Taxon: Clerodendrum thomsoniae Balf. **Family:** Verbenaceae

Common Name(s): bagflower
bleeding glory bower
bleeding heart vine
glorytree

Synonym(s): Clerodendrum balfourii (B.D.Jacks. ex

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 14 Jun 2019

WRA Score: 9.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Tropical Climber, Weedy, Spreads Vegetatively, Bird-Dispersed, Resprouts

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)	y
303	Agricultural/forestry/horticultural weed		
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
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	y=1, n=-1	n
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)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	y
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		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
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	y=-1, n=1	y
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**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	[Widely cultivated as an ornamental, but no evidence of domestication] "Distribution and habitat. Clerodendrum thomsonae is a western African species that ranges from Senegal to Zaire. It has been collected throughout Mesoamerica."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). 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. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Jun 2019]	"Native Africa WEST-CENTRAL TROPICAL AFRICA: Cameroon, Democratic Republic of the Congo WEST TROPICAL AFRICA: Ghana, Mali, Nigeria, Senegal, Sierra Leone"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Jun 2019]	

203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Dave's Garden. (2019). Clerodendrum Species, Bleeding Heart Vine, Glory Bower, Tropical Bleeding Heart - Clerodendrum thomsoniae. https://davesgarden.com/guides/pf/go/506/. [Accessed 7 Jun 2019]	"Hardiness: USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"

Qsn #	Question	Answer
	Missouri Botanical Garden. (2019). Clerodendrum thomsoniae . http://www.missouribotanicalgarden.org. [Accessed 7 Jun 2019]	"Zone: 10 to 12"
	Tropicos.org. 2019. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 7 Jun 2019]	Collected from elevations of 5 m to 900 m elevation, and latitudes from 01°36'10"N to 18°29'00"N

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Jun 2019]	"Native Africa WEST-CENTRAL TROPICAL AFRICA: Cameroon, Democratic Republic of the Congo WEST TROPICAL AFRICA: Ghana, Mali, Nigeria, Senegal, Sierra Leone"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"C. thomsoniae is a vine which is native to western Africa but has been widely cultivated in tropics and subtropics around the world, and is known to be naturalized in many introduced places including the Guiana Shield, Belize, the United States, the Galapagos Islands, and Australia (Funk et al., 2007; Randall, 2012)."

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"C. thomsoniae is a vine which is native to western Africa but has been widely cultivated in tropics and subtropics around the world, and is known to be naturalized in many introduced places including the Guiana Shield, Belize, the United States, the Galapagos Islands, and Australia (Funk et al., 2007; Randall, 2012). The species is listed in the Global Compendium of Weeds as an environmental weed (Randall, 2012) but does not appear to be a Clerodendrum species with high risk of introduction based on current evidence."
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Jun 2019]	"Naturalized (widely natzd. in tropics & subtropics)"

