Taxon: Castanospermum australe A. Cunn. & C. Fraser ex Hook.

Family: Fabaceae

Common Name(s): Australian chestnut
beantree
black bean
Moreton Bay bean
Moreton Bay chestnut

Synonym(s):

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 9 Nov 2018

WRA Score: 1.0 **Designation:** L **Rating:** Low Risk

Keywords: Tropical Tree, Naturalized, Toxic Seeds, N-Fixing, Water-Dispersed

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	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	y
406	Host for recognized pests and pathogens		

Qsn #	Question	Answer Option	Answer
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	y
408	Creates a fire hazard in natural ecosystems		
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	n
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	n
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	y
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	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Cultivated, but not domesticated] "Moreton Bay Chestnut is native to the coastal rainforests and beaches in Australia from around Lismore, New South Wales to the Iron Range, Cape York Peninsula on the Queensland coast and 160 km west to the Bunya Mountains. It has been introduced into India, Malaysia, Papua New Guinea, Sri Lanka and the United States of America."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. 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. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Nov 2018]	"Native Australasia AUSTRALIA: Australia [Queensland] Pacific SOUTHWESTERN PACIFIC: New Caledonia, Vanuatu"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Nov 2018]	

203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Climate: Altitudinal range: 50–1000 m; Hottest/coldest month: 30–35°C/10–20°C; Frost incidence: mainly low but ranging to moderate at upland sites in the south of its range; Rainfall: 1000–3800 mm per year, summer max."

Qsn #	Question	Answer
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Moreton Bay Chestnut is suited for a wide range of conditions throughout Australia spanning subtropical and tropical climatic regimes. It thrives in areas with mean annual temperature of 28 ° C and mean annual rainfall of 1,000– 3,800 mm in altitudes of 50–750 m." … "It will tolerate only light frost."
	Plants for a Future. (2018). Castanospermum austral. https://pfaf.org/user. [Accessed 8 Nov 2018]	"USDA hardiness: 8-12" … "A tree of moist, lowland tropical and subtropical climates, it grows best at an elevation between 50 - 750 metres"
	Cunningham, S., & Read, J. (2003). Comparison of temperate and tropical rainforest tree species: growth responses to temperature. Journal of Biogeography, 30(1), 143-153	[Elevation range exceeds 1000 m, demonstrating environmental versatility] "Table 1 The species used in the study grouped into rainforest types and with details of their collection sites and distributional ranges" [Castanospermum austral - Latitude = 12.5–30□S; Altitude (m) = 5–1150]

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Nov 2018]	"Native Australasia AUSTRALIA: Australia [Queensland] Pacific SOUTHWESTERN PACIFIC: New Caledonia, Vanuatu"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Moreton Bay Chestnut is native to the coastal rainforests and beaches in Australia from around Lismore, New South Wales to the Iron Range, Cape York Peninsula on the Queensland coast and 160 km west to the Bunya Mountains. It has been introduced into India, Malaysia, Papua New Guinea, Sri Lanka and the United States of America."
	Skolmen, R.G. 1980. Plantings on the forest reserves of Hawaii: 1910–1960. Institute of Pacific Islands Forestry, Pacific Southwest Forest & Range Experiment Station, US Forest Service, Honolulu, HI	Castanospermum australe - 1,187 planted on 4 of the Hawaiian Islands (Kauai - 306 planted in 1935; Oahu - 687 planted between 1927- 1955; Maui - 153 between 1930 - 1936; Hawaii - 41 planted between 1928 - 1957)

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Flora of Australia Online. (2018). Castanospermum. http://www.anbg.gov.au/abrs/online-resources/flora/stddisplay.xsql?pnid=52630. [Accessed 4 Nov 2018]	"A monotypic genus from Australia (eastern Qld, north-eastern N.S.W.), New Caledonia and Vanuatu; naturalised on Norfolk Is."
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Parris, B. S. 2008. Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2004–06. New Zealand Journal of Botany, 46(2): 257-283	"NOTES: Cultivation escape. Collected as seedlings and saplings within a public reserve, with the parent tree in an adjacent garden. Further establishment is prevented because the seedlings are periodically removed by the Department of Conservation."

