

<b>Taxon:</b> <i>Gardenia latifolia</i> Aiton	<b>Family:</b> Rubiaceae
<b>Common Name(s):</b> Ceylon boxwood Indian boxwood tree gardenia	<b>Synonym(s):</b> <i>Gardenia calyculata</i> Roxb. <i>Gardenia enneandra</i> J.Koenig ex S. & G. Smith

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 21 Feb 2018
<b>WRA Score:</b> 0.0	<b>Designation:</b> L	<b>Rating:</b> <span style="background-color: yellow;">Low Risk</span>

**Keywords:** Tropical Shrub, Ornamental, Edible Fruit, Bird-Dispersed, Mammal-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	n
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		
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		
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		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	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		
605	Requires specialist pollinators		
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		
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/m <sup>2</sup> )	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Multiple uses. No evidence of domestication] "India. Tree, smooth grey bark, white to yellow flowers, globose berries, ripe fruits eaten" ... "Used in Ayurveda and Sidha. Pounded bark in water used to cure stomach troubles, heartburn and constipation. Resinous sap from the stem tips applied on sores of hand and feet in rainy season. Root taken to treat heavy bleeding during menstrual cycle. Pasted fruits given to cure amebiasis. Veterinary medicine, young leaves applied to wounds of cattle; leaf paste mixed with turmeric applied in boils, blisters, ulcers and wounds; fruits along with leaves of <i>Jasminum auriculatum</i> , stem bark of <i>Helicteres isora</i> pounded and the extract given orally for tympany. Stem bark as fish poison."

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]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 16 Feb 2018]	"Native Asia-Tropical Indian Subcontinent: India"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 20 Feb 2018]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes

Qsn #	Question	Answer
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	"Found in dry deciduous belts from 400-900m. Common. Throughout India."
	Dave's Garden. (2018). Ceylon Boxwood, Indian Boxwood - <i>Gardenia latifolia</i> . <a href="https://davesgarden.com/guides/pf/go/67860/">https://davesgarden.com/guides/pf/go/67860/</a> . [Accessed 20 Feb 2018]	"Hardiness: USDA Zone 10b: to 1.7 °C (35 °F)"
	Choudhary, P. 1994. Seed germination studies of certain forest tree seed of Rubiaceae. PhD Dissertation. GoCur University	"The natural climate, it prefers, is broadly subtropical having an annual rainfall of 750 to 2000 mm."

<b>204</b>	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 20 Feb 2018]	"Native Asia-Tropical Indian Subcontinent: India"

<b>205</b>	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Saroya, A. S. (2013). <i>Controversial Herbal Drugs of Ayurveda</i> . Scientific Publishers, Jodhpur, India	" <i>G. latifolia</i> is found in the forests of Madhya Pradesh in India, and has been widely cultivated elsewhere, to the point of naturalization, especially in Nigeria, West Africa where the tree is highly valued for both its fruit and shade."
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. <a href="http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/">http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/</a> . [Accessed 16 Feb 2018]	" <i>Gardenia latifolia</i> Solander Locations: Ho'omaluhia Botanical Garden Waimea Arboretum & Botanical Garden"

<b>301</b>	<b>Naturalized beyond native range</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Saroya, A. S. (2013). <i>Controversial Herbal Drugs of Ayurveda</i> . Scientific Publishers, Jodhpur, India	" <i>G. latifolia</i> is found in the forests of Madhya Pradesh in India, and has been widely cultivated elsewhere, to the point of naturalization, especially in Nigeria, West Africa where the tree is highly valued for both its fruit and shade."

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

<b>303</b>	<b>Agricultural/forestry/horticultural weed</b>	<b>n</b>
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Center for Invasive Species and Ecosystem Health. 2018. <i>Gardenia latifolia</i> Aiton. <a href="https://www.invasive.org/browse/subinfo.cfm?sub=60373">https://www.invasive.org/browse/subinfo.cfm?sub=60373</a> . [Accessed 20 Feb 2018]	"No reference that we have lists this species as invasive in North America. This species is included for comparison to other species that are considered invasive."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	<i>Gardenia angusta</i> , <i>Gardenia augusta</i> . <i>Gardenia erubescens</i> , <i>Gardenia jasminoides</i> , <i>Gardenia spatulifolia</i> , <i>Gardenia taitensis</i> & <i>Gardenia thunbergia</i> listed as naturalized or as weeds, but evidence of impacts is insufficient or unspecified

