

<b>Taxon:</b> Chamaedorea ernesti-augusti	<b>Family:</b> Arecaceae
<b>Common Name(s):</b> Ernest August's palm guaya de abajo guayita tuna tail palm xate palm	<b>Synonym(s):</b> Chamaedorea ernesti-augustii H. Chamaedorea glazioviana Drude ex Eleutheropetalum ernesti-augustii

<b>Assessor:</b> Assessor	<b>Status:</b> Assessor Approved	<b>End Date:</b> 9 Aug 2014
<b>WRA Score:</b> -3.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Understory Palm, Dioecious, Shade Tolerant, Ornamental, Fleshy-fruited

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)	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		

Qsn #	Question	Answer Option	Answer
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	n
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		
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	y
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	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	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
	Cibrián-Jaramillo, A., Bacon, C. D., Garwood, N. C., Bateman, R. M., Thomas, M. M., Russell, S., Donovan Bailey, C., Hahn, W.J., Bridgewater, S.G.M. & DeSalle, R. 2009. Population genetics of the understory fishtail palm <i>Chamaedorea ernesti-augusti</i> in Belize: high genetic connectivity with local differentiation. <i>BMC Genetics</i> , 10 (1):65	[No evidence of domestication] "We focus on the harvesting of the palm <i>Chamaedorea ernesti-augusti</i> (H. Wendl.). <i>Chamaedorea</i> is the largest genus of palms in the neotropics, with many species of high socioeconomic importance (Hodel 1992). It is distributed in the seasonal forests of Mexico, Guatemala, Belize, and Honduras and is locally known as xaté. The leaves of xaté are traded internationally for use in floriculture, and the annual value of exports from Guatemala is estimated to be USD 4 million (Bridgewater et al. 2006)."
	Henderson, A., Galeano, G. & Bernal, R. 1997. <i>Field Guide to the Palms of the Americas</i> . Princeton University Press, Princeton, NJ	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2014. 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, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 8 Aug 2014]	"Native: NORTHERN AMERICA Southern Mexico: Mexico - Chiapas, Oaxaca SOUTHERN AMERICA Mesoamerica: Belize; Guatemala; Honduras"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed ]	

203	Broad climate suitability (environmental versatility)	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	"It prefers a semi-shaded, moist site in a subtropical to tropical climate."
	Riffle, R.L. & Craft, P. 2003. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	"The palm is not hardy to cold and is adapted only to zones 10b and 11 and marginal in 10a."

<b>204</b>	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 8 Aug 2014]	"Native: NORTHERN AMERICA Southern Mexico: Mexico - Chiapas, Oaxaca SOUTHERN AMERICA Mesoamerica: Belize; Guatemala; Honduras"

<b>205</b>	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Palmpedia. 2014. <i>Chamaedorea ernesti-augusti</i> . <a href="http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti">http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti</a> . [Accessed 9 Aug 2014]	"It was apparently widely cultivated in Europe in the latter half of the 19th century and first part of this century. Today, it is fairly common in gardens and collections in California, Florida, Hawaii, and Australia and, to some extent, in Europe. Seeds of this species, nearly all from Mexico, are handled commercially on a limited scale and distributed throughout the world."

<b>301</b>	<b>Naturalized beyond native range</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Imada, C. 2012. Hawaiian Native and Naturalized Vascular Plants Checklist (December 2012 update). Bishop Museum Technical Report 60. Bishop Museum, Honolulu, HI	No evidence
	Meyer, J. Y., Lavergne, C., & Hodel, D. R. 2008. Time bombs in gardens: invasive ornamental palms in tropical islands, with emphasis on French Polynesia (Pacific Ocean) and the Mascarenes (Indian Ocean). <i>Palms</i> , 52(2): 71-83	No evidence
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

<b>302</b>	<b>Garden/amenity/disturbance weed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

