

Taxon: <i>Brownea grandiceps</i> Jacq.	Family: Fabaceae
Common Name(s): rose of Venezuela scarlet flame bean	Synonym(s): <i>Brownea amplibracteata</i> Pittier <i>Brownea araguensis</i> Pittier <i>Brownea ariza</i> Lindl. & Paxton <i>Hermesias grandiceps</i> (Jacq.) Kuntze

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 7 Apr 2022
WRA Score: -5.0	Designation: L	Rating: Low Risk

Keywords: Tropical Tree, Shade-Tolerant, N-Fixing, Slow Growing, Water-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	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	n=0, y = 1*multiplier (see Appendix 2)	n
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	y=1, n=0	y
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	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	y
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	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
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	y=1, n=-1	y
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
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
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	[No evidence of domestication] "Distribution and ecology. Widely distributed in the northwestern part of South America from Venezuela to Peru; in Amazonian Ecuador at elevations from 10-950 m. (Fig. 5). <i>B. grandiceps</i> grows in understory rain forests (igapo, varzea, and terra firme forests). "

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2022). 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, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 6 Apr 2022]	"Native Southern America NORTHERN SOUTH AMERICA: Venezuela (Aragua, Carabobo, Distrito Federal, Yaracuy) WESTERN SOUTH AMERICA: Colombia, Ecuador, Peru"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 6 Apr 2022]	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Distribution and ecology. Widely distributed in the northwestern part of South America from Venezuela to Peru; in Amazonian Ecuador at elevations from 10-950 m."
	The National Gardening Association. (2022). Rose of Venezuela (<i>Brownea grandiceps</i>). https://garden.org/plants/view/116201/Rose-of-Venezuela-Brownea-grandiceps/ . [Accessed 6 Apr 2022]	"Minimum cold hardiness: Zone 11 +4.4 °C (40 °F) to +7.2 °C (50 °F) Maximum recommended zone: Zone 12"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Distribution and ecology. Widely distributed in the northwestern part of South America from Venezuela to Peru; in Amazonian Ecuador at elevations from 10-950 m."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[The cited references do not indicate that this species is a cultivation escape, naturalized, or a weed in the Philippines or India] " <i>Brownea grandiceps</i> Jacq. Fabaceae - Caesalpinioideae Total N° of Refs: 2 Habit: Tree Preferred Climate/s: Subtropical, Tropical Origin: S Am Major Pathway/s: Herbal, Ornamental Dispersed by: Humans References: Philippines-nC-1099, India-W- 1977."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"The species <i>Brownea coccinea</i> , <i>B. grandiceps</i> , and <i>B. macrophylla</i> are widely used as ornamentals"

301	Naturalized beyond native range	n
	Source(s)	Notes

Qsn #	Question	Answer
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[The cited references do not indicate that this species is a cultivation escape, naturalized, or a weed in the Philippines or India] "Brownea grandiceps Jacq. Fabaceae - Caesalpiniaaceae Total N° of Refs: 2 Habit: Tree Preferred Climate/s: Subtropical, Tropical Origin: S Am Major Pathway/s: Herbal, Ornamental Dispersed by: Humans References: Philippines-nC-1099, India-W- 1977."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No confirmed evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No confirmed evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No confirmed evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Global Invasive Species Database (2022). http://www.iucngisd.org/gisd/ . [Accessed 6 Apr 2022]	No evidence

Qsn #	Question	Answer
305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No confirmed evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Global Invasive Species Database (2022). http://www.iucngisd.org/gisd/ . [Accessed 6 Apr 2022]	No evidence

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Roth, I., & Lindorf, H. (2002). South American Medicinal Plants: Botany, Remedial Properties and General Use. Springer-Verlag, Berlin Heidelberg	[No evidence] " <i>Brownea grandiceps</i> JACQ. (<i>rosa de montafta</i> , <i>rosa de Venezuela</i>) is a small tree or shrub 3-8 m high, with simply pinnate leaves, 5-45 cm long, having 5-15 pairs of pinnae. The fruits are large legumes, about 25 cm long and coriaceous. The inflorescences are head-shaped and large, about 10-15cm in diameter. The flowers are of a showy red."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Pittier, H. (1916). New Or Noteworthy Plants from Colombia and Central America, 2. Contributions from the United States National Herbarium Volume 18, Part 4. Government Printing Office, Washington, D.C.	"A tree varying in stature from 3 to 20 meters" [No evidence. Fabaceae]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Palatability to grazing animals unknown [although possibly palatable based on information from other species]

