

Taxon: *Atractocarpus fitzalanii* (F. Muell.) Puttock

Family: Rubiaceae

Common Name(s): brown gardenia
yellow mangosteen

Synonym(s): *Gardenia fitzalanii* F. Muell.
Randia fitzalanii (F. Muell.) Benth.
Trukia fitzalanii (F. Muell.) Fosberg

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 16 Aug 2019

WRA Score: 6.0

Designation: H(HPWRA)

Rating: High Risk

Keywords: Tropical Shrub, Naturalized, Ornamental, Shade-Tolerant, Bird-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	n
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		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic	y=1, n=0	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	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	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
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	y
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)		
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		
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
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	No evidence
	Nicholson, N. & Nicholson, H. (1991). Australian Rainforest Plants II. Second Edition. Terania Rainforest Publishing, The Channon, Australia	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2019). 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
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Endemic to north-eastern Queensland."
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Aug 2019]	"Native Australasia AUSTRALIA: Australia [Queensland]"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Aug 2019]	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	"Altitudinal range from sea level to 1200 m. Grows as an understory tree in well developed rain forest on a variety of sites." [Elevation range exceeds 1000 m, demonstrating environmental versatility]
	Nicholson, N. & Nicholson, H. (1991). Australian Rainforest Plants II. Second Edition. Terania Rainforest Publishing, The Channon, Australia	"Cold is a problem, particularly for young plants, and fruit may not set on plants south of Brisbane."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Endemic to north-eastern Queensland."
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	"Endemic to Queensland, occurs in NEQ and southwards as far as coastal central Queensland. Altitudinal range from sea level to 1200 m. Grows as an understory tree in well developed rain forest on a variety of sites."
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers 87: 3-18	"This tree, native to tropical Asia and Australia, was first planted in the Arboretum in 1919 and first noted by Lyon as volunteering in 1943. The plant is characterized by dark green, glabrous, obovate-ovate leaves 1–20 cm long. Leaves are commonly oblanceolate in seedlings. The flowers are white and fragrant, and the fruit is yellow at maturity, ca. 8 cm in diameter, and many seeded. Thousands of seedlings and dozens of saplings were observed in 'Aihualama. Records indicate that it was planted only in the lower parts of 'Aihualama, but saplings and mature plants were found more than 300 m away in upper 'Aihualama, bordering on State of Hawai'i watershed forest. Material examined: O'AHU: Mature naturalized tree ca. 5 m tall in Haukulu with dozens of seedlings in the vicinity, Lyon Arboretum, 14 Jun 2005 C. Daehler 1317 (BISH); seedlings in Ardisia elliptica forest, 'Aihualama, Lyon Arboretum, 3 Mar 2005, C. Daehler 1094 (HAW); Lyon Arboretum (cultivated), 22 Mar 1972, S. Ishikawa 72 (HLA)."

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"A bushy species with decorative foliage and fragrant flowers. The fruit are edible and soft." [Most information about this species comes from the native range in Australia]
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers 87: 3-18	"This tree, native to tropical Asia and Australia, was first planted in the Arboretum in 1919 and first noted by Lyon as volunteering in 1943."

Qsn #	Question	Answer
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/ . [Accessed 15 Aug 2019]	" <i>Trukia fitzalanii</i> (F. Mueller) Fosberg (Confirmed) Synonyms: Syn. <i>Randia fitzalanii</i> (F. Mueller) F. Mueller First Collected: 1930 Locations: Harold L. Lyon Arboretum (Confirmed) Ho'omaluhia Botanical Garden Waimea Arboretum & Botanical Garden (Confirmed)"