<b>303</b>	<b>Agricultural/forestry/horticultural weed</b>	<b>n</b>
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Meyer, J. Y., Lavergne, C., & Hodel, D. R. 2008. Time bombs in gardens: invasive ornamental palms in tropical islands, with emphasis on French Polynesia (Pacific Ocean) and the Mascarenes (Indian Ocean). <i>Palms</i> , 52(2): 71-83	No evidence
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	y
	<b>Source(s)</b>	<b>Notes</b>
	Florida Exotic Pest Plant Council. 2011. Florida EPPC's 2011 Invasive Plant Species List. <a href="http://www.fleppc.org/list/11list.html">http://www.fleppc.org/list/11list.html</a> . [Accessed 9 Aug 2014]	[ <i>Chamaedorea seifrizii</i> - An invader of minor significance at this time] "Invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These species may become ranked Category I, if ecological damage is demonstrated." [ <i>Chamaedorea seifrizii</i> included in this list]
	Langeland, K.A.& Stocker, R.K. 2001. Control of Non-native Plants in Natural Areas of Florida. SP 242. Institute of Food & Agricultural Sciences, University of Florida, Gainesville, FL	[ <i>Chamaedorea seifrizii</i> is a weed of minor significance with the potential to become an environmental weed] "Treatment: Cut palm below growing point and treat with 50% Garlon 3A or 10% Garlon 4. Alternatively, Garlon 4 can be applied to the apical bud.? ... "Treatment: Treat as fishtail palm, above. Comments: Pinnate-leaved, narrow trunked, clustering species; invades hammocks."

401	Produces spines, thorns or burrs	n
	<b>Source(s)</b>	<b>Notes</b>
	Henderson, A., Galeano, G. & Bernal, R. 1997. Field Guide to the Palms of the Americas. Princeton University Press, Princeton, NJ	"Field characters. Stems solitary, 0.8-2 m tall and 1-1.5 cm diameter, erect. Leaves 5-8, simple; blades broadly wedge shaped-obovate, bifid to about half their length, 25-60 cm long and 20-30 cm wide, with 12-18 primary veins per side."

402	Allelopathic	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2014. Personal Communication	Unknown

Qsn #	Question	Answer
403	<b>Parasitic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	"Plants to 2 meters high or more" [Arecaceae]
404	<b>Unpalatable to grazing animals</b>	
	<b>Source(s)</b>	<b>Notes</b>
	2006. Berry, E.J.. Population ecology of the harvested understory palm <i>Chamaedorea radicalis</i> : pollination biology, female fecundity, and source-sink population dynamics. PhD Dissertation. Miami University, Oxford, OH	[Unknown for <i>Chamaedorea ernesti-augusti</i> . Another species, <i>C. radicalis</i> , is palatable to livestock] "These large palms were more abundant on rock outcrops than the forest floor, suggesting that rock outcrops are better microsites for <i>C. radicalis</i> . However, field experiments revealed that differences between the substrates were not from natural variation in microsite conditions, but rather due to differences in browsing by free-range livestock, which negatively affects palm survival, growth, and fecundity."
405	<b>Toxic to animals</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Riffle, R.L. & Craft, P. 2003. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	[No evidence of toxicity, but may be a mild irritant] "Almost all species, like those of <i>Caryota</i> , have fruits which contain calcium oxalate crystals that are irritating to the skin."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence
406	<b>Host for recognized pests and pathogens</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2014. Personal Communication	Unknown
407	<b>Causes allergies or is otherwise toxic to humans</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Riffle, R.L. & Craft, P. 2003. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	[No evidence of toxicity, but fruit possibly a skin irritant] "Almost all species, like those of <i>Caryota</i> , have fruits, which contain calcium oxalate crystals that are irritating to the skin."
	Penn, M. G., Moncrieff, C. B., Bridgewater, S. G., Garwood, N. C., Bateman, R. M., Chan, I., & Cho, P. 2009. Using GIS techniques to model the distribution of the economically important xaté palm <i>Chamaedorea ernesti-augusti</i> within the Greater Maya Mountains, Belize. <i>Systematics and Biodiversity</i> , 7(01): 63-72	[No evidence] " <i>Chamaedorea</i> palms are known locally as xat'e. Their economic value relates to their leaves, which are harvested to provide a source of leaf greenery for the international floricultural industry. The harvesting of xat'e leaf provides a livelihood for many communities across Central America, and is one of the region's most economically important Non-Timber Forest Products (NTFPs). Within Belize, <i>Chamaedorea ernesti-augusti</i> H.Wendl., known as fishtail, is the main focus of this trade."
408	<b>Creates a fire hazard in natural ecosystems</b>	n

