

Taxon: *Bulnesia arborea* (Jacq.) Engl.

Family: Zygophyllaceae

Common Name(s): Maracaibo lignum vitae
verawood

Synonym(s): *Zygophyllum arboreum* Jacq.

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 4 Jun 2019

WRA Score: -5.0

Designation: L

Rating: Low Risk

Keywords: Tropical Tree, Ornamental, Timber Uses, Self-Compatible, 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	n
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	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		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	n
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
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	y=1, n=-1	n
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)	y=1, n=-1	n
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
	Lasser, T. (1957). Las Zygophyllaceas Venezolanas. Bulletin Du Jardin Botanique De L'État a Bruxelles, 27(3), 381-390	[No evidence of domestication] "Arbol de crecimiento lento y madera pesada muy usada en construcciones civiles, navales y durmientes de ferrocarril. Como ornamental se siembra en parques y jardines." [Translation: Slow growing tree and heavy wood widely used in civil, naval and railway sleeper constructions. As an ornamental it is sown in parks and gardens.]

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 4 Jun 2019]	"Native Southern America NORTHERN SOUTH AMERICA: Venezuela WESTERN SOUTH AMERICA: Colombia"

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 4 Jun 2019]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Dave's Garden. (2019). <i>Bulnesia</i> Species, Vera, Verawood - <i>Bulnesia arborea</i> . https://davesgarden.com/guides/pf/go/115330/ . [Accessed 4 Jun 2019]	"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) USDA Zone 11: above 4.5 °C (40 °F)"

Qsn #	Question	Answer
	Plants for a Future. (2019). <i>Bulnesia arborea</i> . https://pfaf.org . [Accessed 4 Jun 2019]	"USDA hardiness: 9-12"
	Tropicos.org. 2019. Missouri Botanical Garden. http://www.tropicos.org/ . [Accessed 4 Jun 2019]	Collected from 0-1000 m elevation at latitudes from 05°46'N to 10°57'N

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Chudnoff, M. (1984). Tropical Timbers of the World. Agriculture Handbook Number 607. USDA Forest Service, Washington, D.C.	"Distribution: Coastal region of Colombia and Venezuela, common on the dry foothills between Porto Cabello and Lake Maracaibo."
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 4 Jun 2019]	"Native Southern America NORTHERN SOUTH AMERICA: Venezuela WESTERN SOUTH AMERICA: Colombia"

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/ . [Accessed 4 Jun 2019]	" <i>Bulnesia arborea</i> Engler Locations: Pacific Tropical Botanical Garden (now National Tropical Botanical Garden)"
	Dave's Garden. (2019). <i>Bulnesia</i> Species, Vera, Verawood - <i>Bulnesia arborea</i> . https://davesgarden.com/guides/pf/go/115330/ . [Accessed 4 Jun 2019]	"This plant has been said to grow in the following regions: Fort Lauderdale, Florida Fort Pierce, Florida Hollywood, Florida Port Charlotte, Florida Summerland Key, Florida"

301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence to date
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. (2019). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/ . [Accessed]	No evidence to date

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	University of Florida, IFAS. (2019). Assessment of Non-Native Plants in Florida's Natural Areas. https://assessment.ifas.ufl.edu/ . [Accessed 4 Jun 2019]	<i>Bulnesia arborea</i> - Not a problem species (un-documented)
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	University of Florida, IFAS. (2019). Assessment of Non-Native Plants in Florida's Natural Areas. https://assessment.ifas.ufl.edu/ . [Accessed 4 Jun 2019]	Bulnesia arborea - Not a problem species (un-documented)
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence to date

304	Environmental weed	n
	Source(s)	Notes
	University of Florida, IFAS. (2019). Assessment of Non-Native Plants in Florida's Natural Areas. https://assessment.ifas.ufl.edu/ . [Accessed 4 Jun 2019]	Bulnesia arborea - Not a problem species (un-documented)
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence to date

305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[One species naturalized. No invasive species in the genus have been documented] "Bulnesia foliosa Griseb. Zygophyllaceae Total N° of Refs: 1 References: Paraguay-NI-876"

