Taxon: Schizolobium parahyba **Family:** Fabaceae

Common Name(s): Brazilian firetree
guapiruvu
parica

Synonym(s): Cassia parahyba Vell.
Schizolobium amazonicum Huber ex
Schizolobium excelsum Vogel

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 20 Nov 2015

WRA Score: 7.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Tropical Tree, Invasive, Light-Demanding, 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	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		
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)	y
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	y=1, n=0	n
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

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	y
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)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Breeding trials have increased growth potential in some provenances. No evidence of domestication] "Rosales et al. (2000) conducted trials on three provenances and 35 open-pollinated families of S. parahyba from Guatemala and Honduras were established at El Hierro, Venezuela. At three years, the average productivity was 34 cubic metres/ha/yr with the best source producing 12% more volume than the worst provenance. After eight years, the average productivity had fallen to 23 cubic metres/ha/yr. The average family wood density ranged from 277-447 kg/cubic metre with a mean of 348 kg/cubic metre, with large differences between Honduran and Guatemalan provenances. Family and individual tree heritability for height generally decreased with time, whereas that of diameter decreased during the period of most rapid growth (years two and three) and then increased. Individual tree selection at 3-4 years old for breeding purposes seems to be optimum because trees have reached approximately 90% of their growth potential (based on eight years of observation)."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2015. 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. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 19 Nov 2015]	"Native: NORTHERN AMERICA Mexico [s.e.] SOUTHERN AMERICA Mesoamerica: Belize; Costa Rica; El Salvador; Guatemala; Nicaragua; Panama Northern South America: Venezuela Brazil: Brazil Western South America: Bolivia; Colombia; Ecuador; Peru"

202	**Quality of climate match data**	**High**

Qsn #	Question	Answer
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 19 Nov 2015]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Elevation range exceeds 2000 m, demonstrating environmental versatility] "Climate: S. parahyba is found in the tropics and sub-tropics. In Brazil, the species occurs in areas that reach 650 m altitude, with a mean annual rainfall from 1100-2400 mm, with moderate water deficit in northern Espirito Santo (Carvalho, 1994). In Chiapas (Mexico) there are records of occurrence from 0-2000 m in altitude (Gomez-Pompa and Dirzo, 1995)."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"The natural distribution of S. parahyba ranges from southern Brazil, 30°15'S (Carvalho, 1994), to southern Mexico, 17°N (Heuveldop et al., 1997). In Brazil it is a characteristic and exclusive species to the Atlantic forest (east coast) and it occurs occasionally in the semi-deciduous forests in São Paulo (Carvalho, 1994). Latitude: between 17°N and 31°S"

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Abreu, R. C. R., de Miranda Santos, F. F., & Durigan, G. (2014). Changes in plant community of Seasonally Semideciduous Forest after invasion by Schizolobium parahyba at southeastern Brazil. Acta Oecologica, 54: 57-64	"The recent range expansion of guapuruvu into the SSF likely occurred as a result of human-mediated invasion. Guapuruvu is a fast growing tree (Backes and Irgang, 2002; Lorenzi, 2002), recommended and widely cultivated as ornamental or for restoration purposes, being included in almost 50% of forest restoration projects away from its native range, in the western São Paulo state (Barbosa et al., 2003)."
	Negi, P. S., & Hajra, P. K. 2007. Alien flora of Doon Valley, Northwest Himalaya. Current Science 92(7): 968-978	[Schizolobium parahyba documented as present, but not naturalized, in this publication] "This communication is an attempt to prepare an up-todate account of alien/exotic flora of the Doon Valley." ... "Since the Doon Valley is part of the mega Himalayan 'hotspot' belt1, globally designated for priority of conservational activities in India, the occurrence of 45.69% woody and 19.4% herbaceous alien species and the naturalization of some of them cannot be considered safe for native and endemic flora from an ecological and socio-economic perspective."
	Dawson, W., Mndolwa, A. S., Burslem, D. F., & Hulme, P. E. (2008). Assessing the risks of plant invasions arising from collections in tropical botanical gardens. Biodiversity and Conservation, 17(8): 1979-1995	Cultivated at Amani Botanical Garden (ABG), Tanzania

