

**Taxon:** *Radermachera sinica* (Hance) Hemsl.

**Family:** Bignoniaceae

**Common Name(s):** China doll  
emerald tree  
serpent tree

**Synonym(s):** *Stereospermum sinicum* Hance

**Assessor:** Chuck Chimera

**Status:** Assessor Approved

**End Date:** 27 Jul 2016

**WRA Score:** 4.0

**Designation:** EVALUATE

**Rating:** Evaluate

**Keywords:** Tropical Tree, Naturalized, Unarmed, Ornamental, Wind-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)	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	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)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
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
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
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		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
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	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	y
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		
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		
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
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence of domestication] "Slopes and forests; 300-800 m. Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bhutan, India (Assam, Darjeeling), N Myanmar, Vietnam]"

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
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 26 Jul 2016]	"Native: Asia-Temperate China: China - Guangdong, - Guizhou, - Yunnan, - Guangxi Eastern Asia: Japan - Ryukyu Islands; Taiwan Asia-Tropical Indian Subcontinent: Bhutan; India - Assam, - West Bengal Indo-China: Myanmar; Vietnam"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 26 Jul 2016]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Dave's Garden. 2016. China Doll, Serpent Tree, Emerald Tree - <i>Radermachera sinica</i> . <a href="http://davesgarden.com/guides/pf/go/54477/">http://davesgarden.com/guides/pf/go/54477/</a> . [Accessed 27 Jul 2016]	"Hardiness: USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F)"

Qsn #	Question	Answer
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Slopes and forests; 300-800 m."
	Missouri Botanical Garden. 2016. <i>Radermachera sinica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;</a> . [Accessed 27 Jul 2016]	"Zone: 10 to 12"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Madhukar, V. K., Srivastava, S. K., & Dubey, N. K. (2012). Enumeration of family Bignoniaceae in India. <i>Indian Journal of Forestry</i> , 35(4), 521-534	"Distribution: INDIA: (Arunachal Pradesh, Nagaland). Grows in deciduous forests."
	Wunderlin, R. P., Hansen, B. F., Franck, A. R., Bradley, K. A., & Kunzer, J. M. (2010). Plants new to Florida. <i>Journal of the Botanical Research Institute of Texas</i> , 4(1): 349-355	"Native to subtropical Asia. it is cultivated widely as a houseplant and outdoors in the Old and New world tropics as an ornamental. It is naturalized in Hawaii. This is the first report of it naturalized in the continental United States." ... "Voucher specimen. Miami-Dade Co.: Fire suppressed pine rockland at SW corner of SW 296 St. & 197 Ave., frequent in understory, 25.490747°N, 80.510248°W, 24 Jun 2009, Bradley 2677 (FTG, USF)."
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 26 Jul 2016]	"Native: Asia-Temperate China: China - Guangdong, - Guizhou, - Yunnan, - Guangxi Eastern Asia: Japan - Ryukyu Islands; Taiwan Asia-Tropical Indian Subcontinent: Bhutan; India - Assam, - West Bengal Indo-China: Myanmar; Vietnam"
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. <i>Bishop Museum Occasional Papers</i> 100: 3-12	"Several individuals were found naturalizing on O'ahu in Waimea Botanical Garden along an access road about 150 m from the accessioned tree."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Wunderlin, R. P., Hansen, B. F., Franck, A. R., Bradley, K. A., & Kunzer, J. M. (2010). Plants new to Florida. <i>Journal of the Botanical Research Institute of Texas</i> , 4(1): 349-355	"Native to subtropical Asia. it is cultivated widely as a houseplant and outdoors in the Old and New world tropics as an ornamental. It is naturalized in Hawaii. This is the first report of it naturalized in the continental United States."
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. <a href="http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/">http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/</a> . [Accessed 27 Jul 2016]	" <i>Radermachera pinnata</i> (Blanco) Seemann (Confirmed) Synonyms: Syn. <i>Radermachera fenicis</i> Merrill Common Names: <i>Radermachera</i> First Collected: 1993 Locations: Ho'omaluhia Botanical Garden

Qsn #	Question	Answer
	Dave's Garden. 2016. China Doll, Serpent Tree, Emerald Tree - <i>Radermachera sinica</i> . <a href="http://davesgarden.com/guides/pf/go/54477/">http://davesgarden.com/guides/pf/go/54477/</a> . [Accessed 27 Jul 2016]	Widely planted as an ornamental