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Gilman, E.F. 1997. Trees for Urban and Suburban Landscapes. Delmar Publishers, Albany, NY	"Bark is thin and easily damaged by mechanical impact; branches droop as tree grows, and will require pruning for vehicular or pedestrian clearance beneath canopy; routinely grown with multiple trunks; can be trained to grow with a short, single trunk. no thorns"
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Genus description. No evidence] "Shrubs and long-lived trees with very hard wood. Leaves opposite, pinnately compound, with 1 to several pairs of sub-opposite leaflets. Flowers yellow, axillary, solitary or in few-flowered cymes, actinomorphic or slightly zygomorphic; sepals 5, unequal; petals 5, clawed, imbricate; disc thick, 10-angled; stamens 10, filaments with toothed or laciniate appendages; ovary sometimes stipitate, 5-locular with numerous ovules in 2 rows in each locule; style simple. Fruit a winged capsule separating into 3-5 ventrally dehiscent mericarps, each 1-seeded by abortion. Embryo with or without endosperm. 2n = 26, 52. Eight species, mostly in dry areas of South America."

Qsn #	Question	Answer
	Lasser, T. (1957). Las Zygophyllaceas Venezolanas. Bulletin Du Jardin Botanique De L'État a Bruxelles, 27(3), 381-390	[No evidence] "Bulnesia arborea ... Arbol, corteza gris; hojas 4-9.5 cm de largo; hojuelas 10-14 oblong as, mucronadas, asimetricas 1.3-3.9 cm de largo por 0.5-1.4 cm de ancho, glabras, reticuladas, enteras, obtusas, sesiles; estipulas pubescentes, lineal-lanceoladas; Hores en cortos racimos terminales; pedunculos pubescentes; sepalos pubescentes en la base 6-7 mm de largo por 4.5 mm de ancho; petalos amarillos 2.6 cm de largo por 1.8 de ancho; ovario glabro, alargado; fruto pedicelado 4.1 cm de largo por 4 cm de ancho."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Chudnoff, M. (1984). Tropical Timbers of the World. Agriculture Handbook Number 607. USDA Forest Service, Washington, D.C.	"Occasionally 100 ft tall but usually 40 to 50 ft with a trunk diameter of 14 to 20 in.; boles slender, straight, and of rather good form, free of branches for 15 to 20 ft." [Zygophyllaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Sánchez, C. M., Gómez, G., Álvarez, M., Daza, H., & Garmendia, J. (2004). Nutritional Characterization of Goat Fodder Resources in Extensive Systems. Archivos Latinoamericanos de Producción Animal, 12(4s1), 63-66	"ABSTRACT: The main fodder species preferred by goats were identified through surveys to farmers in natural prairies of semiarid region of Lara state, Venezuela." [Cuadro 1. Especies forrajeras y consumo relativo (fr) por los caprinos según los productores - Table 1. Forage species and relative consumption (fr) by the goats according to the producers. Includes Vera, Bulnesia arborea]
	Medina, M. G., García, D. E., Cova, L. J., Soca, M., Domínguez, C. E., Baldizán, A., & Pizzani, P. (2008). Ruminant Preference For Trees, Shrub, and Herbaceous Foliage in the Low Zone of Trujillo state. Zootecnia Tropical, 26(3), 1-5	"An experiment was carried out in order to determine the preference of cattle, ovines and goats for nine fodder potential species (<i>Acacia</i> spp., <i>Bauhinia cumanensis</i> , <i>Erythrina fusca</i> , <i>Bulnesia arborea</i> , <i>Capparis odoratissima</i> , <i>Cassia alata</i> , <i>Hibiscus rosa-sinensis</i> , <i>Pentaclethra macroloba</i> and <i>Wedelia</i> aff. <i>caracasana</i>) using a experimental Latin square desing with period of evaluation of nine days in Trujillo state, Venezuela." [Bulnesia arborea was consumed, but is less preferable than other species evaluated]

405	Toxic to animals	n
	Source(s)	Notes
	Sánchez, C. M., Gómez, G., Álvarez, M., Daza, H., & Garmendia, J. (2004). Nutritional Characterization of Goat Fodder Resources in Extensive Systems. Archivos Latinoamericanos de Producción Animal, 12(4s1), 63-66	"ABSTRACT: The main fodder species preferred by goats were identified through surveys to farmers in natural prairies of semiarid region of Lara state, Venezuela." [Cuadro 1. Especies forrajeras y consumo relativo (fr) por los caprinos según los productores - Table 1. Forage species and relative consumption (fr) by the goats according to the producers. Includes Vera, Bulnesia arborea]
	Plants for a Future. (2019). Bulnesia arborea. https://pfaf.org . [Accessed 4 Jun 2019]	"Known Hazards - None known"

