

**Taxon:** *Jacaranda copaia* (Aubl.) D. Don

**Family:** Bignoniaceae

**Common Name(s):** cupay  
abey  
chingale  
copaia  
gualandai

**Synonym(s):** *Bignonia copaia* Aubl.

**Assessor:** Chuck Chimera

**Status:** Assessor Approved

**End Date:** 18 Jul 2022

**WRA Score:** 0.0

**Designation:** L

**Rating:** Low Risk

**Keywords:** Tropical Tree, Light-Demanding, Self-Incompatible, Wind-Dispersed, Coppices

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	?
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

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	n
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		
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	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	y
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m <sup>2</sup> )	y=1, n=-1	n
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
	Condit, R., Pérez, R. & Daguerre, N. (2010). Trees of Panama and Costa Rica. Princeton University Press, Princeton, NJ	[No evidence of domestication] "Distribution: Very common in moist and wet forest of c. Panama. Can be abundant there as saplings along roadsides and clearings in wet or moist areas. Elsewhere, sparsely but widely known."

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

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 13 Jul 2022]	"Native Southern America CENTRAL AMERICA: Belize, Costa Rica, Honduras, Nicaragua, Panama NORTHERN SOUTH AMERICA: French Guiana, Guyana, Suriname, Venezuela BRAZIL: Brazil (n. & w.) WESTERN SOUTH AMERICA: Bolivia (n.w.), Colombia, Ecuador, Peru"
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"This is a widespread tree of the tropical moist forest, premontane wet forest, and tropical wet forest. It ranges from British Honduras to Brazil, Peru, and the Guianas."

202	Quality of climate match data	High
	Source(s)	Notes
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"This is a widespread tree of the tropical moist forest, premontane wet forest, and tropical wet forest. It ranges from British Honduras to Brazil, Peru, and the Guianas."

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

Qsn #	Question	Answer
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"J. copaia may adapt to many environmental conditions, such as humid or very humid lowland climates, poor soils, and regions with or without a marked dry season. It is also very common in secondary forest (INIA-OIMT, 1996)." "Climatic amplitude (estimates) - Altitude range: 0 - 1000 m - Mean annual rainfall: 600 - 2000 mm - Rainfall regime: summer; bimodal; uniform - Dry season duration: 4 - 6 months - Mean annual temperature: 20 - 28°C - Mean maximum temperature of hottest month: 27 - 38°C - Mean minimum temperature of coldest month: 14 - 22°C - Absolute minimum temperature: 99 - 99°C"
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The tree grows without much demand for nutrients on flat grounds and hillsides that are moderately to well drained. The species tolerates temporary floods, soils having a sandy-clayey to loose muddy texture and an acid to slightly acid pH. Its growth is delayed in very shallow soils. It adapts to multiple environmental conditions, growing naturally in areas with a marked dry season and in regions, such as the South Pacific, where there is no hydric deficit. In Colombia, it is found from sea level to 1000 m. It grows in areas with an average temperature of 25 oC and an annual precipitation ranging from 600 to 3000 mm. It grows in formations of the wet and very wet Tropical forest (bh/mh-T) (Venegas 1978). It is a pioneer and colonizing species."

204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"This is a widespread tree of the tropical moist forest, premontane wet forest, and tropical wet forest. It ranges from British Honduras to Brazil, Peru, and the Guianas."

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>?</b>
	<b>Source(s)</b>	<b>Notes</b>
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Cultivated within native range]

301	<b>Naturalized beyond native range</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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

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

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

305	Congeneric weed	y
	<b>Source(s)</b>	<b>Notes</b>
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"J. mimosifolia is a striking ornamental tree characteristic of many cities in tropical and sub-tropical countries, well-known for its clusters of striking bell-shaped, blue-violet flowers. Native to South America, like many ornamental trees, it was very widely introduced over the centuries. This species has naturalized in a number of countries and has been reported as invasive in a number of locations; Queensland, Australia, Hawaii, Chile's Juan Fernandez Islands and in Kenya, Tanzania, South Africa and Zambia. J. mimosifolia is a fast growing tree that re-sprouts easily if damaged. It is deep-rooted and competitive and few plants or crops can grow beneath it once it has established. It can form thickets of seedlings beneath planted trees from which the species may expand and exclude other vegetation thereby decreasing biodiversity in an area."
	Henderson, L. (2007). Invasive, naturalized and casual alien plants in southern Africa: a summary based on the Southern African Plant Invaders Atlas (SAPIA). Bothalia, 37 (2): 215–248	"Jacaranda mimosifolia is another species that has been planted throughout South Africa yet is only invasive in the moister parts of the Savanna and Forest Biomes. In its native northeastern Argentina, J. mimosifolia occurs mainly on river banks under warmer-temperate, subhumid conditions (Poynton 1973)—environmental conditions which are similar to those in its naturalized range in southern Africa. A previous study by Henderson (2006b) showed that the current distributions of invasive plants in southern Africa are a reflection of the climatic zones of their origin."