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Brownea grandiceps</i> . https://tropical.theferns.info/viewtropical.php?id=Brownea+grandiceps . [Accessed 6 Apr 2022]	"Known Hazards None known"
	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
	GardensOnline. (2022). <i>Brownea grandiceps</i> . https://www.gardensonline.com.au . [Accessed 7 Apr 2022]	"Diseases: None of note."
	WRA Specialist. (2022). Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Brownea grandiceps</i> . https://tropical.theferns.info/viewtropical.php?id=Brownea+grandiceps . [Accessed 6 Apr 2022]	"Known Hazards None known"
	Roth, I., & Lindorf, H. (2002). South American Medicinal Plants: Botany, Remedial Properties and General Use. Springer-Verlag, Berlin Heidelberg	[Members of genus used medicinally] " <i>Brownea</i> is an ornamental with beautiful headed inflorescences. Flowers are used as a vomitive and to cure bleeding and excessive menstruation. Twigs and bark are contraceptive."
	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
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Widely distributed in the northwestern part of South America from Venezuela to Peru; in Amazonian Ecuador at elevations from 10-950 m. (Fig. 5). <i>B. grandiceps</i> grows in understory rain forests (igap6, varzea, and terra firme forests)." [No evidence. Unlikely. Does not occur in fire prone ecosystems]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes

Qsn #	Question	Answer
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	" <i>B. grandiceps</i> grows in understory rain forests (igapo, varzea, and terra firme forests)." [Presumably shaded environments]
	Stebbins, M. (1999). <i>Flowering Trees of Florida</i> . Pineapple Press Inc., Sarasota, FL	" <i>Brownea</i> grows in semi-shaded or shaded areas"
	Roth, I., & Lindorf, H. (2002). <i>South American Medicinal Plants: Botany, Remedial Properties and General Use</i> . Springer-Verlag, Berlin Heidelberg	"Its radical system is profound and its life span long. But it needs shade below other trees (HOYOS 1978)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	GardenTags. (2022). <i>Brownea grandiceps</i> . Rose of Venezuela. https://www.gardentags.com . [Accessed 7 Apr 2022]	"ph 5.5 - 7.3 Acid - Neutral" ... "Plant Rose of Venezuela in moist but free-draining acid or neutral soil that has had organic matter added to it, in a sheltered sunny or sunny with dappled shade site."
	Asean Plant Export. (2022). <i>Brownea grandiceps</i> . https://www.aseanplantexport.com . [Accessed 7 Apr 2022]	"Soil : well drained, rich soil"
	Plant This. (2022). <i>Brownea grandiceps</i> . http://www.plantthis.com.au . [Accessed 7 Apr 2022]	"Soil: enriched soil, mildly acidic to mildly alkaline"
	GardensOnline. (2022). <i>Brownea grandiceps</i> . https://www.gardensonline.com.au . [Accessed 7 Apr 2022]	"Soil: Grow Rose of Venezuela in fertile, consistently moist soil in a location with partial sun to dappled shade. The addition of plenty of organic matter prior to planting will be appreciated, as will a good layer of mulch to maintain moisture - they do not like drying out and thrive in humid conditions."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Tree or slender shrub, height 3-8(-15) m. Leaves with rachis with 4 longitudinal furrows and corky lenticels, epidermis with a waxy coat, glabrous or f tomentose, dark brown to red; petiole with sparse, corky lenticels, glabrous or f tomentose; rachis + petiole 41-54 cm long."

