

Key Words: Evaluate, Possibly Naturalizing, Tropical Legume, Edible Seeds, Bird-dispersed

**Family:** *Fabaceae*

**Taxon:** *Parkia speciosa*

**Synonym:** *Inga pyriformis* Jungh.  
*Mimosa pedunculata* Hunter  
*Parkia harbesonii* Elmer  
*Parkia macropoda* Miq.

**Common Name:** petai  
bitter bean  
twisted cluster bean  
stink bean

**Questionnaire :** current 20090513      **Assessor:** Chuck Chimera      **Designation:** EVALUATE  
**Status:** Assessor Approved      **Data Entry Person:** Chuck Chimera      **WRA Score** 1

101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?	y=1, n=-1	
103	Does the species have weedy races?	y=1, n=-1	
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	
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	y=1, n=0	
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	y=1, n=0	
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

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	y=1, n=-1	
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	n
705	Propagules water dispersed	y=1, n=-1	
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)	y=1, n=-1	n
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: EVALUATE

WRA Score **1**

## Supporting Data:

101	1994. Hopkins, H.C.F.. The Indo-Pacific Species of <i>Parkia</i> (Leguminosae : Mimosoideae). Kew Bulletin. 49(2): 181-234.	[Is the species highly domesticated?] "The cultivation of <i>P. speciosa</i> appears to have given rise to <i>P. intermedia</i> which is probably an ancient cultivated hybrid between it and <i>P. timoriana</i> ."
101	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Is the species highly domesticated? No evidence] "The species is widely cultivated for its fruits within its natural range, and also in western Java, Indonesia, as far east as Seram (Hopkins, 1994). No large scale plantations has been attempted for the species." ... "No study of variation and breeding has been done for <i>P. speciosa</i> , and no breeding programmes are known about. In Java, two kinds of <i>P. speciosa</i> are recognized. One form, with large seeds, is called 'petai gede' or 'segobang', and a form with small seeds is called 'petai pare'. A wild form, with very long pods and a high seed protein count (20%) has been described, from western Sumatra (Wiriadinata and Bamroongruga, 1993)."
102	2013. WRA Specialist. Personal Communication.	NA
103	2013. WRA Specialist. Personal Communication.	NA
201	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Species suited to tropical or subtropical climate(s) 2-High] " <i>P. speciosa</i> is naturally distributed in southern Thailand, Peninsular Malaysia, Sumatra (Indonesia), Borneo Island and Palawan (only) in the Philippines."
202	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Quality of climate match data 2-High]
203	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Broad climate suitability (environmental versatility)?] " <i>P. speciosa</i> is found in tropical lowland forests up to about 900 m altitude. It is found in moist equatorial climate in areas with no long pronounced dry seasons (<3 months). The best growth occurs where mean annual rainfall exceeds 2000 mm, more or less uniformly distributed throughout the year and a mean annual temperature of about 22°C to 27°C. The species cannot tolerate frost."
203	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database: a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Broad climate suitability (environmental versatility)? Yes] "Altitude: 0-1 000(1 400) m, Mean annual temperature: About 24 deg. C, Mean annual rainfall: 1 000-2 000 mm" [Elevation range exceeds 1000 m]
204	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Native or naturalized in regions with tropical or subtropical climates? Yes] " <i>P. speciosa</i> is naturally distributed in southern Thailand, Peninsular Malaysia, Sumatra (Indonesia), Borneo Island and Palawan (only) in the Philippines."
205	1992. Nielsen, I.E.. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11 - part 1. Mimosaceae (Leguminosae-Mimosoideae). Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[Does the species have a history of repeated introductions outside its natural range? No] "Cultivated outside its natural range in Indonesia as far east as Seram (E. Wijadja, personal comm.). In Java, frequently cultivated."
205	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? No] " <i>P. speciosa</i> is becoming increasingly popular, and has been planted in villages for fruit production in many parts of South-East Asia. It is particularly common in western Java." [Cultivated widely in native range with limited introductions outside native range]
301	2013. Parker, J.. BIISC Early Detection Botanist. Pers. Comm. 10 Jan 2013.	[Naturalized beyond native range? Potentially on Hawaii Island] " we found two new naturalizing species near Hilo: <i>Parkia speciosa</i> , and <i>Mimusops caffra</i> . We're actually not sure on the exact species yet,..."
302	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Garden/amenity/disturbance weed? No evidence]
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No evidence]
304	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Environmental weed? No evidence]
305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? No evidence] Four species of <i>Parkia</i> are documented to be naturalized, but there are no records of invasiveness.