Qsn #	Question	Answer
	BioNET-EAFRINET. (2022). <i>Jacaranda mimosifolia</i> ( <i>Jacaranda</i> ). <a href="https://keys.lucidcentral.org/keys/v3/eafrinet/weeds/key/weeds/Media/Html/Jacaranda_mimosifolia_(Jacaranda).htm">https://keys.lucidcentral.org/keys/v3/eafrinet/weeds/key/weeds/Media/Html/Jacaranda_mimosifolia_(Jacaranda).htm</a> . [Accessed 14 Jul 2022]	" <i>Jacaranda mimosifolia</i> is regarded as an invasive species in parts of South Africa and Queensland, Australia, where it can out-compete native species. It can form thickets of seedlings beneath planted trees from which the species may expand and exclude other vegetation. <i>J. mimosifolia</i> has been listed as a Category 3 invader in South Africa (no further planting is allowed - except with special permission - nor is trade in propagative material. Existing plants must be prevented from spreading). "
	Lok, A. F. S. L., Tan, K., Giam, X., Ng, T. P., & Tan, H. T. W. (2008). The spread of <i>Jacaranda obtusifolia</i> Humb. & Bonpl. (Bignoniaceae) into the Central Catchment Nature Reserve, Singapore. <i>Nature in Singapore</i> , 1, 143-147	"This paper describes the spread of <i>Jacaranda obtusifolia</i> Humb. & Bonpl. ssp. <i>rhombifolia</i> (G. Mey.) A. Gentry, a new potentially invasive tree species in the Central Catchment Nature Reserve of Singapore. It belongs to a neotropical genus of 49 species in the tribe Tecomeae and of the family Bignoniaceae (Gentry, 1980). This subspecies is native to Venezuela, Guyana, Suriname, French Guiana and Brazil, growing in savannah forest and is also known by the following synonyms, <i>Bignonia filicifolia</i> , <i>Jacaranda filicifolia</i> , <i>Jacaranda filicifolia</i> var. <i>rhombifolia</i> and <i>Jacaranda rhombifolia</i> (Gentry, 1992)." ... "Unlike the other invasive tree species of Singapore so far, only <i>Jacaranda obtusifolia</i> ssp. <i>rhombifolia</i> seems to be able to penetrate the forest at the Central Catchment Nature Reserve. Individuals seen at Lower and Upper Pierce Reservoirs as well as Upper Seletar Reservoir were all found closer to the shoreline in brightly lit conditions. However, Populations 1 and 2 at MacRitchie Reservoir appeared to have successfully established themselves under the forest canopy with seedlings and saplings being found in deep shade"

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). <i>Flora of Panama</i> . Part IX. Family 172. Bignoniaceae. <i>Annals of the Missouri Botanical Garden</i> 60(3): 781-977	[No evidence] "Tree to 45 cm d.b.h. and 45 m tall, the trunk usually unbranched for most of its length and often somewhat flattened, young trees unbranched with a cluster of giant leaves at top, bark gray, smooth; twigs lepidote, subtetragonal, drying brown or blackish, the pith large, sometimes hollowed by ants. Leaves pinnately bicomposite, 15-165 cm long, with 5-20 pinnae, each pinna 5-35 cm long with essentially wingless rachis and 5-25 sessile leaflets, these 1.5-8 cm long and 0.8-2.5 cm wide, asymmetrically rhombic-elliptic, acute to acuminate, asymmetrically attenuate, membranaceous, secondary veins 3-5 on one side and 4-6 on the other, lepidote with scabrous to puberulous midvein above and beneath; drying dark brown above, olive beneath, petiole 3.5-29 cm long, the petiolules 2.5-4 cm long, petiole and petiolules lepidote to subpuberulous as on the main and lateral rachises."

