

Taxon: *Vochysia guatemalensis* Donn. Sm.

Family: Vochysiaceae

Common Name(s): árbol de cuerpo
white mahogany
white yemeri

Synonym(s): *Vochysia hondurensis* Sprague

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 6 Aug 2019

WRA Score: 1.0

Designation: EVALUATE

Rating: Evaluate

Keywords: Tropical Tree, Timber Source, Monospecific Stands, 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	y
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)	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		
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	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	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		
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/m2)		
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	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
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence of domestication] "V. guatemalensis is distributed in Central America and Colombia in moist or wet forest (annual rainfall 600-3200 mm) at moderate to high altitudes 350-1500 m. This species is utilized in agroforestry, soil improvement and conservation, and in shelterbelts. The timber is used for posts, building poles, light construction, boxes, tool handles, toys and furniture."

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 2 Aug 2019]	"Native Northern America SOUTHERN MEXICO: Mexico [Chiapas, Oaxaca, Tabasco, Veracruz de Ignacio de la Llave] Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras (= V. hondurensis Sprague), Nicaragua"

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 2 Aug 2019]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes

Qsn #	Question	Answer
	Orwa C., Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed]	"BIOPHYSICAL LIMITS Altitude: 350-1 500 m Mean annual temperature: 24-30°C Mean annual rainfall: 600-3 200 mm" [Elevation range exceeds 1000 m, demonstrating a degree of environmental versatility]
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Climatic amplitude (estimates) - Altitude range: 350 - 1500 m - Mean annual rainfall: 600 - 3200 mm - Rainfall regime: bimodal - Dry season duration: > 6 months - Mean annual temperature: 12 - 35°C - Mean maximum temperature of hottest month: 23 - 38°C - Mean minimum temperature of coldest month: 8 - 10°C - Absolute minimum temperature: > 4°C"
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The species grows from the lowlands to 1100 m in the humid and very humid forests of the coastal plains. Temperature varies from 24 to 30 °C; and annual rainfall, from 3000 to 5000 mm."

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 2 Aug 2019]	"Native Northern America SOUTHERN MEXICO: Mexico [Chiapas, Oaxaca, Tabasco, Veracruz de Ignacio de la Llave] Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras (= <i>V. hondurensis</i> Sprague), Nicaragua"

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 2 Aug 2019]	"Native: Belize, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Panama Exotic:" [No countries listed outside native range]
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	Cultivated within native range

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
	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

Qsn #	Question	Answer
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 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 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 evidence

305	Congeneric weed	y
	Source(s)	Notes
	Nunes da Cunha, C., & Junk, W. J. (2004). Year-to-year changes in water level drive the invasion of <i>Vochysia divergens</i> in Pantanal grasslands. <i>Applied Vegetation Science</i> , 7(1), 103-110	[<i>Vochysia divergens</i> - weed of cattle ranches] "Abstract. In recent decades, cattle ranchers of the Pantanal of Mato Grosso, Brazil, have pointed to the accelerated spread of several herbaceous and woody plant species that invade natural and artificial pastures (campos). It has been speculated that overgrazing by an increasing number of cattle, lack of grazing in abandoned areas, or large-scale changes in environmental conditions may be the reason for this invasion. This study focuses on ecological and ecophysiological aspects of <i>Vochysia divergens</i> (cambará), a flood-tolerant tree that began spreading in the Pantanal during the last 30 years and is considered a very aggressive invasive plant. The study shows that the spread of cambará can be related to natural multi-years wet periods. During multi-years dry periods the species is reduced by the increasing impact of fires in the Pantanal. This points to the great importance of multi-years climatic events on the vegetation cover of the Pantanal and indicates a very dynamic development in plant communities." ... "According to observations of the ranchers the spread of invasive plants started since the large floods of the early seventies including <i>Vochysia divergens</i> , <i>Licania parvifolia</i> , <i>Combretum lanceolatum</i> , <i>C. laxum</i> , <i>Byrsonima orbignyana</i> and <i>Ipomoea fistulosa</i> . Although they are native, these species are called invasive species (Anon. 1974; Pott 1982; Allen & Valls 1987). Of special importance is <i>Vochysia divergens</i> , <i>Vochysiaceae</i> (cambará), which vigorously spreads into pastures and can form monospecific stands locally called cambarazais."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	[No evidence] "A large tree, often 15 meters high or more, with pale bark, the branchlets glabrous; stipules subulate, 3 mm. long; leaves 3-4-verticillate or the uppermost opposite, on petioles 2-3 cm. long, oblong-lanceolate, 9-15 cm. long, 2.5-5.5 cm. wide, rather abruptly acuminate or long acuminate, acute or acuminate at the base, coriaceous, glabrous; flowers bright yellow, the thyrses terminal and axillary, forming large leafy panicles 10-18 cm. long, the rachis sparsely puberulent, the cymes 3-4-flowered; blade of the posterior sepal 15-20 mm. long, the spur half as long; petals oblong-obovate, the intermediate one half as long as the calyx and 4 mm. wide, the others slightly shorter and much narrower; anther glabrous, 10 mm. long."