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	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	"APPENDIX 4.—Summary o f results for all naturalized and casual alien plants in the study area, Savanna Biome, Fynbos Biome, Forest habitats. Grassland Biome, Nama-Karoo Biome, Succulent Karoo Biome and watercourse/wetland habitats" [Schizolobium parahyba listed as naturalzed in Southern Africa]
	Haysom, K.A. & Murphy, S.T. (2003). The status of invasiveness of forest tree species outside their natual habitat: a global review and discussion paper. Forest Health and Biosecurity Working Paper FBS/3E. FAO, Rome, Italy	"Table 7. The 114 alien forestry species found to be associated with naturalization or invasion events in South America" [Schizolobium parahyba - Countries where naturalized = Puerto Rico]
	Abreu, R. C. R., de Miranda Santos, F. F., & Durigan, G. (2014). Changes in plant community of Seasonally Semideciduous Forest after invasion by Schizolobium parahyba at southeastern Brazil. Acta Oecologica, 54: 57-64	[Naturalized within Brazil outside natural range] "The recent range expansion of guapuruvu into the SSF likely occurred as a result of human-mediated invasion. Guapuruvu is a fast growing tree (Backes and Irgang, 2002; Lorenzi, 2002), recommended and widely cultivated as ornamental or for restoration purposes, being included in almost 50% of forest restoration projects away from its native range, in the western São Paulo state (Barbosa et al., 2003). From the trees planted as ornamentals or for forest restoration, the species has easily invaded patches of SSF, and the consequences of this process have not yet been evaluated."
	Dawson, W., Mndolwa, A. S., Burslem, D. F., & Hulme, P. E. (2008). Assessing the risks of plant invasions arising from collections in tropical botanical gardens. Biodiversity and Conservation, 17(8): 1979-1995	[Naturalizing in Amani Botanical Garden (ABG), Tanzania] "Table 4 Naturalising species with known planting history in ABG" [Includes Schizolobium parahyba, originally planted, now spreading in additional compartments]

Qsn #	Question	Answer
302	**Garden/amenity/disturbance weed**	
	Source(s)	**Notes**
	Quevedo, L. (2006). Ecology and silviculture of long-lived pioneer timber species in a Bolivian tropical forest. PhD Dissertation. CATIE, Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica	[Disturbance-adapted] "S. parahyba develops well in secondary forests and in disturbed natural forests. It responds well and rapidly to disturbances created by harvesting, such as in gaps formed by tree fall gaps, roads, and skid trials. Natural regeneration will not occur without direct light; in an undisturbed forest the species has very low abundance, but it increases with any kind of disturbance (Justiniano et al., 2001). Its abundance can be up to four times higher in forests with soils scarified by skidders (Jackson et al., 2002) and even 10-fold (Fredericksen and Pariona, 2002)."
	Reforestation in Southern Bahia. (2015). Schizolobium parahyba. http://www.refloresta-bahia.org/en/amargosa/schizolobium-parahyba. [Accessed 20 Nov 2015]	[Possibly nuisance in landscaping] "The tree is ornamental in blossom but is not recommended to urban tree planting and park landscaping because its branches fall easily in windy periods."
303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
304	**Environmental weed**	**y**
	Source(s)	**Notes**
	Abreu, R. C. R., de Miranda Santos, F. F., & Durigan, G. (2014). Changes in plant community of Seasonally Semideciduous Forest after invasion by Schizolobium parahyba at southeastern Brazil. Acta Oecologica, 54: 57-64	[Invasive in Brazil outside natural range. Lowers biodiversity] "The recognition of a species as invasive is generally accepted when it comes from another continent or even from another country, but requires strong evidences of negative impacts to support control actions when the invasive species comes from another region in the same country. Schyzolobium parahyba e the 'guapuruvu', is a Brazilian tree native from the evergreen type of the Atlantic Forest, which has been recorded as invader in a number of remnants of the Seasonally Semideciduous Forest e SSF. We hypothesized that this giant and fast growing invasive tree changes the structure and composition of the understory, thus impairing the forest dynamics. We assessed the invasive population in the whole fragment, and, within the portion invaded, we sampled the regenerating plant community 1) under the largest alien trees, 2) under a native species with similar ecology (Peltophorum dubium), and 3) randomly in the forest. Density, basal area and richness under S. parahyba were remarkably lower than under the equivalent native species or in the understory as a whole. Floristic composition of the plant community was also distinct under S. parahyba, possibly due to increased competition for soil water. Even though the alien species has occupied, as yet, a small proportion of the forest fragment, it dominates the overstory and threatens the regeneration processes under its canopy. In view of our findings, we recommend extirpation of the species from SSF, as well as avoiding cultivation of the species away from its native range."