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

403	Parasitic	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"Tree to 45 cm d.b.h. and 45 m tall, the trunk usually unbranched for most of its length and often somewhat flattened, young trees unbranched with a cluster of giant leaves at top, bark gray, smooth; twigs lepidote, subtetragonal, drying brown or blackish, the pith large, sometimes hollowed by ants." [No evidence]

404	Unpalatable to grazing animals	
	<b>Source(s)</b>	<b>Notes</b>
	Milton, K. (1980). The Foraging Strategy of Howler Monkeys: A Study in Primate Economics. Columbia University Press, New York	[Possibly low palatability] "Young leaves of species not eaten by howler monkeys, such as <i>Jacaranda copaia</i> and <i>Anacardium excelsum</i> , had protein contents higher than the mean protein content of young leaves howlers eat; however, these leaf species also had a cell wall content higher than the mean of young leaves eaten. This too supports the view that the protein/ fiber ratio is an important factor in determining the preference of howlers for young leaves."

405	Toxic to animals	n
	<b>Source(s)</b>	<b>Notes</b>
	NC State Extension. (2022). <i>Jacaranda copaia</i> . <a href="https://plants.ces.ncsu.edu/plants/jacaranda-copaia/">https://plants.ces.ncsu.edu/plants/jacaranda-copaia/</a> . [Accessed 15 Jul 2022]	"#non-toxic for horses #non-toxic for dogs #non-toxic for cats"
	Tropical Plants Database, Ken Fern. (2022). <i>Jacaranda copaia</i> . <a href="https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia">https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia</a> . [Accessed 15 Jul 2022]	"Known Hazards None known"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "Leaves antimalarial"

406	Host for recognized pests and pathogens	
	<b>Source(s)</b>	<b>Notes</b>
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Pests recorded Insects: Xyleborus volvulus Pests recorded at the generic level ( <i>Jacaranda</i> ): Insects: Coccus hesperidum (brown soft scale) Maconellicoccus hirsutus (pink hibiscus mealybug) Parasaissetia nigra (pomegranate scale)"

407	Causes allergies or is otherwise toxic to humans	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Tropical Plants Database, Ken Fern. (2022). <i>Jacaranda copaia</i> . <a href="https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia">https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia</a> . [Accessed 15 Jul 2022]	"Known Hazards None known"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "Leaves antimalarial"
	Meier, E. (2022). Wood Allergies and Toxicity. The Wood Database. <a href="https://www.wood-database.com/wood-articles/wood-allergies-and-toxicity/">https://www.wood-database.com/wood-articles/wood-allergies-and-toxicity/</a> . [Accessed 15 Jul 2022]	Copaia ( <i>Jacaranda copaia</i> ) sawdust reported to be a skin irritant

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"Because the tree is resistant to fire and termites, it can be used to improve soils."
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. <i>Annals of the Missouri Botanical Garden</i> 60(3): 781-977	"This is a widespread tree of the tropical moist forest, premontane wet forest, and tropical wet forest." [Unlikely. Does not occur in fire prone habitats]

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Jones, F. A., Chen, J., Weng, G.-J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). <i>The American Naturalist</i> , 166(5), 543–555	" <i>Jacaranda copaia</i> is a light-demanding pioneer tree that requires large tree fall gaps to regenerate (Brokaw 1985). A study of realized vital rates and size distributions for 70 of the most common species in the FDP found that <i>J. copaia</i> is at the extreme of light-requiring species."
	Jones, F. A., & Hubbell, S. P. (2006). Demographic spatial genetic structure of the Neotropical tree, <i>Jacaranda copaia</i> . <i>Molecular Ecology</i> , 15(11), 3205-3217	" <i>Jacaranda</i> is a fast-growing, light-demanding species with low recruitment rates and high mortality rates in the smaller diameter classes. It successfully regenerates only in large light gaps, which occur infrequently and stochastically in space and time."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	CAB International. (2005). <i>Forestry Compendium</i> . CAB International, Wallingford, UK	"Soil descriptors - Soil texture: light; medium; heavy - Soil drainage: seasonally waterlogged - Soil reaction: neutral; alkaline - Special soil tolerances: saline; infertile"
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"The tree grows without much demand for nutrients on flat grounds and hillsides that are moderately to well drained. The species tolerates temporary floods, soils having a sandy-clayey to loose muddy texture and an acid to slightly acid pH. Its growth is delayed in very shallow soils."