Qsn #	Question	Answer
	New Zealand Plant Conservation Network. (2014). Castanospermum austral. http://m.nzpcn.org.nz/. [Accessed 4 Nov 2018]	"Raewynn Osborne (Non-member from Thames-Coromandel District) 4/03/2014 7:35:04 p.m. Is it possible to buy/get seeds for this plant in NZ?" … "Peter de Lange 5/03/2014 2:36:33 p.m. Not that I am aware of - however you can find it growing in some parts of Auckland, North Head for example. Its grows readily from seed, and indeed has started to naturalise (but its very slow growing), which you should be aware of. However I doubt it will be a major weed, its been slowly naturalizing on Norfolk Island for 80+ years and has hardly done anything much, and plants are easily destroyed."
	Negi, P. S., & Hajra, P. K. 2007. Alien flora of Doon Valley, Northwest Himalaya. Current Science 92(7): 968-978	"Table 1. Exotics of the Doon Valley" [Castnospermum austral present but not listed as naturalized]
	WRA Specialist. 2018. Personal Communication	Reproducing and possibly naturalized or naturalizing on Hawaii island

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	New Zealand Plant Conservation Network. (2014). Castanospermum austral. http://m.nzpcn.org.nz/. [Accessed 4 Nov 2018]	"Peter de Lange 5/03/2014 2:36:33 p.m. Not that I am aware of - however you can find it growing in some parts of Auckland, North Head for example. Its grows readily from seed, and indeed has started to naturalise (but its very slow growing), which you should be aware of. However I doubt it will be a major weed, its been slowly naturalizing on Norfolk Island for 80+ years and has hardly done anything much, and plants are easily destroyed."
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	[Not regarded as weedy, but some landscaping considerations are warranted] "Due to its extensive root system, it should not be planted within 10 metres of drainage lines, sewers, house foundations, garages or swimming pools."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Cited as a weed, but subsequent searches of references listed were unable to corroborate or find evidence of impacts

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. Cited as a weed, but subsequent searches of references listed were unable to corroborate or find evidence of impacts

305	Congeneric weed	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Black bean is the sole species of this genus."

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence] "A tall evergreen tree, reaching heights of 20–40 m high, with a dense rounded canopy with a spread of 4–8 m, low spreading branches, trunk diameter of 1.2 m and greyish brown bark. Leaves are alternate, imparipinnate, 20–35 cm long, with 11–17 mostly alternate leaflets (Plates 1 and 2). Leaflets have entire margins, elliptic-lanceolate to oval, about 8–17 × 3–6 cm, obtuse apex and unequal sides at base, glossy green on upper surface and pale green below and borne on 0.5–7 cm long petiolules."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Black bean is a tall tree up to 40 m in height and with stem diameters to 1.2 m." [Fabaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 8 Nov 2018]	"The leaves and seeds are toxic to livestock." [Presumably palatable, despite toxicity]

405	Toxic to animals	y
	Source(s)	**Notes**
	French, B. R. (2006). Food plants of Papua New Guinea. A compendium Revised edition. Privately published, Tasmania, Australia	"Caution: In Australia several deaths and stomach upsets have been reported in cattle which have eaten the seeds."

