

Taxon: <i>Astronium fraxinifolium</i> Schott	Family: Anacardiaceae
Common Name(s): kingwood locustwood tigerwood zebrawood	Synonym(s): <i>Astronium fraxinifolium</i> f. <i>Astronium fraxinifolium</i> f. pilosum <i>Astronium graveolens</i> var. <i>brasiliense</i> <i>Astronium graveolens</i> var. <i>brasiliensis</i>

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 25 Jun 2021
WRA Score: 0.0	Designation: L	Rating: Low Risk

Keywords: Tropical Tree, Timber Source, Dioecious, Wind-Dispersed, Stump Resprouter

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)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	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		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	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
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Not domesticated] " <i>Astronium fraxinifolium</i> is an endangered tree species from Brazil. Due to its significance in environmental reforestation, as well as the continued exploitation of its wood, it is necessary to develop management programs that support the conservation of the species."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2021). 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
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"Present distribution: Occurring mainly in Brazil, <i>A. fraxinifolium</i> extends into Bolivia, Colombia, Paraguay and Venezuela (Salomão, unpubl.). López (1987) reports its occurrence in northern Argentina, but there are apparently no collections to support this claim."

202	Quality of climate match data	High
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"Present distribution: Occurring mainly in Brazil, <i>A. fraxinifolium</i> extends into Bolivia, Colombia, Paraguay and Venezuela (Salomão, unpubl.). López (1987) reports its occurrence in northern Argentina, but there are apparently no collections to support this claim."

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

Qsn #	Question	Answer
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Occurs across a relatively broad range of elevations and rainfall regimes in tropical climates] "Elevation: Evidence from herbarium information and from Barkley (1968) indicates that the species occurs over an elevational range from ca. 50 to 800 m a.s.l. It is obvious, though, that the upper limit is actually higher; it is found for example in the Central Plateaux of Brazil on terrain above 1,000 m (E.J. Leite, pers. observ.). Climate: Comments relate to a detailed mean annual rainfall map of South America (WMO et al. 1975) and association with the distribution map (Fig. 2). The amplitude of rainfall where the species is present is very large, ranging from 600 mm in northeastern Brazil to 1,600 mm in more rainfed areas in the southeast of that country. It has also been reported in Amazonia, however, where the rainfall exceeds 2,000 mm. This pattern is consistent with the mesophytic character of the species."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"Present distribution: Occurring mainly in Brazil, <i>A. fraxinifolium</i> extends into Bolivia, Colombia, Paraguay and Venezuela (Salomão, unpubl.). López (1987) reports its occurrence in northern Argentina, but there are apparently no collections to support this claim."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence of naturalization
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence of naturalization

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	CAB International. (2005). <i>Forestry Compendium</i> . CAB International, Wallingford, UK	No evidence
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/ . [Accessed 21 Jun 2021]	No evidence. <i>Astronium balansae</i> recorded at Harold L. Lyon Arboretum
	Skolmen, R.G. 1980. Plantings on the forest reserves of Hawaii: 1910–1960. Institute of Pacific Islands Forestry, Pacific Southwest Forest & Range Experiment Station, US Forest Service, Honolulu, HI	No planting records for this species

301	Naturalized beyond native range	n
	Source(s)	Notes

Qsn #	Question	Answer
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence of naturalization
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence of naturalization

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
	Global Invasive Species Database (2021). http://www.iucngisd.org/gisd/ . [Accessed 24 Jun 2021]	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
	Global Invasive Species Database (2021). http://www.iucngisd.org/gisd/ . [Accessed 24 Jun 2021]	No evidence
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Global Invasive Species Database (2021). http://www.iucngisd.org/gisd/ . [Accessed 24 Jun 2021]	No evidence

305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Global Invasive Species Database (2021). http://www.iucngisd.org/gisd/ . [Accessed 24 Jun 2021]	No evidence