302	Garden/amenity/disturbance weed	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[A weed with potential negative environmental impacts] "C. thomsoniae has minor negative environmental impacts but could increase if not monitored. It is listed as an environmental weed in Australia (Randall, 2012). Its roots can spread as far as 15 feet (Missouri Botanical Garden, 2014) and the species can propagate by both seed and root cuttings (Royal Horticultural Society, 2014). So far, however, there is little evidence that this species has caused significant damage to the native flora in places where it has been introduced and, in some cases naturalized."
	Dave's Garden. (2019). Clerodendrum Species, Bleeding Heart Vine, Glory Bower, Tropical Bleeding Heart - Clerodendrum thomsoniae. https://davesgarden.com/guides/pf/go/506/. [Accessed 7 Jun 2019]	Several negative reviews by growers describe the weedy and aggressive tendencies of this plant in the landscape, especially in Florida. The following are a selection of quotes from their posts: "On Sep 17, 2012, gardenpackrat from Tampa, FL wrote:… the red/white has been very aggressive and spreads underground through out my yard. It is lovely on the fence but really needs to be contained in zone 9. Plant with care!" … "On May 7, 2011, tampabay1 from Safety Harbor, FL wrote:… Recommend you only plant it where new underground growth can be mown down. Underground roots are as invasive as passion flower, or starburst clerodendron. "… "On Oct 11, 2008, lauraroxie from Saint Petersburg, FL wrote:… This thing is horrible. impossible to kill. Apparently a neighbor had it. It destroyed a hedge i had. I removed the hedge and poured undiluted roundup directly into the leaves and directly into some stems where i had chopped it. it didnt even blink." … "On Aug 8, 2005, sugarweed from Taylor Creek, FL (Zone 10a) wrote:… This is really a thug in Floridas sandy soil. I don't know if it spreads in clay as easily, but in sandy soil it's akin to Wisteria and Vinca. Don't put this in the ground in Florida without expecting it to go wild. It's trying to eat my backyard!" … "On Aug 7, 2005, RoyRogers from Tampa, FL (Zone 9b) wrote:… I have the red/pink variety and I have begun to consider it a noxious weed. The "running" of the underground rhizomes reminds me of temperate (running) bamboo. I have new pieces popping up in the middle of my lawn some 20 feet away from main plant. It comes up in the middle of my other flower beds. I have it growing in the shade in the backyard and I have spent all Summer digging all the little pieces out of the ground. When I think I have it all dug out, then another piece pops up"

Qsn #	Question	Answer
303	**Agricultural/forestry/horticultural weed**	
	Source(s)	**Notes**
	Tachie–Menson, J. W. (2012). Studies on the Contribution of Weeds and their Management to the Prevalence of Pineapple Mealybugs. Thesis. Department of Crop Science, University of Cape Coast, Ghana	[Potentially. Regarded as a crop weed within its native range. Requires removal for crop planting] "4.1.2 Species composition of weeds in pineapple fields in the Districts surveyed Table 4.2 shows the species composition of weeds in the three Districts surveyed." [Includes Clerodendrum thomsoniae] … Most farmers in the Mfantsiman District do not have access to heavy duty machines and hence often clear the land by the slashing and burning. The remaining stumps are hardly gotten rid off, hence it is clear that the dominant weeds are woody perennial weeds like Baphia nitida, Clerodendrum thomsoniae, Lantana camara, Malotus oppositifolius and Chromolaena odorata, with a few perennial grasses such as Panicum maximum."

304	**Environmental weed**	
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Potentially] "C. thomsoniae has minor negative environmental impacts but could increase if not monitored. It is listed as an environmental weed in Australia (Randall, 2012). Its roots can spread as far as 15 feet (Missouri Botanical Garden, 2014) and the species can propagate by both seed and root cuttings (Royal Horticultural Society, 2014). So far, however, there is little evidence that this species has caused significant damage to the native flora in places where it has been introduced and, in some cases naturalized."

305	**Congeneric weed**	**y**
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"C. chinense is a highly invasive weed in tropical and subtropical ecosystems. " … "C. indicum is a small shrub which is listed in the Global Compendium of Weeds as 'environmental weed', 'naturalised', and 'weed' (Randall, 2012)." … "C. speciosissimum is an attractive shrub or subshrub listed as an environmental weed, naturalized weed, and cultivation escape" … "C. quadriloculare is a highly invasive perennial shrub."

Qsn #	Question	Answer
401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	[No evidence] "Shrub 2-2.5 m tall; branchlets tetragonal, medullose, puberulent, lenticellate; leaf scars often circular, corky, elevated. Leaves decussate-opposite; blades elliptic or elliptic-ovate, 4-13 cm long, 2- 6 cm wide, base rounded or subacute, apex acuminate or short-acuminate, margin entire, ciliate, puberulent on both surfaces; midrib puberulent, secondaries 5-7 pairs, the lowest pair issuing palmately from the leaf base; petioles 0.5-3 cm long, puberulent. Inflorescences axillary, cymose, puberulent, 5-13 cm long, 5-15 cm wide, individual cymes 5-9 cm long, 4-8.5 cm wide, often trichotomous first and then dichotomous; peduncles 2-6 cm long, puberulent; bracteoles and prophylls · linear, 2-11 mm long, puberulent."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Shrub 2-2.5 m tall; branchlets tetragonal, medullose, puberulent, lenticellate; leaf scars often circular, corky, elevated." [Lamiaceae. Nc evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Kavana, P. Y., & Kakengi, V. A. M. (2014). Availability of pasture for domestic and wild herbivores in grazing land of Mpanda Tanzania. Livestock Research for Rural Development, 26(2): 1-8	"A study was conducted to assess feed resource base for domestic and wild herbivores in grazing lands of Mpanda district. Forage samples were taken from various grazing lands in wet and dry seasons." … "A list of edible plant species recorded include: … Clerodendrum thomsoniae"