Qsn #	Question	Answer
	McKenzie, R. A., Reichmann, K. G., Dimmock, C. K., Dunster, P. J., & Twist, J. O. (1988). The toxicity of Castanospermum australe seeds for cattle. Australian Veterinary Journal, 65(6), 165-167	"SUMMARY: Two calves given a mean of 16.1 g and 16.4 g ripe Casfanospermum austral seeds/kg body weight daily for 13 and 16 days respectively developed haemorrhagic gastroenteritis. The first calf died. The second calf had mild myocardial degeneration and necrosis and mild nephrosis at necropsy. Two calves given a mean of 16.8 g unripe C. australe seeds/kg body weight daily for 18 days remained clinically normal and had mild gastritis at necropsy. The activity of alpha-glucosidase was reduced in the mononuclear cells of peripheral blood and in skeletal muscle. This was attributed to the presence of the indolizidine alkaloid, castanospermine, in the seeds. The toxin causing the gastroenteritis and other lesions is unknown."
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	"The leaves and seeds are toxic to livestock."
	Williams, C. 2012. Medicinal Plants in Australia Volume 3: Plants, Potions and Poisons. Rosenberg Publishing, Kenthurst NSW	[Eaten by rodents and possums, but toxic to humans] "The impressive Blackbean or Moreton Bay Chestnut (Castanospermum australe) is a large tree that features along the Australian east coast." … "The pods crack open when they fall to reveal large seeds that are eaten with no apparent ill effect by possums and native rodents – but humans are well advised to be wary of trying this fare without prior experience with its preparation. In the raw state the seeds contain a strong natural purgative, with distressing potential."

406	Host for recognized pests and pathogens	
	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 9 Nov 2018]	"C. australe harbours a spectrum of surface and internal fungal contaminants at harvest. During wet storage (which is presently the only means of short-term storage of such seeds) the range of fungal genera narrowed, with Fusarium spp. becoming dominant. Black bean sapwood is susceptible to Lyctus."
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	"May occasionally be affected by scale insects and psyllids. Over-watering may cause fungal root rot."

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	**y**
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The starchy seeds of this tree are poisonous and are eaten by the aborigines after considerable preparation. The hard seeds are cracked and soaked in water, then pounded, and made into cakes, and finally roasted. The washing in water removes some of the soluble toxins, while roasting destroys other toxins."
	Plants Rescue. (2018). Castanospermum australe. http://www.plantsrescue.com/castanospermum-australe/. [Accessed 9 Nov 2018]	"Toxicity: The leaves and seeds are toxic, Keep the plant away from pets and small children."

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"The species is common along the banks of streams and rivers in rather sheltered sites or sometimes on terraces upslope from river banks. Soils are river alluvia or deep loams on basalt. Black bean typically occurs in gallery-type rainforests. These include subtropical and tropical rainforests. The species is often dominant in riverine rainforests." [No evidence that this species contributes to our increases fire risk in native ecosystems]

409	**Is a shade tolerant plant at some stage of its life cycle**	**y**
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	"Castanospermum australe is a hardy species that is suited for a wide range of conditions throughout Australia, including Melbourne where it may grow to 8 metres. Full sun is recommended, however shady situations are tolerated, as is light frost. "
	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 8 Nov 2018]	"Intercropping: The Australian chestnut is a shade tolerant tree with prospects of intercropping with other forest or plantation trees."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**n**
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	"It grows in moist, fertile, well-drained soils on terraces on the side of mountains or along the banks of rivers and streams."
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"It thrives on well-drained, fertile, moist alluvial soils and deep loams on basalt in sunny positions but will tolerate partially shaded conditions."

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 8 Nov 2018]	"Soil type: Generally prefers fertile soils, consisting largely of alluvia and also deep loams on basalt."
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Soils are river alluvia or deep loams on basalt."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Black bean is a tall tree up to 40 m in height and with stem diameters to 1.2 m."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[No evidence] "The species is common along the banks of streams and rivers in rather sheltered sites or sometimes on terraces upslope from river banks. Soils are river alluvia or deep loams on basalt. Black bean typically occurs in gallery-type rainforests. These include subtropical and tropical rainforests. The species is often dominant in riverine rainforests."