305	**Congeneric weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "Habit: S. parahyba is a deciduous tree and commonly reaches heights of 10-20 m with a d.b.h. of 30-60 cm, or even 30 m in height with a d.b.h. of 100 cm. It presents monopodial growth, a cylindrical and straight trunk marked by petiolar scars, sometimes with proproots, bole up to 15 m in height, and deep roots. Cymose ramification, very wide crown, umbelliform. The external bark is almost smooth, green when young and greyish when adult, with presence of lenticels (Lorenzi, 1992; Carvalho, 1994). Foliage: Leaves: Bipinnately compound, alternate, showing 15-25 pairs of opposite pinnae, each one with 20-30 pairs of oblong leaflets 2-3 cm long (Reitz et al., 1988; Lorenzi, 1992; Carvalho, 1994). In the first few years, the leaves can reach 1.70 m in length, but in mature trees they reach only 0.50 m long (Labouriau et al., 1961)"

Qsn #	Question	Answer
402	**Allelopathic**	
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 19 Nov 2015]	"Soil improver: The enormous amount of biomass shed by the tree improves soil fertility."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"The species is indicated for restoration of riparian forests in southeast Brazil in mixed plantations (Botelho et al., 1995; Joly et al., 1995). It is also recommended for agroforestry systems, and is grown in associated with banana, cassava, coffee and pasture (Carvalho, 1994; TCA, 1994). In Ecuador the species has been planted since the 1980s for timber production; there are currently about 12,000 ha (Heuveldop et al., 1997)."
	Soares, G. L. G., Scalon, V. R., Pereira, T. D. O., & Vieira, D. D. A. (2002). Potencial alelopático do extrato aquoso de folhas de algumas leguminosas arbóreas brasileiras. Floresta e Ambiente, 9(1): 119-126	[Schizolobium parahyba extracts demonstrate allelopathic properties in experimental trials] "This work describes the effect of the aqueous extracts obtained from leaves of some Brazilian leguminous trees on germination and root growth of lettuce (Lactuca sativa L. cv."Grand Rapids"). The extracts were obtained by static maceration with distilled water and the germination assays were performed with these extracts with and without phenolics, which was obtained by filtering through polivinylpirrolidone (PVP). The majority of the tested species inhibited the growth of lettuce root radicle, but only Mimosa artemisiana inhibited lettuce seed germination. The inhibition of seed germination did not occur with PVP filtered extracts, suggesting the phenolic nature of phytotoxins present in this extract."
	Souza, H.N., Cardoso, I.M., Fernandes, J.M., Garcia, F.C., Bonfim, V.R., Santos, A C., Carvalho, A.F. & Mendonca, E.S. 2010. Selection of native trees for intercropping with coffee in the Atlantic Rainforest biome. Agroforestry systems, 80(1), 1-16	[Suspected allelopathy. Not empirically demonstrated] "fine tree roots have to be deeper than the coffee roots to avoid competition for water and nutrients. However, Jaramillo-Botero (2007) could not find competition for water and nutrients between S. parahyba (an incompatible species, Table 3) and coffee, and suggested allelopathy between the two species to explain the incompatibility."