301	Naturalized beyond native range	y
	Source(s)	Notes
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers 87: 3-18	" <i>Randia fitzalanii</i> F. Muell. New naturalized record This tree, native to tropical Asia and Australia, was first planted in the Arboretum in 1919 and first noted by Lyon as volunteering in 1943. The plant is characterized by dark green, glabrous, obovate-ovate leaves 1–20 cm long. Leaves are commonly oblanceolate in seedlings. The flowers are white and fragrant, and the fruit is yellow at maturity, ca. 8 cm in diameter, and many seeded. Thousands of seedlings and dozens of saplings were observed in 'Aihualama. Records indicate that it was planted only in the lower parts of 'Aihualama, but saplings and mature plants were found more than 300 m away in upper 'Aihualama, bordering on State of Hawai'i watershed forest. Material examined: O'AHU: Mature naturalized tree ca. 5 m tall in Haukulu with dozens of seedlings in the vicinity, Lyon Arboretum, 14 Jun 2005 C. Daehler 1317 (BISH); seedlings in <i>Ardisia elliptica</i> forest, 'Aihualama, Lyon Arboretum, 3 Mar 2005, C. Daehler 1094 (HAW); Lyon Arboretum (cultivated), 22 Mar 1972, S. Ishikawa 72 (HLA)."

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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

Qsn #	Question	Answer
	Andreasen, K., & Bremer, B. (2000). Combined phylogenetic analysis in the Rubiaceae-Ixoroideae: morphology, nuclear and chloroplast DNA data. American Journal of Botany, 87(11), 1731-1748	"Randia fitzalanii, an Australian species that is part of this clade has been placed in Trukia (Fosberg, 1987). Recently, Puttock (1999) and Puttock and Quinn (1999) performed morphological analyses of Asian-Australian Gardenieae and considered it appropriate to include Trukia, Sukunia, and possibly Porterandia in Atractocarpus. Our results support these relationships, although our analysis includes a more limited sampling compared to Puttock and Quinn's analysis." [No weedy species listed in Atractocarpus, but Randia spp. listed as weeds]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Randia aculeata (Rubiaceae) Randia formosa (Rubiaceae) Randia mitis (Rubiaceae) Randia spinifex (Rubiaceae) [No weedy species listed in Atractocarpus, but Randia spp. listed as weeds]

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Cooper, W., & Cooper, W. (2013). Australian Rainforest Fruits: A Field Guide. CSIRO Publishing, Collingwood, Australia	"Fruit: 60-100 x 50-90 mm; seeds numerous, about 8 mm long. Jan.-Aug. Habit: tree to 20 m. Leaves: simple, 65-220 x 50-130 mm. Key features: fruit with tube at apex, smooth flat brown seeds. Distribution: Cooktown NE Qld to Koumala near Sarina CE Qld." [Unlikely, but no information found on number of seeds per fruit]
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - Atractocarpus fitzalanii subsp. fitzalanii. http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	"Fruits frequently solitary (rarely 2-4 together) globular or ellipsoid, about 60-70 x 35-100 mm, calyx often persisting at the apex. Pedicels about 10-15 mm long. Seeds numerous, flattened, about 8 x 6-7 mm. Cotyledons wider than the radicle."

402	Allelopathic	n
	Source(s)	Notes
	Kutt, A. S. (1997). Terrestrial vertebrate survey in the coastal wetlands surrounding Cairns International Airport, North Queensland. Australian Zoologist, 30(3), 300-309	"Sand Ridge Woodland Habitat (S) This habitat corresponds to the tall 18 m Melaleuca leucadendra woodland and closed forest vegetation communities recorded on the sand dune ridges. These communities also typically contain Acacia crassicaarpa, Pleiogynum timoreme, Canarium australanum, Randia fitzalanii in the sub-canopy, an understorey up to 5 m of Cupaniopsis anacardioides, Polyscias elegans, Ficus opposita, Pandanus sp., Mimusops elengi, Persomia falcata, Schefflera actinophylla, Morinda citrifolia, Terminalia meulleri and a shrub/ground layer of Urena lobata, Imperata cylindrica, Alyxia obtusifolia, Dianella sp. and Dendrobium spp. Vines such as Jasminum volubile and Flagellaria indica are prominent in these communities." [No evidence of allelopathy, and species grows in diverse understory]