401	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Produces spines, thorns or burrs? No evidence] "P. speciosa is a tree to about 30 (-45) m high. Bole is reddish brown, especially near butt or on buttresses, buttresses large."
402	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Allelopathic? Probably No] "Shade or shelter: P. speciosa is sometimes planted as a shade tree, for example, for coffee plantations and in nurseries."
403	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Parasitic? No] "P. speciosa is a tree to about 30 (-45) m high." [Not parasitic]
404	1989. Beets, W.C.. Sustainable continuous crop production in a tropical environment. ILEIA Newsletter. 5(2): 24-26.	[Unpalatable to grazing animals? No] "After harvesting the cassava, cattle can graze the pasture legume, which has established itself by that time. The trees can now be browsed; they provide shade for the cattle, protect the land from air and water erosion, ameliorate stream flows and in addition, produce fuel, fence posts and timber. The trees can be harvested after 5 to 10 years. Soil fertility will then be restored and annual crops can be grown again. Other trees that may be suitable for this type of ley systems are Parkia speciosa and Parkia javanica (African locust bean), Acacia spp., Dalbergia cochinchensis, Albizzia spp. and some Eucalyptus species." [Cattle can graze P. speciosa once established.]
404	2006. National Research Council. Lost Crops of Africa: Volume II: Vegetables. National Academies Press, Washington, D.C.	[Unpalatable to grazing animals? No] "Parkia speciosa. Indigenous to Southeast Asia, where it can be found in cultivated plantations. There the odorous/stinking seeds are eaten raw, roasted and fried after sun drying and storage, or else cooked in sauces and curries, more as a condiment. In Indonesia and Malaysia, the pods are an important foodstuff. When ground into a meal, they make a nutritious ingredient of livestock rations. These trees may be found in fairly moist areas in southern Asia. Many of the species are noted for the pods or beans and nuts they bear, which are of good quality and make excellent and nutritious foodstuffs. The leaves also provide useful forage for livestock."
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No evidence]
405	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Toxic to animals? No evidence] "The helmeted hornbill (Rhinoplax vigil) eats the fruits. In Malaysia, the banded leaf monkey (Presbytis melalophus) is known to eat the fruits as well as the flowers and buds. The black-banded squirrel and the slender squirrel are often seen stripping pieces of the outer bark from P. speciosa in Malaysia to eat the inner bark or cambium."
406	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Host for recognized pests and pathogens?] "Protection: There are no records of diseases for P. speciosa. In Java, pod-boring larvae of the pyralid moth Citripestis sagittiferella and the tortricid moth Cryptophlebia illepida infest ripening seeds (Kalshoven, 1950). Pests recorded Insects: Citripestis sagittiferella (citrus fruit borer) [1] Cryptophlebia illepida (koa seedworm) [1]"
406	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Host for recognized pests and pathogens?] "Wood has no resistance to any kind of insect or wood borer attack or to wood-staining fungi; sapwood is susceptible to Lyctus borers. In the Far East, moth larvae (Argyroplote illepida and Mussidia pectinicornella) attack the seeds."
407	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Causes allergies or is otherwise toxic to humans? No] "P. speciosa or petai is not important as a timber species as it produces a rather poor quality timber and supplies are limited (Setyowati, 1998). However, the seeds, and to a lesser extent the fruits and leaves, are commonly used as a vegetable, which has a strong garlic-like flavour (Wiradinata and Bamroongruga, 1993). Fresh seeds are eaten raw, cooked or roasted, and can also be used dried (after soaking). The seeds are considered to be beneficial in the treatment of liver disease, oedema, kidney disease, diabetes, and as an antihelmintic; the leaves are used against jaundice (Wiradinata and Bamroongruga, 1993)."
407	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No evidence]