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

Qsn #	Question	Answer
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[No evidence] "Habit, size and form of mature tree: <i>Astronium fraxinifolium</i> is a medium to large tree, depending on soil conditions. In Colombia it is reported to reach 12–15 m in dry forests below 365 m elevation (Barkley 1968). López (1987) reported, however, individuals from 20 to 30 m and diameter between 45 and 100 cm. The bole is straight and yields commercial logs 6–15 m long. The branches are cylindrical and pubescent when young. The primary branches are large and tortuous, leading to a flat crown with thick branchlets. There is little ramification. The base of the trunk is sometimes expanded (López 1987). The bark is greyish-brown to whitish (due to the presence of lichens), devoid of hairs, rough but not fissured, and thick (10–15 mm). López (1987) described the outer bark as having numerous small lenticels. It is thin (1–3 mm), smooth and with rounded thick scales, which leave white spots when removed. The blaze is brown whilst the inner bark is pinkish and rather thick (10–16 mm)."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	" <i>Astronium fraxinifolium</i> is a medium to large tree, depending on soil conditions." [Anacardiaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Morais-Costa, F., Soares, A.C.M., Bastos, G.A. et al. (2015). Plants of the Cerrado naturally selected by grazing sheep may have potential for inhibiting development of <i>Haemonchus</i> . <i>Tropical Animal Health and Production</i> 47, 1321–1328	[Commonly selected, and presumably palatable to sheep] "Abstract Plant species naturally selected by sheep grazing in the Cerrado region of Brazil were assessed in vitro for activity against <i>Haemonchus contortus</i> . One year of observations showed the plant families in the region exhibiting greatest richness to be Fabaceae, Rubiaceae, Malpighiaceae, Bignoniaceae, Myrtaceae, and Annonaceae. Nine species commonly selected by grazing sheep showed variation in the selectivity index with respect to the dry and rainy seasons." ... "The commonly selected species <i>Erythroxylum deciduum</i> , <i>Astronium fraxinifolium</i> , <i>Machaerium opacum</i> , <i>Tabebuia aurea</i> , <i>Copaifera langsdorffii</i> , <i>Senna spectabilis</i> , <i>X. americana</i> , and <i>Schinopsis brasiliensis</i> (Table 2) were also identified by Sales et al. (2009a, 2009b) and Veloso et al. (2014) in other Cerrado areas."
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	Uses include timber for construction, bark for medicinal uses, and bark for tanning. Palatability of foliage or use as fodder not discussed.

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2021). <i>Astronium fraxinifolium</i> . http://tropical.theferns.info . [Accessed 24 Jun 2021]	"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	[<i>Astronium graveolens</i> and <i>Astronium fraxinifolium</i> var. <i>glabrum</i> , a synonym of this species, could cause irritation if milled, but there is no evidence of toxicity to animals reported] "The sawdust sometimes causes such intense skin irritation that the affected areas resemble second-degree burns. Bactericidal, there is good evidence in several primate taxa of the use of these plants for medicinal purposes."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Dianese, J. C., Santos, L. T. P., Medeiros, R. B., & Furlanetto, C. (1995). <i>Kimuromyces cerradensis</i> gen. et sp. nov., the rust fungus of "gonçalo alves" (<i>Astronium fraxinifolium</i> -Anacardiaceae) from the Brazilian cerrado. <i>Fitopatologia Brasileira</i> , 20(2), 251-255	"Abstract : <i>K. cerradensis</i> gen. et sp. nov. is described on <i>A. fraxinifolium</i> (Anacardiaceae) collected in the cerrado region of central Brazil." [Importance unknown]