501	Aquatic	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[Terrestrial tree that commonly occurs in riparian areas] "The species is common along the banks of streams and rivers in rather sheltered sites or sometimes on terraces upslope from river banks."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Nov 2018]	Family: Fabaceae (alt.Leguminosae) Subfamily: Faboideae Tribe: Sophoreae

503	Nitrogen fixing woody plant	y
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"It has nodules in its roots that harbour the Rhizobium bacterium that fixes nitrogen."

Qsn #	Question	Answer
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Nov 2018]	Family: Fabaceae (alt.Leguminosae) Subfamily: Faboideae Tribe: Sophoreae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Black bean is a tall tree up to 40 m in height and with stem diameters to 1.2 m."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"This species occurs from near Lismore, New South Wales, to Iron Range, Cape York Peninsula, in northern Queensland. It also extends to New Caledonia and the New Hebrides. Black bean is present in the Bellinger and Orara Valleys, New South Wales, but it is not certain that these are natural stands (A.G. Floyd, pers. comm.). It extends inland to the Bunya Mountains in southern Queensland." [No evidence of reproductive failure]

602	Produces viable seed	y
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter."
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	"Propagation of this species is from fresh seed. Germination requires a temperature of 18C - 25C. Sow in large, individual tubes using a mix of 3 parts river sand and 1 part perlite. Transplanting should be done after the first pair of true leaves have formed. Plant the seedling in a bed of thoroughly loosened, moist soil (pH of approx. 5.9 is preferred), mulch around the base of the plant and water regularly. The Black Bean is slow to establish but will respond to liquid fertilizer (NPK), which should be firstly applied 3 months after germination."
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The tree is propagated by seeds."

Qsn #	Question	Answer
603	**Hybridizes naturally**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Related species: Black bean is the sole species of this genus." [No evidence]

604	**Self-compatible or apomictic**	**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 9 Nov 2018]	"The Australian chestnut is dioecious. Flowers between October and November, fruits mature from February-April."
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"This dioecious species flowers between October and November and fruit mature from February to April in Australia ."

605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Inflorescences: Racemes up to 15 cm long, pedicels slender and about 2.5 cm long, flowers 4–5 cm long and very attractive. Usually cauline or at least produced on twigs below the leaves. Calyx waxy-yellow, bell-shaped up to 2 × 1.5 cm and 5-lobed at the apex, sparsely covered with small brown hairs. Petals coriaceous, changing from greenish yellow to deep orange, the largest (standard) about 3–4 × 3 cm and 2-lobed at the apex. Stamens yellow, 8–10, all free, incurved, about 4–5 cm long, alternately long and short. Anthers about 0.4 × 0.15 cm and can dehisce in the bud stage. Ovary on a stalk about 1.5–2 cm long, 1-celled, ovules about 3–4. Style 1–2 cm long, glabrous; stigma small, terminal." [Flowers unspecialized]
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"The flowers are an important source of nectar and pollen for bees."
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. Castanospermum australe. https://www.anbg.gov.au/gnp/interns-2002/castanospermum-australe.html. [Accessed 5 Nov 2018]	"The nectar produced by the flowers attracts birds, bats and butterflies."

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**n**
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"A tall evergreen tree, reaching heights of 20–40 m high, with a dense rounded canopy with a spread of 4–8 m, low spreading branches, trunk diameter of 1.2 m and greyish brown bark." … "The tree is propagated by seeds." [No evidence that tree suckers or spreads vegetatively]
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"The seeds germinate in 10-21 days and are recalcitrant and wet-storage is the only way to achieve short-term storage. The tree can be coppiced with care." [No evidence of vegetative spread]

607	**Minimum generative time (years)**	
	Source(s)	**Notes**
	SelecTree. "Castanospermum australe Tree Record." 1995-2018. https://selectree.calpoly.edu/tree-detail/castanospermum-australe . [Accessed 9 Nov 2018]	"Growth Rate: 24 Inches per Year. Longevity 50 to 150 years." [Probably >4 years to maturity]

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter." [Unlikely. Large pods and seeds lack means of external attachment]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Moreton Bay Chestnut is native to the coastal rainforests and beaches in Australia from around Lismore, New South Wales to the Iron Range, Cape York Peninsula on the Queensland coast and 160 km west to the Bunya Mountains. It has been introduced into India, Malaysia, Papua New Guinea, Sri Lanka and the United States of America." … "Castanospermum australe is an ideal shade tree in parks, resorts and gardens, in addition it has a strong root system, which can be used to consolidate stream banks against erosion. It is valuable as a timber species."