411	Climbing or smothering growth habit	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"Tree to 45 cm d.b.h. and 45 m tall, the trunk usually unbranched for most of its length and often somewhat flattened, young trees unbranched with a cluster of giant leaves at top"

412	Forms dense thickets	n
	<b>Source(s)</b>	<b>Notes</b>
	Condit, R., Pérez, R. & Daguerre, N. (2010). Trees of Panama and Costa Rica. Princeton University Press, Princeton, NJ	[As a pioneer species, establishes abundantly in clearings, and disturbed sites. Natural formation of dense stands, however, has not been documented] "Very common in moist and wet forest of c. Panama. Can be abundant there as saplings along roadsides and clearings in wet or moist areas. Elsewhere, sparsely but widely known."
	Croat, T.B. (1978). Flora of Barro Colorado Island. Stanford University Press, Stanford, CA	[Described as common and abundant, but with no indication that pure stands are naturally formed] "Common to locally abundant in the forest." ... "Belize to the Guianas, Brazil, and Peru. In Panama, a characteristic tree species of tropical moist forest (Holdridge & Budowski, 1956; Tosi, 1971) and common in secondary areas at low elevations (Holdridge, 1970); known from tropical moist forest in the Canal Zone, Bocas del Toro, San Bias, Panama, and Darien, from premontane wet forest in Panama, and from tropical wet forest in Colon and Darien."
	Gentry, A.H. (1992). Bignoniaceae: Part II (Tribe Tecomeae). Flora Neotropica 25(2): 1-370	[Jacaranda orinocensis is the only species in this publication described as forming dense thickets. No evidence is provided for Jacaranda copaia, which is also given a thorough treatment in this publication] "Jacaranda orinocensis ... Endemic to the middle Orinoco in the area of Puerto Ayacucho. Apparently restricted to sandy river beaches where it is locally common and can form dense thickets; ca. 100 m elevation."

501	Aquatic	n
	<b>Source(s)</b>	<b>Notes</b>
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	[Terrestrial] "This is a widespread tree of the tropical moist forest, premontane wet forest, and tropical wet forest."

502	Grass	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 14 Jul 2022]	"Family: Bignoniaceae Tribe: Jacarandae"

503	Nitrogen fixing woody plant	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 14 Jul 2022]	"Family: Bignoniaceae Tribe: Jacarandaeae"

<b>504</b>	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Woodson, Jr., R.E., Schery, R.W.& Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"Tree to 45 cm d.b.h. and 45 m tall, the trunk usually unbranched for most of its length and often somewhat flattened"

<b>601</b>	<b>Evidence of substantial reproductive failure in native habitat</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Condit, R., Pérez, R. & Daguerre, N. (2010). Trees of Panama and Costa Rica. Princeton University Press, Princeton, NJ	"Distribution: Very common in moist and wet forest of c. Panama. Can be abundant there as saplings along roadsides and clearings in wet or moist areas. Elsewhere, sparsely but widely known."
	Woodson, Jr., R.E., Schery, R.W.& Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"This is a widespread tree of the tropical moist forest, premontane wet forest, and tropical wet forest. It ranges from British Honduras to Brazil, Peru, and the Guianas. It flowers during the dry season from February to April, and seed release is in mid wet season in late July and early August."

<b>602</b>	<b>Produces viable seed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"Seeds can be stored up to 2 months in plastic bags at a moisture content less than 8 percent and a temperature of 4 °C. A fungicide should be applied to the seeds before storage. Pregermination treatment consists of submerging the seeds in running water for 1 day. Seeds germinate in 5 to 20 days. About 25,000 plantules are obtained from 1 kg of seeds in nurseries. The recommended substrate consists of two parts sand and one part soil, which must be disinfected before planting the seeds. A substrate of humus with loose texture is used in seedbeds to facilitate germination. Once the seedbed is disinfected with formol or hot water, the seed is planted at a depth no greater than 1 cm and covered with very fine soil."
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). The American Naturalist, 166(5), 543–555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh). On BCI, <i>Jacaranda</i> seeds are dispersed August through November, with a pronounced peak in September."