407	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Causes allergies or is otherwise toxic to humans? No evidence] "Food: Seeds are sometimes used as a vegetable; they have a garlic flavour and a very strong odour. Due to the foul smell of the green seeds, they are sometimes referred to as the 'evil-smelling bean'. Half ripe pods are pickled in salt. The young leaves and fresh parts of the flower stalks can also be eaten raw. Fibre: The wood is used in the manufacture of paper." ... "Medicine: The seeds are known to be hypoglycemic (reducing blood sugar level), and is used traditionally for treating kidney pain, cancer, diabetes, hepatalgia, oedema, nephritis, colic, cholera and as an anthelmintic; also applied externally to wounds and ulcers. The seeds are also valued as a carminative."
408	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Creates a fire hazard in natural ecosystems? No evidence] "Parkia occurs in scattered lowland rainforests and sometimes also in tall secondary forest, on sandy, loamy and podzolic soils, also in waterlogged locations, in freshwater swamp forest and on riverbanks." [Habitat suggests fire is not a part of the ecology of this species]
409	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Is a shade tolerant plant at some stage of its life cycle? Yes] "The tropical lowland tree requires some shade when young."
410	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Tolerates a wide range of soil conditions? Yes] "P. speciosa grows in a wide variety of soils with slightly acidic to neutral on sandy and loamy soils, also waterlogged and podzolic soils (Setyowati, 1998)."
411	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Climbing or smothering growth habit? No] "P. speciosa is a tree to about 30 (-45) m high. Bole is reddish brown, especially near butt or on buttresses, buttresses large."
412	1990. Keng, H.. The Concise Flora of Singapore: Gymnosperms and dicotyledons. Singapore University Press, Singapore	[Forms dense thickets? No evidence] "Scattered in forests."
412	1992. Nielsen, I.E.. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11 - part 1. Mimosaceae (Leguminosae-Mimosoideae). Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[Forms dense thickets? No evidence] "Tall tree specimens of Parkia speciosa and P. timoriana can be seen in the fields in the Malay Peninsula as old forest remnants."
412	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Forms dense thickets? No evidence] "Parkia occurs in scattered lowland rainforests and sometimes also in tall secondary forest, on sandy, loamy and podzolic soils, also in waterlogged locations, in freshwater swamp forest and on riverbanks."
501	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Aquatic? No] "Parkia occurs in scattered lowland rainforests and sometimes also in tall secondary forest, on sandy, loamy and podzolic soils, also in waterlogged locations, in freshwater swamp forest and on riverbanks."
502	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Grass? No] Fabaceae
503	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Nitrogen fixing woody plant? Yes] "P. speciosa is a tree to about 30 (-45) m high. Bole is reddish brown, especially near butt or on buttresses, buttresses large." [Fabaceae]
504	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "P. speciosa is a tree to about 30 (-45) m high."
601	1994. Hopkins, H.C.F.. The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin. 49(2): 181-234.	[Evidence of substantial reproductive failure in native habitat? No evidence] "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,..."
601	2008. Bumrungsri, S./Harbit, A./Benzie, C./Carmouche, K./Sridith, K./Racey, P.. The pollination ecology of two species of Parkia (Mimosaceae) in southern Thailand. Journal of Tropical Ecology. 24(5): 467-475.	[Evidence of substantial reproductive failure in native habitat? No] "Parkia speciosa and P. timoriana are canopy trees which are relatively common in lowland tropical rain forest as well as upland evergreen forests in the Indo-Pacific region (Hopkins 1994). Parkia speciosa is also currently semi-wild, grown from seed in gardens, or by grafting of selected wild trees."
602	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Produces viable seed? Yes] "Seeds of P. speciosa are recalcitrant, the seeds mature with rather high moisture content and germination must take place almost immediately. Germination of soft seed takes 3-15 days (Ng, 1992)."