403	Parasitic	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"A bushy shrub or tree to about 6 m tall." [Rubiaceae. No evidence]

404	Unpalatable to grazing animals	
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Qsn #	Question	Answer
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown

405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2019). <i>Atractocarpus fitzalanii</i> . http://tropical.theferns.info/viewtropical.php?id=Atractocarpus+fitzalanii . [Accessed 16 Aug 2019]	"Known Hazards: None known"
	Nicholson, N. & Nicholson, H. (1991). Australian Rainforest Plants II. Second Edition. Terania Rainforest Publishing, The Channon, Australia	"These fruits are edible and have prompted the common name Yellow Mangosteen, after the delicious Malaysian Mangosteen (<i>Garcinia mangostana</i>). They are, however, not related nor even similar in taste...Well-grown garden plants are bushy and very handsome. They make excellent indoor or outdoor container plants" [Ornamental and edible fruit with no mention of toxicity or allergic reactions, and no evidence that animals browse or feed on plant]
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 15 Aug 2019]	"Pests and Diseases: Possibly spider mites. Birds eat the fruit."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2019). <i>Atractocarpus fitzalanii</i> . http://tropical.theferns.info/viewtropical.php?id=Atractocarpus+fitzalanii . [Accessed 16 Aug 2019]	"Known Hazards: None known"
	Nicholson, N. & Nicholson, H. (1991). Australian Rainforest Plants II. Second Edition. Terania Rainforest Publishing, The Channon, Australia	"These fruits are edible and have prompted the common name Yellow Mangosteen, after the delicious Malaysian Mangosteen (<i>Garcinia mangostana</i>). They are, however, not related nor even similar in taste...Well-grown garden plants are bushy and very handsome. They make excellent indoor or outdoor container plants" [ornamental and edible fruit with no mention of toxicity or allergic reactions]
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
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Qsn #	Question	Answer
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	"Grows as an understory tree in well developed rain forest on a variety of sites." [No evidence that this rainforest species is adapted to or increases fire]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	"Grows as an understory tree in well developed rain forest on a variety of sites."
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 15 Aug 2019]	"Grows in full sun or partial shade. Mulch well."
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"This species grows well in a shady position and likes an abundance of water."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Divine Plants Online. (2019). <i>Atractocarpus fitzalanii</i> . https://www.divineplantsonline.com.au/attractocarpus-fitzalanii-51.phtml . [Accessed 15 Aug 2019]	"Most soil types ok."
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 15 Aug 2019]	"Soils: Good drainage. Can grow near beach."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"A bushy shrub or tree to about 6 m tall."

412	Forms dense thickets	n
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	[No evidence from native range] "Endemic to Queensland, occurs in NEQ and southwards as far as coastal central Queensland. Altitudinal range from sea level to 1200 m. Grows as an understory tree in well developed rain forest on a variety of sites."
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	No evidence from native range

501	Aquatic	n
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Qsn #	Question	Answer
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 15 Aug 2019]	[Terrestrial] "Usually a small tree seldom exceeding 30 cm dbh. ... Endemic to Queensland, occurs in NEQ and southwards as far as coastal central Queensland. Altitudinal range from sea level to 1200 m. Grows as an understory tree in well developed rain forest on a variety of sites."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Aug 2019]	Family: Rubiaceae Subfamily: Ixoroideae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Aug 2019]	Family: Rubiaceae Subfamily: Ixoroideae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"A bushy shrub or tree to about 6 m tall."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Propagation: From fresh seed" [No evidence]
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 16 Aug 2019]	[No evidence] "Distribution and Ecology: Endemic to Queensland, occurs in NEQ and southwards as far as coastal central Queensland. Altitudinal range from sea level to 1200 m. Grows as an understory tree in well developed rain forest on a variety of sites. Natural History: A shrub or small tree now often cultivated for the showy perfumed flowers. It maintains a good shape and is adaptable and easy to grow. This species is one of the few native plants known to have been used as an aphrodisiac by the aborigines. Cribb (1981)."