Qsn #	Question	Answer
703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Black bean is a tall tree up to 40 m in height and with stem diameters to 1.2 m." … "Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter." [No evidence. Large pods and seeds would be conspicuous and unlikely to be inadvertently dispersed]

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Williams, C. 2012. Medicinal Plants in Australia Volume 3: Plants, Potions and Poisons. Rosenberg Publishing, Kenthurst NSW	"Blackbean seeds, which float well, migrate easily to the ocean from their riverine habitat and are frequently seen strewn along the tropical northern beaches. The seeds are extremely resilient and have undertaken some remarkable sea journeys."
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter." [Pods and seeds large, and are adapted for water dispersal]

705	Propagules water dispersed	y
	Source(s)	**Notes**
	Williams, C. 2012. Medicinal Plants in Australia Volume 3: Plants, Potions and Poisons. Rosenberg Publishing, Kenthurst NSW	"Blackbean seeds, which float well, migrate easily to the ocean from their riverine habitat and are frequently seen strewn along the tropical northern beaches. The seeds are extremely resilient and have undertaken some remarkable sea journeys. They have been found washed ashore on the New Zealand coastline, an ambitious journey across the Tasman Sea."
	Smith, J., Heatwole, H., Jones, M., & Waterhouse, B. (1990). Drift Disseminules on Cays of the Swain Reefs, Great Barrier Reef, Australia. Journal of Biogeography, 17 (1), 5-17	"Most taxa of drift disseminule recorded on Swain Reefs cays are tropical woody plants with wide distributions. Some taxa are inland species whose disseminules reach the sea in rivers (e.g. Aieurites moluccana (L.) Willd., Castanospermum australe Cunn. & Fraser ex. Hook.) but most are littoral species, growing in mangrove swamps, coastal dunes and similar situations."
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"The species is common along the banks of streams and rivers in rather sheltered sites or sometimes on terraces upslope from river banks."

706	Propagules bird dispersed	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[Large seeds water dispersed. Unlikely to be consumed or effectively dispersed by any birds in the Hawaiian Islands] "Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter."
	Stocker, G. C., & Irvine, A. K. (1983). Seed dispersal by cassowaries (Casuarius casuarius) in North Queensland's rainforests. Biotropica, 15(3): 170-176	[Possibly ingested by cassowaries, but unlikely to be regularly consumed or dispersed by these large birds] "Two suspect species, however, were included; both were recorded only once. The first, Castanospermum australe {nomenclarure of tree species follows Hyland (1982)} is a common leguminous tree which has a simple diaspore of a large brown seed devoid of a fleshy pericarp or aril. Its presence probably reflects either the rather non selective nature of the cassowary's foraging habits or an accidental inclusion in the dung sample by the collector."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter." [No means of external attachment]

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Stocker, G. C., & Irvine, A. K. (1983). Seed dispersal by cassowaries (Casuarius casuarius) in North Queensland's rainforests. Biotropica, 15(3): 170-176	[Possibly ingested by cassowaries, but unlikely to be regularly consumed or dispersed by these large birds] "Two suspect species, however, were included; both were recorded only once. The first, Castanospermum australe {nomenclarure of tree species follows Hyland (1982)} is a common leguminous tree which has a simple diaspore of a large brown seed devoid of a fleshy pericarp or aril. Its presence probably reflects either the rather non selective nature of the cassowary's foraging habits or an accidental inclusion in the dung sample by the collector."

