

Key Words: High Risk, Naturalized, Rhizomatous Herb, Neotropical, Bird-dispersed

**Family:** *Marantaceae*

**Taxon:** *Stromanthe tonckat*

**Synonym:** *Maranta tonckat* Aubl. (*basionym*)

**Common Name:** Stromanthe

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation:	H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score	7
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		n
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)		n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)		n
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)		
401	Produces spines, thorns or burrs		y=1, n=0		n
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		
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		y
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	
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	n
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	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m <sup>2</sup> )	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: H(HPWRA)

WRA Score 7

## Supporting Data:

101	2012. WRA Specialist. Personal Communication.	[Is the species highly domesticated? No] No evidence
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Species suited to tropical or subtropical climate(s) 2- High] "Mesoamerica: Belize; Costa Rica; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Guyana; Suriname; Venezuela Brazil: Brazil [e.] Western South America: Colombia"
202	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Quality of climate match data 2-High]
203	1995. Instituto Nacional de Biodiversidad/Missouri Botanical Garden. Manual de la Flora de Costa Rica - <i>Stromanthe tonckat</i> . <a href="http://www.mobot.org/manual.plantas/047251/S047689.html">http://www.mobot.org/manual.plantas/047251/S047689.html</a>	[Broad climate suitability (environmental versatility)? Yes] Collections in Costa Rica range from 400 m to 1500 m. Elevation range exceeds 1000 m, demonstrating potential environmental versatility.
203	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Broad climate suitability (environmental versatility)? Yes] Grows at 130 m at Lyon Arboretum.
203	2012. Tropicos.org. Tropicos [Online Database]. Missouri Botanical Garden, <a href="http://www.tropicos.org/">http://www.tropicos.org/</a>	[Broad climate suitability (environmental versatility)? Yes] Collections range from 40 m in Brazil to 2500 m in Colombia. Elevation range exceeds 1000 m, demonstrating potential environmental versatility.
204	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "New naturalized record" ... "This erect, rhizomatous herb, native to tropical America, was first planted in 1981. The plant sends up 1–1.2 m long internodes, which then produce several leafy branches. Mature berries are ellipsoid, somewhat pear shaped, red then turning black at maturity. This species is common in Haukulu, where it has established along trails and in unmanaged wet areas of the Arboretum. It has definitely increased in abundance in recent years."
204	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Mesoamerica: Belize; Costa Rica; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Guyana; Suriname; Venezuela Brazil: Brazil [e.] Western South America: Colombia"
205	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Does the species have a history of repeated introductions outside its natural range? No] "This erect, rhizomatous herb, native to tropical America, was first planted in 1981." [No other records of introduction found]
301	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Naturalized beyond native range? Yes] " <i>Stromanthe tonckat</i> (Aubl.) Eichler New naturalized record This erect, rhizomatous herb, native to tropical America, was first planted in 1981. The plant sends up 1–1.2 m long internodes, which then produce several leafy branches. Mature berries are ellipsoid, somewhat pear shaped, red then turning black at maturity. This species is common in Haukulu, where it has established along trails and in unmanaged wet areas of the Arboretum. It has definitely increased in abundance in recent years. Material examined: O'AHU: Fruiting plants established in Oplismenus, beneath large Ficus trees, Haukulu, Lyon Arboretum, 1 Mar 2005, C. Daehler 1076 (BISH, duplicate HAW); Lyon Arboretum (cultivated), 28 Nov 1984, Nagata 3096 (HLA)."
302	2012. Lau, A.. Oahu Early Detection Botanist. Pers. Comm. 25 May 2012.	[Garden/amenity/disturbance weed? Probably Yes] Being evaluated for control, and regarded as a weed to garden staff of Lyon Arboretum. Only report of weediness to date.
303	2007. Randall, R.P.. Global Compendium of Weeds - Index. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	[Agricultural/forestry/horticultural weed? No] No evidence
304	2007. Randall, R.P.. Global Compendium of Weeds - Index. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	[Environmental weed? No] No evidence
305	2007. Randall, R.P.. Global Compendium of Weeds - Index. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	[Congeneric weed? Possibly] No evidence of invasive <i>Stromanthe</i> , but <i>Maranta arundinacea</i> is documented as a weed. <i>Stromanthe tonckat</i> was previously placed in the genus <i>Maranta</i> .