402	Allelopathic	
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R., & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 5 Aug 2019]	[Unknown. Grows with other species, but also forms monospecific stands] "It inhabits the humid tropical forest and the very humid forest of the coastal plains, where it often grows in monospecific stands or in patches with other <i>Vochysia</i> spp. It is also associated with <i>Calophyllum brasiliense</i> , <i>Simphonia globulifera</i> , <i>Terminalia amazonia</i> , <i>Ferrule koschnyi</i> , <i>Dialium guianensis</i> , <i>Guarea grandifolia</i> , among others."
	WRA Specialist. (2019). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	" <i>V. guatemalensis</i> is medium sized tree which may reach 15-25 m in height with a d.b.h. of 80 cm." [Vochysiaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Unknown. No mention of use as a source of fodder or feed for livestock] "This species is utilized in agroforestry, soil improvement and conservation, and in shelterbelts. The timber is used for posts, building poles, light construction, boxes, tool handles, toys and furniture."
	WRA Specialist. (2019). Personal Communication	Unknown

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2019). <i>Vochysia guatemalensis</i> . http://tropical.theferns.info/viewtropical.php?id=Vochysia+guatemalensis . [Accessed 5 Aug 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

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"Chaverri and others (1997) found in a 5-year-old plantation of <i>V. guatemalensis</i> in Tabarcia, Costa Rica (premontane moist forest) that almost all of the trees had some insect damage, but in 80 percent the severity was less than 20 percent. The majority of the caterpillars were captured on young leaves, and the larvae were classified as belonging to eight species. Associated with them, six species of parasitoids or hyperparasitoids were detected."
	Orwa C., Mutua, A., Kindt R., Jamnadass, R., & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 5 Aug 2019]	"Fungi of the genera <i>Fusarium</i> sp. and <i>Phoma</i> sp. Have been reported to infect the seeds."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2019). <i>Vochysia guatemalensis</i> . http://tropical.theferns.info/viewtropical.php?id=Vochysia+guatemalensis . [Accessed 5 Aug 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

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R., & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 5 Aug 2019]	[Fire ecology unknown, but monospecific stands could potentially facilitate spread of fire during dry periods or prolonged droughts] "It inhabits the humid tropical forest and the very humid forest of the coastal plains, where it often grows in monospecific stands or in patches with other <i>Vochysia</i> spp."

409	Is a shade tolerant plant at some stage of its life cycle	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Balderrama, S. I. V., & Chazdon, R. L. (2005). Light-dependent seedling survival and growth of four tree species in Costa Rican second-growth rain forests. <i>Journal of Tropical Ecology</i> , 21(4), 383-395	" <i>Vochysia guatemalensis</i> , in contrast, is a high-light-demanding species but can tolerate shaded understory conditions. Dense patches of seedlings of this species can be observed after peaks of fruit production in the shaded understory both in young and late second-growth forests (S. Iriarte, pers. obs.). <i>Vochysia</i> can be a successful competitor in understory conditions of young second-growth forests once one or more canopy layers have developed. Finegan (1996) refers this behaviour to long-lived pioneers, which tend to exhibit some degree of shade tolerance to be able to establish in young second-growth forests."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Balderrama, S. I. V., & Chazdon, R. L. (2005). Light-dependent seedling survival and growth of four tree species in Costa Rican second-growth rain forests. <i>Journal of Tropical Ecology</i> , 21(4), 383-395	"Table 1. Study species characteristics" [<i>Vochysia guatemalensis</i> - Habitat = Alluvial and sandy soils, but also clay/acid soils]
	Camacho, M. E., Alvarado, A., & Fernández-Moya, J. (2016). <i>Vochysia guatemalensis</i> Donn. Smith, an alternative species for reforestation on acid tropical soils. <i>New Forests</i> , 47(4), 497-512	" <i>Vochysia guatemalensis</i> grows well in clay, acidic (pH 5.0 to 6.0) soils with a high concentration of iron and aluminum."
	Vozzo, J.A. 2002. <i>Tropical Tree Seed Manual</i> . USDA Forest Service, Washington, D.C.	" <i>Vochysia guatemalensis</i> grows well in clay, acidic (pH 5.0 to 6.0) soils with a high concentration of iron and aluminum."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). <i>Flora of Guatemala</i> . Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"A large tree, often 15 meters high or more, with pale bark, the branchlets glabrous"