412	Forms dense thickets	n
	Source(s)	Notes
	Valencia, R. et al. (2004). Tree species distributions and local habitat variation in the Amazon: large forest plot in eastern Ecuador. <i>Journal of Ecology</i> , 92(2), 214-229	"Table 5 Dominant species in four different habitats of the Yasuni 25-ha plot, based on abundance ≥ 10 mm d.b.h." [<i>Brownea grandiceps</i> recorded at a density of 91.0 trees per hectare in Valley habitats. Common, but not monoculture-forming]

Qsn #	Question	Answer
	Pitman, N. C. et al. (2001). Dominance and distribution of tree species in upper Amazonian terra firme forests. <i>Ecology</i> , 82(8), 2101-2117	[A common tree, but not reported to form dense or pure stands] "In practical terms, this means that a hectare established anywhere in the thousands of square kilometers of terra firme forest around our tree plots in Ecuador is not only virtually assured of containing <i>Iriartea deltoidea</i> , <i>Matisia ochrocalyx</i> sensu latu, <i>Brownea grandiceps</i> , and dozens of other common species—it is also more likely than not to contain them at densities of .1 individual/ha."
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	[Forms stands, but no indication that these are monotypic or competitively exclude other tree species] "B. <i>grandiceps</i> grows in understorey rain forests (igap6, varzea, and terra firme forests). Trees often form stands along rivers, which may indicate that the seeds are water dispersed, as observed by Kubitzki (1985) in the related genera <i>Macrolobium</i> and <i>Cynometra</i> ."

501	Aquatic	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	[Terrestrial] "Distribution and ecology. Widely distributed in the northwestern part of South America from Venezuela to Peru; in Amazonian Ecuador at elevations from 10-950 m."

502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 6 Apr 2022]	Family: Fabaceae (alt. Leguminosae) Subfamily: Detarioideae

503	Nitrogen fixing woody plant	y
	Source(s)	Notes
	Winrock International. (2022). Nitrogen Fixing Trees and Shrubs. https://winrock.org/factnet-a-lasting-impact/nitrogen-fixing-trees-and-shrubs/ . [Accessed 6 Apr 2022]	<i>Brownea grandiceps</i> Jacq.

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Tree or slender shrub, height 3-8(-15) m. Leaves with rachis with 4 longitudinal furrows and corky lenticels, epidermis with a waxy coat, glabrous or ± tomentose, dark brown to red; petiole with sparse, corky lenticels, glabrous or ± tomentose; rachis + petiole 41-54 cm long."

Qsn #	Question	Answer
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Widely distributed in the northwestern part of South America from Venezuela to Peru; in Amazonian Ecuador at elevations from 10-950 m. (Fig. 5)."

602	Produces viable seed	y
	Source(s)	Notes
	Roth, I., & Lindorf, H. (2002). <i>South American Medicinal Plants: Botany, Remedial Properties and General Use</i> . Springer-Verlag, Berlin Heidelberg	" <i>Brownea grandiceps</i> JACQ. (rosa de montana, rosa de Venezuela) is a small tree or shrub 3-8 m high, with simply pinnate leaves, 5-45 cm long, having 5-15 pairs of pinnae." ... "Reproduction occurs by seeds."
	Stebbins, M. (1999). <i>Flowering Trees of Florida</i> . Pineapple Press Inc., Sarasota, FL	" <i>Brownea</i> is propagated from seed or cuttings. The seed is as rare as the trees themselves."
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Seeds germinate under the mother trees. Germination is cryptogeal or cryptoepigeal."

603	Hybridizes naturally	
	Source(s)	Notes
	Schley, R. J., de la Estrella, M., Pérez-Escobar, O. A., Bruneau, A., Barraclough, T., Forest, F., & Klitgaard, B. (2018). Is Amazonia a 'museum' for Neotropical trees? The evolution of the <i>Brownea</i> clade (Detarioideae, Leguminosae). <i>Molecular Phylogenetics and Evolution</i> , 126, 279-292	"The genera <i>Brownea</i> and <i>Browneopsis</i> , which were previously circumscribed into separate genera by Klitgaard (1991), are not supported as monophyletic in our analyses (Fig. 2). This is an unexpected result, as the two putative genera differ in stamen number, petal, leaf and pollen morphology, as well as phenology. However, resolution in the polyphyletic clade containing the two genera is probably low because of incomplete lineage sorting and hybridization, since complete monophyly with distinct species boundaries is very uncommon rainforest trees (Pennington and Lavin, 2016)."
	Schley, R. J. et al. (2020). Introgression across evolutionary scales suggests reticulation contributes to Amazonian tree diversity. <i>Molecular Ecology</i> , 29(21), 4170-4185	[Possibly Yes. Unverified] "Although they co-occur, these species favour different habitats: <i>B. jaramilloi</i> grows on ridge tops and hillsides, whereas <i>B. grandiceps</i> shows a slight preference for swamps and valleys but is more evenly distributed (pers. obs. & Klitgaard, 1991; Pérez et al., 2013). Despite this, hybridization appears to occur, as evidenced by the existence of a putative hybrid between these two species known as <i>B. "rosada"</i> (Figure 1). <i>Brownea "rosada"</i> displays an intermediate morphology between its two parental species, producing pink flowers. The hypothesis of a <i>B. jaramilloi</i> x <i>B. grandiceps</i> hybrid has not yet been tested, however, using molecular data."