401	Produces spines, thorns or burrs	n
	<b>Source(s)</b>	<b>Notes</b>
	Cooke, T. (1903). The Flora of the Presidency of Bombay, Volume 1. Taylor and Francis, London, UK	[No evidence] "A small deciduous tree reaching 30 ft. high, with stiff divergent branches forming a rounded head; bark smooth, pale-grey, flaking off in small round pieces ; young parts glabrous but coated with a resinous exudation. Leaves opposite or 3-nately whorled, crowded towards the ends of the branches, subsessile, 4-8 by 2½-6½ in., broadly elliptic or obovate, rounded or very shortly and obtusely acuminate at the apex, apple-green above, paler beneath, glabrous or more or less pubescent ; main nerves 10-20 pairs ; stipules adnate to the base of the petiole, connate, forming a thin truncate tube at first enclosing the young leaves, but, after the fall of the leaf, separating at the base and forming a loose ring round the stem."

402	Allelopathic	n
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

403	Parasitic	n
	<b>Source(s)</b>	<b>Notes</b>
	Cooke, T. (1903). The Flora of the Presidency of Bombay, Volume 1. Taylor and Francis, London, UK	"A small deciduous tree reaching 30 ft. high, with stiff divergent branches forming a rounded head" [Rubiaceae. No evidence]

404	Unpalatable to grazing animals	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Haleem, A., & Ilyas, O. (2018). Food and Feeding Habits of Gaur ( <i>Bos gaurus</i> ) in Highlands of Central India: A Case Study at Pench Tiger Reserve, Madhya Pradesh (India). <i>Zoological Science</i> , 35(1), 57-67	"Indian gaur ( <i>Bos gaurus</i> ) is one of nine species of wild oxen found in the world." ... "A total of 29 plant species were identified from dung piles of gaur." ... "Table 1. Gaur diet in different season: occurrence of fragments of tree, shrub, herb and grasses within the identified browse and grass fragments in faecal pellets during summer, post-monsoon, and winter season." [ <i>Gardenia latifolia</i> in diet]
	Jain, S. K. (1964). Wild plant foods of the tribals of Bastar. <i>Khadi Gramodyog</i> , 10, 557-561	[Fruit palatable] "Very young fruits are reported to be eaten. Fruits are generally eaten by birds and monkeys."

405	Toxic to animals	
	<b>Source(s)</b>	<b>Notes</b>
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	"ripe fruits eaten ... Stem bark as fish poison." [No evidence of fruit toxicity. Toxicity of stem bark to other vertebrates unknown]
	Jain, S. K. (1964). Wild plant foods of the tribals of Bastar. <i>Khadi Gramodyog</i> , 10, 557-561	[No evidence of fruit toxicity] "Very young fruits are reported to be eaten. Fruits are generally eaten by birds and monkeys."

406	Host for recognized pests and pathogens	
	<b>Source(s)</b>	<b>Notes</b>
	Hassan, M. E., Mukherjee, P., & Biswas, B. (2016). Report of aggregation behavior in sweet potato bug, <i>Physomerus grossipes</i> (Fabricius) (Hemiptera: Coreidae) from Nasik, Maharashtra on <i>Gardenia latifolia</i> plant. <i>International Journal of Fauna and Biological Studies</i> , 3(3), 192-196	"Heavy infestation of sweet potato bug, <i>Physomerus grossipes</i> (Fabricius) recorded from Maharashtra on <i>Gardenia latifolia</i> plant. Several clusters of <i>Physomerus grossipes</i> (Fabricius) were recorded for the first time from the upper branches of the <i>Gardenia latifolia</i> plant (about 20 ft.). Measurements of different body parts and ratios were calculated as additional diagnostic characters and to understand the significance of aggregation behavior."

407	Causes allergies or is otherwise toxic to humans	n
	<b>Source(s)</b>	<b>Notes</b>
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	[No evidence. Medicinal uses] "ripe fruits eaten ... Used in Ayurveda and Sidha. Pounded bark in water used to cure stomach troubles, heartburn and constipation. Resinous sap from the stem tips applied on sores of hand and feet in rainy season. Root taken to treat heavy bleeding during menstrual cycle. Pasted fruits given to cure amebiasis. Veterinary medicine, young leaves applied to wounds of cattle; leaf paste mixed with turmeric applied in boils, blisters, ulcers and wounds; fruits along with leaves of <i>Jasminum auriculatum</i> , stem bark of <i>Helicteres isora</i> pounded and the extract given orally for tympany. Stem bark as fish poison."