603	1994. Hopkins, H.C.F.. The Indo-Pacific Species of Parkia (Leguminosae : Mimosoideae). Kew Bulletin. 49(2): 181-234.	[Hybridizes naturally? Unknown] "The cultivation of <i>P. speciosa</i> appears to have given rise to <i>P. intermedia</i> which is probably an ancient cultivated hybrid between it and <i>P. timoriana</i> ." ... "There have been no studies of self-compatibility in Indo-Pacific <i>Parkia</i> , but the presumed hybrid origin of <i>P. intermedia</i> suggests at least limited interspecific compatibility."
604	2008. Bumrungsri, S./Harbit, A./Benzie, C./Carmouche, K./Sridith, K./Racey, P.. The pollination ecology of two species of <i>Parkia</i> (Mimosaceae) in southern Thailand. Journal of Tropical Ecology. 24(5): 467-475.	[Self-compatible or apomictic? No] "The present study aimed, for the first time, to determine the breeding system of the economically important canopy trees, <i>Parkia speciosa</i> and <i>P. timoriana</i> , and to identify their pollinators. Pollination experiments carried out in Trang and Songkhla Provinces, in 28 trees of <i>P. speciosa</i> and four <i>P. timoriana</i> indicated that they are self incompatible."
605	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Requires specialist pollinators?] "Like most species of <i>Parkia</i> , <i>P. speciosa</i> is bat pollinated."
605	2008. Bumrungsri, S./Harbit, A./Benzie, C./Carmouche, K./Sridith, K./Racey, P.. The pollination ecology of two species of <i>Parkia</i> (Mimosaceae) in southern Thailand. Journal of Tropical Ecology. 24(5): 467-475.	[Requires specialist pollinators? No. Bats are the most effective pollinators, but are not required for seed set] "Insect pollination resulted in fruit set in only 12% of <i>P. speciosa</i> inflorescences. Fruit bats, mainly <i>Eonycteris spelaea</i> , 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 <i>P. speciosa</i> and <i>P. timoriana</i> . The fact that populations of <i>E. spelaea</i> appear to be declining throughout their distribution is therefore a matter of increasing concern." ... "Of the two studied species, it is only in <i>P. speciosa</i> 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 <i>P. speciosa</i> implies some degree of generalization within the specialized pollination system postulated in the genus <i>Parkia</i> ."
606	1994. Hopkins, H.C.F.. The Indo-Pacific Species of <i>Parkia</i> (Leguminosae : Mimosoideae). Kew Bulletin. 49(2): 181-234.	[Reproduction by vegetative fragmentation? No evidence] "Recently the propagation of cuttings from adult trees of <i>P. speciosa</i> has been successful; since the cuttings bloom and set fruit after only a few years, cross breeding and selection of preferred clones will enable further commercialization (Saw et al. 1991)."
606	2013. World Agroforestry Centre. Agroforestry tree database - <i>Parkia speciosa</i> . PROSEA, <a href="http://www.worldagroforestrycentre.org/sea/products/afdbases/af/asp/SpeciesInfo.asp?SpID=1258">http://www.worldagroforestrycentre.org/sea/products/afdbases/af/asp/SpeciesInfo.asp?SpID=1258</a> [Accessed 18 Kan 2013]	[Reproduction by vegetative fragmentation? No evidence] "Farmers collect seedlings of <i>P. speciosa</i> from the wild and plant them in their homegarden or field. About 90% of the soft seeds show rapid germination in 3-15 days. <i>P. speciosa</i> can be successfully propagated from stem cuttings and budding. Trees propagated by cuttings bloom and set fruit after only a few years and thereby provide the means for cross breeding, selecting preferred clones, and rapid commercializing what had formerly been a wild-gathered fruit."
607	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Minimum generative time (years)? 5+] "Flowering and fruiting begin at about age 5 years old, and occur in most years (Saw et al., 1991)."
607	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database: a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Minimum generative time (years)?] "Domesticated trees take up to 7 years to mature."
701	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No evidence] "Pods strap-shaped, usually twisted, the valves coriaceous, conspicuously swollen over, and indented between the seeds, glabrous, the veins prominent and forming reticulate network, c. 20-40 x 2.0-4.9 cm, gradually attenuate at base into a narrow stipe 3 to 13.5 cm long. About 18 seeds per pod, elliptical or broadly elliptical in outline, lying horizontal or obliquely horizontal across the width of the pod, up to 20-23 mm long; testa green, soft, strongly smelling of garlic." [Unlikely. Pods & seeds relatively large and lack means of external attachment]
702	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] " <i>P. speciosa</i> is becoming increasingly popular, and has been planted in villages for fruit production in many parts of South-East Asia. It is particularly common in western Java."
703	1992. Nielsen, I.E.. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11 - part 1. Mimosaceae (Leguminosae-Mimosoideae). Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[Propagules likely to disperse as a produce contaminant? No] "Pods strap-shaped, usually twisted,..." ... "c. 20-40 by 2-4.9 cm, gradually attenuate at base into a narrow stipe 3-13.5 cm long." ... "Seeds c. 18 per pod, elliptical or broadly elliptical in outline, lying horizontal or obliquely horizontal across the width of the pod, up to 23 mm long, foul smelling; testa green, softish." [Pods and seeds relatively large. Unlikely to become an inadvertent produce contaminant]