403	Parasitic	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"S. parahyba is a deciduous tree and commonly reaches heights of 10-20 m with a d.b.h. of 30-60 cm, or even 30 m in height with a d.b.h. of 100 cm." [Fabaceae. No evidence]

Qsn #	Question	Answer
404	**Unpalatable to grazing animals**	
	Source(s)	**Notes**
	Grandtner, M.M. & Chevrette, J. (2012). Dictionary of Trees, Volume 2: South America: Nomenclature, Taxonomy and Ecology. Academic Press, New York	Possibly. Flowers & fruit used as fodder.
	Amato, K. (2013). Black howler monkey (Alouatta pigra) nutrition: Integrating the study of behavior, feeding ecology, and the gut microbial community. PhD Dissertation, University of Illinois at Urbana-Champaign	Schizolobium parahyba stems are consumed by howler monkeys

405	Toxic to animals	n
	Source(s)	**Notes**
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Mehl, J. W. M., Slippers, B., Roux, J., & Wingfield, M. J. (2014). Botryosphaeriaceae associated with die-back of Schizolobium parahyba trees in South Africa and Ecuador. Forest Pathology, 44(5): 396-408	"Die-back of Schizolobium parahyba var. amazonicum is a serious problem in plantations of these trees in Ecuador. Similar symptoms have also been observed on trees of this species in various parts of South Africa. The most common fungi isolated from disease symptoms on S. parahyba var. amazonicum in both locations were species of the Botryosphaeriaceae. The aim of this study was to identify these fungi from both Ecuador and South Africa, and to test their pathogenicity in greenhouse and field trials. Isolates obtained were grouped based on culture morphology and identified using comparisons of DNA sequence data for the internal transcribed spacer (ITS) and translation elongation factor 1α (TEF-1α) gene regions. The β-tubulin-2 (BT2) locus was also sequenced for some isolates where identification was difficult. Three greenhouse trials were conducted in South Africa along with a field trial in Ecuador. Neofusicoccum parvum was obtained from trees in both areas and was the dominant taxon in South Africa. Lasiodiplodia theobromae was the dominant taxon in Ecuador, probably due to the subtropical climate in the area. Isolates of Neofusicoccum vitifusiforme (from South Africa only), Neofusicoccum umdonicola and Lasiodiplodia pseudotheobromae (from Ecuador only) were also obtained. All isolates used in the pathogenicity trials produced lesions on inoculated plants, suggesting that the Botryosphaeriaceae contribute to the die-back of S. parahyba trees. While the disease is clearly not caused by a single species of the Botryosphaeriaceae in either region, N. parvum has been introduced into at least one of the regions. This species has a broad host range and could have been introduced on other hosts."

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"S. parahyba is susceptible to attack by Acanthoderes jaspidea, and in Brazil this has been reported as a major pest for this species. Attacks mainly occur during summer to the beginning of autumn, and the risk is higher during the first 4 years. Other pests include: the wood-boring beetle Micrapate brasiliensis; the branch- and stem-girdlers Oncideres dejeani and Oncideres saga; Rhaphiorhynchus pictus; and acarids (Carvalho, 1994)."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No direct evidence. Used medicinally] "The species contains tannin in the bark, which is used to tan leather. The bark has astringent therapeutic properties and is used in popular medicine (Carvalho, 1994). The flowers produce nectar which forms a clear and perfumed honey (Barros, 1960)."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Widespread & widely cultivated tree. No evidence of increased fire risk] "S. parahyba is a fast growing tree, and is used widely in mixed plantations in Brazil for land reclamation, environmental purposes, and also as an ornamental. In some South American countries the species is used in agroforestry systems." ... "Vegetation types: broadleaved evergreen forests; deciduous forests; mixed forests; rair forests; riparian forests; secondary forests"

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"S. parahyba is a light demanding climax species"
	Sampaio-e-Silva, T. A., Tiberio, F. C. S., Dodonov, P., & Silva Matos, D. M. (2015). Differences in allometry and population structure between native and invasive populations of a tropical tree. New Zealand Journal of Botany, 53(2): 90–102	"Under natural conditions, germination is low in shaded environments (Ferreira et al. 1978) and the survival of seedlings located in disturbed areas, such as forest edges, is greater than in undisturbed forest (Souza & Valio 2001)."
	Quevedo, L. (2006). Ecology and silviculture of long-lived pioneer timber species in a Bolivian tropical forest. PhD Dissertation. CATIE, Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica	[Regeneration will not occur without direct light] "S. parahyba develops well in secondary forests and in disturbed natural forests. It responds well and rapidly to disturbances created by harvesting, such as in gaps formed by tree fall gaps, roads, and skid trials. Natural regeneration will not occur without direct light; in an undisturbed forest the species has very low abundance, but it increases with any kind of disturbance (Justiniano et al., 2001)."