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. 2006. Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[No evidence and unlikely. A large-seeded, non-masting tree. Seeds recalcitrant and unlikely to build up high seed densities] "Fruits: Large, woody, pendant cylindrical legumes about 15–25 × 4–5 cm, 2-valved, slightly falcate, with 3–5 cells separated by a spongy substance, containing 3–5 round or compressed, large, brown-coated seeds about 3–5 cm diameter."

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

Qsn #	Question	Answer
	Source(s)	**Notes**
	Stewart, A. (2012). Let's Propagate! A plant propagation manual for Australia. Allen & Unwin, Sydney, Melbourne, Auckland, London	"Castanospermum australe (Black bean tree) - This fascinating rainforest tree has highly ornamental pods (legumes) with very large seeds in them. These seeds should be sown fresh (as for most rainforest species) and only half-embedded in the medium."
	Hopkins, M., & Graham, A. W. (1987). The viability of seeds of rainforest species after experimental soil burials under tropical wet lowland forest in north-eastern Australia. Australian Journal of Ecology, 12(2), 97-108	"Some seedlings of Castanospermum australe were alive and were transplanted successfully after 2 years burial" [Seedlings may survive burial, but no evidence that recalcitrant seeds form a persistent seed bank]
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"The seeds germinate in 10-21 days and are recalcitrant and wet-storage is the only way to achieve short-term storage."
	Pammenter, N. W., Berjak, P., & Walters, C. (2000). The effect of drying rate on recalcitrant seeds: 'lethal water contents', causes of damage, and quantification of recalcitrance. Seed biology: advances and applications. Proceedings of the Sixth International Workshop on Seeds, Merida, Mexico, 1999. pp.215-221	[Recalcitrant. Unlikely to form a persistent seed bank] "The rate of drying influences the response of recalcitrant seeds (such as Trichilia dregeana, Castanospermum australe, tea and Ekebergia capensis) to desiccation. Seeds or excised axes that are dried rapidly can survive to lower water contents than those dried slowly. It has been suggested that at intermediate water contents metabolism becomes uncoordinated, leading to damaging oxidative chemical processes. At low water contents, damage is biophysical, directly affecting macromolecular structures. Slowly dried material is exposed to high water contents for a period adequate to permit aqueous-based chemical oxidative processes to occur, and so loses viability at a high water content. Rapidly dried material passes through this water content range before excessive oxidative damage accumulates and is killed by biophysical processes occurring at lower water contents. The time component of drying cannot be ignored, and it is not possible to identify a specific or damaging water content to describe the desiccation tolerance of a seed species."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species. No evidence species has ever been evaluated for chemical control

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Ability to coppice"
	Stocker, G. (1981). Regeneration of a North Queensland Rain Forest Following Felling and Burning. Biotropica, 13 (2), 86-92	"TABLE 2. Regeneration modes observed in species encountered 10 or more times." [Castanospermum austral - Coppicing stumps (%) = 94]

Qsn #	Question	Answer
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Grows in tropical climates
• Possibly naturalizing on Hawaii (Hawaiian Islands), naturalized on Norfolk Island, and a cultivation escape in New Zealand
• Seeds and foliage toxic to animals; seeds toxic to humans
• Shade tolerant
• N-fixing (may alter soil chemistry)
• Reproduces by seeds
• Seeds dispersed by water and intentionally by people
• Able to coppice & resprout after cutting

Low Risk Traits
• No reports of invasiveness or negative impacts outside native range
• Unarmed (no spines, thorns, or burrs)
• Dioecious
• Not reported to spread vegetatively
• Large fruit and seeds unlikely to be inadvertently dispersed
• Recalcitrant seeds will not form a persistent seed bank

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Tolerates shade but not known to form dense stands
(B) Bird or clearly wind-dispersed?> No. Dispersed by water
Outcome = Accept (Low Risk)