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	[No evidence, and unlikely given wet forest habitat] "Dense, wet forests, often on limestone, mostly at low elevations but to 1100 meters in Alta Verapaz"
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	[No evidence. Humid rainforests unlikely to be fire prone] "The humid rainforests of Mexico, Guatemala, Belize and Honduras are the natural habitat of this small palm."

409	Is a shade tolerant plant at some stage of its life cycle	y
	<b>Source(s)</b>	<b>Notes</b>
	Voight, C. N. 2011. Xate Palm ( <i>Chamaedorea</i> Sp.) Enrichment in Western Belize: The Ecological Effects of Management in Relation to Understory Plant Species Richness, Diversity, and Composition. Master's Thesis. University of Florida, Gainesville	" <i>C. ernesti-agustii</i> ranges from the Mexican Atlantic slope to Honduras (Henderson et al. 1995). All <i>Chamaedorea</i> species are understory palms and require shade."
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	"It prefers a semi-shaded, moist site in a subtropical to tropical climate."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	<b>Source(s)</b>	<b>Notes</b>
	Penn, M. G., Moncrieff, C. B., Bridgewater, S. G., Garwood, N. C., Bateman, R. M., Chan, I., & Cho, P. 2009. Using GIS techniques to model the distribution of the economically important xaté palm <i>Chamaedorea ernesti-agustii</i> within the Greater Maya Mountains, Belize. Systematics and Biodiversity, 7(01): 63-72	" <i>Chamaedorea ernesti-agustii</i> occurs throughout northern Guatemala, the Pet'én and western Belize (Hodel, 1992), and is particularly prevalent on limestone soils."
	Voight, C. N. 2011. Xate Palm ( <i>Chamaedorea</i> Sp.) Enrichment in Western Belize: The Ecological Effects of Management in Relation to Understory Plant Species Richness, Diversity, and Composition. Master's Thesis. University of Florida, Gainesville	"They prefer well-drained calcareous sandy loam soils, abundant organic matter, and limestone bedrock (CEC 2002; BBG 2005). Some xate species, including <i>C. ernesti-agustii</i> , will actually grow on "pure limestone outcroppings with only a thin layer of leaf litter" (Hodel 1992)."

411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	"Plants to 2 meters high or more, the slender stems to 13 mm. in diameter, sometimes flowering while nearly stemless; leaves spreading, simple, broadly cuneate-obovate in outline, deeply cleft at the apex, dull dark green above, dull green below, the sheath obliquely open above the middle, 8-10 cm. long, the petiole 8-20 cm. long, pale-centered below as is the rachis, this 17-28 cm. long, the blade 22-25 cm. long on the upper margin, 20-25 cm. wide at the tip of the rachis, the subscarious margins shortly emarginate at the tips of the 13-16 nerves on each side, toothed between the nerves, the latter pale, dull, and scarcely prominent below, prominently keeled above"

Qsn #	Question	Answer
412	Forms dense thickets	n
	Source(s)	Notes
	Palmpedia. 2014. <i>Chamaedorea ernesti-augusti</i> . <a href="http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti">http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti</a> . [Accessed 9 Aug 2014]	"Habit: solitary, slender, erect, to 2 m tall or more, sometimes flowering when nearly stemless."
	Natural History Museum. 2014. <i>Chamaedorea ernesti-augusti</i> . (fishtail palm). <a href="http://www.nhm.ac.uk/nature-online/species-of-the-day/scientific-advances/industry/chamaedorea-ernesti-augusti/index.html">http://www.nhm.ac.uk/nature-online/species-of-the-day/scientific-advances/industry/chamaedorea-ernesti-augusti/index.html</a> . [Accessed 9 Aug 2014]	[No evidence] "In the wild, fishtail populations typically have a natural abundance of around 100 200 individuals per hectare."