<b>603</b>	<b>Hybridizes naturally</b>	
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Bittencourt, N. S. (2019). Reproductive systems and low outbreeding barriers between <i>Jacaranda cuspidifolia</i> and <i>J. mimosifolia</i> (Jacarandaeae, Bignoniaceae). <i>Nordic Journal of Botany</i> , 37(11): 1-12	[Unknown. Hybrids reported in genus] "Reciprocal interspecific crosses in this study show that <i>J. cuspidifolia</i> and <i>J. mimosifolia</i> are bilaterally interfertile (viable seeds were obtained from crosses in both directions), and if assuming that these species may share pollinators (a possibility that still needs to be confirmed) their hybridization in natural conditions seems to be feasible."

604	Self-compatible or apomictic	n
	<b>Source(s)</b>	<b>Notes</b>
	Maués, M. M., de Oliveira, P. E. A., & Kanashiro, M. (2008). Pollination biology in <i>Jacaranda copaia</i> (Aubl.) D. Don. (Bignoniaceae) at the "Floresta Nacional do Tapajós", Central Amazon, Brazil. <i>Brazilian Journal of Botany</i> , 31(3), 517-527	" <i>Jacaranda copaia</i> (Aubl.) D. Don is a pioneer tree widespread in the Brazilian Amazon, usually found colonizing forest gaps and altered areas, and the forest fragment edges. This study investigated aspects of the floral biology, breeding system and pollinators of <i>J. copaia</i> trees. Flowering lasts from August to November, during the low rainfall period extending up to four weeks per tree and 3-4 months for the population as a whole, characterizing a cornucopia flowering pattern. The fruit set ends in the beginning of the rainy season, with wind dispersed winged seeds. Fruit set from open pollination was 1.06% (n = 6,932). Hand pollination using self-pollen (n = 2,099) did not set fruits. Cross-pollination resulted in 6.54% fruit set (n = 2,524), representing six times more than the natural pollination rate (1.06%, n = 6,932). Flowers excluded from insect visitation (automatic self-pollination) did not set fruits (n = 5,372). Pollen tube growth down to ovary was detected under fluorescence microscopy in cross pollinated and selfed pistils. The species is an obligate allogamous plant, with late-acting self-incompatibility system. Approximately 40 species of native bees visited the flowers, but the main pollinators were medium-sized solitary bees as <i>Euglossa</i> and <i>Centris</i> species due to the compatibility between their body sizes with the corolla tube, direct contact with the reproductive structures and high frequency of visits."

605	Requires specialist pollinators	n
	<b>Source(s)</b>	<b>Notes</b>
	Maués, M. M., de Oliveira, P. E. A., & Kanashiro, M. (2008). Pollination biology in <i>Jacaranda copaia</i> (Aubl.) D. Don. (Bignoniaceae) at the "Floresta Nacional do Tapajós", Central Amazon, Brazil. <i>Brazilian Journal of Botany</i> , 31(3), 517-527	"Approximately 40 species of native bees visited the flowers, but the main pollinators were medium-sized solitary bees as <i>Euglossa</i> and <i>Centris</i> species due to the compatibility between their body sizes with the corolla tube, direct contact with the reproductive structures and high frequency of visits." ... "There was a plethora of 61 different species of flower visitors, including medium to large-sized bees, butterflies, wasps and hummingbirds (table 1)."

Qsn #	Question	Answer
	Maués, M. M., Souza, M. S., & Kanashiro, M. (2004). The importance of solitary bees on the reproductive biology of timber trees at the Tapajós National Forest, Brazil. Solitary Bees Conservation, Rearing and Management for Pollination. Fortaleza: Imprensa Universitária, 241-254	"In both species, there was a plethora of flower visitors, including medium to large-sized bees, butterflies, moths, wasps and hummingbirds. Considering the species separately, <i>J. copaia</i> the flowers were mainly visited by <i>Euglossa</i> spp. and <i>Centris</i> , which initiated the visits at the anthesis, sometimes promoting the flower opening by forcing the entrance at the pre-anthesis flower stage. The visits of <i>Centris</i> were very fast lasting from 3 to 6 seconds (n=46), and the main reward was nectar. The euglossine bees were also very active and their visits lasted 8 to 12 seconds (n=55). These bees together were considered the legitimate pollinators, due to the compatibility between their body sizes with the petal hood, direct contact with the reproductive organs and frequency of visits (Table 2)."
	Maués, M. M. (2001). Importance of the floral biology and pollinators on the sustainability of forest management. <i>Acta Horticulturae</i> 561, 81-85	"Table 2– Pollination features and pollinators of the studied species" [ <i>J. copaia</i> - Legitimate pollinators = Bees (Anthophoridae: <i>Epicharis rustica</i> , <i>Epicharis</i> sp., <i>Centris similis</i> , <i>Centris</i> sp.; Apidae: <i>Bombus transversalis</i> , <i>Euglossa</i> spp.)]