301	Naturalized beyond native range	y
	Source(s)	Notes
	Nelson, G. 2010. The Trees of Florida. A Reference and Field Guide. 2nd Edition. Pineapple Press Inc, Sarasota, FL	"China doll or serpent tree ( <i>Radermachera sinica</i> (Hance) Hemsley), an Asian species known in the United States mostly as a house plant, is naturalized in Miami-Dade County. It has the potential to become a tree 30 m tall in subtropical climates."
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	"This species is native to Asia and was previously uncollected as naturalized in the state." ... "Several individuals were found naturalizing on O'ahu in Waimea Botanical Garden along an access road about 150 m from the accessioned tree. Material examined. O'AHU: Waimea Botanical Garden, naturalizing along access road to water treatment facility, ca 150 m from accessioned tree, disturbed site with several pig wallows, tree seedling, ca 0.5 m, no fruit or flowers seen, several small (<1 m tall) seedlings growing along road, 2 m, 25 Jan 2007, D. Frohlich & A. Lau s.n. (BISH 725935)."

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

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

304	Environmental weed	
	Source(s)	Notes
	Caloundra City Council. 2004. Caloundra City Plan. Sunshine Coast Regional Council. <a href="https://www.sunshinecoast.qld.gov.au/">https://www.sunshinecoast.qld.gov.au/</a> . [Accessed 27 Jul 2016]	"Table 11.B Environmental Weeds" [Includes <i>Radermachera sinica</i> . No impacts specified]
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Listed as an environmental weed. Impacts unable to be verified] " <i>Radermachera sinica</i> (Hance) Hemsl. Bignoniaceae Cultivated 201-E"

305	Congeneric weed	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Listed as a weed of unspecified impacts] "Radermachera pentandra Hemsl. Bignoniaceae Cultivated Refs: 4 919-U, 824-N, 823-N, 280-UW"

401	Produces spines, thorns or burrs	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence] "Trees ca. 10 m tall. Petioles, leaf axis, and inflorescences glabrous. Leaves 2(or 3)-pinnately compound; leaf rachis ca. 30 cm; lateral petiolules less than 5 mm, terminal one 1-2 cm; leaflets ovate to ovate-lanceolate, 4-7 X 2-3.5 cm, glabrous, base broadly cuneate, margin entire, apex caudate-acuminate; lateral veins 5 or 6 on each side of midrib."

402	Allelopathic	n
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2016. Personal Communication	Unknown

403	Parasitic	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Trees ca. 10 m tall." [Bignoniaceae. No evidence]

404	Unpalatable to grazing animals	n
	<b>Source(s)</b>	<b>Notes</b>
	Tang, C., Huang, L., Huang, Z., Krzton, A., Lu, C., & Zhou, Q. (2016). Forest seasonality shapes diet of limestone-living rhesus macaques at Nonggang, China. <i>Primates</i> , 57(1), 83-92	[Palatable to macaques] "Table 2 List of the major food species that each accounted for [1 % of all feeding records for rhesus macaques at Nonggang]" [Radermachera sinica - Part(s) eaten = YL young leaf, ML mature leaf, F flower, ST stem, P petiole]
	WRA Specialist. 2016. Personal Communication	Palatability to grazing animals unknown

405	Toxic to animals	n
	<b>Source(s)</b>	<b>Notes</b>
	California Poison Control System. 2009. Know Your Plants. <a href="http://www.calpoison.org/hcp/KNOW%20YOUR%20PLANTS-plant%20list%20for%20CPCS%2009B.pdf">http://www.calpoison.org/hcp/KNOW%20YOUR%20PLANTS-plant%20list%20for%20CPCS%2009B.pdf</a> . [Accessed 27 Jul 2016]	"Table 1. – Nontoxic Plants by Common Name" [Includes Radermachera sinica]

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
	Missouri Botanical Garden. 2016. <i>Radermachera sinica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;</a> . [Accessed 27 Jul 2016]	"Problems - No serious insect or disease problems. Watch for aphids and spider mites on indoor plants."
	Poole, R.T. , Chase, A.R. & Osborne, L.S. 2016. China Doll Production Guide. CFREC-A Foliage Plant Research Note RH-91-11. University of Florida, IFAS, Apopka, FL. <a href="http://mrec.ifas.ufl.edu/fofolnotes/chinadol.htm">http://mrec.ifas.ufl.edu/fofolnotes/chinadol.htm</a> . [Accessed 27 Jul 2016]	A number of fungal pathogens & insect pests are documented for this species.