604	Self-compatible or apomictic	
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Qsn #	Question	Answer
	Source(s)	Notes
	Owens, S. J. (1985). Stigma structure and the pollen-stigma interaction in Caesalpinioideae-Leguminosae. In Sexual reproduction in seed plants, ferns and mosses. Proceedings of the 8th International Symposium on Sexual Reproduction in Seed Plants, Ferns and Mosses. Pudoc, Wageningen (pp. 84-87)	"Preliminary data on self-incompatibility suggests that the two <i>Brownea</i> hybrids (both highly pollen fertile) are self-incompatible while <i>Cassia floribunda</i> , <i>Caesalpinia gilliesii</i> and <i>C. pulcherrima</i> are self-compatible."
	Jaimes, I., & Ramírez, N. (1998). Self-Compatibility, Autogamy and Agamospermy in Tropical Angiosperms. <i>Acta Biologica Venezuelica</i> : 18(3): 59-80	<i>Brownea birschellii</i> listed as AI: autoincompatible [self-incompatible]
	WRA Specialist. (2022). Personal Communication	Unknown. Self-incompatibility documented in genus

605	Requires specialist pollinators	y
	Source(s)	Notes
	von Marilaun, A .K. (1895). The Natural History of Plants: Their Forms, Growth, Reproduction, and Distribution, Volume 2. Blackie and Son, London, UK	" <i>Brownea</i> ...whose flowers are so constructed that their honey can hardly be obtained except by the hovering hummingbird..."
	Melo Burbano, A. E. (2018). Patrones de floración de <i>Brownea grandiceps</i> un árbol leguminoso de la amazonía ecuatoriana, Bachelor's thesis. Pontificia Universidad Católica del Ecuador, Quito, Ecuador	"In relation to wildlife associated with flowers, we found two species. The first was the Great-billed hermit hummingbird (<i>Phaetornis malaris</i>), which visits the flowers, and is possibly the pollinator of <i>B. grandiceps</i> . The second was the red Titi monkey (<i>Callicebus discolor</i>), which was observed feeding on the flowers. The continuous flowering of <i>B. grandiceps</i> most likely represents a food resource to the Great-billed hermit hummingbird (pollinator) and the red Titi monkey (predator) throughout the year."
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"The two genera differ strikingly in their mode of pollination as indicated by flower and inflorescence morphology. <i>Brownea</i> species are readily recognized by their large, red, almost globose flower heads, with tubular, nectiferous flowers adapted for hummingbird pollination (Snow & Snow 1972; Kalin Arroyo 1981; collection labels; pers. obs.)."

Qsn #	Question	Answer
606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Top Tropicals. (2022). <i>Brownea grandiceps</i> . https://toptropicals.com/catalog/uid/brownea_grandiceps.htm . [Accessed 7 Apr 2022]	"The pods are velvety, and propagation is from seeds."
	Tropical Plants Database, Ken Fern. (2022). <i>Brownea grandiceps</i> . https://tropical.theferns.info/viewtropical.php?id=Brownea+grandiceps . [Accessed 7 Apr 2022]	[No evidence] "Propagation. Seed - it has a short period of viability and so is best sown as soon as it is ripe in a partially shaded position in individual containers. Germination is rather slow, with the seed sprouting within 30 - 60 days[419]. Like many species within the family Fabaceae, once they have been dried for storage the seeds of this species may benefit from scarification before sowing in order to speed up and improve germination. This can usually be done by pouring a small amount of nearly boiling water on the seeds (being careful not to cook them!) and then soaking them for 12 - 24 hours in warm water. By this time they should have imbibed moisture and swollen - if they have not, then carefully make a nick in the seedcoat (being careful not to damage the embryo) and soak for a further 12 hours before sowing[K]."