401	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Produces spines, thorns or burrs? No] "This erect, rhizomatous herb, native to tropical America, was first planted in 1981. The plant sends up 1–1.2 m long internodes, which then produce several leafy branches"
402	2012. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Parasitic? No] "This erect, rhizomatous herb, native to tropical America, was first planted in 1981. The plant sends up 1–1.2 m long internodes, which then produce several leafy branches."
404	2012. WRA Specialist. Personal Communication.	[Unpalatable to grazing animals? Unknown]
405	2012. WRA Specialist. Personal Communication.	[Toxic to animals? Unknown]
406	2012. WRA Specialist. Personal Communication.	[Host for recognized pests and pathogens? Unknown]
407	1997. Gragson, T.L.. The use of underground plant organs and its relation to habitat selection among the Pumé Indians of Venezuela. <i>Economic Botany</i> . 51(4): 377-384.	[Causes allergies or is otherwise toxic to humans? No evidence] "Stromanthe sp." ... "The taproots are pounded until fibrous and mixed into fish soup to add starch."
407	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No] No evidence of toxicity to humans
408	1971. Burger, W.C./Pohl, R.W.. Stromanthe tonckat (Aubl.) Eichler. Collection Number 7778. Accession 2218444. Missouri Botanical Garden Herbarium. <a href="http://www.tropicos.org/Specimen/1309557">http://www.tropicos.org/Specimen/1309557</a>	[Creates a fire hazard in natural ecosystems? No. Unlikely given habitat] "Evergreen montane cloud forest on the southwestern slopes of Volcan Rincon de la Vieja and Volcan Santa Maria along the trail from Hda. Guachipelin with virgin oak forest from 900 to about 1300 m elevation and short (5-8 m) elfin forest to 1400 m"
408	1986. Haber, W.A./Bello C.E./Powell, M.. Stromanthe tonckat (Aubl.) Eichler. Collection Number 5605. Accession 5315485. Missouri Botanical Garden Herbarium. <a href="http://www.tropicos.org/Specimen/630288">http://www.tropicos.org/Specimen/630288</a>	[Creates a fire hazard in natural ecosystems? No] "Herb in forest, 1 m;" ... "Monteverde Reserve and upper San Luis valley below Monteverde; Pacific slope, wet forest" [Unlikely, given plant is an herb of the wet forest understory]
408	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Creates a fire hazard in natural ecosystems? No. Unlikely] "This erect, rhizomatous herb, native to tropical America, was first planted in 1981." ... "This species is common in Haukulu, where it has established along trails and in unmanaged wet areas of the Arboretum." [Unlikely, given plant is an herb of the wet forest understory]
409	1996. Hawkins, T.. Stromanthe tonckat (Aubl.) Eichler. Collection Number 996. Accession 4975995. Missouri Botanical Garden Herbarium. <a href="http://www.tropicos.org/Specimen/1072799">http://www.tropicos.org/Specimen/1072799</a>	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Moist disturbed primary forest of hardwood trees 30 to 40 m tall with an understory growing in dense shade." [Honduras]
409	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Fruiting plants established in Oplismenus, beneath large Ficus trees, Haukulu, Lyon Arboretum"
411	1937. Standley, P.C./Dahlgren, B.E.. Flora of Costa Rica - Vol. 18 - Part I. Fieldiana. 18: 1-398.	[Climbing or smothering growth habit? No] "Wet forests of Guanacaste; also San Ramon. A branched plant, 1-2 meters high, with the general appearance of Maranta, the flowers white, bracted; ovary covered with short, silky hairs; fruit red. Ranging to Brazil."
412	1937. Standley, P.C./Dahlgren, B.E.. Flora of Costa Rica - Vol. 18 - Part I. Fieldiana. 18: 1-398.	[Forms dense thickets? No evidence from Costa Rica]
412	2012. Tropicos.org. Tropicos [Online Database]. Missouri Botanical Garden, <a href="http://www.tropicos.org/">http://www.tropicos.org/</a>	[Forms dense thickets? No] No evidence from botanical collections
501	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Aquatic? No] "This erect, rhizomatous herb, native to tropical America, was first planted in 1981. The plant sends up 1–1.2 m long internodes, which then produce several leafy branches. Mature berries are ellipsoid, somewhat pear shaped, red then turning black at maturity."
502	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Grass? No] Marantaceae