Qsn #	Question	Answer
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Soil and physiography: S. parahyba naturally grows in fertile, deep and moist soils, with good drainage and medium to heavy texture. Soils that are shallow, low in chemical fertility, sandy in texture or very dry are inadequate for this species. It occurs in a plain topography mainly in the alluvial plain and in the lower parts of the slopes (Carvalho, 1994; Gomez-Pompa and Dirzo, 1995). It rarely occurs in areas subject to floods (Rodrigues and Silva, 2000). Rosales et al. (2000) suggest that S. parahyba should be planted in tropical humid lowlands on clay or clay loam soils of pH 5.5-7 in areas with at least 1500 mm annual rainfall."
	Orwa C,, Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 19 Nov 2015]	"Soil type: Flourishes on well-drained soils."
	Quevedo, L. (2006). Ecology and silviculture of long-lived pioneer timber species in a Bolivian tropical forest. PhD Dissertation. CATIE, Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica	"This species can colonize a wide range of habitats, such as areas well or poor drained, and rich or poor soils, but it may be demand favorable edaphic conditions to reach its potential growth."

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"S. parahyba is a deciduous tree and commonly reaches heights of 10-20 m with a d.b.h. of 30-60 cm, or even 30 m in height with a d.b.h. of 100 cm."

412	**Forms dense thickets**	
	Source(s)	**Notes**
	Reforestation in Southern Bahia. (2015). Schizolobium parahyba. http://www.refloresta-bahia.org/en/amargosa/schizolobium-parahyba. [Accessed 20 Nov 2015]	[Dense populations in valleys] "Rare on slopes and hilltops, usually in dense populations in valleys, lowlands and riverside areas."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Forms dense groups] "S. parahyba is a light demanding climax species; it is common in secondary vegetation and may form dense groups in large gaps."

501	**Aquatic**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Terrestrial tree] "Vegetation types: broadleaved evergreen forests; deciduous forests; mixed forests; rain forests; riparian forests; secondary forests"

502	**Grass**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 19 Nov 2015]	"Family: Fabaceae (alt. Leguminosae) subfamily: Caesalpinioideae tribe: Caesalpinieae. Also placed in: Caesalpiniaceae"

503	Nitrogen fixing woody plant	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"S. parahyba is able to fix nitrogen (Winrock International, 2000; Heuveldop et al., 1997)."

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"It presents monopodial growth, a cylindrical and straight trunk marked by petiolar scars, sometimes with proproots, bole up to 15 m in height, and deep roots."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 19 Nov 2015]	[No evidence] "S. parahybum is a widespread pioneer species from tropical and premontane forests zones of the American Atlantic coast, flourishing on well-drained moist soils on plains or hillsides."

602	Produces viable seed	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"The fruit is ovate-oblong, dehiscent, winged, sessile, flat, coriaceous or sub-woody, 10-16 cm long and 4-6 cm wide. It generally contains one seed, sometimes two. The seeds are flat, brilliant, with hard integument, 2-3 cm long and 1.5-2 cm wide (Carvalho, 1994)." ... "The seeds are orthodox and remain viable for a long time when stored" ... "Seeds present seed coat dormancy, which is easily released by mechanical scarification, boiling water (Davide et al., 1995), or concentrated sulfuric acid (Carvalho, 1994). With these treatments, germination occurs within 5-15 days and is generally high."