607	Minimum generative time (years)	
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Brownea grandiceps</i> . https://tropical.theferns.info/viewtropical.php?id=Brownea+grandiceps . [Accessed 7 Apr 2022]	"Growth Rate Slow"
	Korning, J., & Balslev, H. (1994). Growth Rates and Mortality Patterns of Tropical Lowland Tree Species and the Relation to Forest Structure in Amazonian Ecuador. <i>Journal of Tropical Ecology</i> , 10(2), 151–166	[Slow growth rate suggests time to maturity is likely >3+ years] "Table I. Characteristics of 22 tree species with more than 12 individuals in 4 samples equivalent to 4.1 ha of tropical rainforest in Amazonian Ecuador." [<i>Brownea grandiceps</i> - Mean growth = 0.6±1.1 (mm y ⁻¹)]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." ... "Dispersal and germination. Seeds germinate under the mother trees." [Relatively large seeds with no means of external attachment, unlikely to be dispersed unintentionally]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"The species <i>Brownea coccinea</i> , <i>B. grandiceps</i> , and <i>B. macrophylla</i> are widely used as ornamentals"

703	Propagules likely to disperse as a produce contaminant	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." ... "Dispersal and germination. Seeds germinate under the mother trees." [Relatively large seeds. Unlikely to be dispersed as a produce contaminant]
704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." ... "Dispersal and germination. Seeds germinate under the mother trees." [No adaptations for wind dispersal]
705	Propagules water dispersed	y
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Trees often form stands along rivers, which may indicate that the seeds are water dispersed, as observed by Kubitzki (1985) in the related genera <i>Macrolobium</i> and <i>Cynometra</i> ." [Presumably Yes]
706	Propagules bird dispersed	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." ... "Dispersal and germination. Seeds germinate under the mother trees." [Not fleshy-fruited]
707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." ... "Dispersal and germination. Seeds germinate under the mother trees." [Relatively large pods and seeds with no means of external attachment]
708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." ... "Dispersal and germination. Seeds germinate under the mother trees." [No evidence of consumption or internal dispersal by animals]
801	Prolific seed production (>1000/m2)	

Qsn #	Question	Answer
	Source(s)	Notes
	Stebbins, M. (1999). Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"Brownea is propagated from seed or cuttings. The seed is as rare as the trees themselves."
	Klitgaard, B. B. (1991). Ecuadorian <i>Brownea</i> and <i>Browneopsis</i> (Leguminosae-Caesalpinioideae): taxonomy, palynology, and morphology. <i>Nordic Journal of Botany</i> , 11 (4), 433-449	"Flowers pedicelled, (22-)40-90(-102) flowers per inflorescence" ... "Mature pods 21-40 x 6--8 cm; seeds 30-42 x 25-35 x 5-15 mm." [Seed densities not reported]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Brownea grandiceps</i> . https://tropical.theferns.info/viewtropical.php?id=Brownea+grandiceps . [Accessed 7 Apr 2022]	"Seed - it has a short period of viability and so is best sown as soon as it is ripe in a partially shaded position in individual containers. Germination is rather slow, with the seed sprouting within 30 - 60 days"

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown. No information on herbicide efficacy or evidence of chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Grows, and could potentially spread, in regions with tropical climates
- A shade-tolerant, understory tree that could potentially establish in intact forests
- N-fixing (could affect soil nutrient levels)
- Reproduces by seeds
- Seeds dispersed by gravity, water, and through intentional cultivation by people

Low Risk Traits

- Widely cultivated, with no reports of naturalization or invasiveness
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Pollinated by hummingbirds (lack of effective pollinators may limit seed set)
- Slow growing
- Relatively large pods and seeds may limit long distant, or accidental dispersal
- Seeds reported to lose viability quickly (may limit ability to form a seed bank)