Taxon: Parkia timoriana (DC.) Merr. **Family:** Fabaceae

Common Name(s): tree bean **Synonym(s):** Inga timoriana DC.
Parkia javanica auct.
Parkia roxburghii G. Don

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 20 Jul 2017

WRA Score: 5.0 **Designation:** EVALUATE **Rating:** Evaluate

Keywords: Naturalized, Tropical Legume, Edible Seeds, N-Fixing, 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)	n
305	Congeneric weed		
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	y=1, n=-1	n
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	y

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	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	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		
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "P. timoriana is a relatively large, buttressed tree which can grow up to 30 m tall and 100 cm or more in diameter. It is a multipurpose species with a wide natural range in East and South-East Asia. It is an important species for villagers in ASEAN countries, producing edible seeds that are eaten as vegetables. The branches and leaves are used as a green mulch and as a green manure since they contain a high concentration of nitrogen. It has been grown as a shade tree for coffee due to its small crown and light foliage and also planted for ornamental purposes. It is very adaptable, growing on a wide variety of sites but it is also an aggressive colonizer. It is a valuable species for erosion control in steep lands and on degraded sites."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 26 Jun 2017]	"Native: Asia-Tropical Indian Subcontinent: India - Assam Indo-China: Myanmar; Thailand Malesia: Indonesia; Malaysia"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 26 Jun 2017]	"Native: Asia-Tropical Indian Subcontinent: India - Assam Indo-China: Myanmar; Thailand Malesia: Indonesia; Malaysia"

203	**Broad climate suitability (environmental versatility)**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Altitude range: 0 - 1200 m - Mean annual rainfall: 1500 - 3600 mm - Rainfall regime: uniform - Dry season duration: 0 - 3 months - Mean annual temperature: 21 - 28ºC - Mean maximum temperature of hottest month: 24 - 34ºC - Mean minimum temperature of coldest month: 20 - 30ºC - Absolute minimum temperature: > 15ºC"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 26 Jun 2017]	"Native: Asia-Tropical Indian Subcontinent: India - Assam Indo-China: Myanmar; Thailand Malesia: Indonesia; Malaysia"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Cultivated in Taiwan [native to tropical Asia]."
	Francis, J.K. & Liogier, H.A. 1991. Naturalized Exotic Tree Species in Puerto Rico. General Technical Report SO-82. United States Department of Agriculture Forest Service, New Orleans, LA	"Table 1 -Naturalized and escaped exotic trees in Puerto Rico" [Includes Parkia timoriana. Rate of spread - 2I. 2 = Slow spread and abundant reproduction, I = Infrequent or confined to limited habitat (less than 100 hectares)]
	Parker, J.L. & Parsons, B. 2016. New Plant Records from the Big Island for 2015. Bishop Museum Occasional Papers 118: 17–22	"Tree bean is native to east Asia and several large specimens can be found cultivated in Hawai'i."

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Francis, J.K. & Liogier, H.A. 1991. Naturalized Exotic Tree Species in Puerto Rico. General Technical Report SO-82. United States Department of Agriculture Forest Service, New Orleans, LA	"Table 1 -Naturalized and escaped exotic trees in Puerto Rico" [Includes Parkia timoriana. Rate of spread - 2I. 2 = Slow spread and abundant reproduction, I = Infrequent or confined to limited habitat (less than 100 hectares)]
	Parker, J.L. & Parsons, B. 2016. New Plant Records from the Big Island for 2015. Bishop Museum Occasional Papers 118: 17–22	"Tree bean is native to east Asia and several large specimens can be found cultivated in Hawai'i. east of Hilo, at the collection site, hundreds of germinated seeds can be found littering the ground underneath a large specimen. many saplings up to 20 ft tall were also observed."

302	Garden/amenity/disturbance weed	

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Aggressive] "It is very adaptable, growing on a wide variety of sites but it is also an aggressive colonizer."

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Six species of Parkia are documented to be naturalized, and two are included in citations of weeds, but impacts are unverified.

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Trees, to 30 m tall. Branchlets brown. Leaf rachis more than 30 cm, glabrous or pubescent; petiolar gland elliptic to circular, 2–4 mm; pinnae 20–30(–42) pairs, pinna rachis 9–12 cm; leaflets 50–60 pairs, falcate or slightly sigmoid, linear, 5– 10 × 1–2 mm, lateral veins inconspicuous, base truncate, apex acute."

402	Allelopathic	
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"The branches and leaves are used as a green mulch and as a green manure since they contain a high concentration of nitrogen. It has been grown as a shade tree for coffee due to its small crown and light foliage and also planted for ornamental purposes."

