Family: ***Euphorbiaceae***

Taxon: ***Macaranga tanarius***

Synonym: *Ricinus tanarius L.* ***Common Name:***

Questionaire : current 20090513 **Assessor:** Patti Clifford **Designation:**

Status: Assessor Approved **Data Entry Person:** Patti Clifford **WRA Score 12**

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)**	**y**
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**	**y**
402	**Allelopathic**	**y=1, n=0**	
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**	
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	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	n
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	
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	n
705	Propagules water dispersed	y=1, n=-1	
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	
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	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	
	Designation:	**WRA Score**	**12**

Supporting Data:

101	2010. WRA Specialist. Personal Communication.	No evidence.
201	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	Native: China - Guandong; Japan -Ryukyu Island; Taiwan; India; Thailand; Vietnam; Borneo; Indonesia; New Guinea; Philippines; Australia; Solomon Islands; Vanuatu
202	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	Native: China - Guandong; Japan -Ryukyu Island; Taiwan; India; Thailand; Vietnam; Borneo; Indonesia; New Guinea; Philippines; Australia; Solomon Islands; Vanuatu
203	2003. Starr, F./Starr, K./Loope, L.. Macaranga tanarius Parasol leaf tree Euphorbiacea. USGS Biological Resources Division, Haleakala Field Station , Maui http://www.hear.org/starr/hiplants/reports/pdf/macaranga_tanarius.pdf	"On Maui, M. tanarius is widely naturalized in the Waikapu area of West Maui where it forms dense thickets in mesic valleys and streams from near sea level up to about 4,400 ft (1,341 m) elevation"
203	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Altitude: Up to 1500 m, Mean annual rainfall: 1000-2800 mm, Mean annual temperature: 10-30 deg. C.
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.	In Hawaii, naturalized in disturbed mesic valleys, 0-220 m on Kauai and Oahu.
204	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	Native: China - Guandong; Japan -Ryukyu Island; Taiwan; India; Thailand; Vietnam; Borneo; Indonesia; New Guinea; Philippines; Australia; Solomon Islands; Vanuatu
205	2003. Starr, F./Starr, K./Loope, L.. Macaranga tanarius Parasol leaf tree Euphorbiacea. USGS Biological Resources Division, Haleakala Field Station , Maui http://www.hear.org/starr/hiplants/reports/pdf/macaranga_tanarius.pdf	"Macaranga tanarius is cultivated for a variety of uses. This small tree is grown as an ornamental tree in landscaping and for reforestation projects in Hawai'i and other warm tropical regions of the world>"
301	2003. Starr, F./Starr, K./Loope, L.. Macaranga tanarius Parasol leaf tree Euphorbiacea. USGS Biological Resources Division, Haleakala Field Station , Maui http://www.hear.org/starr/hiplants/reports/pdf/macaranga_tanarius.pdf	In Hawaii, naturalized in disturbed mesic valleys, 0-220 m on Kauai and Oahu and Maui from sea-level to ~1300 m.
302	2010. Maui Invasive Species Committee. Manager's Report. http://www.hawaiiinvasivespecies.org/iscs/misc/pdfs/2010fy_miscq2report.pdf	MISC field crew controlled Macaranga tanarius at a nursery in Kïhei growing among nursery stock.
303	2007. Randall, R.. Global Compendium of Weeds. http://www.hear.org/gcw/	No evidence.
304	2007. Randall, R.. Global Compendium of Weeds. http://www.hear.org/gcw/	No evidence. [although the GCW lists M. tanarius as an environmental weed, there is no evidence of impact or control]
305	2007. Wong, C. Pl. Hawaiian lowland wet forests: impacts of invasive plants on light availability. Journal of Young Investigators. 19: .	Macaranga mappa is invasive in the Hawaiian lowland wet forests. It competes with native species and suppresses recruitment through alteration of canopy structure and light availability.
305	2009. Ostertag, R./Cordell, S./Michaud, J./Cole, T.C./Schulten, J.R./Publico, K.M./Enoka, J.H.. Ecosystem and restoration consequences of invasive woody species removal in Hawaiian lowland wet forest. Ecosystems. 12: 503-515.	This study evaluated the affects of removing non-native species (including Macaranga mappa) from a lowland wet forest on the island of Hawaii. The study demonstrated that biomass from alien species is having an ecosystem effect on lowland wet forests.