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Palmer, J. R. (1980). <i>Jacaranda copaia</i> , a fast-growing narrow-crowned neotropical species for lowland pulpwood plantations. International Union of Forest Research symposium and workshop on genetic improvement and productivity of fast-growing tree species. Sao Paulo, Brazil	"Ledoux (1969) emphasised the importance of good coppicing power in short-rotation pulpwood plantations. This power is well shown by roadside <i>J. copaia</i> which is slashed back and repeatedly regrows." [Coppices, but no evidence of suckering or natural vegetative spread]
	Tropical Plants Database, Ken Fern. (2022). <i>Jacaranda copaia</i> . <a href="https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia">https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia</a> . [Accessed 18 Jul 2022]	"Seed - best sown as soon as it is ripe in a partially shaded position in a nursery seedbed. A high germination rate can be expected, with the seed sprouting within 14 - 21 days[419]. When they are 5 - 6cm tall, transplant the seedlings into individual containers. They should be ready to plant out into their permanent positions 5 - 6 months later[419]. Cuttings of half-ripe wood with a heel[200]."

607	Minimum generative time (years)	
	Source(s)	Notes
	Palmer, J. R. (1980). <i>Jacaranda copaia</i> , a fast-growing narrow-crowned neotropical species for lowland pulpwood plantations. International Union of Forest Research symposium and workshop on genetic improvement and productivity of fast-growing tree species. Sao Paulo, Brazil	"Although the tree does not usually grow to a large size it is one of the fastest growing of Amazonian tree species in height and diameter."
	Tropical Plants Database, Ken Fern. (2022). <i>Jacaranda copaia</i> . <a href="https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia">https://tropical.theferns.info/viewtropical.php?id=Jacaranda+copaia</a> . [Accessed 15 Jul 2022]	"Growth Rate Fast"

Qsn #	Question	Answer
	Petit, B., & Montagnini, F. (2006). Growth in pure and mixed plantations of tree species used in reforesting rural areas of the humid region of Costa Rica, Central America. <i>Forest Ecology and Management</i> , 233(2-3), 338-343	[Fast growth rate. Time to maturity not specified] "This paper compares productivity of native tree species plantations, in monoculture and mixtures, at La Selva Biological Station in the Caribbean lowlands of Costa Rica. In monocultures, <i>Jacaranda copaia</i> , <i>Vochysia guatemalensis</i> , and <i>Vochysia ferruginea</i> were the most productive of 10 species compared. However, <i>J. copaia</i> and <i>V. guatemalensis</i> grew significantly faster in mixtures than in monocultures. A mixture of <i>J. copaia</i> , <i>V. guatemalensis</i> , and <i>Calophyllum brasiliense</i> produced 21% more merchantable volume than a monoculture of <i>J. copaia</i> , which grew the fastest of the three species. Mixed plantations of <i>Dipteryx panamensis</i> , <i>Virola koschnyi</i> , and <i>Terminalia amazonia</i> had productivity rates similar to monocultures of the fastest growing of these species ( <i>Virola koschnyi</i> ). The productivity of mixed plantations of <i>V. ferruginea</i> , <i>Hyeronima alchorneoides</i> , <i>Genipa americana</i> , and <i>Balizia elegans</i> was intermediate from the respective species' productivities in monocultures. Cultivating tree species in mixtures affected species' growth forms and ability to persist on the site. # 2006 Elsevier B.V. All rights reserved."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). <i>Flora of Panama</i> . Part IX. Family 172. Bignoniaceae. <i>Annals of the Missouri Botanical Garden</i> 60(3): 781-977	"Capsule compressed-oblong, the margins straight, not wavy, 6.2-12.7 cm long and 3.3-6.0 cm wide, somewhat lepidote to glabrous, drying brown or blackish; seeds small-bodied with a surrounding suborbicular wing, 1.0-2.0 cm long and 1.7-2.8 cm wide, the body 3-5 mm long and 3-4 mm wide, the wing hyaline-membranaceous, with radial brownish striations, clearly demarcated from the seed body." [Seeds wind-dispersed, and lack means of external attachment]
	Condit, R., Pérez, R. & Daguerre, N. (2010). <i>Trees of Panama and Costa Rica</i> . Princeton University Press, Princeton, NJ	"Very common in moist and wet forest of c. Panama. Can be abundant there as saplings along roadsides and clearings in wet or moist areas. Elsewhere, sparsely but widely known." [Colonizes roadsides because it is a disturbance species, and not because the seeds are able to attach externally]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	rarepalmseeds.com. (2022). <i>Jacaranda copaia</i> . <a href="https://www.rarepalmseeds.com/jacaranda-copaia">https://www.rarepalmseeds.com/jacaranda-copaia</a> . [Accessed 18 Jul 2022]	"Mature trees produce a vase-shaped crown with stunning display of blue flowers during the dry season. Native to tropical Central and South America from Mexico to Bolivia, it is best suited for climates in USDA Zones 10 and above." [Seeds sold online]