Qsn #	Question	Answer
	Aleem, M. O., Alamu, L. O., & Olabode, O. S. (2014). Allelopathic Effects of Some Selected Tree Species on the Germination and Growth of Cowpea (Vigna unguiculata L. Walp.). Open Journal of Forestry, 4(4), 310-315	[Parkia biglobosa may be allelopathic] "The allelopathic effect of three tree species (Azardiracta indica, Vitellaria paradoxa, and Parkia biglobosa) on germination and growth of cowpea was investigated in the Southern Guinea Savannah agro ecological zone of Nigeria. The experiment was laid out in Randomized Complete Block Design (RCBD) with three (3) replicates. Data were collected on germination, plant height, stem diameter, number of leaves, number of branches, root length, the above grand biomass and the below grand biomass and were subjected to statistical analysis using Analysis of Variance (ANOVA) while the significant mean was separated using Duncan's Multiple Range Test (DMRT) at 5% possibility level. Results showed that the tree species brought about considerable inhibition in the germination of cowpea seeds and in its growth parameters. The statistical germination value of the cowpea seeds under the tree species had decreased value thus indicating that growth inhibitions were seriously felt. It was apparent that Parkia biglobosa (53.33) and Vitellaria paradoxa (60.00) had more inhibitory effect on cowpea seeds germinability than that of Azardiracta indica. (63.33) while all the treatments are lower than that of control (100). The tree species had similar inhibition capability in the cowpea plant height, stem circumference, number of leaves, above grand biomass and below grand biomass. However, in all treatment, statistic showed that there is no significant difference ($p < 0.05$) among the means."

403	Parasitic	n
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees, to 30 m tall." [Fabaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Descriptors: oils; medicinal products; food; fodder; mulches; green manures"

Qsn #	Question	Answer
405	**Toxic to animals**	**n**
	Source(s)	**Notes**
	Useful Tropical Plants Database. 2017. Parkia timoriana. http://tropical.theferns.info/viewtropical.php?id=Parkia+timoriana. [Accessed 19 Jul 2017]	"Known Hazards - None known"
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "Descriptors: oils; medicinal products; food; fodder; mulches; green manures"
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	[Substances may deter seed predation. No evidence that substances poison animals, which may server as seed dispersers of intact seeds] "A variety of potentially toxic substances have been isolated from the seeds of Parkia, including non-protein amino acids, lectins, and alkaloids (see references in Hopkins (1983) for Africa and Hopkins (1992a) for Malesia), but so far no geographical patterns have emerged which correlate with the distribution of these seed predators."

406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 26 Jun 2017]	"Diseases and pests Parkia species have a number of pests in common with other leguminous trees and shrubs. The stem and bark borers Xystrocera festiva and Cossus subfuscus can cause severe damage in Parkia speciosa, especially at lower elevations in Java. Other pests are the pod borers Cryptophlebia ombrodelta and Mussidia pectinicornella, and the caterpillars of the leaf feeders Polyura hebe, Eurema blanda and Eurema hecabe. The seeds are relished by a great number of arboreal mammals."

407	**Causes allergies or is otherwise toxic to humans**	**n**
	Source(s)	**Notes**
	Useful Tropical Plants Database. 2017. Parkia timoriana. http://tropical.theferns.info/viewtropical.php?id=Parkia+timoriana. [Accessed 19 Jul 2017]	"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	[Medicinal uses. No evidence] "Seeds diuretic, anthelmintic, a remedy for edema, nephritis, diabetes and colic. Ripe seeds, roasted or boiled and powdered taken in decoction as a remedy for colic. Leaves and/ or bark externally applied to clean wounds and ulcers and to cure scabies; leaves against jaundice. Pods pounded with water used as a hair shampoo.)"

408	**Creates a fire hazard in natural ecosystems**	**n**
	Source(s)	**Notes**
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	[No evidence. Unlikely given wet habitat] "HABITAT. Evergreen primary and disturbed rain forest, forest and dry evergreen forests on flat and hilly ground, but not in swampy areas. Usually 0 - 600 m, most common to 1300 m in NE India and Bangladesh, and Borneo, upper limit of dipterocarp forest."

Qsn #	Question	Answer
409	**Is a shade tolerant plant at some stage of its life cycle**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Tolerates drought; wind; shade"

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 descriptors - Soil texture: light; medium; heavy - Soil drainage: free - Soil reaction: acid; neutral - Special soil tolerances: shallow; infertile"

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"P. timoriana is a relatively large, buttressed tree which can grow up to 30 m tall and 100 cm or more in diameter."