412	Forms dense thickets	y
	Source(s)	Notes
	Vozzo, J.A. 2002. <i>Tropical Tree Seed Manual</i> . USDA Forest Service, Washington, D.C.	" <i>Vochysia guatemalensis</i> ranges naturally from Veracruz, Mexico, to Panama. The trees are frequently found in monospecific stands or in patches with <i>V. ferruginea</i> Mart. and <i>V. allenii</i> Standl. & L.O. Williams."

501	Aquatic	n
	Source(s)	Notes
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Terrestrial] " <i>V. guatemalensis</i> is distributed in Central America and Colombia in moist or wet forest (annual rainfall 600-3200 mm) at moderate to high altitudes 350-1500 m."

Qsn #	Question	Answer
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 2 Aug 2019]	Vochysiaceae [Vochysiaceae are closest to Myrtaceae]

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 2 Aug 2019]	Vochysiaceae [Vochysiaceae are closest to Myrtaceae]

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"A large tree, often 15 meters high or more, with pale bark, the branchlets glabrous"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	[No evidence] " <i>Vochysia guatemalensis</i> ranges naturally from Veracruz, Mexico, to Panama. The trees are frequently found in monospecific stands or in patches with <i>V. ferruginea</i> Mart. and <i>V. allenii</i> Standl. & L.O. Williams. The species has been associated with secondary vegetation (Flores 1993b), but in Costa Rica it grows in primary forests."

602	Produces viable seed	y
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"Seeds do not require pregermination treatments and a germination of 85 to 90 percent is obtained under greenhouse conditions. Germination is epigeal and the seedling is phanerocotylar. Under natural conditions, germination is rapid and begins in 8 to 9 days."
	Jøker, D. (2000). <i>Vochysia guatemalensis</i> J.D. Sm. Seed Leaflet No. 39. Danida Forest Seed Centre, Denmark	"The seeds are sown in boxes with fine sand. Unlike most other seeds, the radicle does not emerge through the micropyle but laterally through the seed coat. The best result is obtained when the seeds are placed horizontally in the soil allowing correct root anchoring and faster growth (see illustration below). Alternatively the seeds can be sown vertically with the wing buried in the soil. Germination starts 10-12 days after sowing and is terminated within one month. Fresh seeds will normally germinate close to 100%."

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	Kawasaki M.L. (2007) Vochysiaceae. In: Kubitzki K. (eds) Flowering Plants · Eudicots. The Families and Genera of Vascular Plants, vol 9. Springer, Berlin, Heidelberg	"Vochysia ... About 100 species, from Central to South America." [Unknown. No evidence found]

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R., & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 2 Aug 2019]	"The anthers open before the flowers open and the species may be predominantly self pollinating."
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The species is autocompatible and seems to be autogamous, but some nectarivorous insects extract nectar from the spur and pollinate some of the flowers."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Kawasaki M.L. (2007) Vochysiaceae. In: Kubitzki K. (eds) Flowering Plants · Eudicots. The Families and Genera of Vascular Plants, vol 9. Springer, Berlin, Heidelberg	"The data on pollination biology of Vochysiaceae are incomplete. The markedly zygomorphic flowers, which have white, yellow, pink, or purple petals with adequate landing surface and often nectar guides, weak odor, and a single stamen, are characteristic of bee-pollination (Faegri and van der Pijl 1979). Bees have been observed visiting flowers of Vochysiaceae (Fischer and Gordo 1993), and they are probably rewarded by nectar accumulated in the spur. Pollination also by moths has been reported in <i>Qualea grandiflora</i> Mart. (Silberbauer-Gottsberger and Gottsberger 1975). Secondary pollen presentation occurs in <i>Vochysia</i> , when the pollen is initially deposited on the style and eventually transferred to pollinators (Yeo 1993)."
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The species is autocompatible and seems to be autogamous, but some nectarivorous insects extract nectar from the spur and pollinate some of the flowers."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	[No evidence] "The seeds are planted in boxes full of damp sand. After germination, seedlings should be fertilized (soil or foliar fertilization) because they have high nutritional requirements." ... "Propagation by pseudografting twigs and naked root seedlings has not been successful (Flores 1993b). However, research continues and Corea (1994) believes using juvenile succulent cuttings for rooting will prove successful."