401	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.	"Capsules 2-3-valved, 10-12 mm long, covered with pale waxy glands and soft, scattered, elongate, spine-like processes."
402	2010. WRA Specialist. Personal Communication.	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.	Not parasitic.
404	2003. Calub, B.M.. Indigenous fodder trees for rehabilitation. Leisa Magazine. December: 22-23.	Macaranga tanarius is used as a fodder tree for cattle and goats in the Philippines.
405	2003. Calub, B.M.. Indigenous fodder trees for rehabilitation. Leisa Magazine. December: 22-23.	Macaranga tanarius is used as a fodder tree for cattle and goats in the Philippines.
406	2010. WRA Specialist. Personal Communication.	Unknown
407	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	"Alcohol: Bark and leaves are widely used in the Philippines in the preparation of a fermented drink called 'basi' made from sugarcane. Food: In Sumatra, fruit are added to palm juice when it is boiled down into crystals, improving the quality of the sugar produced."
407	2010. National Center for Biotechnology Information. PubMed. U.S. National Library of Medicine, Bethesda, Maryland http://www.ncbi.nlm.nih.gov/sites/entrez	No evidence of toxicity in PubMed.
408	2010. WRA Specialist. Personal Communication.	Unknown.
409	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	"A very fast-growing pioneer species, M. tanarius is often common in secondary forests, especially in logging areas. It is also found in thickets, brushwood, village groves and beach vegetation."
409	2010. WRA Specialist. Personal Communication.	Unknown
410	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Soil type: Occurs on clayey, loamy and sandy soils, usually in lowlands.
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.	Trees 4-10 (-20) m tall.
412	2003. Starr, F./Starr, K./Loope, L.. Macaranga tanarius Parasol leaf tree Euphorbiacea. USGS Biological Resources Division, Haleakala Field Station , Maui http://www.hear.org/starr/hiplants/reports/pdf/macaranga_tanarius.pdf	"On Maui, M. tanarius is widely naturalized in the Waikapu area of West Maui where it forms dense thickets in mesic valleys and streams from near sea level up to about 4,400 ft (1,341 m) elevation"
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.	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.	Euphorbiaceae.
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.	Euphorbiaceae.
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.	Tree.
601	2010. WRA Specialist. Personal Communication.	No evidence

602	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Propagate from seed.
603	2010. WRA Specialist. Personal Communication.	Unknown.
604	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.	Dioecious.
605	2009. Ishida, C./Kono, M./Sakai, S.. A new pollination system: brood-site pollination by flower bugs in Macaranga (Euphorbiaceae). Annals of Botany. 103: 39-44.	The results of this study on pollination of Macaranga tanarius indicate that the plant is pollinated by flower bugs, Orius atratus (Anthocoridae, Hemiptera), and Decomioides schneirlai (Miridae, Hemiptera) breeding on the inflorescences.
605	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Wind-pollinated.
606	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Propagate from seed.
607	2010. WRA Specialist. Personal Communication.	Fast growing.
701	2010. WRA Specialist. Personal Communication.	Unknown.
702	2003. Starr, F./Starr, K./Loope, L.. Macaranga tanarius Parasol leaf tree Euphorbiacea. USGS Biological Resources Division, Haleakala Field Station , Maui http://www.hear.org/starr/hiplants/reports/pdf/macaranga_tanarius.pdf	"Macaranga tanarius is cultivated for a variety of uses. This small tree is grown as an ornamental tree in landscaping and for reforestation projects in Hawai'i and other warm tropical regions of the world."
702	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Shade or shelter: M. tanarius has been recommended as a shade and shelter tree to promote natural regeneration on deforested land
703	2010. WRA Specialist. Personal Communication.	No evidence of produce contamination.
704	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.	"Capsules 2-3-valved, 10-12 mm long, covered with pale waxy glands and soft, scattered, elongate, spine-like processes." [no adaptation for wind dispersal]
705	2010. WRA Specialist. Personal Communication.	Unknown.
706	1999. Hamann, A./Curio, E.. Interactions among frugivores and fleshy fruit trees in a Philippine submontane rainforest. Conservation Biology. 13: 766-773.	In a study in the Philippines on the effects of frugivore extinctions on forest regeneration, ten frugivorous bird species (number of birds not indicated) were recorded foraging on Macaranga tanarius.
706	2007. Moran,C.. Consequences of rainforest fragmentation for frigivorous vertebrates and seed dispersal. Griffith School of Environment, Griffith University, South Bank	In this study on the effects of seed dispersal on forest regeneration, 6 frugivorous bird species were recorded foraging on Macaranga tanarius.
707	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.	"Capsules 2-3-valved, 10-12 mm long, covered with pale waxy glands and soft, scattered, elongate, spine-like processes."
708	1999. Hamann, A./Curio, E.. Interactions among frugivores and fleshy fruit trees in a Philippine submontane rainforest. Conservation Biology. 13: 766-773.	In a study in the Philippines on the effects of frugivore extinctions on forest regeneration, ten frugivorous bird species (number of birds not indicated) were recorded foraging on Macaranga tanarius.
708	2007. Moran,C.. Consequences of rainforest fragmentation for frigivorous vertebrates and seed dispersal. Griffith School of Environment, Griffith University, South Bank	In this study on the effects of seed dispersal on forest regeneration, 6 frugivorous bird species were recorded foraging on Macaranga tanarius.
801	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Unknown

802	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simmons, A.. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	Seed storage orthodox.
803	2010. WRA Specialist. Personal Communication.	Unknown
804	2000. Mori, T.. Effects of droughts and forest fire on Dipterocarp forests in East Kalimantan. Springer-Verlag, Tokyo http://books.google.com/books?id=NgALmUAi9HYC&pg=PA44&lpg=PA44&dq=macaranga+tanarius+%2B+%22fire%22&source=bl&ots=6plnCn0mJl&sig=CLR7YA5O	Macaranga tanarius is a fire-tolerant species in rainforest systems of East Kalimantan.
805	2010. WRA Specialist. Personal Communication.	Unknown.