412	**Forms dense thickets**	**n**
	Source(s)	**Notes**
	Hopkins, H. C. (1986). Parkia (Leguminosae: Mimosoideae). Flora Neotropica, 43: 1-123	"Distributed in forests of tropical Asia from NE India to the Philippines." [No evidence]
	Kessler, P. J., & Sidiyasa, K. (1994). Trees of the Balikpapan-Samarinda Area, East Kalimantan, Indonesia: a manual to 280 selected species. Tropenbos Foundation, Wageningen, The Netherlands	"Habitat & Ecology - Lowland rain forest, sometimes common. Distribution - NE. India, Bangladesh, Burma, Thailand, Malesia."
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	"HABITAT. Evergreen primary and disturbed rain forest, forest and dry evergreen forests on flat and hilly ground, sometimes near rivers but not in swampy areas. Usually 0 - 600 m, most common to 1300 m in NE India and Bangladesh, and Borneo, upper limit of dipterocarp forest." [No evidence]
	Shankar, U., & Tripathi, A. K. (2017). Rainforests north of the Tropic of Cancer: Physiognomy, floristics and diversity in 'lowland rainforests' of Meghalaya, India. Plant Diversity, 39(1), 20-36	"Table 2 Floristic composition and phytosociology of woody layer (girth ⍰10 cm) of lowland rainforests of Meghalaya. The species arrangement is in descending order of importance value index (IVI). The growth forms are: LT, large tree; MT, medium tree; ST, small tree SH, shrub; SS, scandent shrub; LI, liana." [Parkia timoriana - Density (ha ⍰-1) = 1.2]

501	**Aquatic**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Terrestrial] "It is very adaptable, growing on a wide variety of sites but it is also an aggressive colonizer. It is a valuable species for erosion control in steep lands and on degraded sites."

Qsn #	Question	Answer
502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 26 Jun 2017]	Family: Fabaceae (alt.Leguminosae) Subfamily: Caesalpinioideae Tribe: Mimoseae

503	**Nitrogen fixing woody plant**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Ability to fix nitrogen; regenerate rapidly; coppice; pollard"
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 26 Jun 2017]	Family: Fabaceae (alt.Leguminosae) Subfamily: Caesalpinioideae Tribe: Mimoseae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees, to 30 m tall. Branchlets brown. Leaf rachis more than 30 cm, glabrous or pubescent; petiolar gland elliptic to circular, 2–4 mm; pinnae 20–30(–42) pairs, pinna rachis 9–12 cm; leaflets 50–60 pairs, falcate or slightly sigmoid, linear, 5– 10 × 1–2 mm, lateral veins inconspicuous, base truncate, apex acute."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 26 Jun 2017]	"Parkia timoriana has the largest area of distribution, occurring from India to New Guinea." [No evidence]
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	"The distributions of individual species can be divided into two main groups. Parkia timoriana, P. speciosa, P. sumatrana and P. singularis are relatively widespread and occur on more than one major island in Malesia and/or several political units of the Asian mainland."

602	**Produces viable seed**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Thangjam, U., & Sahoo, U. K. (2016). Effect of Seed Mass on Germination and Seedling Vigour of Parkia Timoriana (DC.) Merr. Current Agriculture Research Journal, 4(2), 171 -178	"Our study indicated that light and intermediate weight seeds of Parkia timoriana germinated faster than the heavy one. There was a gradual increase in seedling vigour with increasing seed mass with maximum vigour was observed in between 60 to 75 days interval. Thus the study recommends that the tree planters and other stakeholders should use heavier seeds of this species for obtaining better quality of seedling."
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 26 Jun 2017]	"Propagation and planting Parkia can be propagated by seed and by vegetative means. Seeds of Parkia timoriana are hand-picked from underneath mother trees."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	[Unknown] "The cultivation of P. speciosa appears to have given rise to P. intermedia which is probably an ancient cultivated hybrid between it and P. timoriana." … "There have been no studies of self-compatibility in Indo- Pacific Parkia, but the presumed hybrid origin of P. intermedia suggests at least limited interspecific compatibility."

