areas of forestry plantings, 1,083-4,003 ft (330-1,220 m) elevation.
204	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Native or naturalized in regions with tropical or subtropical climates? Yes] Naturalized in Hawaii on Kauai, Oahu and Lanai.
205	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Does the species have a history of repeated introductions outside its natural range? Yes] Planted in Hawaii as forestry species and naturalized on Kauai, Oahu and Lanai.
205	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> . 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Does the species have a history of repeated introductions outside its natural range? Yes] " <i>Leptospermum scoparium</i> has been extensively planted in the milder areas of the British Isles as a semi-hardy garden plant and is described as ubiquitous in Ireland gardens."
301	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Naturalized beyond native range? Yes] Naturalized on Hawaii, primarily in disturbed mesic to wet forest and areas of forestry plantings, 330-1,220m, at least on Kauai, Oahu, and Lanai.

301	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Naturalized beyond native range? Yes] "Despite the extent of garden planting in the British Isles naturalisation is only reported at Tresco Abby, Isles of Scilly, where groves of self-sown seedlings are found."
302	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching, L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	[Garden/amenity/disturbance weed? Yes] Invades disturbed forest sites. [scored as an environmental weed]
303	1954. Mulcock, A.P.. A disease of manuka <i>Leptospermum scoparium</i> Forst.. <i>Transactions of the Royal Society of New Zealand</i> . 82: 115-118. http://rsnz.natlib.govt.nz/volume/rsnz_82/rsnz_82_01_001530.pdf	[Agricultural/forestry/horticultural weed? Yes] "During the last decade, a disease has appeared in New Zealand which is causing the death of manuka (<i>Leptospermum scoparium</i>). The death of <i>L. scoparium</i> over large areas has been greeted as a blessing by some farmers who look upon manuka as a weed associated with pasture deterioration and diminished stock-carrying capacity." The malady features a combination of insect and fungal parasites. The former belongs to the family Coccidae within the genus <i>Eriococcus</i> . The fungus <i>Capnodium walteri</i> Sacc. is a member of the sooty mould group and is nourished by honey-dew secreted by the insects which infest <i>L. scoparium</i> .
303	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Agricultural/forestry/horticultural weed? Yes] " <i>Leptospermum scoparium</i> is tolerant of infertile environments, thriving in a wide range of marginal and disturbed environments. The seral habitat in New Zealand has been greatly extended by human vegetation disturbance, and due to its invasive nature, the species has been regarded as an agricultural woody weed."
304	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Environmental weed?] "Other than Hawaii, <i>Leptospermum</i> is also considered invasive in South Africa where <i>Leptospermum laevigatum</i> is known to spread and potentially threatens native vegetation."
304	2011. Oahu Army Natural Resource Program. 2011 Status report for the Makua and Oahu implementation plan. Pacific Studies Cooperative Unit, University of Hawaii Manoa, manoa.hawaii.edu/hpicesu/DPW/2011_YER/2011_YER.pdf	[Environmental weed? Yes] The Oahu Army Natural Resource Program is controlling <i>Leptospermum scoparium</i> in areas surrounding the Koala Management Unit to prevent its spread into this area of high biodiversity value.
305	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Congeneric weed? Yes] "Other than Hawaii, <i>Leptospermum</i> is also considered invasive in South Africa where <i>Leptospermum laevigatum</i> is known to spread and potentially threatens native vegetation."
305	2011. Kitenge, E.M.. Harvesting of invasive woody vegetation (<i>Eucalyptus lehmanii</i> , <i>Leptospermum laevigatum</i> , <i>Acacia cyclops</i>) as energy feedstock in the Cape Agulhas Plain of South Africa. University of Stellenbosch Department of Forest and Wood Science,	[Congeneric weed? Yes] "This study focused on the feasibility of using <i>Acacia Cyclops</i> [Rooikrans], <i>Leptospermum laevigatum</i> [Myrtle] and <i>Eucalyptus lehmanii</i> [Spider Gum] as energy feedstock. The potential availability of 693.38 oven-dry tonnes (ODT) of biomass can be harvested from six hectares of invasive stands. This proves that biomass from invasive vegetation could be considered as a viable energy feedstock of substantial quantity. It is therefore clear that the recovery of woody biomass of these three invasive species has significant potential in sustaining a bioenergy project in the Agulhas area. These findings can aid decision-making in other areas in the country where similar conditions occur."
401	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. <i>Manual of the flowering plants of Hawaii</i> . Revised edition.. University of Hawaii Press and Bishop Museum Press, Honolulu, HI.	[Produces spines, thorns or burrs? No] Shrubs or small trees to 2-5m tall, bark shredding into long strips; young branches silky pubescent.