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes

Qsn #	Question	Answer
	Woodson, Jr., R.E., Schery, R.W. & Gentry, A.H. (1973). Flora of Panama. Part IX. Family 172. Bignoniaceae. Annals of the Missouri Botanical Garden 60(3): 781-977	"Capsule compressed-oblong, the margins straight, not wavy, 6.2-12.7 cm long and 3.3-6.0 cm wide, somewhat lepidote to glabrous, drying brown or blackish; seeds smallbodied with a surrounding suborbicular wing, 1.0-2.0 cm long and 1.7-2.8 cm wide, the body 3-5 mm long and 3-4 mm wide, the wing hyaline-membranaceous, with radial brownish striations, clearly demarcated from the seed body." [No evidence. Wind-dispersed seeds relatively large and unlikely to contaminate produce]
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). The American Naturalist, 166(5), 543-555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh)." [No evidence]

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 pale purple flowers appear at the beginning of summer; the fruit ripens before winter so the seeds can be scattered by the wind."
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). The American Naturalist, 166(5), 543-555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh). On BCI, <i>Jacaranda</i> seeds are dispersed August through November, with a pronounced peak in September."

705	Propagules water dispersed	n
	Source(s)	Notes
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). The American Naturalist, 166(5), 543-555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh). On BCI, <i>Jacaranda</i> seeds are dispersed August through November, with a pronounced peak in September."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). The American Naturalist, 166(5), 543-555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh). On BCI, <i>Jacaranda</i> seeds are dispersed August through November, with a pronounced peak in September."

707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). The American Naturalist, 166(5), 543-555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh). On BCI, <i>Jacaranda</i> seeds are dispersed August through November, with a pronounced peak in September."

Qsn #	Question	Answer
	Nepstad, D. C., Uhl, C., Pereira, C. A., & Da Silva, J. M. C. (1996). A comparative study of tree establishment in abandoned pasture and mature forest of eastern Amazonia. <i>Oikos</i> , 76(1): 25-39	[May be externally carried and potentially dispersed by ants] "There were two principal groups of seed removers active in the open field: ants and small rodents. The most conspicuous ant species was <i>Atta sexdens</i> . We observed this ant removing most of the seeds of <i>Inga</i> sp. and <i>Nectandra</i> sp. placed in the abandoned pasture. We also observed the ant genera <i>Solenopsis</i> and <i>Pheidole</i> removing seeds of <i>Bagassa guianensis</i> Aubl., <i>Laetia procera</i> (P. et Endl.) Eichl., <i>Vismia guianensis</i> , <i>Solanum crinitum</i> , <i>Cecropia obtusa</i> , <i>Jacaranda copaia</i> , and <i>Eugenia</i> sp. In all the cases cited above, we observed the ants carrying the seeds into nests."

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Jones, F. A., Chen, J., Weng, G.-J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). <i>The American Naturalist</i> , 166(5), 543–555	"The small, wind-dispersed seeds (mass < 2 mg) are produced in large, woody capsules in the canopy of adult trees (≥20 cm dbh)." [No evidence that seeds are zoochorous]