604	Self-compatible or apomictic	n
	Source(s)	**Notes**
	Bumrungsri, S., Harbit, A., Benzie, C., Carmouche, K., Sridith, K., & Racey, P. (2008). The Pollination Ecology of Two Species of Parkia (Mimosaceae) in Southern Thailand. Journal of Tropical Ecology,24(5): 467-475	"The present study aimed, for the first time, to determine the breeding system of the economically important canopy trees, Parkia speciosa and P. timoriana, and to identify their pollinators. Pollination experiments carried out in Trang and Songkhla Provinces, in 28 trees of P. speciosa and four P. timoriana indicated that they are self incompatible."

605	Requires specialist pollinators	
	Source(s)	**Notes**
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 26 Jun 2017]	"The flowering heads are usually pollinated by bats, but are also visited by insects and birds. They produce a fetid odour and a copious nocturnal supply of nectar."

Qsn #	Question	Answer
	Bumrungsri, S., Harbit, A., Benzie, C., Carmouche, K., Sridith, K., & Racey, P. (2008). The Pollination Ecology of Two Species of Parkia (Mimosaceae) in Southern Thailand. Journal of Tropical Ecology,24(5): 467-475	[Possibly pollinator limited, but trees in Hawaii set seeds, despite the lack of bat pollinators] "Insect pollination resulted in fruit set in only 12% of P. speciosa inflorescences. Fruit bats, mainly Eonycteris spelaea, visit flowering plants continuously from dusk till after midnight. Nocturnal and diurnal insects (moths and stingless bees respectively) visit capitula, mostly at the nectar zone. Nectarivorous bats are the most effective pollinator for P. speciosa and P. timoriana The fact that populations of E. spelaea appear to be declining throughout their distribution is therefore a matter of increasing concern." … "Of the two studied species, it is only in P. speciosa that insects, either or both nocturnal and diurnal, are also responsible for fruit set although to a much lesser extent than fruit bats, with respect to both fruiting percentage and number of fruits." … "The fact that insects have a facultative role in pollination of P. speciosa implies some degree of generalization within the specialized pollination system postulated in the genus Parkia."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Vegetative propagation by air layering - Stand establishment using stump plants; natural regeneration; planting stock"
	Roy, S.S., Kumar, S., Sharma, S.K., Devi, A.R., Singh, N.A., Prakash, N. and Ngachan, S.V. (2016). Tree Bean (Parkia roxburghii): A Potential Multipurpose Tree Legume of North East India. Pp. 201-208 in National Symposium on Vegetable Legumes for Soil and Human Health. February 12-14, 2016	[No evidence] "Tree bean is commonly propagated by seed. Mature pods should be collected from healthy, productive and disease free mother plants during March-April."

607	Minimum generative time (years)	>3
	Source(s)	**Notes**
	Roy, S.S., Kumar, S., Sharma, S.K., Devi, A.R., Singh, N.A., Prakash, N. and Ngachan, S.V. (2016). Tree Bean (Parkia roxburghii): A Potential Multipurpose Tree Legume of North East India. Pp. 201-208 in National Symposium on Vegetable Legumes for Soil and Human Health. February 12-14, 2016	"At the age of 6 years the plant starts its production; however, full bearing stage is only after 10 years. The lifespan of this tree may be 80–90 years or more." [Parkia roxburghii G. Don Synonym of Parkia timoriana]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Legume straight, strap-shaped, flat, 20–36 × 3–4.5 cm, glabrous, base attenuate into a stipe 6–15 cm. Seeds 13–21, black, ovoid, ca. 2 cm, hard." [No evidence. Pods and seeds lack means of external attachment]

702	Propagules dispersed intentionally by people	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Hopkins, H. C. (1986). Parkia (Leguminosae: Mimosoideae). Flora Neotropica, 43: 1-123	"Distributed in forests of tropical Asia from NE India to the Philippines. Cultivated in tropical botanical gardens."
	eBay. 2017. Parkia timoriana 20 Seeds, tree bean seeds, Nitta tree, Rare ''Riang'' From Thai. http://www.ebay.com/itm/Parkia-timoriana-20-Seeds-tree-bean-seeds-Nitta-tree-Rare-Riang-From-Thai-/172216544073. [Accessed 20 Jul 2017]	[Seeds sold commercially online] "Number of seeds: 20 Seeds"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Legume straight, strap-shaped, flat, 20–36 × 3–4.5 cm, glabrous, base attenuate into a stipe 6–15 cm. Seeds 13–21, black, ovoid, ca. 2 cm, hard." [Pods and seeds relatively large. Unlikely to become an inadvertent produce contaminant]
	Roy, S.S., Kumar, S., Sharma, S.K., Devi, A.R., Singh, N.A., Prakash, N. and Ngachan, S.V. (2016). Tree Bean (Parkia roxburghii): A Potential Multipurpose Tree Legume of North East India. Pp. 201-208 in National Symposium on Vegetable Legumes for Soil and Human Health. February 12-14, 2016	"Pods are formed in clusters of 10–15, each measuring 25–40 cm in length and 2–4 cm in breadth. At the age of 6 years the plant starts its production; however, full bearing stage is only after 10 years." [Nc evidence. Large trees with a relatively long time to maturity produce large pods & seeds that are highly unlikely to become a produce contaminant]