602	Produces viable seed	y
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Propagation: From fresh seed" [No evidence]

Qsn #	Question	Answer
	Tropical Plants Database, Ken Fern. (2019). <i>Atractocarpus fitzalanii</i> . http://tropical.theferns.info/viewtropical.php?id=Atractocarpus+fitzalanii . [Accessed 16 Aug 2019]	"Propagation: Seed - sown fresh it germinates slowly but reliably [694]."
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 16 Aug 2019]	"Propagation: Seeds, cuttings. Seeds are recalcitrant: remove from the fruit and sow immediately."

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Daleys Fruit Tree Nursery. (2019). Native Gardenia - <i>Atractocarpus fitzalanii</i> . https://www.daleysfruit.com.au/buy/randia-fitzalanii-native-gardenia-tree.htm . [Accessed 16 Aug 2019]	"Plants required to Pollinate: 1 (Self Pollinating)"
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 16 Aug 2019]	"The small (2-2.5cm) white fragrant monoecious flowers appear from September to November, occur singly and have five lanceolate petals forming a tube. The flowers resemble those of Gardenia. Male flowers: Flowers on a pedicle about 1-15 mm long. Calyx lobes small and inconspicuous. Flowers quite large, corolla tube about 10mm long with corolla lobes about 15mm long. Anthers sessile, about 6-7mm long, included in the corolla tube. Female flowers: Hypanthium about 7mm long. Calyx tube about 6mm long, lobes about 1mm long. Corolla tube about 15mm long, lobes about 20mm long. There is an inferior ovary with style plus stigma about 14-17mm long, swollen part about 9-12mm long, stigmatic lobes about 6-10mm long. The flowers open in the afternoon and are pollinated by moths."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 16 Aug 2019]	[Moth-pollinated] "The small (2-2.5cm) white fragrant monoecious flowers appear from September to November, occur singly and have five lanceolate petals forming a tube. The flowers resemble those of Gardenia. Male flowers: Flowers on a pedicle about 1-15 mm long. Calyx lobes small and inconspicuous. Flowers quite large, corolla tube about 10mm long with corolla lobes about 15mm long. Anthers sessile, about 6-7mm long, included in the corolla tube. Female flowers: Hypanthium about 7mm long. Calyx tube about 6mm long, lobes about 1mm long. Corolla tube about 15mm long, lobes about 20mm long. There is an inferior ovary with style plus stigma about 14-17mm long, swollen part about 9-12mm long, stigmatic lobes about 6-10mm long. The flowers open in the afternoon and are pollinated by moths."

Qsn #	Question	Answer
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers 87: 3-18	[Reproducing and apparently not pollinator-limited] "The flowers are white and fragrant, and the fruit is yellow at maturity, ca. 8 cm in diameter, and many seeded. Thousands of seedlings and dozens of saplings were observed in 'Aihualama. Records indicate that it was planted only in the lower parts of 'Aihualama, but saplings and mature plants were found more than 300 m away in upper 'Aihualama, bordering on State of Hawai'i watershed forest."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Propagation: From fresh seed" [No evidence of vegetative spread]