402	2011. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Parasitic? No] Myrtaceae.
404	2011. Department of Conservation New Zealand. Native plants: manuka/kahikatoa & kanuka. Department of Conservation New Zealand,	[Unpalatable to grazing animals?] "Unlike many other native plants, mānuka/kāhikatoa and kānuka are not usually eaten by browsing animals like sheep, cattle and goats. This is another reason that these plants are useful in restoration projects."
405	2011. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland http://www.ncbi.nlm.nih.gov/	[Toxic to animals? No] No evidence of toxicity.
405	2011. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	[Toxic to animals? No] No evidence of toxicity.
406	2003. Starr, F./Starr, K./Loope, L.. Leptospermum scoparium. United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Host for recognized pests and pathogens?] According to Brickell and Zuk (1997), pests and diseases are infrequent.
406	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of Leptospermum scoparium (Myrtaceae) in New Zealand. New Zealand Journal of Botany. 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Host for recognized pests and pathogens?] "The three most commonly found species are the endemic Coelostomidia wai roensis and introduced Eriococcus orariensis and E. leptospermi. The condition commonly described as manuka blight is associated with infestation by the introduced insect species and the development of a covering of sooty mould on the resultant honeydew."
407	2011. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland http://www.ncbi.nlm.nih.gov/	[Causes allergies or is otherwise toxic to humans? No] No evidence of toxicity or allergies.
407	2011. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	[Causes allergies or is otherwise toxic to humans? No] No evidence of toxicity or allergies.
408	2011. WRA Specialist. Personal Communication.	[Creates a fire hazard in natural ecosystems? No] No evidence.
409	1995. Sunset. Western garden book 6th edition.	[Is a shade tolerant plant at some stage of its life cycle?] Full sun.
409	2011. Dave's Garden. PlantFiles: New Zealand tea, New Zealand tea bush, manuka. Dave's Garden, http://davesgarden.com/guides/pf/go/38241/	[Is a shade tolerant plant at some stage of its life cycle?] Full sun to partial shade.
409	2011. Dirr, M.A.. Dirr's encyclopedia of trees and shrubs. Timber Press, Portland	[Is a shade tolerant plant at some stage of its life cycle?] Full sun to partial shade.
410	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of Leptospermum scoparium (Myrtaceae) in New Zealand. New Zealand Journal of Botany. 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] Leptospermum scoparium tolerates a wide range of infertile soils in New Zealand, including: infertile clays, sand podzols, bogs, fens, upland peat, gley soils, ignimbrite pumice, oligotrophic mires and swamps.
410	2011. Dirr, M.A.. Dirr's encyclopedia of trees and shrubs. Timber Press, Portland	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] Acid to neutral well-drained soil.
411	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Climbing or smothering growth habit? No] Shrubs or small trees 2-5m tall.

412	2002. Harris, G.. Our native plant invaders. The New Zealand Garden Journal. 5: 6-8. http://www.mnzih.org.nz/pages/NativeWeeds.htm	[Forms dense thickets? Yes] Manuka. (<i>Leptospermum scoparium</i>) and kanuka (<i>Kunzea ericoides</i>) were first planted in Hawaii about 70 years ago and they have now infested several islands where they form thickets that crowd out and suppress other plants.
412	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Forms dense thickets? Yes] "Some invasive attributes of plants in this genus include shrubby thick aggressive growth capable of crowding or shading out desirable species, ability to invade inhospitable areas, and numerous light wind born seeds."
501	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Aquatic? No] Terrestrial.
502	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Grass? No] Myrtaceae.
503	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Nitrogen fixing woody plant? No] Myrtaceae.
504	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] Shrub or small tree [woody].
601	1954. Mulcock, A.P.. A disease of manuka <i>Leptospermum scoparium</i> Forst.. Transactions of the Royal Society of New Zealand. 82: 115-118. http://rsnz.natlib.govt.nz/volume/rsnz_82/rsnz_82_01_001530.pdf	[Evidence of substantial reproductive failure in native habitat? Yes] "During the last decade, a disease has appeared in New Zealand which is causing the death of manuka (<i>Leptospermum scoparium</i>). The death of <i>L. scoparium</i> over large areas has been greeted as a blessing by some farmers who look upon manuka as a weed associated with pasture deterioration and diminished stock-carrying capacity." The malady features a combination of insect and fungal parasites. The former belongs to the family Coccidae within the genus <i>Eriococcus</i> . The fungus <i>Capnodium walteri</i> Sacc, is a member of the sooty mould group and is nourished by honey-dew secreted by the insects which infest <i>L. scoparium</i> .
602	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Produces viable seed? Yes] " <i>Leptospermum</i> spp. can be propagated from seeds in the spring, from cuttings in May, or from hardwood cuttings in the fall."
602	2011. Dave's Garden. PlantFiles: New Zealand tea, New Zealand tea bush, manuka. Dave's Garden, http://davesgarden.com/guides/pf/go/38241/	[Produces viable seed? Yes] Propagation Methods: From herbaceous stem cuttings From woody stem cuttings From seed; stratify if sowing indoors
603	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. New Zealand Journal of Botany. 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Hybridizes naturally? Yes] "Further evidence for the recent evolution the genus <i>Leptospermum</i> is provided by incomplete sterility barriers and the number of putative hybrids in Australia."
604	2009. Bennick, R.M.. The effects of honeybees (<i>Apis mellifera</i>) on the biodiversity of manuka (<i>Leptospermum scoparium</i>) patches. Massey University, Palmerston North http://mro.massey.ac.nz/bitstream/handle/10179/1269/02whole.pdf?sequence=2	[Self-compatible or apomictic? Yes] "Pollination treatments revealed that manuka is partially self-compatible, but relies more heavily on cross-pollination for higher yields of capsule and seed set."