501	Aquatic	n
	Source(s)	Notes
	Henderson, A., Galeano, G. & Bernal, R. 1997. Field Guide to the Palms of the Americas. Princeton University Press, Princeton, NJ	[Terrestrial] "rain forest, often on limestone soils, at 100-1000 m elevation."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 8 Aug 2014]	Areaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 8 Aug 2014]	Areaceae



Qsn #	Question	Answer
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	"Plants to 2 meters high or more, the slender stems to 13 mm. in diameter, sometimes flowering while nearly stemless; leaves spreading, simple, broadly cuneate-obovate in outline, deeply cleft at the apex, dull dark green above, dull green below, the sheath obliquely open above the middle, 8-10 cm. long, the petiole 8-20 cm. long, pale-centered below as is the rachis, this 17-28 cm. long, the blade 22-25 cm. long on the upper margin, 20-25 cm. wide at the tip of the rachis, the subscarious margins shortly emarginate at the tips of the 13-16 nerves on each side, toothed between the nerves, the latter pale, dull, and scarcely prominent below, prominently keeled above"

601	<b>Evidence of substantial reproductive failure in native habitat</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Cibrián-Jaramillo, A., Bacon, C. D., Garwood, N. C., Bateman, R. M., Thomas, M. M., Russell, S., Donovan Bailey, C., Hahn, W.J., Bridgewater, S.G.M. & DeSalle, R. 2009. Population genetics of the understory fishtail palm <i>Chamaedorea ernesti-augusti</i> in Belize: high genetic connectivity with local differentiation. BMC Genetics, 10 (1):65	"In recent years, <i>C. ernesti-augusti</i> has gained economic importance as an important Non-Timber Forest Product (NTFP) in Central America [35-37]. The leaves of this species, known as xaté or fishtail palm, are harvested and exported into the international floral industry, generating increasingly important revenue [37]. The combination of over-harvesting and habitat loss has led to populations in this region becoming progressively more vulnerable [38,39]."
	Williams, S. J., Gibbons, J. M., Clubbe, C., Dibble, A., Marroquín, A., & Jones, J. P. 2012. Who Harvests and Why? Characteristics of Guatemalan Households Harvesting Xaté ( <i>Chamaedorea ernesti-augusti</i> ). Economic Botany, 66(4): 357-369	[Over-harvesting may be contributing to rarity] "Because of the substantial extraction levels of xaté in Belize, we suggest that <i>C. ernesti-augusti</i> should be a priority for Red Listing. However, additional fieldwork would be needed to assess the area occupied by xaté across Central America and to determine the scale of additional threats, such as deforestation."

602	<b>Produces viable seed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	"The oblong fruit is black when ripe and seeds are available in limited quantities. Germination takes 3 to 6 months and is aided by bottom heat."

603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Voight, C. N. 2011. Xate Palm ( <i>Chamaedorea</i> Sp.) Enrichment in Western Belize: The Ecological Effects of Management in Relation to Understory Plant Species Richness, Diversity, and Composition. Master's Thesis. University of Florida, Gainesville	[Unknown for <i>Chamaedorea ernesti-augusti</i> ] " <i>Chamaedorea</i> is the largest Neotropical palm genus, encompassing between 77 to 100 species, depending on the recognition of horticultural hybrids (Henderson et al. 1995)."

Qsn #	Question	Answer
604	Self-compatible or apomictic	n
	Source(s)	Notes
	Henderson, A. 1986. A review of pollination studies in the Palmae. <i>The Botanical Review</i> , 52(3): 221-259	
	Bullock, S.H. 1984. Biomass and nutrient allocation in a neotropical dioecious palm. <i>Oecologia</i> , 63(3): 426-428	[Dioecious] "The sexes of <i>Chamaedorea ernesti-augusti</i> are largely undifferentiated in the distribution of biomass, nitrogen, phosphorus, potassium, and total non-structural carbohydrates, among leaves and stems. Males bear more inflorescences that are cheaper except in nitrogen, but most females bear greater annual energetic and nutritional burdens due to seed production. The ratio of vegetative to reproductive biomass is 3.5 for males but only 1.2 for females on a per module basis."