Qsn #	Question	Answer
	<p>Abreu, K., Araújo, F., de Lima, E., & Daud, R. (2017). Mites (Arachnida, Acari) on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) from the Cerrado remnants associated with nickel mining areas. <i>Acarologia</i>, 57(2), 223-232</p>	<p>[Host of several mite species, which could possibly impact other economically or ecologically important plants] "ABSTRACT — The Cerrado biome suffers constant impacts mainly due to agricultural activities, which can reduce food resources and habitats for many plant-dwelling mites, including important species to agriculture, such as predators. However, the mite fauna from this biome are still poorly known. Here, we present a checklist of mite species on <i>Astronium fraxinifolium</i> Schott, a Brazilian plant species threatened with extinction, from the Cerrado remnants associated with nickel mining areas, in the Niquelândia municipality, Brazil. Moreover, we performed cumulative (Mao Tau) and estimated (Jackknife 1) species accumulation curves in order to test for an effect of sampling effort and to estimate the potential number of species sheltered by the studied Cerrado remnants, and NMDS and ANOSIM analyses to test for similarity in mite species composition among samples. We sampled five <i>A. fraxinifolium</i> plants in each of six Cerrado remnants. Among these, three remnants were preserved (PR) and three were experiencing a secondary regeneration process (SR). Both PR and SR remnants were close to nickel mining areas. We recorded 1,562 mites including 17 species from 12 genera and eight families. Tetranychidae was the most diverse family, followed by Phytoseiidae and Tenuipalpidae. The most abundant species were phytophagous mites, namely <i>Brevipalpus</i> sp.1, <i>Oligonychus</i> sp., <i>Eotetranychus</i> sp.1, and the predator <i>Agistemus brasiliensis</i> Matioli, Ueckermann & Oliveira. Regarding feeding behavior, phytophagous mites were the most abundant and diverse on <i>A. fraxinifolium</i>. Both species accumulation curves (Mao Tau) for PR and SR remnants trended towards an asymptote, while estimated curves (Jackknife 1) proved to be similar to accumulation curves (Mao Tau). These results indicate that sampling was sufficient to assess mite assemblages using the methods applied in this study. No differences in mite species composition were observed between PR and SR areas. This paper is a pioneer report of mite assemblages on <i>A. fraxinifolium</i>. Furthermore, we report here two genera and one species recorded for the first time in the Cerrado biome. Our checklist can contribute to bridging the knowledge gap on the occurrence of plant mite species in Brazilian natural vegetation remnants."</p>

Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2021). <i>Astronium fraxinifolium</i> . http://tropical.theferns.info . [Accessed 24 Jun 2021]	"Known Hazards - None known"
	de Fátima Agra, M., Silva, K. N., Basilio, I. J. L. D., De Freitas, P. F., & Barbosa-Filho, J. M. (2008). Survey of medicinal plants used in the region Northeast of Brazil. <i>Revista Brasileira de Farmacognosia</i> , 18(3), 472-508	[<i>Astronium fraxinifolium</i> used medicinally] "Part used - Resin and stem bark ... Indication and form of use - The use topic against calluses. The juice against toothaches."
	Quattrocchi, U. (2012). <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	[<i>Astronium graveolens</i> and <i>Astronium fraxinifolium</i> var. <i>glabrum</i> , a synonym of this species, could cause irritation if milled, but there is no evidence of toxicity to animals reported] "The sawdust sometimes causes such intense skin irritation that the affected areas resemble second-degree burns. Bactericidal, there is good evidence in several primate taxa of the use of these plants for medicinal purposes."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[May be impacted by fire, but there is no evidence that it contributes to fire risk or frequent fires] "The amplitude of rainfall where the species is present is very large, ranging from 600 mm in northeastern Brazil to 1,600 mm in more rainfed areas in the southeast of that country. It has also been reported in Amazonia, however, where the rainfall exceeds 2,000 mm. This pattern is consistent with the mesophytic character of the species." ... "It is essential to protect seedlings from fire, implying their use within established mixed stands."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2021). <i>Astronium fraxinifolium</i> . http://tropical.theferns.info . [Accessed 24 Jun 2021]	"Prefers a sunny position in a well-drained soil [419]. "
	Vieira, D. L., Scariot, A., & Holl, K. D. (2007). Effects of habitat, cattle grazing and selective logging on seedling survival and growth in dry forests of Central Brazil. <i>Biotropica</i> , 39(2), 269-274	"We selected seven tree species that are abundant in mature forest fragments. Five are important timber species: <i>Astronium fraxinifolium</i> Schott, <i>M. urundeuva</i> , <i>Schinopsis brasiliensis</i> Engl. (all Anacardiaceae), <i>T. impetiginosa</i> , and <i>Enterolobium contortisiliquum</i> (Vell.) Morong (Mimosaceae) (IBGE 1995, Scariot & Sevilha 2000)." ... "All species studied are classified as shade intolerant in the literature (Lorenzi 1992, Pinard et al. 1999, Lorenzi 2002, Souza et al. 2002)."
	Abreu, K., Araújo, F., de Lima, E., & Daud, R. (2017). Mites (Arachnida, Acari) on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) from the Cerrado remnants associated with nickel mining areas. <i>Acarologia</i> , 57(2), 223-232	[Heliophytic] "This is a pioneer, heliophytic species which presents great economic value since its wood can be used for furniture manufacturing; besides its use for programs to recovering natural degraded areas."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2021). <i>Astronium fraxinifolium</i> . http://tropical.theferns.info . [Accessed 24 Jun 2021]	"Prefers a sunny position in a well-drained soil[419]."
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Grows on fertile and infertile soils] "Soil: In the Cerrado region the species has been recorded mainly on acid soils of low fertility in gentle landscapes. Noteworthy, however, are the occurrences on fairly rich soils, luvisols, mainly in the Brazilian northeast and the deep sandy planosols (López 1987), restricted to the southwestern part of the range. The species seems to develop well and with good form even in the poor soils of the Cerrado in the State of São Paulo (Garrido & Poggiani 1979). The species is abundant in gallery forests, despite the rather poor, acidic soils and seasonal climate. The occasional presence of the species in the upper canopy in tall forests is attributed by López (1987) to the occurrence at these sites of well-drained soils."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	" <i>Astronium fraxinifolium</i> is a medium to large tree, depending on soil conditions. In Colombia it is reported to reach 12–15 m in dry forests below 365 m elevation (Barkley 1968). López (1987) reported, however, individuals from 20 to 30 m and diameter between 45 and 100 cm. The bole is straight and yields commercial logs 6–15 m long. The branches are cylindrical and pubescent when young."