607	Minimum generative time (years)	3
	Source(s)	Notes
	Buermeyer, K. (2009). US Fish and Wildlife Service, Pacific Islands Office. Pers. Comm. 8 June	"I may be able to shed some light on reproductive maturity; the ones I have been watching are just about 4 years old, and the first of them are blooming this year."
	Houzz. (2005). GardenWeb Forums - randia fitzalanii. April 28, 2005. https://www.gardenweb.com/discussions/2799269/randia-fitzalanii . [Accessed 16 Aug 2019]	"My older one is about 4 years old now and only about 2m high. They don't seem to like the hottest direct northern sun - bleaches some leaves. The leaves are a beautiful glossy deep green. My older one has had a few flowers over the last two years, but flowering has yet to get into full stride." [Flowers in <4 years]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed 16 Aug 2019]	"Fruits frequently solitary (rarely 2-4 together) globular or ellipsoid, about 60-70 x 35-100 mm, calyx often persisting at the apex. Pedicels about 10-15 mm long. Seeds numerous, flattened, about 8 x 6-7 mm." [Relatively large fruit and seeds with no means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"A bushy species with decorative foliage and fragrant flowers. The fruit are edible and soft." [Ornamental, and fruit tree]

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - <i>Atractocarpus fitzalanii</i> subsp. <i>fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed]	"Fruits frequently solitary (rarely 2-4 together) globular or ellipsoid, about 60-70 x 35-100 mm, calyx often persisting at the apex. Pedicels about 10-15 mm long. Seeds numerous, flattened, about 8 x 6-7 mm." [Unlikely, relatively large fruit and seeds]

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Rounded, yellowish fruit grow to about 8 cm across"

705	Propagules water dispersed	y
	Source(s)	Notes
	Tucker, N. I., & Murphy, T. M. (1997). The effects of ecological rehabilitation on vegetation recruitment: some observations from the Wet Tropics of North Queensland. Forest Ecology and Management, 99(1-2), 133-152	"Appendix B Native plant species colonising study sites" [Randia fitzalanii (now Atractocarpus fitzalanii) reported to be dispersed by Wr, water; possibly by T, bat; by M, mammal and by S, cassowary]
	FNQROC. (2005). FNQROC Development Manual Operational. Works Specification S9. Natural Area Restoration. Far North Queensland Regional Organisation of Councils, Cairns	Position in riparian habitats described as M = mid-bank and creek flat area; R = riparian (flat at top of creek slope) and W = wet areas...listed as growing in Melaleuca quinquervia & Dillenia alata swamp community [Distribution suggests fruits and/or seeds may float and could be water dispersed]

706	Propagules bird dispersed	y
	Source(s)	Notes
	Tucker, N. I., & Murphy, T. M. (1997). The effects of ecological rehabilitation on vegetation recruitment: some observations from the Wet Tropics of North Queensland. Forest Ecology and Management, 99(1-2), 133-152	"Appendix B Native plant species colonising study sites" [Randia fitzalanii (now Atractocarpus fitzalanii) reported to be dispersed by Wr, water; possibly by T, bat; by M, mammal and by S, cassowary]
	Atlas of Living Australia. (2019). Atractocarpus fitzalanii. https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2887364#cite_note-Puttock99b-5 . [Accessed 15 Aug 2019]	"Flowers open in the afternoon, and moths then visit the plants. Birds eat the fruit."
	Buermeyer, K. (2009). US Fish and Wildlife Service, Pacific Islands Office. Pers. Comm. 8 June	"I'm guessing Bulbuls would be a pretty good dispersal mechanism, if they open up papayas, seems like they could handle these fruits"
	Nicholson, N. & Nicholson, H. (1991). Australian Rainforest Plants II. Second Edition. Terania Rainforest Publishing, The Channon, Australia	"In late autumn, yellow fruits develop, 4-8 cm in diameter and filled with small seeds embedded in a soft pulp."
	Jones, D.L. (1986). Ornamental Rainforest Plants in Australia, Reed Books, Frenchs Forest, Australia	"Rounded, yellowish fruit grow to about 8 cm across" [fleshy-fruited]
	Environmental Protection Agency. (1994). Nature notes. Tropical Topics No. 23	"The many-seeded fruit are listed as being eaten by cassowaries and it is recorded that Aborigines ate the pulp without preparation."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	CSIRO. (2010). Australian Tropical Rainforest Plants Edition 6.1 - Atractocarpus fitzalanii subsp. fitzalanii. http://keys.trin.org.au/key-server/ . [Accessed 16 Aug 2019]	"Fruits frequently solitary (rarely 2-4 together) globular or ellipsoid, about 60-70 x 35-100 mm, calyx often persisting at the apex. Pedicels about 10-15 mm long. Seeds numerous, flattened, about 8 x 6-7 mm." [No evidence. No means of external attachment]