605	Requires specialist pollinators	y
	Source(s)	Notes
	Palmpedia. 2014. <i>Chamaedorea ernesti-augusti</i> . <a href="http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti">http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti</a> . [Accessed 9 Aug 2014]	"Unfortunately, <i>C. ernesti-augustii</i> and other species of subgenus <i>Eleutheropetalum</i> do not set fruits readily in cultivation without some human assistance. Hand-pollination is necessary since pollen tends to adhere to the anthers and natural insect pollinators are usually absent."
	Voight, C. N. 2011. Xate Palm ( <i>Chamaedorea</i> Sp.) Enrichment in Western Belize: The Ecological Effects of Management in Relation to Understory Plant Species Richness, Diversity, and Composition. Master's Thesis. University of Florida, Gainesville	"While some <i>Arecaceae</i> genera may be, xate palm species are most likely not since the understory of the rainforest is floristically and structurally not well adapted to wind pollination (Hodel 1992). Most <i>Chamaedorea</i> species are undoubtedly insect pollinated because their flowers are brightly colored, aromatic, and contain sticky pollen (Fisher and Moore 1977). <i>Chamaedorea ernesti-augustii</i> palms are pollinated by thrips, tiny insects in the order <i>Thysanoptera</i> (Porter-Morgan 2007)."
	Cibrián-Jaramillo, A., Bacon, C. D., Garwood, N. C., Bateman, R. M., Thomas, M. M., Russell, S., Donovan Bailey, C., Hahn, W.J., Bridgewater, S.G.M. & DeSalle, R. 2009. Population genetics of the understory fishtail palm <i>Chamaedorea ernesti-augusti</i> in Belize: high genetic connectivity with local differentiation. <i>BMC Genetics</i> , 10 (1):65	[Thrips pollinated] " <i>Chamaedorea ernesti-augusti</i> is a >5 m tall dioecious perennial species that can live for up to 15 years [29] (Figure 1). They flower once per year and have a thrip-mediated pollination system (via <i>Brooksithrips chamaedoreae</i> : <i>Thysanoptera</i> ) [30]."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Ellison, D. & Ellison, A. 2001. <i>Cultivated Palms of the World</i> . UNSW Press, Sydney, Australia	[A solitary palm with no evidence of spread by suckering] "It has a short, slender, solitary trunk and a full crown of striking, undivided leaves." ... "Germination takes 3 to 6 months and is aided by bottom heat."

607	Minimum generative time (years)	>3
	Source(s)	Notes

Qsn #	Question	Answer
	Natural History Museum. 2014. <i>Chamaedorea ernesti-augusti</i> . (fishtail palm). <a href="http://www.nhm.ac.uk/nature-online/species-of-the-day/scientific-advances/industry/chamaedorea-ernesti-augusti/index.html">http://www.nhm.ac.uk/nature-online/species-of-the-day/scientific-advances/industry/chamaedorea-ernesti-augusti/index.html</a> . [Accessed 9 Aug 2014]	[Growth rate suggests maturity will not be reached until after 3+ years of growth] "The species grows slowly, only producing 1-2 leaves per year, and it is possible to gauge the palm's lifespan from the number of permanent leaf scars on its stem. From counting these it is believed that individuals can survive for over 40 years in the wild."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	[Theoretically possible due to small size, but no evidence, and unlikely as fruits and seeds lack means of external attachment] "fruit subglobose to generally ellipsoid, green to blue-green becoming black at maturity, to 14 mm. long, 8 mm. in diameter with remains of a single stigma at the base and pale depressions where abortive carpels have torn away, the seed to 11 mm. long, 7 mm. in diameter."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Henderson, A., Galeano, G. & Bernal, R. 1997. Field Guide to the Palms of the Americas. Princeton University Press, Princeton, NJ	"Uses. It is a commonly planted ornamental."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Palmpedia. 2014. <i>Chamaedorea ernesti-augusti</i> . <a href="http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti">http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti</a> . [Accessed 9 Aug 2014]	[No evidence. Limited seed set in cultivation and relatively large seed size would make inadvertent contamination of produce or other plant material unlikely] "Fruits: 15 x 8-10 mm, subglobose to ellipsoid, green to blue-green becoming black at maturity, remains of a single stigma at base, abortive carpels often adherent to perianth in fruit or pale depressions where abortive carpels may have come away, mesocarp fleshy, thin, mucilaginous, aromatic; seeds 10 x 7 mm, ellipsoid. (Hodel, D.R. 1992)/Palmweb. Editing by edric." ... "Unfortunately, <i>C. ernesti-augustii</i> and other species of subgenus <i>Eleutheropetalum</i> do not set fruits readily in cultivation without some human assistance. Hand-pollination is necessary since pollen tends to adhere to the anthers and natural insect pollinators are usually absent."