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 in genus

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Gilman, E.F. 1997. Trees for Urban and Suburban Landscapes. Delmar Publishers, Albany, NY	"Bulnesia is usually pest-free"
	Flechtmann, C., & Vásquez, C. (2006). A new species and new records of plant mites of <i>Bulnesia arborea</i> (Zygophyllaceae) from Venezuela. Boletín del Centro de Investigaciones Biológicas, 40(1)	"Tetra tarabanensis n. sp. (Prostigmata: Eriphyidae) is described from leaf galls of <i>Bulnesia arborea</i> (Jacq.) Engl. (Zygophyllaceae). The predaceous mite (<i>Phytoseius woodburyi</i>) and the false spider mite (<i>Brevipalpus phoenicis</i>) are reported for the first time from the same host plant in Venezuela."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Plants for a Future. (2019). <i>Bulnesia arborea</i> . https://pfaf.org . [Accessed 4 Jun 2019]	"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 in genus

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown. No information on fire ecology or fire regime was found.

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Rozendale Agroforestry Database. (2019). <i>Bulnesia arborea</i> - Maracaibo verawood. https://rozendale.com . [Accessed 4 Jun 2019]	"It is moderate fast growing and intolerant to shade."
	Gilman, E.F. 1997. Trees for Urban and Suburban Landscapes. Delmar Publishers, Albany, NY	"Light Requirement: full sun for best flowering"
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"Plant <i>Bulnesia</i> in a sunny location."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"It adapts to a wide variety of soils, and once established it is drought-tolerant."

Qsn #	Question	Answer
	Gilman, E.F. 1997. Trees for Urban and Suburban Landscapes. Delmar Publishers, Albany, NY	"Soil Tolerances: all textures; alkaline to acidic; salt-sensitive; drought"
	Plants for a Future. (2019). <i>Bulnesia arborea</i> . https://pfaf.org . [Accessed 4 Jun 2019]	"Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (alkaline) soils and can grow in very alkaline and saline soils."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Chudnoff, M. (1984). Tropical Timbers of the World. Agriculture Handbook Number 607. USDA Forest Service, Washington, D.C.	"Occasionally 100 ft tall but usually 40 to 50 ft with a trunk diameter of 14 to 20 in.; boles slender, straight, and of rather good form, free of branches for 15 to 20 ft."

412	Forms dense thickets	n
	Source(s)	Notes
	University of Florida, IFAS. (2019). Assessment of Non-Native Plants in Florida's Natural Areas. https://assessment.ifas.ufl.edu/ . [Accessed 4 Jun 2019]	"Not a problem species (un-documented)" [Status in Florida indicates tree does not form dense stands or has become a competitor with other vegetation]
	Chudnoff, M. (1984). Tropical Timbers of the World. Agriculture Handbook Number 607. USDA Forest Service, Washington, D.C.	[No evidence] "Distribution: Coastal region of Colombia and Venezuela, common on the dry foothills between Porto Cabello and Lake Maracaibo."
	WRA Specialist. (2019). Personal Communication	No evidence from native or introduced range

501	Aquatic	n
	Source(s)	Notes
	Chudnoff, M. (1984). Tropical Timbers of the World. Agriculture Handbook Number 607. USDA Forest Service, Washington, D.C.	"Distribution: Coastal region of Colombia and Venezuela, common on the dry foothills between Porto Cabello and Lake Maracaibo."
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	[Terrestrial] "Plant <i>Bulnesia</i> in a sunny location. It adapts to a wide variety of soils, and once established it is drought-tolerant."

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 4 Jun 2019]	Family: Zygophyllaceae Subfamily: Larreoideae

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 4 Jun 2019]	Family: Zygophyllaceae Subfamily: Larreoideae

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Genus description. No evidence] "Shrubs and long-lived trees with very hard wood. Leaves opposite, pinnately compound, with 1 to several pairs of sub-opposite leaflets."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Chudnoff, M. (1984). Tropical Timbers of the World. Agriculture Handbook Number 607. USDA Forest Service, Washington, D.C.	"Distribution: Coastal region of Colombia and Venezuela, common on the dry foothills between Porto Cabello and Lake Maracaibo."