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Zamora, C. O., & Montagnini, F. (2007). Seed rain and seed dispersal agents in pure and mixed plantations of native trees and abandoned pastures at La Selva Biological Station, Costa Rica. <i>Restoration Ecology</i> , 15(3), 453-461	[In tree plantations, <i>Jacaranda copaia</i> produced seed densities of 522.75 m2] "Lack of seed dispersal can be an important obstacle to natural regeneration (NR) of degraded pastures in the humid tropics. Tree plantations can facilitate secondary forest succession by attracting seed dispersal agents from nearby forests. We studied seed rain and seed dispersal agents in 12–13 years old pure and mixed native tree plantations at La Selva Biological Station, Costa Rica from July to December 2004. Plantations of <i>Balizia elegans</i> (5,522), <i>Dipteryx panamensis</i> (2,263), and <i>Jacaranda copaia</i> (2,091) had the greatest total seed abundance; treatments with the least total seed abundance were <i>Calophyllum brasiliense</i> (56), nonplanted abandoned pasture control 2 (353), Mixed Species 2 (389), and control 1 (836). Plantations of <i>J. copaia</i> and <i>Hyeronima alchorneoides</i> had the greatest seed species richness density, whereas the lowest seed species richness was found in the control treatments. The NR plots had more seeds dispersed by wind, whereas in the plantations, the most important dispersal agents were birds and mammals. The most abundant seeds were those of <i>Miconia</i> spp. (14,492), <i>Psychotria bracheata</i> (2,252), and the Poaceae family (1,346), all species from early successional stages. Plantations of native species are effective in attracting seed dispersal agents and thus facilitating regeneration of degraded pasturelands in the region."

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

Qsn #	Question	Answer
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	"Seeds can be stored up to 2 months in plastic bags at a moisture content less than 8 percent and a temperature of 4 °C. A fungicide should be applied to the seeds before storage. Pregermination treatment consists of submerging the seeds in running water for 1 day. Seeds germinate in 5 to 20 days."
	Jones, F. A., Chen, J., Weng, G. -J., & Hubbell, S. P. (2005). A Genetic Evaluation of Seed Dispersal in the Neotropical Tree <i>Jacaranda copaia</i> (Bignoniaceae). <i>The American Naturalist</i> , 166(5), 543–555	"Seeds of <i>J. copaia</i> are nondormant (Gonzalez 1991) and do not form a persistent seed bank in the soil (Dalling et al. 1997). Its small seeds, lack of a seed bank, and high light requirement suggest that seed germination, seedling establishment, and recruitment in <i>J. copaia</i> depend on dispersal to very recently created gap sites and on the high levels of irradiance found within these sites (Pearson et al. 2002)."

803	Well controlled by herbicides	
	Source(s)	Notes
	Palmer, J. R. (1980). <i>Jacaranda copaia</i> , a fast-growing narrow-crowned neotropical species for lowland pulpwood plantations. International Union of Forest Research symposium and workshop on genetic improvement and productivity of fast-growing tree species. Sao Paulo, Brazil	"It is resistant to hormonal arboricides applied in a frill girdle (Dubois, 1971)." [Unable to access cited publication by Dubois to determine which herbicides were evaluated]
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	[Herbicides used to control congeners may be similarly effective if needed] "For larger <i>J. mimosifolia</i> trees, they should be cut and herbicide should be applied to the stumps (PIER, 2014). Henderson (2001) reports that <i>J. mimosifolia</i> is very difficult to control once it is established and that large tree must be ring-barked or cut down below ground level and any regrowth treated with herbicide. Effective herbicides include imazapyr or glyphosate."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Palmer, J. R. (1980). <i>Jacaranda copaia</i> , a fast-growing narrow-crowned neotropical species for lowland pulpwood plantations. International Union of Forest Research symposium and workshop on genetic improvement and productivity of fast-growing tree species. Sao Paulo, Brazil	"Ledoux (1969) emphasised the importance of good coppicing power in short-rotation pulpwood plantations. This power is well shown by roadside <i>J. copaia</i> which is slashed back and repeatedly regrows."

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



**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Broad elevation range in the tropics
- Other *Jacaranda* species are regarded as invasive
- Tolerates many soil types (not substrate limited)
- Reproduces by seeds
- Fast growth rate (but time to reproductive maturity unknown)
- Seeds dispersed by wind, by ants, and through intentional cultivation
- Able to coppice and grow back repeatedly following cutting

## Low Risk Traits

- No reports of naturalization or invasiveness, but unclear how widespread cultivation is outside native range
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- A light-demanding pioneer tree (dense shade may inhibit ability to spread)
- Self-incompatible (requires outcrossing for seed set)
- Not reported to spread vegetatively
- Seeds of are nondormant and do not form a persistent seed bank in the soil