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	"fruit subglobose to generally ellipsoid, green to blue-green becoming black at maturity, to 14 mm. long, 8 mm. in diameter with remains of a single stigma at the base and pale depressions where abortive carpels have torn away, the seed to 11 mm. long, 7 mm. in diameter."

705	Propagules water dispersed	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	[No evidence from fruit morphology or natural distribution] "Dense, wet forests, often on limestone, mostly at low elevations ... " ... "fruit subglobose to generally ellipsoid, green to blue-green becoming black at maturity, to 14 mm. long, 8 mm. in diameter with remains of a single stigma at the base and pale depressions where abortive carpels have torn away, the seed to 11 mm. long, 7 mm. in diameter."

706	Propagules bird dispersed	y
	Source(s)	Notes
	Cibrián-Jaramillo, A., Bacon, C. D., Garwood, N. C., Bateman, R. M., Thomas, M. M., Russell, S., Donovan Bailey, C., Hahn, W.J., Bridgewater, S.G.M. & DeSalle, R. 2009. Population genetics of the understory fishtail palm <i>Chamaedorea ernesti-augusti</i> in Belize: high genetic connectivity with local differentiation. BMC Genetics, 10 (1):65	"Its subglobose, aromatic, black fruits and red rachises imply a combination of gravity and animal dispersal, possibly squirrels and ground-foraging birds [31]. The distribution of this species encompasses tropical evergreen forests in southern Mexico, Guatemala, Belize, and Honduras [32-34]." ... "...it is likely that species with the life history characteristics of <i>C. ernesti-augusti</i> have a stratified dispersal model, where local movements occur by one set of mechanisms (e.g. thrip pollination and local seed dispersal by mammals) and accidental or sporadic long-distance transport (e.g. dispersal by birds) occur by another."
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	[Presumably Yes. Fleshy-fruited] "fruit subglobose to generally ellipsoid, green to blue-green becoming black at maturity, to 14 mm. long, 8 mm. in diameter with remains of a single stigma at the base and pale depressions where abortive carpels have torn away, the seed to 11 mm. long, 7 mm. in diameter."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Cibrián-Jaramillo, A., Bacon, C. D., Garwood, N. C., Bateman, R. M., Thomas, M. M., Russell, S., Donovan Bailey, C., Hahn, W.J., Bridgewater, S.G.M. & DeSalle, R. 2009. Population genetics of the understory fishtail palm <i>Chamaedorea ernesti-augusti</i> in Belize: high genetic connectivity with local differentiation. BMC Genetics, 10 (1):65	[Presumably adapted for internal dispersal. but ground foraging rodents may provide some external dispersal] "Its subglobose, aromatic, black fruits and red rachises imply a combination of gravity and animal dispersal, possibly squirrels and ground-foraging birds [31]."