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	Unknown

Qsn #	Question	Answer
604	**Self-compatible or apomictic**	**n**
	Source(s)	**Notes**
	Turchetto-Zolet, A. C., Cruz, F., Vendramin, G. G., Simon, M. F., Salgueiro, F., Margis-Pinheiro, M., & Margis, R. (2012). Large-scale phylogeography of the disjunct Neotropical tree species Schizolobium parahyba (Fabaceae-Caesalpinioideae). Molecular Phylogenetics and Evolution, 65(1): 174-182	"It is hermaphroditic but self-incompatible, pollinated by bees and harbors wind-dispersed seeds (Pietrobom and Oliveira, 2004)."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed]	"Flowers golden yellow, large, profusely produced in axillary semi-erect racemes or terminal panicles; bracts minute; bracteoles absent; calyx tube obliquely turbinate; lobes 5, overlapping, reflexed at flowering; petals 5, clawed, subequal, overlapping, uppermost petal innermost; stamens 10, free, subdeclinate; filaments villous, basally rough; anthers uniform, longitudinally dehiscent; ovary subsessile affixed to 1 side of calyx tube, many-ovuled, style filiform; stigma minute, terminal."
	Quevedo, L. (2006). Ecology and silviculture of long-lived pioneer timber species in a Bolivian tropical forest. PhD Dissertation. CATIE, Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica	"The main pollinators are bees and butterflies."
	Latham, P. (2005). Some Honeybee Plants of Bas-Congo Province, Democratic Republic of Congo. DFID, United Kingdom	"Uses Reported to be a bee forage from September to December in Bas-Congo. Bees are also thought to collect propolis."
	Turchetto-Zolet, A. C., Cruz, F., Vendramin, G. G., Simon, M. F., Salgueiro, F., Margis-Pinheiro, M., & Margis, R. (2012). Large-scale phylogeography of the disjunct Neotropical tree species Schizolobium parahyba (Fabaceae-Caesalpinioideae). Molecular Phylogenetics and Evolution, 65(1): 174-182	[Pollinated by bees] "It is hermaphroditic but self-incompatible, pollinated by bees and harbors wind-dispersed seeds (Pietrobom and Oliveira, 2004)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence of natural vegetative spread] "It sprouts after cutting, at any height of the trunk. It presents intense self-pruning when young. It is a short longevity tree." ... "This species is suitable for vegetative reproduction using young branch cuttings."

607	Minimum generative time (years)	>3
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"In plantations, flowering begins between 6 and 8 years."

Qsn #	Question	Answer
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Barbosa, K. C., & Pizo, M. A. (2006). Seed rain and seed limitation in a planted gallery forest in Brazil. Restoration Ecology, 14(4): 504-515	"...S. parahyba and C. urucurana are dispersed by the wind and the plant itself (autochoric), respectively (Lorenzi 1992)."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence. Pods & seeds relatively large & lack means of external attachment] "The fruit is ovate-oblong, dehiscent, winged, sessile, flat, coriaceous or sub-woody, 10-16 cm long and 4-6 cm wide. It generally contains one seed, sometimes two. The seeds are flat, brilliant, with hard integument, 2-3 cm long and 1.5-2 cm wide (Carvalho, 1994)."

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 19 Nov 2015]	"Ornamental: A spectacular fast-growing tree popularly cultivated as an ornamental, especially beautiful in flower with masses of yellow gold blossoms. Intercropping: The Brazilian fern tree is a promising agroforestry species, intercropping is possible because of its light shade."

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence. Pods & seeds relatively large & trees do not reach maturity until 6-8 years] "The fruit is ovate-oblong, dehiscent, winged, sessile, flat, coriaceous or sub-woody, 10-16 cm long and 4-6 cm wide. It generally contains one seed, sometimes two. The seeds are flat, brilliant, with hard integument, 2-3 cm long and 1.5-2 cm wide (Carvalho, 1994)."

704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Turchetto-Zolet, A. C., Cruz, F., Vendramin, G. G., Simon, M. F., Salgueiro, F., Margis-Pinheiro, M., & Margis, R. (2012). Large-scale phylogeography of the disjunct Neotropical tree species Schizolobium parahyba (Fabaceae-Caesalpinioideae). Molecular Phylogenetics and Evolution, 65(1): 174-182	"It is hermaphroditic but self-incompatible, pollinated by bees and harbors wind-dispersed seeds (Pietrobom and Oliveira, 2004)."

705	**Propagules water dispersed**	
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Adapted for wind dispersal, but secondary dispersal by water may occur in riparian forests] "Vegetation types: broadleaved evergreen forests; deciduous forests; mixed forests; rain forests; riparian forests; secondary forests"

Qsn #	Question	Answer
706	**Propagules bird dispersed**	**n**
	Source(s)	**Notes**
	Turchetto-Zolet, A. C., Cruz, F., Vendramin, G. G., Simon, M. F., Salgueiro, F., Margis-Pinheiro, M., & Margis, R. (2012). Large-scale phylogeography of the disjunct Neotropical tree species Schizolobium parahyba (Fabaceae-Caesalpinioideae). Molecular Phylogenetics and Evolution, 65(1): 174-182	[Wind & gravity-dispersed] "The large genetic differentiation among S. parahyba populations illustrated by the cpDNA data can be related to the poor seed dispersal system of this species, which is mediated by wind and gravity and therefore do not allow a long distance dispersal of the large seeds of S. parahyba."