602	Produces viable seed	y
	Source(s)	Notes
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"Propagate from seed or air layering. Seed may take a month or more to germinate."
	Dave's Garden. (2019). <i>Bulnesia</i> Species, Vera, Verawood - <i>Bulnesia arborea</i> . https://davesgarden.com/guides/pf/go/115330/ . [Accessed 4 Jun 2019]	"Propagation Methods: From seed; direct sow after last frost By air layering"
	Plants for a Future. (2019). <i>Bulnesia arborea</i> . https://pfaf.org . [Accessed 4 Jun 2019]	"Propagation: Seed - Cuttings. Layering"

603	Hybridizes naturally	n
	Source(s)	Notes
	Crisci, J.V., Hunziker, J.H., Palacios, R.A. & Naranjo, C.A. (1979). A numerical study of the genus <i>Bulnesia</i> (Zygophyllaceae): cluster analysis, ordination and simulation of evolutionary trees. <i>American Journal of Botany</i> , 66(2): 133-140	"No hybrids have been detected in the herbaria nor were any discovered in the field despite extensive field studies. It seems that several barriers prevent hybridization because in some localities two or three species coexist almost side by side."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Hunziker, J. H., & Schaal, B. A. (1983). Isozyme variation in diploid tropical and octoploid subtropical-temperate species of <i>Bulnesia</i> . <i>Journal of Heredity</i> , 74(5), 358-360	"There is indirect evidence that both <i>B. arborea</i> and <i>B. carrapo</i> are self-compatible. Isolated trees of both species set seed, apparently by themselves."

Qsn #	Question	Answer
605	Requires specialist pollinators	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"The flowers are insect-pollinated."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"Propagate from seed or air layering."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Rozendale Agroforestry Database. (2019). <i>Bulnesia arborea</i> - Maracaibo verawood. https://rozendale.com . [Accessed 4 Jun 2019]	"It starts flowering after 7 - 13 years."
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"The grow rate is slow to moderate."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"The diverse fruit morphology is related to different methods of dispersal. Seeds from loculicidally dehiscent capsules are shaken out by wind; winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind"

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Gilman, E.F. 1997. Trees for Urban and Suburban Landscapes. Delmar Publishers, Albany, NY	" <i>Bulnesia</i> is an excellent, low-growing tree for small yards, patios, and other small-scale landscapes." [Grown as an ornamental]

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind"

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes

Qsn #	Question	Answer
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind"

705	Propagules water dispersed	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind"

706	Propagules bird dispersed	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind" ... "Fruit a winged capsule separating into 3–5 ventrally dehiscent mericarps, each 1-seeded by abortion."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind" ... "Fruit a winged capsule separating into 3–5 ventrally dehiscent mericarps, each 1-seeded by abortion."

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind" ... "Fruit a winged capsule separating into 3–5 ventrally dehiscent mericarps, each 1-seeded by abortion."

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"winged schizocarps, as in <i>Bulnesia</i> (Fig. 171B), can be dispersed by wind" ... "Fruit a winged capsule separating into 3–5 ventrally dehiscent mericarps, each 1-seeded by abortion." [Unlikely]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes

Qsn #	Question	Answer
	Stebbins, M. 1999. Flowering Trees of Florida. Pineapple Press Inc., Sarasota, FL	"Propagate from seed or air layering. Seed may take a month or more to germinate."
	Rozendale Agroforestry Database. (2019). <i>Bulnesia arborea</i> - Maracaibo verawood. https://rozendale.com . [Accessed 4 Jun 2019]	"Seeds are intermediate and can be stored for 3 months."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Rozendale Agroforestry Database. (2019). <i>Bulnesia arborea</i> - Maracaibo verawood. https://rozendale.com . [Accessed 4 Jun 2019]	"fire intolerant"
	Gilman, E.F. 1997. Trees for Urban and Suburban Landscapes. Delmar Publishers, Albany, NY	"Pruning Requirement: requires pruning to develop one trunk and strong structure; space branches along trunk and head back thin aggressive lower branches to prevent formation of included bark." ... "Main branches and trunks can be pruned back several times when the tree is young to create a more upright form." [Tolerates regular pruning. Unknown if it can resprout from cut stumps]

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 in tropical climates
- Tolerates many soil types
- Reproduces by seeds
- Self-compatible
- Tolerates many soil types
- Seeds dispersed by wind and intentionally by people
- Tolerates repeated pruning (possibly indicating that mechanical control, if needed, would not be effective without herbicide applications)

Low Risk Traits

- No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
- Unarmed (no spines, thorns, or burrs)
- Provides fodder for goats and other livestock
- Shade-intolerant
- Does not hybridize
- Not reported to spread vegetatively
- Long time to reproductive maturity (7-13 years)