704	1992. Nielsen, I.E.. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11 - part 1. Mimosaceae (Leguminosae-Mimosoideae). Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[Propagules adapted to wind dispersal? No] "Dispersal. Birds and mammals have been reported feeding on the fruits"
705	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Propagules water dispersed? Potentially] "Parkia occurs in scattered lowland rainforests and sometimes also in tall secondary forest, on sandy, loamy and podzolic soils, also in waterlogged locations, in freshwater swamp forest and on riverbanks." [Distribution suggests pods or seeds may be moved by water]
706	1992. Nielsen, I.E.. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11 - part 1. Mimosaceae (Leguminosae-Mimosoideae). Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[Propagules bird dispersed? Yes] "Dispersal. Birds and mammals have been reported feeding on the fruits: hornbills on <i>P. speciosa</i> [Ridley, Disp. (1930) 486],"
706	1994. Hopkins, H.C.F.. The Indo-Pacific Species of <i>Parkia</i> (Leguminosae : Mimosoideae). Kew Bulletin. 49(2): 181-234.	[Propagules bird dispersed?] "A few scattered references suggest that birds, monkeys and other mammals may be dispersal agents. Ridley (1930) mentions that the Helmeted Hornbill <i>Rhinoplax vzigil</i> (Forster) is fond of the green pods of <i>P. speciosa</i> , though the Moustached Parakeet <i>Psittacus</i> (sic) <i>alexandri</i> L. apparently only damages the fruits of this species (Sorauer 1931). The Long tailed Macaque <i>Macaca fascicularis</i> (Raffles) and the Dusky and Banded Leaf Monkeys all feed on fruits of <i>Parkia</i> in West Malaysia (Chivers 1974; Curtin & Chivers 1978; Medway & Wells 1971). However, they are not consumed by the Siamang <i>Hylobates syndactylus</i> (Raffles) in the same area (Chivers 1974; Curtin & Chivers 1978), although another gibbon, <i>H. muelleri x agilis</i> has been observed eating immature <i>Parkia</i> pods in Kalimantan (C. Attrill, pers. comm. 1992). Squirrels take <i>Parkia</i> seeds in West Malaysia (Medway 1972), and Corner (1988) reports that deer and elephants are said to eat the seeds of <i>P. sumatrana</i> in Perak. There is no indication as to which of these animals is likely to be an effective dispersal agent."
706	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Propagules bird dispersed? Yes] " <i>P. speciosa</i> is pollinated by bats, and birds disperse the seed pods."
707	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Propagules dispersed by other animals (externally)?] "Pods strap-shaped, usually twisted, the valves coriaceous, conspicuously swollen over, and indented between the seeds, glabrous, the veins prominent and forming reticulate network, c. 20-40 x 2.0-4.9 cm, gradually attenuate at base into a narrow stipe 3 to 13.5 cm long. About 18 seeds per pod, elliptical or broadly elliptical in outline, lying horizontal or obliquely horizontal across the width of the pod, up to 20-23 mm long; testa green, soft, strongly smelling of garlic." [Pods & seeds lack means of external attachment]
708	1992. Nielsen, I.E.. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11 - part 1. Mimosaceae (Leguminosae-Mimosoideae). Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[Propagules survive passage through the gut? Presumably Yes] "Dispersal. Birds and mammals have been reported feeding on the fruits: hornbills on <i>P. speciosa</i> [Ridley, Disp. (1930) 486],"
801	2008. Bumrungsri, S./Harbit, A./Benzie, C./Carmouche, K./Sridith, K./Racey, P.. The pollination ecology of two species of <i>Parkia</i> (Mimosaceae) in southern Thailand. Journal of Tropical Ecology. 24(5): 467-475.	[Prolific seed production (>1000/m <sup>2</sup> )? Presumably Yes] "The number of flowers per capitulum in <i>P. timoriana</i> (3860±393, n=15) is much greater than in <i>P. speciosa</i> (2422±314, n=18) but in both species 70–75% are fertile (Bumrungsri unpubl. data)."
802	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Seeds of <i>P. speciosa</i> are recalcitrant, the seeds mature with rather high moisture content and germination must take place almost immediately. Germination of soft seed takes 3 15 days (Ng, 1992)."
802	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, ( <a href="http://www.worldagroforestry.org/af/treedb/">http://www.worldagroforestry.org/af/treedb/</a> )	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Seeds of <i>P. speciosa</i> lose their viability very rapidly."
803	2013. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	2013. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown]
805	2013. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

## **Summary of Risk Traits**

### **High Risk / Undesirable Traits**

- Possibly naturalizing in Hilo, Hawaii
- Thrives in tropical climates
- Can grow from 0-1400 m elevation within native range
- Shade tolerant
- Tolerates many soil conditions (and potentially able to exploit many different habitat types)
- N-fixing woody legume (may modify soil chemistry)
- Can produce high numbers of seeds which may be dispersed by birds

### **Low Risk / Desirable Traits**

- No negative impacts have been documented to date
- Unarmed (no spines, thorns or burrs)
- Fodder tree
- Non-toxic
- Landscaping and ornamental value
- Edible seeds
- Self-incompatible breeding system
- Reaches reproductive maturity in 5+ years
- Recalcitrant seeds lose viability rapidly