708	Propagules survive passage through the gut	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Standley, P.C. & Steyermark, J.A. 1958. Flora of Guatemala Fieldiana: Botany 24(1): 1-478	[Presumably Yes. Fleshy-fruited] "fruit subglobose to generally ellipsoid, green to blue-green becoming black at maturity, to 14 mm. long, 8 mm. in diameter with remains of a single stigma at the base and pale depressions where abortive carpels have torn away, the seed to 11 mm. long, 7 mm. in diameter. "
	Cibrián-Jaramillo, A., Bacon, C. D., Garwood, N. C., Bateman, R. M., Thomas, M. M., Russell, S., Donovan Bailey, C., Hahn, W.J., Bridgewater, S.G.M. & DeSalle, R. 2009. Population genetics of the understory fishtail palm <i>Chamaedorea ernesti-augusti</i> in Belize: high genetic connectivity with local differentiation. BMC Genetics, 10 (1):65	[Presumably Yes] "Its subglobose, aromatic, black fruits and red rachises imply a combination of gravity and animal dispersal, possibly squirrels and ground-foraging birds [31]. The distribution of this species encompasses tropical evergreen forests in southern Mexico, Guatemala, Belize, and Honduras [32-34]."

801	Prolific seed production (>1000/m2)	n
	<b>Source(s)</b>	<b>Notes</b>
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	"The oblong fruit is black when ripe and seeds are available in limited quantities."
	Palmpedia. 2014. <i>Chamaedorea ernesti-augusti</i> . <a href="http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti">http://www.palmpedia.net/wiki/Chamaedorea_ernesti-augusti</a> . [Accessed 9 Aug 2014]	"Unfortunately, <i>C. ernesti-augustii</i> and other species of subgenus <i>Eleutheropetalum</i> do not set fruits readily in cultivation without some human assistance. Hand-pollination is necessary since pollen tends to adhere to the anthers and natural insect pollinators are usually absent."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	<b>Source(s)</b>	<b>Notes</b>
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 9 Aug 2014]	"Storage Behaviour: No data available for species. Of 3 known taxa of genus <i>Chamaedorea</i> , 33.33% Orthodox(p/?), 66.67% Recalcitrant(?)"
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	[Unknown] "Germination takes 3 to 6 months and is aided by bottom heat."

803	Well controlled by herbicides	
	<b>Source(s)</b>	<b>Notes</b>
	Langeland, K.A. & Stocker, R.K. 2001. Control of Non-native Plants in Natural Areas of Florida. SP 242. Institute of Food & Agricultural Sciences, University of Florida, Gainesville, FL	[Possibly Yes. Related species <i>Chamaedorea seifrizii</i> effectively controlled with herbicides] "Treatment: Cut palm below growing point and treat with 50% Garlon 3A or 10% Garlon 4. Alternatively, Garlon 4 can be applied to the apical bud.? ... "Treatment: Treat as fishtail palm, above. Comments: Pinnate-leaved, narrow-trunked, clustering species; invades hammocks."
	WRA Specialist. 2014. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Riffle, R.L.& Craft, P. 2003. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	"Because stems of older plants form adventitious roots, the palm may be air-layered, but the old stems do not normally put forth leaves after being cut."
	Williams, S. J., Gibbons, J. M., Clubbe, C., Dibble, A., Marroquín, A., & Jones, J. P. 2012. Who Harvests and Why? Characteristics of Guatemalan Households Harvesting Xaté ( <i>Chamaedorea ernesti augusti</i> ). Economic Botany, 66(4): 357-369	[Tolerates some leaf harvesting] "It appears that <i>Chamaedorea</i> species can initially withstand leaf harvest by producing more leaves that are smaller than average, but if harvest is sustained over longer periods leaf production rates eventually decrease (Endress et al. 2004)."

805	<b>Effective natural enemies present locally (e.g. introduced biocontrol agents)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2014. Personal Communication	Unknown

**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Thrives in tropical climates
- Other *Chamaedorea* species have become weedy or invasive
- Shade tolerant
- Seeds probably dispersed by birds, frugivorous mammals & intentionally by people

Low Risk Traits

- No reports of invasiveness or naturalization
- Unarmed (no spines, thorns or burrs)
- Ornamental
- Dioecious
- Requires specialized pollinators
- Not reported to spread vegetatively
- Slow growth rate & long time to reproductive maturity
- Limited seed set in cultivation