Qsn #	Question	Answer
405	**Toxic to animals**	**n**
	Source(s)	**Notes**
	Gardenersworld.com (2019). Clerodendrum thomsoniae. https://www.gardenersworld.com/plants/clerodendrum-thomsoniae/. [Accessed 7 Jun 2019]	"Clerodendrum thomsoniae has no toxic effects reported. No reported toxicity to: No reported toxicity to Birds No reported toxicity to Cats No reported toxicity to Dogs No reported toxicity to Horses No reported toxicity to Livestock No reported toxicity to People "
	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

406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	Khan, M. A., & Maxwell, D. P. (1975). Serological indexing procedure for the detection of tobacco ringspot virus in Clerodendrum thomsoniae. Plant Disease Reporter, 59(9), 754-758	"Abstract : A serological technique for indexing C. thomsoniae for the presence of TRSV included precipitation of the virus from n-butanol:chloroform clarified plant sap by the addition of polyethylene glycol and NaCl to final concs. of 10% and 0.3 M, respectively. The precipitated material was resuspended in 0.03 M potassium phosphate buffer, pH 7 and used as an antigen in an agar-gel double diffusion test. This technique was more sensitive and reliable than indexing crude sap directly on the local lesion host, cowpea. "
	Missouri Botanical Garden. (2019). Clerodendrum thomsoniae . http://www.missouribotanicalgarden.org. [Accessed 7 Jun 2019]	"Watch for mealybugs and spider mites." [General pests common to many plants]

407	**Causes allergies or is otherwise toxic to humans**	**n**
	Source(s)	**Notes**
	Gardenersworld.com (2019). Clerodendrum thomsoniae. https://www.gardenersworld.com/plants/clerodendrum-thomsoniae/. [Accessed 7 Jun 2019]	"Clerodendrum thomsoniae has no toxic effects reported. No reported toxicity to: No reported toxicity to Birds No reported toxicity to Cats No reported toxicity to Dogs No reported toxicity to Horses No reported toxicity to Livestock No reported toxicity to People "
	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

408	**Creates a fire hazard in natural ecosystems**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"C. thomsoniae is native to tropical western Africa and is cultivated in humid tropical and subtropical climates around the world. The species prefers partial shade and moist but well-drained soil." [No evidence and unlikely, given partially shaded, moist habitats]
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Clerodendrum thomsonae is a western African species that ranges from Senegal to Zaire. It has been collected throughout Mesoamerica." [Found in tropical regions. Fire ecology unknown]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	The Royal Horticultural Society. (2019). Clerodendrum thomsoniae - bleeding glory bower. https://www.rhs.org.uk. [Accessed 14 Jun 2019]	"Grow under glass in loam-based potting compost in full light with shade from hot sun and good ventilation in the summer."
	George, S. 2009. Ornamental Plants. New India Publishing, New Delhi, India	"Plants are evergreens having a twining habit adapted to partially shaded situations."
	Missouri Botanical Garden. (2019). Clerodendrum thomsoniae . http://www.missouribotanicalgarden.org. [Accessed 14 Jun 2019]	"Sun: Part shade"
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Tolerant of shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Echter's Plant Finder. (2019). Bleeding Heart Vine - Clerodendrum thomsoniae. http://plants.echters.com. [Accessed 14 Jun 2019]	"It is not particular as to soil type or pH; an average potting soil should work just fine."
	Rauch, F.D. & Weissich, P.R. 2000. Plants for Tropical Landscapes: A Gardener's Guide. University of Hawaii Press, Honolulu, HI	"It performs best in full sun in a rich, loose, moist soil."
	The Royal Horticultural Society. (2019). Clerodendrum thomsoniae - bleeding glory bower. https://www.rhs.org.uk. [Accessed 14 Jun 2019]	"Soil - Loam, Clay, Sand pH - Acid, Alkaline, Neutral"