607	Minimum generative time (years)	>3
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Qsn #	Question	Answer
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 2 Aug 2019]	"Flowering normally begins when the tree is 4-6 years old."
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The trees begin to flower and fruit at the age of 12 to 13 years."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 6 Aug 2019]	"Fruit a thick, dehiscent capsule, narrowly oblong deeply 3 three locules each containing one seed; sulcate, somewhat verucose, acutely angulate, about 4.5 cm long and 1.5 cm wide, yellowish-brown. Seed laterally compressed, brown, winged and wind-dispersed. The size varies but is typically about 4.5 cm long, wing included. The embryo is large (1.8-2.4 cm long) and there is no endosperm." [No evidence, and unlikely. Relatively large seeds with no means of external attachment]

702	Propagules dispersed intentionally by people	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Primarily cultivated within native range] " <i>V. guatemalensis</i> is distributed in Central America and Colombia in moist or wet forest (annual rainfall 600-3200 mm) at moderate to high altitudes 350-1500 m. This species is utilized in agroforestry, soil improvement and conservation, and in shelterbelts. The timber is used for posts, building poles, light construction, boxes, tool handles, toys and furniture."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 6 Aug 2019]	"Seed laterally compressed, brown, winged and wind-dispersed. The size varies but is typically about 4.5 cm long, wing included. The embryo is large (1.8-2.4 cm long) and there is no endosperm." ... "Flowering normally begins when the tree is 4-6 years old." [No evidence. Tree not cultivated with produce, and relatively large seeds unlikely to become a contaminant of produce]

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The yellow-brown fruit is a loculicidal, thick, obovate or oblong capsule, 4.8 to 5.8 cm in length, deeply trisulcate, angulose, and verrucose. The capsule is trilocular and contains two seeds per locule. Fruits ripen August through October, but a small crop of fruits ripen in March. The seeds are laterally compressed, winged, and anemochorous."

705	Propagules water dispersed	n
	Source(s)	Notes
	Orwa C., Mutua, A., Kindt R., Jamnadass, R., & Anthony, S. 2009 Agroforestry Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org . [Accessed 6 Aug 2019]	"Seed laterally compressed, brown, winged and wind-dispersed. The size varies but is typically about 4.5 cm long, wing included." ... "It inhabits the humid tropical forest and the very humid forest of the coastal plains, where it often grows in monospecific stands or in patches with other <i>Vochysia</i> spp." [Buoyancy of wind-dispersed seeds unknown, but riparian habitat not specified in distribution, suggesting water dispersal is not important to this tree's establishment]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Kawasaki M.L. (2007) Vochysiaceae. In: Kubitzki K. (eds) Flowering Plants · Eudicots. The Families and Genera of Vascular Plants, vol 9. Springer, Berlin, Heidelberg	"The species of Vochysiaceae are basically adapted for wind-dispersal; the fruits are either loculicidal capsules with winged seeds or samaroid."
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The yellow-brown fruit is a loculicidal, thick, obovate or oblong capsule, 4.8 to 5.8 cm in length, deeply trisulcate, angulose, and verrucose. The capsule is trilocular and contains two seeds per locule. Fruits ripen August through October, but a small crop of fruits ripen in March. The seeds are laterally compressed, winged, and anemochorous."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The capsule is trilocular and contains two seeds per locule. Fruits ripen August through October, but a small crop of fruits ripen in March. The seeds are laterally compressed, winged, and anemochorous." ... "Many young fruits are eaten by birds and mammals, substantially reducing seed production." [Wind-dispersed seeds. No means of external attachment, and pre-dispersal predation impacts seed production]

708	Propagules survive passage through the gut	n
	Source(s)	Notes

Qsn #	Question	Answer
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The capsule is trilocular and contains two seeds per locule. Fruits ripen August through October, but a small crop of fruits ripen in March. The seeds are laterally compressed, winged, and anemochorous." ... "Many young fruits are eaten by birds and mammals, substantially reducing seed production." [Wind-dispersed seeds. No evidence that intact seeds are dispersed internally, and pre-dispersal predation impacts seed production]