412	Forms dense thickets	n
	Source(s)	Notes
	Pérez-Salicrup, D. R., Sork, V. L., & Putz, F. E. (2001). Lianas and Trees in a Liana Forest of Amazonian Bolivia. <i>Biotropica</i> , 33(1), 34-47	[No evidence from this study] "APPENDIX 1. Species of trees sampled in twenty-four 900-m ² plots in Oquiriquia forest concession, department of Santa Cruz, Bolivia, and their quantitative parameters. N: total number of individuals; P: number of plots in which that species was found; D: density; BA: basal area; RIV: relative importance value [(relative N + relative BA)/2 3 100]. Species are ranked by descending RIVs." [<i>Astronium fraxinifolium</i> - Density (± 1 SE) trees ≥ 10 cm DBH/ha = 20.4 \pm 4.99]
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[No evidence, and also not recommended for pure plantings] "Nor is it suited for pure plantings – enrichment stands are more appropriate for it."

Qsn #	Question	Answer
501	Aquatic	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Terrestrial] "The species is abundant in gallery forests, despite the rather poor, acidic soils and seasonal climate. The occasional presence of the species in the upper canopy in tall forests is attributed by López (1987) to the occurrence at these sites of well-drained soils."

502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 21 Jun 2021]	"Family: Anacardiaceae Subfamily: Anacardioideae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 21 Jun 2021]	"Family: Anacardiaceae Subfamily: Anacardioideae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	" <i>Astronium fraxinifolium</i> is a medium to large tree, depending on soil conditions. In Colombia it is reported to reach 12–15 m in dry forests below 365 m elevation (Barkley 1968). López (1987) reported, however, individuals from 20 to 30 m and diameter between 45 and 100 cm. The bole is straight and yields commercial logs 6–15 m long. The branches are cylindrical and pubescent when young."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"This study explores the basis for conservation action on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae). This is a wide-ranging forest species occurring in Brazil and other South American countries, and typical of gallery forest along watercourses in the Cerrado region."

602	Produces viable seed	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"Propagation: Reported experience is limited to propagation by seed, although propagation by cuttings may be feasible. Germination reaches 80% within 7–14 days under laboratory conditions. Salomão (unpubl.) draws attention to a rapid loss of viability. Reis et al. (1980) reported total deterioration of the seeds during a 285-day germination test in the dark in a germinator at 30 °C."
	Vieira, D. L. M., & Scariot, A. (2006). Effects of logging, liana tangles and pasture on seed fate of dry forest tree species in Central Brazil. <i>Forest Ecology and Management</i> , 230(1-3), 197-205	"We assessed seed fate of six tree species in a seasonally deciduous forest of Central Brazil. Seed germination, predation, removal and death caused by pathogens or desiccation were followed in an undisturbed forest site, a logged forest site, and an active pasture. In both forest types we sowed seeds under patches of liana tangles (Low Forest habitat) and under patches of mature forest (High Forest habitat). Seeds were monitored weekly for up to 8 months. Overall, small-seeded species (<i>Astronium fraxinifolium</i> and <i>Tabebuia impetiginosa</i>) had high germination, although germination was lower in the pasture due to insect predation."