411	Climbing or smothering growth habit	y
	Source(s)	**Notes**
	Burke, D. 2005. The Complete Burke's Backyard: The Ultimate Book of Fact Sheets. Murdoch Books, Millers Point, Australia	"Evergreen twiner native to western tropical Africa. reaching to about 3 m (10 ft) in height." … "Non-invasive climber for a fence, pergola or trellis"
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Shrub 2-2.5 m tall; branchlets tetragonal, medullose, puberulent, lenticellate; leaf scars often circular, corky, elevated."
	George, S. 2009. Ornamental Plants. New India Publishing, New Delhi, India	[Twining in shady conditions] "Plants are evergreens having a twining habit adapted to partially shaded situations."

Qsn #	Question	Answer
412	**Forms dense thickets**	**n**
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Slightly woody vine, twining, attaining 3-7 m in length." [No evidence to date]

501	Aquatic	n
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	[Terrestrial] "Shrub 2-2.5 m tall; branchlets tetragonal, medullose, puberulent, lenticellate; leaf scars often circular, corky, elevated."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Jun 2019]	Family: Lamiaceae Subfamily: Ajugoideae Alternate family(ies): Verbenaceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Jun 2019]	Family: Lamiaceae Subfamily: Ajugoideae Alternate family(ies): Verbenaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Shrub 2-2.5 m tall; branchlets tetragonal, medullose, puberulent, lenticellate; leaf scars often circular, corky, elevated."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 14 Jun 2019]	[No evidence] "Native Africa WEST-CENTRAL TROPICAL AFRICA: Cameroon, Democratic Republic of the Congo WEST TROPICAL AFRICA: Ghana, Mali, Nigeria, Senegal, Sierra Leone Cultivated (widely cult. in tropics & subtropics) Naturalized (widely natzd. in tropics & subtropics)"

Qsn #	Question	Answer
602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"C. thomsoniae is chiefly spread internationally for ornamental purposes, and can be propagated by seeds, semi-hardwood, and root cuttings"
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong"

603	**Hybridizes naturally**	
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Many species seem to be closely related, with some hybridization reported. Some of the species are extremely variable, due to environmental factors and horticultural selection, which has led taxonomists to describe many taxa." [Unknown for Clerodendrum thomsoniae]

604	**Self-compatible or apomictic**	
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Flowers with calyx globose, coarse, ± pentagonal, 1.5-2 cm long, puberulent, 5-lobed, lobes ovate, 1-1.8 cm long, acuminate; corolla hypocrateriform, dark red to scarlet, externally glandular puberulent, internally puberulent, tube ca. 2.5 cm long, limb 5-lobed, ca. 1 cm wide, lobes oblong-elliptic, 5-9 mm long, obtuse or acute; stamens 4, filaments long-exserted, ca. 1.5 cm beyond the throat of the corolla tube, 2-2.2 cm long; ovary oblong, style filiform 2.9-3.2 cm long, exserted, shorter or equal to the stamens."
	Sargent, R. D., & Otto, S. P. (2004). A phylogenetic analysis of pollination mode and the evolution of dichogamy in angiosperms. Evolutionary Ecology Research, 6(8), 1183-1199	"Two forms of dichogamy exist: protandry, in which pollen dispersal precedes stigma receptivity, and protogyny, in which the reverse occurs. " … "protandry, when combined with particular inflorescence architectures and stereotypical pollinator behaviour, may be an adaptation that reduces self-pollination among flowers" … "Appendix … Clerodendrum thomsoniae - Type of dichogamy = Protandry" [Unknown, but protandry may minimize or prevent self-pollination]

605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Sargent, R. D., & Otto, S. P. (2004). A phylogenetic analysis of pollination mode and the evolution of dichogamy in angiosperms. Evolutionary Ecology Research, 6(8), 1183-1199	"Appendix … Primary pollinator - Bee/fly"
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Pollination in Clerodendrum is mostly carried out by butterflies, moths, and bees, which extract the nectar from the base of the corolla tube."