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	California Poison Control System. 2009. Know Your Plants. <a href="http://www.calpoison.org/hcp/KNOW%20YOUR%20PLANTS-plant%20list%20for%20CPCS%2009B.pdf">http://www.calpoison.org/hcp/KNOW%20YOUR%20PLANTS-plant%20list%20for%20CPCS%2009B.pdf</a> . [Accessed 27 Jul 2016]	"Table 1. – Nontoxic Plants by Common Name" [Includes <i>Radermachera sinica</i> ]
	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
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Slopes and forests; 300-800 m" [No evidence that this tree occurs in fire prone habitat]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Dave's Garden. 2016. China Doll, Serpent Tree, Emerald Tree - <i>Radermachera sinica</i> . <a href="http://davesgarden.com/guides/pf/go/54477/">http://davesgarden.com/guides/pf/go/54477/</a> . [Accessed 27 Jul 2016]	"Sun Exposure: Sun to Partial Shade"

Qsn #	Question	Answer
	Missouri Botanical Garden. 2016. <i>Radermachera sinica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;</a> . [Accessed 27 Jul 2016]	"Sun: Full sun to part shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Dave's Garden. 2016. China Doll, Serpent Tree, Emerald Tree - <i>Radermachera sinica</i> . <a href="http://davesgarden.com/guides/pf/go/54477/">http://davesgarden.com/guides/pf/go/54477/</a> . [Accessed 27 Jul 2016]	"Soil pH requirements: 7.6 to 7.8 (mildly alkaline)"
	Plantman. 2016. Trees - Exotic Evergreen   <i>Radermachera sinica</i> . <a href="http://www.plantman.co.nz/">http://www.plantman.co.nz/</a> . [Accessed 27 Jul 2016]	"Soil Type: Any soil Soil Moisture Requirements: Moist, Well drained"
	Learn 2 Grow. 2016. <i>Radermachera sinica</i> . <a href="http://www.learn2grow.com/plants/radermachera-sinica/">http://www.learn2grow.com/plants/radermachera-sinica/</a> . [Accessed 27 Jul 2016]	"Soils must be rich in organic matter, acidic, and well-draining. This plant does not tolerate frost, alkaline soil and drought,"  "Soil pH - Acidic, Neutral Soil Drainage - Well Drained Soil type- Loam, Sand"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Trees ca. 10 m tall. Petioles, leaf axis, and inflorescences glabrous. Leaves 2(or 3)-pinnately compound; leaf rachis ca. 30 cm; lateral petiolules less than 5 mm, terminal one 1-2 cm; leaflets ovate to ovate-lanceolate, 4-7 X 2-3.5 cm, glabrous, base broadly cuneate, margin entire, apex caudate-acuminate; lateral veins 5 or 6 on each side of midrib."

412	Forms dense thickets	
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	Unknown. No evidence found in native range

501	Aquatic	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Trees ca. 10 m tall." ... "Slopes and forests; 300-800 m."

502	Grass	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 27 Jul 2016]	Family: Bignoniaceae

503	Nitrogen fixing woody plant	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 27 Jul 2016]	Family: Bignoniaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Trees ca. 10 m tall."

601	Evidence of substantial reproductive failure in native habitat	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bhutan, India (Assam, Darjeeling), N Myanmar, Vietnam]." [Widely distributed. No evidence]

602	Produces viable seed	y
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Capsule terete, nodding, angular, ca. 85 X 1 cm; pericarp thin leathery, indistinctly lenticellate; septum terete, slightly compressed. Seeds ellipsoid, including wing ca. 2 cm X 5 mm."
	Dave's Garden. 2016. China Doll, Serpent Tree, Emerald Tree - <i>Radermachera sinica</i> . <a href="http://davesgarden.com/guides/pf/go/54477/">http://davesgarden.com/guides/pf/go/54477/</a> . [Accessed 27 Jul 2016]	"Seed Collecting: Collect seedhead/pod when flowers fade; allow to dry Allow pods to dry on plant; break open to collect seeds"
	Hubbuck, C. 2016. Gardening in the Coastal Southeast - The Genus <i>Radermachera</i> Family Bignoniaceae. <a href="http://southeastgarden.com/radermachera.html">http://southeastgarden.com/radermachera.html</a> . [Accessed 27 Jul 2016]	"This plant is propagated easily by seeds and cuttings."