503	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Nitrogen fixing woody plant? No] Marantaceae
504	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "...erect, rhizomatous herb, native to tropical America"
601	2012. Tropicos.org. Tropicos [Online Database]. Missouri Botanical Garden, <a href="http://www.tropicos.org/">http://www.tropicos.org/</a>	[Evidence of substantial reproductive failure in native habitat? No] No evidence. Produces fruit & seeds throughout native range
602	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Produces viable seed? Yes] Recruiting from seeds under Ficus trees at Haukulu, Lyon Arboretum.
603	2012. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]
604	1994. Ramirez, N./Seres, A.. Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. <i>Plant Systematics and Evolution</i> . 190: 129-142.	[Self-compatible or apomictic? Yes] "Table 3. Sexual system, dichogamy, pollinator, and mating system of 29 plant species from the cloud forest studied" [S. tonckat = SC, self-compatible]
604	1995. Seres, A./Ramirez, N.. <i>Biología Floral y Polinización de Algunas Monocotiledoneas de un Bosque Nublado Venezolano</i> . <i>Annals of the Missouri Botanical Garden</i> . 82(1): 61-81.	[Self-compatible or apomictic? Yes] Table 1. <i>Stromanthe tonckat</i> listed as homogamous [The maturation of anthers and stigmas at the same time in the same flower so that the time of pollen presentation and reception coincides. Self pollination may be facilitated by this mechanism.]
605	1995. Seres, A./Ramirez, N.. <i>Biología Floral y Polinización de Algunas Monocotiledoneas de un Bosque Nublado Venezolano</i> . <i>Annals of the Missouri Botanical Garden</i> . 82(1): 61-81.	[Requires specialist pollinators? No] Pollinated by Hymenoptera (bees) and Lepidoptera
606	1994. Ramirez, N./Seres, A.. Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. <i>Plant Systematics and Evolution</i> . 190: 129-142.	[Reproduction by vegetative fragmentation? Possibly Yes] "Vegetative reproduction. Of the 33 plant species considered, 12 (36.4%) had asexual means of reproduction." ... "Another type of asexual reproduction was rooted-shoot formation. These propagules were located either at the petiole base ( <i>Stromanthe jacquinii</i> and <i>Stromanthe tonckat</i> )..." [reproduction and regrowth by rhizomes]
607	2012. WRA Specialist. Personal Communication.	[Minimum generative time (years)? Unknown]
701	2012. WRA Specialist. Personal Communication.	[Propagules likely to be dispersed unintentionally? No] Probably not - fruit berries - no evidence that the propagules have any means of attachment.
702	2012. WRA Specialist. Personal Communication.	[Propagules dispersed intentionally by people? Yes] Probably yes - ornamental plant.
703	2012. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? No] Probably not - no evidence that the species grow in or around seed crops.
704	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Propagules adapted to wind dispersal? No] "Mature berries are ellipsoid, somewhat pear shaped, red then turning black at maturity." [Fruit is berry. No evidence that the seeds are adapted for wind dispersal.]
705	1993. Allen, B.. <i>Stromanthe tonckat</i> (Aubl.) Eichler. Collection Number 15182. Accession 5085541. Missouri Botanical Garden Herbarium. <a href="http://www.tropicos.org/Specimen/627983">http://www.tropicos.org/Specimen/627983</a>	[Propagules water dispersed? Potentially] "Forest along stream in narrow valley in vicinity of Doyle's Delight. Southern Maya Mountains"
706	1981. Snow, D.W.. <i>Tropical Frugivorous Birds and Their Food Plants: A World Survey</i> . <i>Biotropica</i> . 13(1): 1-14.	[Propagules bird dispersed? Yes] "Table 1. Plant genera recorded in the diets of frugivorous birds in the tropics" [Includes <i>Stromanthe</i> species]
706	2006. Daehler, C. C./Baker, R. F.. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers. 87: 3-18.	[Propagules bird dispersed? Yes] "Mature berries are ellipsoid, somewhat pear shaped, red then turning black at maturity." [Fleshy-fruited]
707	2012. WRA Specialist. Personal Communication.	[Propagules dispersed by other animals (externally)? No] Probably not - no evidence that propagules have any means of attachment.
708	1981. Snow, D.W.. <i>Tropical Frugivorous Birds and Their Food Plants: A World Survey</i> . <i>Biotropica</i> . 13(1): 1-14.	[Propagules survive passage through the gut? Presumably Yes] "Table 1. Plant genera recorded in the diets of frugivorous birds in the tropics" [Includes <i>Stromanthe</i> species]

801	2012. WRA Specialist. Personal Communication.	[Prolific seed production (>1000/m2)? Unknown] No evidence regarding seed size and number.
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a>	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] No evidence regarding seed bank.
802	2012. WRA Specialist. Personal Communication.	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] No evidence regarding seed bank.
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species.
804	1994. Ramirez, N./Seres, A.. Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. <i>Plant Systematics and Evolution</i> . 190: 129-142.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Vegetative reproduction. Of the 33 plant species considered, 12 (36.4%) had asexual means of reproduction." ... "Another type of asexual reproduction was rooted-shoot formation. These propagules were located either at the petiole base ( <i>Stromanthe jacquinii</i> and <i>Stromanthe tonckat</i> )..."
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

## **Summary of Risk Traits**

### **High Risk / Undesirable Traits**

- Naturalized in Lyon Arboretum, Oahu, Hawaiian Islands; considered weedy in garden
- Thrives in tropical climates
- Broad elevation range
- Shade tolerant
- Self-compatible
- Bird-dispersed seeds
- Reproduces vegetatively from rhizomes

### **Low Risk / Desirable Traits**

- Potential ornamental value
- Unarmed
- No toxic properties reported