801	Prolific seed production (>1000/m ²)	
	Source(s)	Notes
	Vozzo, J.A. 2002. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	[High seed densities may not be reached due to shortened longevity under natural conditions] "Seed abortion is uncommon and approximately 10 percent of the seeds are nonviable. In Costa Rica, fresh seeds (45 to 55 percent moisture) average 3,500 to 4,500 per kg, and dry seeds (8 to 10 percent moisture) average 7,000 to 8,000 per kg (Corea 1994). Viability lasts from 2 to 3 months if seeds are stored at 24 to 26 °C with good aeration. If the moisture content is reduced to 25 percent, seeds can maintain high viability (75 percent) for 4 to 6 months (Flores 1993b). When seeds are stored for 1 month at a low temperature (3 °C) and a high moisture content (32 percent) viability drops rapidly (to 9 percent)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Dick, J. M., Zúñiga, G., Cornelius, J. P., & Watt, A. D. (1998). Genetic variation in the number of cuttings harvestable and rooted from <i>Vochysia guatemalensis</i> coppiced stumps. <i>Forest Ecology and Management</i> , 111(2-3), 225-230	"The seed of <i>V. guatemalensis</i> is recalcitrant and cannot be stored for more than about 3 months."
	Jøker, D. (2000). <i>Vochysia guatemalensis</i> J.D. Sm. Seed Leaflet No. 39. Danida Forest Seed Centre, Denmark	"The seeds are tolerant to desiccation in the sense that they can be dried down to at least 5% moisture content without loss in viability. However, a trial in Costa Rica showed that at 5% mc germination decreased quickly after a few months' storage. Best results were obtained for seeds with about 10% mc; this was significantly better than either 12% or 6.7%. The same trial indicated that 15°C is better for storage than 5°C. The seeds are sensitive to low temperatures, no seeds survived -17°C. Even with optimal conditions the seeds cannot be stored for more than 6 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	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Dick, J. M., Zúñiga, G., Cornelius, J. P., & Watt, A. D. (1998). Genetic variation in the number of cuttings harvestable and rooted from <i>Vochysia guatemalensis</i> coppiced stumps. <i>Forest Ecology and Management</i> , 111(2-3), 225-230	[Coppices and resprouts from stumps] "A total of 3029 cuttings were harvested from coppiced stumps of 96 trees representing six provenances of <i>Vochysia guatemalensis</i> . There was significant variation in diameter between provenances with tree stumps from La Ceiba in Honduras being the largest with a mean of 13.4 cm compared with 10.5 cm for Siquirres in Costa Rica. Regression analysis was utilized to determine the influence of provenance and diameter on the numbers of coppice shoots produced by each tree and the subsequent rooting ability of cuttings taken from them. Significantly more shoots and cuttings were produced on trees with larger diameters. There was also a significant provenance influence on shoot and cutting production. The fitted regression model predicted a difference of 20 cuttings from stumps of the same diameter between provenances Florencia, Costa Rica and La Ceiba, Honduras. In contrast to the positive effect of large stump diameter on the number of cuttings produced, the rooting ability of cuttings was negatively influenced by the diameter of the stump. The average rooting percentage of cuttings from individual provenances varied between 30% and 70% with an overall rooting percentage of 64%. The implications of these results for commercial vegetative propagation programmes are discussed."

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

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Another species, *Vochysia divergens*, has become a weed of cattle ranches within its native range in Brazil
- Shade-tolerant when younger (although described as light-demanding)
- Forms monospecific stands within native range
- Reproduces by seeds
- Self-compatible, and possibly autogamous
- Seeds are wind-dispersed, and intentionally cultivated within native range
- Able to coppice and resprout after cutting

Low Risk Traits

- No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
- Unarmed (no spines, thorns, or burrs)
- No toxicity reported
- Valued as a source of timber and restoration within native range
- Not reported to spread vegetatively
- Reaches maturity from 4-6 years to as long as 12-13 years
- Seeds do not store well and will not form a persistent seed bank

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Shade-tolerant and forms monospecific stands in native range

(B) Bird or clearly wind-dispersed?> Yes. Wind-Dispersed

(C) Life cycle <4 years? No. Reaches maturity in 4-6 (to 12-13) years

Outcome = Evaluate Further