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

604	Self-compatible or apomictic	
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Inflorescences paniculate, terminal, erect, 25-35 cm; bracts linear-lanceolate, ca. 10 cm, deciduous, bractlets linear, 4-6 cm. Calyx teeth 5, ovate-lanceolate, ca. 12 mm. Corolla white to pale yellow, campanulate-funnelform, 6-8 cm; lobes rounded, ca. 2.5 cm. Stamens 4, didynamous; staminode present, filiform. Ovules 2-rowed. Style exerted; stigma 2-lobed."
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	[Possibly Yes. Only one parent tree identified in the area] "Several individuals were found naturalizing on O'ahu in Waimea Botanical Garden along an access road about 150 m from the accessioned tree."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Murali, K. S., & Sukumar, R. (1994). Reproductive phenology of a tropical dry forest in Mudumalai, southern India. <i>Journal of Ecology</i> , 82(4): 759-767	"Appendix I List of species studied, occurrence, pollination and dispersal modes" [Related taxon <i>Radermachera xylocarpa</i> pollinated by bees]
	Singaravelan, N., Marimuthu, G., & Racey, P. A. (2009). Do fruit bats deserve to be listed as vermin in the Indian Wildlife (Protection) & Amended Acts? A critical review. <i>Oryx</i> , 43(04), 608-613	"TABLE 2 List of plants that are pollinated by the three ubiquitous fruit bats <i>C. sphinx</i> , <i>R. leschenaultii</i> and <i>P. giganteus</i> , and pollination of these plants by other bat species." [Related taxon <i>Radermachera xylocarpa</i> visited and pollinated by fruit bats]
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	[Indicates some effective pollinator is present] Several individuals were found naturalizing on O'ahu in Waimea Botanical Garden along an access road about 150 m from the accessioned tree."

606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	Missouri Botanical Garden. 2016. <i>Radermachera sinica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;</a> . [Accessed 27 Jul 2016]	[Refers to indoor plants. Unknown if natural vegetative reproduction occurs] " Prune as needed to prevent legginess. Propagate by stem cuttings in summer."

607	Minimum generative time (years)	3
	Source(s)	Notes
	Dave's Garden. 2016. China Doll, Serpent Tree, Emerald Tree - <i>Radermachera sinica</i> . <a href="http://davesgarden.com/guides/pf/go/54477/">http://davesgarden.com/guides/pf/go/54477/</a> . [Accessed 27 Jul 2016]	"Great house plant, but be careful about putting in the ground, it grows like a weed here in Carlsbad CA. Mine grew to ~30 feet in about 3-4 years, and it's flowering, and I see a lot of seed pods!"