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	"A few scattered references suggest that birds, monkeys may be dispersal agents."
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2010. Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Legume straight, strap-shaped, flat, 20–36 × 3–4.5 cm, glabrous, base attenuate into a stipe 6–15 cm. Seeds 13–21, black, ovoid, ca. 2 cm, hard."

705	Propagules water dispersed	
	Source(s)	**Notes**
	Hopkins, H.C.F. (1994). The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin, 49(2), 181-234	[Proximity to rivers suggests possibility of water dispersal. Buoyancy unknown] "HABITAT. Evergreen primary and disturbed rain forest, forest and dry evergreen forests on flat and hilly ground, sometimes near rivers but not in swampy areas. Usually 0 - 600 m, most common to 1300 m in NE India and Bangladesh, and Borneo, upper limit of dipterocarp forest."

Qsn #	Question	Answer
706	**Propagules bird dispersed**	**y**
	Source(s)	**Notes**
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 20 Jul 2017]	"Hornbills, monkeys, squirrels, deer, elephants and wild pigs feed on the fruits and probably disperse the seeds."

Qsn #	Question	Answer
707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed]	"Hornbills, monkeys, squirrels, deer, elephants and wild pigs feed on the fruits and probably disperse the seeds." [No evidence]

Qsn #	Question	Answer
708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**
	Yusuf, U.K. & Zuhud, E.A.M., 2001. Parkia R.Br.[Internet] Record from Proseabase. van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 26 Jun 2017]	"Hornbills, monkeys, squirrels, deer, elephants and wild pigs feed on the fruits and probably disperse the seeds."

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	**y**
	Source(s)	**Notes**
	Bumrungsri, S., Harbit, A., Benzie, C., Carmouche, K., Sridith, K., & Racey, P. (2008). The Pollination Ecology of Two Species of Parkia (Mimosaceae) in Southern Thailand. Journal of Tropical Ecology,24(5): 467-475	"The number of flowers per capitulum in P. timoriana (3860±393, n=15) is much greater than in P. speciosa (2422±314, n=18) but in both species 70–75% are fertile (Bumrungsri unpubl. data)." [Presumably yes]

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Jayasuriya, K. G., Wijetunga, A. S., Baskin, J. M., & Baskin, C. C. (2013). Seed dormancy and storage behaviour in tropical Fabaceae: a study of 100 species from Sri Lanka. Seed Science Research, 23(4), 257-269	[Possibly. Longevity in soil unknown] "Table1. Germination, dormancy and storage behaviour of seeds of 73 Fabaceae species assigned to the first seed germination–storage behaviour category. E, endemic; I, introduced; MS, manual scarification; N, native; PY, physical dormancy. Zero to27% of seeds are non-dormant, and the others have PY" [Parkia timoriana - Kind of dormancy = PY, physical dormancy; Storage behavior = Orthodox]

Qsn #	Question	Answer
803	**Well controlled by herbicides**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Ability to fix nitrogen; regenerate rapidly; coppice; pollard" ... "- Stand establishment using stump plants; natural regeneration; planting stock"

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Thrives in tropical climates
• Naturalized on Hawaii Island and Puerto Rico
• Described as an aggressive colonizer
• Tolerates shade
• Tolerates many soil types
• Reproduces by seeds
• Seeds dispersed by birds, mammals & intentionally by people
• Prolific seed production
• Orthodox seeds possess physical dormancy & may form a persistent seed bank (longevity in soil unknown)
• Able to coppice & resprout after cutting

Low Risk Traits
• No reports of invasiveness outside native range
• Unarmed (no spines, thorns, or burrs)
• Provides fodder for livestock
• Seeds with edible and medicinal uses
• Ornamental
• Self-incompatible
• Not reported to spread vegetatively
• Reaches maturity in 6-10 years
• Relatively large pods & seeds unlikely to be accidentally dispersed

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Shade intolerant
(B) Bird-dispersed?> Dispersed by birds
(C) Life cycle <4 years?> No. Reaches maturity in 6-10 years
Outcome = Evaluate further