605	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> . 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Requires specialist pollinators? No] "The small white flowers of <i>L. scoparium</i> are classified as open-access with a dish/bowl shape and, typical of this type, are visited by a range of insect pollinators. Heine (1937) recorded representatives from the orders Coleoptera and Diptera. A detailed study of montane <i>L. scoparium</i> visitors revealed a range of insects arriving in a structured pattern. Open flowers were visited by large tachinid and calliphorid flies at dawn, followed by a great variety of small Diptera with increasing temperature. In fine weather indigenous Hymenoptera visited flowers from mid morning. The bees and flies ended visits in the late afternoon, and in the early evening in settled weather moths (Pyralidae, Geometridae, Noctuidae) and craneflies (Tipulidae) were recorded. Nocturnal moth visits have been noted. The introduced honey-bee (<i>Apis mellifera</i>) also collects both pollen and nectar. These observations confirm the non-specific pollinators associated with <i>L. scoparium</i> .
606	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Reproduction by vegetative fragmentation? No] " <i>Leptospermum</i> spp. can be propagated from seeds in the spring, from cuttings in May, or from hardwood cuttings in the fall."
607	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> . 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Minimum generative time (years)?] "The flowering times within a population, among adjacent populations and geographically widely separated populations, and between seasons are highly variable. This variability also has a genetic component; both age at first flowering and period of flowering differed in a common garden experiment.
701	1954. Mulcock, A.P.. A disease of manuka <i>Leptospermum scoparium</i> Forst.. <i>Transactions of the Royal Society of New Zealand</i> . 82: 115-118. http://rsnz.natlib.govt.nz/volume/rsnz_82/rsnz_82_01_001530.pdf	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Yes] Grows as a weed in pasture areas.
701	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. <i>Manual of the flowering plants of Hawaii</i> . Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Yes] Planted in Hawaii as a forestry species.
701	2011. Imada, C./Clifford, P./Lau, J.. 2010 Rare Plant Survey, O'ahu Forest National Wildlife Refuge, Waipi'o, O'ahu. Hawaii Biological Survey,	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Yes] Botanical survey and mapping indicate that <i>Leptospermum scoparium</i> is spreading along the Kipapa trail, Oahu between the LZ and less-impacted areas.
702	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Propagules dispersed intentionally by people? Yes] This popular plant is spread in horticulture trade. It has also been used in various places to stabilize eroding soils and sands.
702	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> . 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Propagules dispersed intentionally by people? Yes] " <i>Leptospermum</i> is a genus of ornamental worthiness, and has been cultivated since its introduction to Europe. The greatest numbers of cultivars have been bred from <i>L. scoparium</i> . Approximately 150 named cultivars have been derived from <i>L. scoparium</i> , whilst the balance of the genus is represented by about 20–30 cultivars."
703	2011. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? No] No evidence.
704	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Propagules adapted to wind dispersal? Yes] Wind dispersed seeds.

704	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Propagules adapted to wind dispersal? Yes] Wind dispersed seeds.
705	2011. WRA Specialist. Personal Communication.	[Propagules water dispersed? Unknown]
706	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Propagules bird dispersed? No] Wind dispersed. Capsule.
707	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Propagules dispersed by other animals (externally)? No] Capsule [no means of external attachment].
708	2011. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? No] Unlikely to be eaten by animals.
801	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching,L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	[Prolific seed production (>1000/m ²)? Yes] Prolific seeder.
802	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Evidence that a persistent propagule bank is formed (>1 yr)? No] <i>L. scoparium</i> seed does not exhibit dormancy, and the unshed seed in capsules is probably the main reservoir of seed as the soil seed bank is non-persistent.
803	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching,L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	[Well controlled by herbicides?] Sensitive to triclopyr.
803	2003. Starr, F./Starr, K./Loope, L.. <i>Leptospermum scoparium</i> . United States Geological Survey- Biological Research Division, Haleakala Field Station, Maui http://www.hear.org/starr/hiplants/reports/pdf/leptospermum_spp.pdf	[Well controlled by herbicides?] Most likely, cut stump and basal bark application of herbicides are effective. It is uncertain whether foliar applications are effective.
804	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching,L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	[Tolerates, or benefits from, mutilation, cultivation, or fire?] Decapitated <i>Leptospermum scoparium</i> trees do not resprout.
804	2005. Stephens, J.M.C./Molan, P.C./Clarkson, B.D.. A review of <i>Leptospermum scoparium</i> (Myrtaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 43: 431-449. http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5362/A%20review.pdf;jsessionid=4C65513	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] Wardle (1991) recorded <i>L. scoparium</i> as the only New Zealand species to release seed overwhelmingly in concert after fire, a serotinous feature common in the Australian flora.
805	2011. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