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. No evidence found
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	Unknown. Not documented in this publication

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Cornacini, M.R., Manoel, R.O., Alcantara, M.A.M. et al. (2021). Detection and application of novel SSR markers from transcriptome data for <i>Astronium fraxinifolium</i> Schott, a threatened Brazilian tree species. <i>Molecular Biology Reports</i> 48, 3165–3172	"It is a dioecious, insect pollinated tree that is often used in the restoration of degraded areas"

605	Requires specialist pollinators	n
	Source(s)	Notes
	Cornacini, M.R., Manoel, R.O., Alcantara, M.A.M. et al. (2021). Detection and application of novel SSR markers from transcriptome data for <i>Astronium fraxinifolium</i> Schott, a threatened Brazilian tree species. <i>Molecular Biology Reports</i> 48, 3165–3172	"It is a dioecious, insect pollinated tree that is often used in the restoration of degraded areas"
	Vozzo, J.A. (2002). <i>Tropical Tree Seed Manual</i> . USDA Forest Service, Washington, D.C.	[Related taxon wind-pollinated] "In the Neotropics, several families have species that are partially or exclusively wind-pollinated (Bullock 1994, Kubitzki 1993). These species include <i>Astronium graveolens</i> Jacq."

606	Reproduction by vegetative fragmentation	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"Propagation: Reported experience is limited to propagation by seed, although propagation by cuttings may be feasible." [No evidence of natural vegetative spread]

607	Minimum generative time (years)	
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2021). <i>Astronium fraxinifolium</i> . http://tropical.theferns.info . [Accessed 24 Jun 2021]	"Growth Rate Fast" [Time to maturity unspecified]
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Unknown] "Detailed studies of the reproductive biology and demography of natural stands of <i>A. fraxinifolium</i> are urgently needed."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Vieira, D. L. M., & Scariot, A. (2006). Effects of logging, liana tangles and pasture on seed fate of dry forest tree species in Central Brazil. <i>Forest Ecology and Management</i> , 230(1-3), 197-205	" <i>Tabebuia impetiginosa</i> and <i>Astronium fraxinifolium</i> Schott have small wind-dispersed seeds."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	No evidence of cultivation outside native range, but proposed for cultivation in the Hawaiian Islands

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Vieira, D. L. M., & Scariot, A. (2006). Effects of logging, liana tangles and pasture on seed fate of dry forest tree species in Central Brazil. <i>Forest Ecology and Management</i> , 230(1-3), 197-205	" <i>Tabebuia impetiginosa</i> and <i>Astronium fraxinifolium</i> Schott have small wind-dispersed seeds." [Unlikely, and seeds reported to lose viability quickly]

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	"Seed biology in natural conditions: Seed dispersal is apparently anemochoric but there appears to be no information on the distances travelled by the winged seeds."
	Vieira, D. L. M., & Scariot, A. (2006). Effects of logging, liana tangles and pasture on seed fate of dry forest tree species in Central Brazil. <i>Forest Ecology and Management</i> , 230(1-3), 197-205	"Seed size, weight and dispersal syndromes varied among the study species (Table 1). <i>Tabebuia impetiginosa</i> and <i>Astronium fraxinifolium</i> Schott have small wind-dispersed seeds."

705	Propagules water dispersed	
	Source(s)	Notes
	Vieira, D. L. M., & Scariot, A. (2006). Effects of logging, liana tangles and pasture on seed fate of dry forest tree species in Central Brazil. <i>Forest Ecology and Management</i> , 230(1-3), 197-205	" <i>Tabebuia impetiginosa</i> and <i>Astronium fraxinifolium</i> Schott have small wind-dispersed seeds."
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Although seeds are wind-dispersed, occurrence along watercourses suggests water may play a secondary role in dispersal] "This is a wide-ranging forest species occurring in Brazil and other South American countries, and typical of gallery forest along watercourses in the Cerrado region."