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**y**
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Although the species reportedly can spread up to 15 feet (Missouri Botanical Garden, 2014) it does not spread as vigorously as some other vine species and can be controlled (Floridata, 2014)."
	Dave's Garden. (2019). Clerodendrum Species, Bleeding Heart Vine, Glory Bower, Tropical Bleeding Heart - Clerodendrum thomsoniae. https://davesgarden.com/guides/pf/go/506/. [Accessed 14 Jun 2019]	"On Jul 8, 2006, ShelfLife from Clearwater, FL (Zone 9b) wrote: The place you DON'T want this plant is near wooden walkways, porches, or any structure with cracks and crevices. Because as sure as this plant is a crowd pleaser (and its blooms last FOREVER), it's also very naughty about sending out runners and shoots and popping up in unwanted places... and in our climate (Zone 9b, sandy soil), it's nigh on impossible to kill."

607	**Minimum generative time (years)**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Time to maturity unknown, but may be able to sucker & reproduce vegetatively prior to first production of viable seeds

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong;" [Bird-dispersed. Fruit & seeds lack means of external attachment]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 14 Jun 2019]	"Cultivated (widely cult. in tropics & subtropics) Naturalized (widely natzd. in tropics & subtropics)"

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong;" [No evidence. Bird-dispersed]

Qsn #	Question	Answer
704	**Propagules adapted to wind dispersal**	**n**
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong;" [No evidence. Bird-dispersed]

705	Propagules water dispersed	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown. Possible that fruit or stem fragments could be moved by water if plants are cultivated in riparian areas.

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Birds are also possible dispersal vectors, as the seeds are encased in small, red berries; colour has been attributed to the dispersal syndrome and brightly coloured fruits would be more attractive to birds (Pijl, 1982; Chiarini and Barboza, 2009)."
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"The fruits of Clerodendrum species are eaten by birds, which disperse the seeds (Moldenke, 1985)." … "Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong;"

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"The fruits of Clerodendrum species are eaten by birds, which disperse the seeds (Moldenke, 1985)." … "Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong;" [No evidence. No means of external attachment]

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	"The fruits of Clerodendrum species are eaten by birds, which disperse the seeds (Moldenke, 1985)." … "Fruit drupaceous, covered by the calyx, 2.3 cm long, round or depressed-globose, 10-14 mm long and wide, glossy black, 2-bilobed; seeds oblong;" [Presumably yes]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Rueda, R. M. (1993). The genus Clerodendrum (verbenaceae) in Mesoamerica. Annals of the Missouri Botanical Garden, 80(4): 870-890	[Genus] "The seeds may be 4, as in most Verbenaceae, or (by abortion) sometimes only 1-3." [Unlikely. Densities unknown]

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2019) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed]	Unknown for Clerodendrum thomsoniae. Other species have orthodox seeds

