Taxon: Stromanthe jacquinii (Roem. & Schult.) H.A.Kenn. & Nicolson

Family: Marantaceae

Common Name(s): pico de gallo
stromanthe

Synonym(s): Maranta jacquinii Roem. & Schult.
Marantopsis lutea Körn.
Stromanthe lutea Eichler

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 6 Jul 2016

WRA Score: 3.0 **Designation:** L **Rating:** Low Risk

Keywords: Neotropical Herb, Rhizomatous, Ornamental, , Self-Compatible, Bird-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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)		
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		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
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

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators		
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)		
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		
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/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
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)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	No evidence
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	"Costa Rica to Venezuela; chiefly in lowland thickets and open forest."

202	Quality of climate match data	High
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	

203	Broad climate suitability (environmental versatility)	
	Source(s)	**Notes**
	Backyard Gardener. 2016. Stromanthe lutea. http://www.backyardgardener.com/plantname/pda_6921.html. [Accessed 5 Jul 2016]	"USDA Hardiness Zone: 10 to 11"
	Tropicos.org. 2016. Tropicos [Online Database]. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 5 Jul 2016]	Possibly. Collected from 0-1800 m elevation, but primarily at latitudes with 10 degrees of the equator

Qsn #	Question	Answer
204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Costa Rica to Venezuela."

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**?**
	Source(s)	**Notes**
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/. [Accessed 5 Jul 2016]	"Locations: Harold L. Lyon Arboretum (Confirmed) Pacific Tropical Botanical Garden (now National Tropical Botanical Garden) (Confirmed) Wahiawa Botanical Garden Waimea Arboretum & Botanical Garden"

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 5 Jul 2016]	No evidence

Qsn #	Question	Answer
302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
304	**Environmental weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
305	**Congeneric weed**	
	Source(s)	**Notes**
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	[Naturalized] "Stromanthe tonckat (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)."
	Lau, A. 2012. Oahu Early Detection Botanist. Pers. Comm. 25 May 2012	Stromanthe tonckat being evaluated for control, and regarded as a weed to garden staff of Lyon Arboretum. Only report of weediness tc date

401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	[No evidence] "Fairly stout herbs 1-2 m. tall; leaves chiefly whorled at the base of the stem, long-petiolate, oblong-elliptic, very abruptly and shortly acuminate, base broadly obtuse to rounded, 20-40 cm. long, 8-12 cm. broad, glabrous or the midrib inconspicuously puberulent above; petiole 3-5 cm. long, almost wholly callous; sheath 20-30 cm. long, scatteringly pilose to glabrate"

402	**Allelopathic**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

403	**Parasitic**	**n**
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	"Fairly stout herbs 1-2 m. tall" [Marantaceae. No evidence]

404	**Unpalatable to grazing animals**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

405	**Toxic to animals**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Caulescent rhizomatous herb ... Uncommon in the forest and at the edge of the forest along the lake."
	Sugden, A. M. (1982). The vegetation of the Serrania de Macuira, Guajira, Colombia: A contrast of arid lowlands and an isolated cloud forest. Journal of the Arnold Arboretum 63(1): 1-30	[No evidence. Found in non-fire prone habitat] "Most of the larger herbaceous monocotyledons are more or less confined to the damp, shaded gullies; Xiphidium caerideum, the two species of Heliconia, and Stromanthe lutea are good examples of species showing a strong preference for this habitat."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	Backyard Gardener. 2016. Stromanthe lutea. http://www.backyardgardener.com/plantname/pda_6921.html. [Accessed 5 Jul 2016]	"Light Range: Dappled to Full Sun"
	Standley, P.C. & Steyermark., J.A. 1952. Flora of Guatemala. Part III. Fieldiana, Botany Series 24(3): 396–430	[Possibly, if occurring in dense forest understory] "Dense wet mixed forest, at or little above sea level; Izabal. British Honduras along the Atlantic coast to Panama; Colombia, Venezuela, and northern Brazil."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Backyard Gardener. 2016. Stromanthe lutea. http://www.backyardgardener.com/plantname/pda_6921.html. [Accessed 5 Jul 2016]	"pH Range: 5.5 to 6.5 Soil Range: Sandy Loam to Clay Loam"

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	"Fairly stout herbs 1-2 m. tall; leaves chiefly whorled at the base of the stem, long-petiolate, oblong-elliptic, very abruptly and shortly acuminate, base broadly obtuse to rounded, 20-40 cm."

412	Forms dense thickets	
	Source(s)	**Notes**
	Anonymous. 1945. Flora of Panama. Part III. Fascicle I. Annals of the Missouri Botanical Garden, 32(1): 1-105	"chiefly in lowland thickets and open forest." [Unknown. A component of thicket vegetation]

501	Aquatic	n
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	[Terrestrial herb] "Caulescent rhizomatous herb, 1-2 m tall." ... "Uncommon in the forest and at the edge of the forest along the lake."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Jul 2016]	Marantaceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Jul 2016]	Marantaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Caulescent rhizomatous herb, 1- 2 m tall."

Qsn #	Question	Answer
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. Plant Protection Quarterly, 25(2): 56-74	"This question addresses taxa that have specialized organs and should not include plants with just rhizomes/ stolons (see 6.06)."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Uncommon in the forest and at the edge of the forest along the lake."

602	Produces viable seed	y
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	[Presumably Yes] "Fruits ca 1 cm long; seed 1, black, on a short white aril."