Qsn #	Question	Answer
701	<b>Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Seeds ellipsoid, including wing ca. 2 cm X 5 mm." [No evidence. Seeds lack means of external attachment]
702	<b>Propagules dispersed intentionally by people</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Missouri Botanical Garden. 2016. <i>Radermachera sinica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;</a> . [Accessed 27 Jul 2016]	"In cultivation in frost free climates, this tree usually grows to a much smaller 25-30' tall. In more temperate climates, China doll has become a very popular foliage houseplant (it rarely produces flowers indoors) which often tops out at 4-6' tall."
703	<b>Propagules likely to disperse as a produce contaminant</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	NatureWatchNZ. 2016. Emerald Tree ( <i>Radermachera sinica</i> ). <a href="http://naturewatch.org.nz/taxa/429214-Radermachera-sinica">http://naturewatch.org.nz/taxa/429214-Radermachera-sinica</a> . [Accessed 27 Jul 2016]	" <i>Radermachera sinica</i> is often sold as a small houseplant, grown for its attractive glossy leaves; it does not normally flower indoors."
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Trees ca. 10 m tall." ... "Seeds ellipsoid, including wing ca. 2 cm X 5 mm." [No evidence. Unlikely. A wind-dispersed tree cultivated as a house plant. Unlikely to reach maturity indoors & not cultivated with produce]
704	<b>Propagules adapted to wind dispersal</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Winged seeds] "Capsule terete, nodding, angular, ca. 85 X 1 cm; pericarp thin leathery, indistinctly lenticellate; septum terete, slightly compressed. Seeds ellipsoid, including wing ca. 2 cm X 5 mm."
705	<b>Propagules water dispersed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Ability to float unknown] "capsule terete, nodding, angular, ca. 85 X 1 cm; pericarp thin leathery, indistinctly lenticellate; septum terete, slightly compressed. Seeds ellipsoid, including wing ca. 2 cm X 5 mm."
	New Zealand Plant Conservation Network. 2016. Flora Details - <i>Radermachera pentandra</i> . <a href="http://www.nzpcn.org.nz/flora_details.aspx?ID=4182">http://www.nzpcn.org.nz/flora_details.aspx?ID=4182</a> . [Accessed 27 Jul 2016]	[Related taxon shares similarities in seed morphology. It may be possible that <i>R. sinica</i> seeds also float on water] "Dispersal Gravity and wind dispersed, possibly floats on water"
706	<b>Propagules bird dispersed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Datta, A., & Rawat, G. S. (2008). Dispersal modes and spatial patterns of tree species in a tropical forest in Arunachal Pradesh, northeast India. <i>Tropical Conservation Science</i> , 1(3): 163-185	[Winged seeds, but identified as consumed & potentially dispersed by doves] "Appendix 1. List of identified tree species, fruit type and color, dispersal mode, major consumers and tree density (trees per ha). A total of 158 tree species are listed, of which 128 were represented in 21 vegetation plots and classified based on dispersal mode, 30 additional species were not recorded in sample plots, but observed to be consumed by animals" [Radermachera sinica - Dispersal mode = Birds; Known consumers and/or dispersers = Bar-tailed cuckoo dove]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Seeds ellipsoid, including wing ca. 2 cm X 5 mm." [No evidence. No means of external attachment]

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Tang, C., Huang, L., Huang, Z., Krzton, A., Lu, C., & Zhou, Q. (2016). Forest seasonality shapes diet of limestone-living rhesus macaques at Nonggang, China. <i>Primates</i> , 57(1), 83-92	"Table 2 List of the major food species that each accounted for [1 % of all feeding records for rhesus macaques at Nonggang]" [Radermachera sinica - Part(s) eaten = YL young leaf, ML mature leaf, F flower, ST stem, P petiole. No evidence of fruit or seed consumption]
	Datta, A., & Rawat, G. S. (2008). Dispersal modes and spatial patterns of tree species in a tropical forest in Arunachal Pradesh, northeast India. <i>Tropical Conservation Science</i> , 1(3): 163-185	[Winged seeds, but identified as consumed & potentially dispersed by doves] "Appendix 1. List of identified tree species, fruit type and color, dispersal mode, major consumers and tree density (trees per ha). A total of 158 tree species are listed, of which 128 were represented in 21 vegetation plots and classified based on dispersal mode, 30 additional species were not recorded in sample plots, but observed to be consumed by animals" [Radermachera sinica - Dispersal mode = Birds; Known consumers and/or dispersers = Bar-tailed cuckoo dove]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Trees ca. 10 m tall." ... "Seeds ellipsoid, including wing ca. 2 cm X 5 mm." [Unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

803	Well controlled by herbicides	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

<b>804</b>	<b>Tolerates, or benefits from, mutilation, cultivation, or fire</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Missouri Botanical Garden. 2016. <i>Radermachera sinica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277931&amp;isprofile=0&amp;</a> . [Accessed 27 Jul 2016]	"Prune as needed to prevent legginess." [Tolerates some pruning]
	WRA Specialist. 2016. Personal Communication	Unknown

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

**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Grows in tropical climates
- Naturalized on Oahu, Hawaiian Islands & in Florida
- Cited as an environmental weed (but no impacts specified)
- Reproduces by seeds
- Seeds dispersed by wind, possibly birds & intentionally by people
- Reaches maturity in 3+ years
- Limited ecological information limits accuracy of risk prediction

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Ornamental
- May have limited shade tolerance

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Unknown. Not known to form dense stands. Described as growing in full sun to partial shade, but may be able to establish in Hawaiian forests with higher light levels in understory

(B) Bird or clearly wind-dispersed?> Dispersed by wind & possibly by birds

(C) Life cycle <4 years? Yes. Reaches maturity in 3+ years

Outcome = Evaluate