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	Dave's Garden. (2019). Clerodendrum Species, Bleeding Heart Vine, Glory Bower, Tropical Bleeding Heart - Clerodendrum thomsoniae. https://davesgarden.com/guides/pf/go/506/. [Accessed 14 Jun 2019]	[Anecdotal reports that Roundup is not effective] "On Oct 11, 2008, lauraroxie from Saint Petersburg, FL wrote: This thing is horrible. impossible to kill. Apparently a neighbor had it. It destroyed a hedge i had. I removed the hedge and poured undiluted roundup directly into the leaves and directly into some stems where i had chopped it. it didnt even blink. " ... "On Jul 20, 2005, user833894 from Odessa, FL wrote: ... Anywhere there was a piece of root left in the ground it has come back up. I just can't kill it. It laughs at Round Up."
	Swarbrick, J.T. 1997. Weeds of the Pacific Islands. Technical paper no. 209. South Pacific Commission, Noumea, New Caledonia	[Control methods for C. chinense would likely be effective on C. thomsoniae] "Probably susceptible to: 1) foliar application of arboricides such as picloram, metsulfuron methyl, glyphosate and triclopyr at standard rates and dilutions; 2) cut-stump application of the same herbicides; 3) soil application of hexazinone, karbutilate, fluroxypyr and bromacil at standard rates"
	Englberger, K. 2009. Invasive weeds of Pohnpei: A guide for identification and public awareness. Conservation Society of Pohnpei, Kolonia, FM	[Control methods for C. chinense would likely be effective on C. thomsoniae] "Young plants can be sprayed by a herbicide such as triclopyr (Garlon 4). Undiluted herbicide can be applied to the cut stems of larger plants with woody stems"
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	[Control methods for C. chinense would likely prove effective on C. thomsoniae] "A little work done suggests hormone-type herbicides in timely repeat applications will control this weed"
	Waterhouse, D.F. 1993. Biological control: Pacific prospects. Supplement 2. Australian Centre for International Agricultural Research, Canberra, Australia	[Herbicides provide effective control for C. chinense. Likely would be effective on C. thomsoniae] "No detailed screening of herbicides has been carried out, although 2,4,5-T, or the more expensive Tordon 520 Brushkiller, are suggested as possible herbicides for Western Samoa. More recently a mixture of dicamba and 2,4-D has proved effective. Work carried out in Western Samoa has also shown that metsulfuron methyl ester produces effective control. It has been recommended that the plants be cut and the new growth sprayed. When herbicides were applied in Western Samoa to regrowth four weeks after it had been slashed to the ground, glyphosate partially destroyed the foliage, but complete regrowth had occurred by 4 to 6 weeks after application. Treatment with 2,4,5-T resulted in complete kill of foliage, but 5 to 15% of the plants had regrown after 8 weeks"

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Dave's Garden. (2019). Clerodendrum Species, Bleeding Heart Vine, Glory Bower, Tropical Bleeding Heart - Clerodendrum thomsoniae. https://davesgarden.com/guides/pf/go/506/. [Accessed 14 Jun 2019]	[Resprouts after repeated cutting] "On Jul 20, 2005, user833894 from Odessa, FL wrote: I live just north of Tampa in zone 9a but do to my forest of pine trees and proximity to a large pond I don't get temperatures lower than about 30. We bought this house one year ago and it had been abandon. There were lots and lots of this vine covering everything very pretty but way to much. It seem to have been started in one spot and then spread by underground runners everywhere. It had also forced it's way under my rock facade on the side of the house and when pulled loose down came the rocks too. I cut it way back to one spot and it came back very fast. I dug it up and took about a 4 square foot area of roots and move it out to a pasture fence were there was more of it growing. Anywhere there was a piece of root left in the ground it has come back up."
	Missouri Botanical Garden. (2019). Clerodendrum thomsoniae . http://www.missouribotanicalgarden.org. [Accessed 14 Jun 2019]	[Tolerates heavy pruning] "Do not be afraid to prune severely. Thin out old, overcrowded shoots and any other far-reaching growth to keep the vine in bounds. "

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Grows well in tropical climates
• Widely naturalized in the tropics and subtropics (but no evidence in the Hawaiian Islands to date)
• Regarded by some growers as an aggressive and weedy landscaping plant
• Other Clerodendrum species are invasive
• Tolerates many soil types
• Grows as both a shrub and a climber, with potential to overtop or smother other vegetation
• Reproduces by seeds and vegetatively by runners
• Seeds dispersed by birds and intentionally by people
• Able to regrow following sever pruning and repeated cutting

Low Risk Traits
• Although regarded as an aggressive and weedy landscaping plant by some, other growers regard it as a desirable, and non-invasive landscaping plant
• Unarmed (no spines, thorns, or burrs)
• Non-toxic
• Herbicides effective at controlling other Clerodendrum species would likely be effective at controlling Clerodendrum thomsoniae if necessary