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

604	Self-compatible or apomictic	y
	Source(s)	**Notes**
	Ramirez, N., & Seres, A. (1994). Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. Plant Systematics and Evolution, 190(3-4), 129-142	"Autofertility. Fruits and seeds per flower after self- and automatic self-pollination are shown in Table 2. Of 13 plant species producing some fruits and seeds by automatic self-pollination, three were autogamous (Pitcairnia altensteinii, Scleria latifolia, Stromanthe jackinii),"

605	Requires specialist pollinators	
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Inflorescence usually solitary, arising from a leaf sheath, held above the leaves; peduncle 50-75 cm long; spikes diffusely and paniculately compound, the rachis closely flexuous; bracts orange, mostly broadly ovate, 1-2.5 cm long, soon deciduous; flowers ca 1 cm long, pedicellate, in pairs on a common stalk, subtended by a bracteole; sepals 3, free, ca 7 mm long, slightly shorter than petals; petals united at base, white with red markings; staminodia petaloid, slightly shorter than petals."
	Ramirez, N., & Seres, A. (1994). Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. Plant Systematics and Evolution, 190(3-4), 129-142	"Table 3. Sexual system, dichogamy, pollinator, and mating system of 29 plant species from the cloud forest studied" [Stromanthe jackinii - Pollinator = Bird]

606	Reproduction by vegetative fragmentation	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Ramirez, N., & Seres, A. (1994). Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. Plant Systematics and Evolution, 190(3-4), 129-142	"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 (Stromanthe jacquinii and Stromanthe tonckat), on the inflorescence base (Costus spiralis), or on the stems (Geonoma tenuis)."

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Plant This. 2016. Stromanthe lutea. http://www.plantthis.com/plant-information.asp?gardener=23121&tabview=design&plantSpot=1. [Accessed 6 Jul 2016]	"Growth rate: average"
	WRA Specialist. 2016. Personal Communication	Time to sexual maturity unknown, but plants may be able to reproduce vegetatively at an earlier age

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Fruits ca 1 cm long; seed 1, black, on a short white aril." [Unlikely. No means of external attachment. Small size may possibly allow for some external dispersal by attachment in soil/mud]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Backyard Gardener. 2016. Stromanthe lutea. http://www.backyardgardener.com/plantname/pda_6921.html. [Accessed 6 Jul 2016]	Cultivated as an ornamental

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Probably not - no evidence that the species grow in or around seed crops.

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Fruits ca 1 cm long; seed 1, black, on a short white aril."

705	Propagules water dispersed	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Fruits ca 1 cm long; seed 1, black, on a short white aril." ... "Uncommon in the forest and at the edge of the forest along the lake." [Proximity to water may allow for secondary dispersal by water]

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	Sugden, A. M. (1982). Long-distance dispersal, isolation, and the cloud forest flora of the Serranía de Macuira, Guajira, Colombia. Biotropica, 14(3): 208-219	"APPENDIX. Notes on the propagules and their dispersal. The mechanisms stated here are the means considered most likely for the introduction, by long-distance dispersal, of each species to the Macuira cloud forest. The plants are listed in the same order as in Sugden (1982a)." [Stromanthe lutea - dispersed by birds internally]
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	[Arillate seeds] "Fruits ca 1 cm long; seed 1, black, on a short white aril."
	Snow, D. W. (1981). Tropical frugivorous birds and their food plants: a world survey. Biotropica, 13(1): 1-14	[Generic description indicates Stromanthe fruits are eaten by unspecialized frugivorous birds] "TABLE 1. Plant genera recorded" in the diets of frugivorous birds in the tropics (including subtropical South Africa and Australasia, and excluding oceanic islands and Madagascar)." [Stromanthe U - eaten by unspecialized frugivores]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Sugden, A. M. (1982). Long-distance dispersal, isolation, and the cloud forest flora of the Serranía de Macuira, Guajira, Colombia. Biotropica, 14(3): 208-219	"APPENDIX. Notes on the propagules and their dispersal. The mechanisms stated here are the means considered most likely for the introduction, by long-distance dispersal, of each species to the Macuira cloud forest. The plants are listed in the same order as in Sugden (1982a)." [Stromanthe lutea - dispersed by birds internally]

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Sugden, A. M. (1982). Long-distance dispersal, isolation, and the cloud forest flora of the Serranía de Macuira, Guajira, Colombia. Biotropica, 14(3): 208-219	"APPENDIX. Notes on the propagules and their dispersal. The mechanisms stated here are the means considered most likely for the introduction, by long-distance dispersal, of each species to the Macuira cloud forest. The plants are listed in the same order as in Sugden (1982a)." [Stromanthe lutea - dispersed by birds internally]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Croat, T.B. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	"Fruits ca 1 cm long; seed 1, black, on a short white aril." [Unknown, but possibly no. One-seeded fruit]

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/. [Accessed 6 Jul 2016]	Unknown

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Ramirez, N., & Seres, A. (1994). Plant reproductive biology of herbaceous monocots in a Venezuelan tropical cloud forest. Plant Systematics and Evolution, 190(3-4), 129-142	"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 (Stromanthe jacquinii and Stromanthe tonckat)..." [Can likely resprout from rhizomes if cut back]

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Thrives in tropical climates
• Other Stromanthe species have become naturalized & are potential weeds
• Reproduces by seeds & vegetatively by rhizomes
• Self-compatible
• Seeds dispersed by birds & intentionally by people
• Able to resprout from rhizomes after cutting

Low Risk Traits
• No reports of invasiveness or naturalization, but limited information on cultivation outside native range
• Unarmed (no spines, thorns or burrs)
• Non-toxic
• Ornamental
• Bird-pollination requirement may limit seed set in introduced range

Second Screening Results for Herb/Low Stature Shrubby Life Form

(A) Reported as a weed of cultivated lands? No
Outcome = Accept (Low Risk)