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Quevedo, L. (2006). Ecology and silviculture of long-lived pioneer timber species in a Bolivian tropical forest. PhD Dissertation. CATIE, Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica	[Wind-dispersed. No evidence, & no means of external attachment] "S. parahyba fruits are a samara legume, single-seeded and wind dispersed (Peña-Claros and de Boo, 2002)."

708	**Propagules survive passage through the gut**	
	Source(s)	**Notes**
	Quevedo, L. (2006). Ecology and silviculture of long-lived pioneer timber species in a Bolivian tropical forest. PhD Dissertation. CATIE, Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica	"Its fruits are eaten by macaws and parrots, but depredation does not seem to affect the species' capacity for regeneration (Justiniano et al., 2001)."

801	**Prolific seed production (>1000/m2)**	**n**
	Source(s)	**Notes**
	Barbosa, K. C., & Pizo, M. A. (2006). Seed rain and seed limitation in a planted gallery forest in Brazil. Restoration Ecology, 14(4): 504-515	[Not documented in this study] "Apart from the low number of seeds collected below S. parahyba, the other three focal plant species did not differ greatly in the abundance of zoochorous seeds collected below them (Fig. 2A)."
	Martins, A. M., & Engel, V. L. (2007). Soil seed banks in tropical forest fragments with different disturbance histories in southeastern Brazil. Ecological Engineering, 31 (3): 165-174	[Not documented in this study] "S. parahyba was represented by only one seed in each season."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y**
	Source(s)	**Notes**
	Sampaio-e-Silva, T. A., Tiberio, F. C. S., Dodonov, P., & Silva Matos, D. M. (2015). Differences in allometry and population structure between native and invasive populations of a tropical tree. New Zealand Journal of Botany, 53(2): 90–102	"Germination rate in the greenhouse is typically > 85%, and seeds retain their viability and form a persistent seed bank (Lorenzi 2008)."

Qsn #	Question	Answer
	Orwa C,, Mutua, A., Kindt R., Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 19 Nov 2015]	"Seeds usually need mechanical scarification or thermal shock to ensure germination within 5-15 days. The hard, impermeable seed coat promotes dormancy. Breaking of dormancy is by removal of the seed tip, immersion in boiling water, mechanical scarification, chemical (acid, organic solvent), scarification or brief exposure to fire."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"The seeds are orthodox and remain viable for a long time when stored; one kilogram contains almost 550 seeds. Mean moisture content for intact and split seeds determined by the oven dry method are 4.5% and 11.4%, respectively (Malavasi, 1995). Seeds present seed coat dormancy, which is easily released by mechanical scarification, boiling water (Davide et al., 1995), or concentrated sulfuric acid (Carvalho, 1994). With these treatments, germination occurs within 5-15 days and is generally high."

803	Well controlled by herbicides	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	Unknown. Herbicide efficacy not evaluated for this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"It sprouts after cutting, at any height of the trunk. It presents intense self-pruning when young."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range ca. 2000 m, demonstrating environmental versatility
• Thrives in tropical climates
• Naturalized in Brazil, outside natural range, as well as in Southern Africa, Puerto Rico & possibly Tanzania
• Disturbance adapted
• Potential landscaping hazard (branches fall easily in wind)
• Invasive in Brazil, reducing native diversity
• Grows on many soil types
• Forms dense populations in areas
• Reproduces by seeds
• Seeds dispersed by wind, & intentionally planted by people
• Seeds form a persistent seed bank
• Able to coppice & resprout after cutting & pruning

Low Risk Traits
• Unarmed (no spines, thorns or burrs)
• Light demanding (may not invade dense, intact forest)
• Self-incompatible
• Not reported to spread vegetatively
• Reaches maturity in 6 to 8 years
• Seeds relatively large & unlikely to be inadvertently dispersed