708	Propagules survive passage through the gut	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Tucker, N. I., & Murphy, T. M. (1997). The effects of ecological rehabilitation on vegetation recruitment: some observations from the Wet Tropics of North Queensland. <i>Forest Ecology and Management</i> , 99(1-2), 133-152	"Appendix B Native plant species colonising study sites" [<i>Randia fitzalanii</i> (now <i>Atractocarpus fitzalanii</i>) reported to be dispersed by Wr, water; possibly by T, bat; by M, mammal and by S, cassowary]
	Atlas of Living Australia. (2019). <i>Atractocarpus fitzalanii</i> . https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2887364#cite_note-Puttock99b-5 . [Accessed 15 Aug 2019]	"Flowers open in the afternoon, and moths then visit the plants. Birds eat the fruit."
	Nicholson, N. & Nicholson, H. (1991). <i>Australian Rainforest Plants II</i> . Second Edition. Terania Rainforest Publishing, The Channon, Australia	"In late autumn, yellow fruits develop, 4-8 cm in diameter and filled with small seeds embedded in a soft pulp."
	Jones, D.L. (1986). <i>Ornamental Rainforest Plants in Australia</i> , Reed Books, Frenchs Forest, Australia	"Rounded, yellowish fruit grow to about 8 cm across" [fleshy-fruited]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	CSIRO. (2010). <i>Australian Tropical Rainforest Plants Edition 6.1 - Atractocarpus fitzalanii subsp. fitzalanii</i> . http://keys.trin.org.au/key-server/ . [Accessed]	"Usually a small tree seldom exceeding 30 cm dbh." ... "Fruits frequently solitary (rarely 2-4 together) globular or ellipsoid, about 60-70 x 35-100 mm, calyx often persisting at the apex. Pedicels about 10-15 mm long. Seeds numerous, flattened, about 8 x 6-7 mm." [Probably not, due to small plant size. Seeds numerous, but densities unspecified]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Rare Fruit Club WA. (2019). <i>Atractocarpus</i> (formerly <i>Randia</i>) <i>fitzalanii</i> . http://www.rarefruitclub.org.au/Randia.htm . [Accessed 16 Aug 2019]	"Seeds, cuttings. Seeds are recalcitrant: remove from the fruit and sow immediately."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Guildford Garden Centre. (2019). <i>Native Gardenia</i> (<i>Atractocarpus fitzalanii</i>). https://guildfordgardencentre.com.au/product/native-gardenia-bush-tucker/ . [Accessed 16 Aug 2019]	[Tolerates pruning] "Can reach a height of 6 m high by 3 m wide, however can be kept smaller by regular pruning. May be grown in a pot."

Qsn #	Question	Answer
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility in tropical regions
- Thrives in tropical climates
- Naturalized on Oahu, Hawaiian Islands
- Shade-tolerant (could invade intact forest)
- Tolerates many soil types (not substrate-limited)
- Reproduces by seeds
- Reported to be self-pollination
- Seeds dispersed by birds, water and intentionally by people

Low Risk Traits

- Despite naturalization, no reports of negative impacts (but limited cultivation outside native range)
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Edible fruit and ornamental uses
- Not reported to spread vegetatively
- Recalcitrant seeds may 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.

(B) Bird or clearly wind-dispersed?> Yes. Dispersed by birds

(C) Life cycle <4 years? Yes. Reported to flower in 3+ years.

Outcome = Reject (High Risk)