706	Propagules bird dispersed	n
	Source(s)	Notes
	de Aguiar, A. V., Bortolozo, F. R., de Moraes, M. L. T., & da Costa Andrade, J. A. (2003). Genetic variation in <i>Astronium fraxinifolium</i> populations in consortium. <i>Crop Breeding and Applied Biotechnology</i> , 3(2): 95-106	"The wind plays a small role in the fertilization process but plays an important role in seed dispersal, as <i>A. fraxinifolium</i> trees annually produce many seeds easily disseminated by the wind (Allem, 1991)."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Vieira, D. L. M., & Scariot, A. (2006). Effects of logging, liana tangles and pasture on seed fate of dry forest tree species in Central Brazil. <i>Forest Ecology and Management</i> , 230(1-3), 197-205	[Possibly. Seeds may be transported by insect seed predators. Some may be effectively dispersed if they escape predation and are able to germinate] "Ants and termites were responsible for the high removal rates of <i>Astronium</i> seeds and for predation on <i>Tabebuia</i> , which reduced germination rates in the pasture (Fig. 2). Predation on seeds of <i>Tabebuia</i> resulted in lower germination in the HF than in the LF. Pathogens killed more <i>Astronium</i> seeds in the HF than in the LF, resulting in lower germination in the HF (Table 2; Fig. 2)."

Qsn #	Question	Answer
708	Propagules survive passage through the gut	n
	Source(s)	Notes
	de Aguiar, A. V., Bortolozo, F. R., de Moraes, M. L. T., & da Costa Andrade, J. A. (2003). Genetic variation in <i>Astronium fraxinifolium</i> populations in consortium. <i>Crop Breeding and Applied Biotechnology</i> , 3(2): 95-106	"The wind plays a small role in the fertilization process but plays an important role in seed dispersal, as <i>A. fraxinifolium</i> trees annually produce many seeds easily disseminated by the wind (Allem, 1991)." [No evidence of consumption]
801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Densities in natural conditions unknown] "No information on seed crop; variation in seed weight ranges: 4,290–6,450 seeds kg ⁻¹ ."
802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Leite, E. J. (2002). State-of-knowledge on <i>Astronium fraxinifolium</i> Schott (Anacardiaceae) for genetic conservation in Brazil. <i>Perspectives in Plant Ecology, Evolution and Systematics</i> , 5(1), 63-77	[Presumably no] "Salomão (unpubl.) draws attention to a rapid loss of viability. Reis et al. (1980) reported total deterioration of the seeds during a 285-day germination test in the dark in a germinator at 30 °C."
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. No evidence on herbicide efficacy or chemical control of this species
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Vieira, D. L., Scariot, A., Sampaio, A. B., & Holl, K. D. (2006). Tropical dry-forest regeneration from root suckers in Central Brazil. <i>Journal of Tropical Ecology</i> , 22:353-357	[<i>Astronium fraxinifolium</i> one of the species resprouting in pastures] "Table 1. Species resprouting after ploughing in an early successional site, a 10-y-old pasture, and a 25-y-old pasture, in a dry-forest region of central Brazil. Individuals were surveyed in 30 plots of 10×10m (3000m ²) in each area. Trees (>5 cm dbh, 2.4 ha sampled) observed in an intact forest fragment adjacent to the 25-y-old pasture are shown. Values indicate relative abundance (%)."
	Kammesheidt, L. (1998). The role of tree sprouts in the restoration of stand structure and species diversity in tropical moist forest after slash-and-burn agriculture in Eastern Paraguay. <i>Plant Ecology</i> , 139(2), 155-165	[Reported to resprout from cut stumps] "Sprouts emerging from stumps and lower parts of live stems (≤ 1 m) were measured and identified in both strata; the number of sprouts per stump were counted. The diameter of resprouting stumps was measured at the stem base." ... "Only two species occurring exclusively as sprouts, <i>Astronium fraxinifolium</i> Schott (large tree) and <i>Bastardiopsis densiflora</i> (Hook&Arn.) Hassler (mediumsized tree), remained."

Qsn #	Question	Answer
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability (based on elevation and rainfall gradients)
- Thrives, and could spread, in regions with tropical climates
- Tolerates many soil types
- Reproduces by seeds
- Seeds dispersed by wind, possibly water, and intentional cultivation
- Resprouts from cut stumps

Low Risk Traits

- No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
- Unarmed (no spines, thorns, or burrs)
- Heliophytic, and classified as shade intolerant. Dense shade may limit ability to spread
- Dioecious. Individual trees would presumably not be able to set seed
- Not reported to spread vegetatively
- Seeds lose viability rapidly, and should not form a persistent seed bank