Qsn #	Question	Answer
408	<b>Creates a fire hazard in natural ecosystems</b>	
	<b>Source(s)</b>	<b>Notes</b>
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	"Found in dry deciduous belts from 400-900m. Common. Throughout India." [Occurs in dry areas. Flammability unknown]

409	Is a shade tolerant plant at some stage of its life cycle	n
	<b>Source(s)</b>	<b>Notes</b>
	Rauch, F.D. & Weissich, P.R. 2009. <i>Small Trees for the Tropical Landscape</i> . University of Hawaii Press, Honolulu, HI	"Plant it in full sun in a well-drained soil."
	Dave's Garden. (2018). <i>Ceylon Boxwood, Indian Boxwood - Gardenia latifolia</i> . <a href="https://davesgarden.com/guides/pf/go/67860/">https://davesgarden.com/guides/pf/go/67860/</a> . [Accessed 20 Feb 2018]	"Sun Exposure: Sun to Partial Shade"
	Khurana, E., Sagar, R., & Singh, J. S. (2006). Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. <i>Acta Oecologica</i> , 29(2), 196-204	"Table 1 ... <i>Gardenia latifolia</i> ... Shade tolerance - IT = relatively shade-intolerant"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	<b>Source(s)</b>	<b>Notes</b>
	Rauch, F.D. & Weissich, P.R. 2009. <i>Small Trees for the Tropical Landscape</i> . University of Hawaii Press, Honolulu, HI	"Plant it in full sun in a well-drained soil."
	Choudhary, P. 1994. Seed germination studies of certain forest tree seed of Rubiaceae. PhD Dissertation. GoCur University	"The trees may grow on boulder and gravelly soil."

411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>
	Cooke, T. (1903). <i>The Flora of the Presidency of Bombay</i> , Volume 1. Taylor and Francis, London, UK	"A small deciduous tree reaching 30 ft. high, with stiff divergent branches forming a rounded head"

412	Forms dense thickets	
	<b>Source(s)</b>	<b>Notes</b>
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	"Found in dry deciduous belts from 400-900m. Common. Throughout India." [Unknown. No indication that tree forms dense stands]
	Troup, R.S. 1921. <i>The Silviculture of Indian Trees</i> . Volume II. Leguminosae (Caesalpinieae) to Verbenaceae. Oxford University Press, London, UK	[Unknown for <i>G. latifolia</i> ] "The gardenias are comparatively immune from damage by grazing, and in grazed areas tend to become dominant owing to the extent to which most other species are kept down."

Qsn #	Question	Answer
501	<b>Aquatic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	[Terrestrial] "Found in dry deciduous belts from 400-900m."

502	<b>Grass</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 16 Feb 2018]	Family: Rubiaceae Subfamily: Ixoroideae

503	<b>Nitrogen fixing woody plant</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 16 Feb 2018]	Family: Rubiaceae Subfamily: Ixoroideae

504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Cooke, T. (1903). The Flora of the Presidency of Bombay, Volume 1. Taylor and Francis, London, UK	"A small deciduous tree reaching 30 ft. high, with stiff divergent branches forming a rounded head"

601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	"Found in dry deciduous belts from 400-900m. Common. Throughout India." [No evidence]

602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	"Fruit - A globose berry, with a crown of calyx; seeds many, rugose. Fruiting throughout the year."
	Mahapatra, A. K. & Panda, P. C. 2009. Wild Edible Fruit Plants of Eastern India. Regional Plant Resource Centre,	"propagation from seeds, stem cuttings and by air-layering."



Qsn #	Question	Answer
	Choudhary, P. 1994. Seed germination studies of certain forest tree seed of Rubiaceae. PhD Dissertation. GoCur University	"Seeds from ripe fruits are collected from standing trees in winter i.e. December to January. Each fruit is 3.5 to 5 cm. long and contains numerous seeds which germinate with the onset of monsoon." ... "Germination is reported to be only fifteen to twenty percent in the field."
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 20 Feb 2018]	"Storage Behaviour: Orthodox? Storage Conditions: Little loss in viability after 1 year hermetic storage at room temperature (Dent, 1948)"

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Genus Description] "Gardenia flowers have an interesting pollination mechanism; when the flower bud opens, the pollen has already been deposited from the anthers onto the sides of the spindle- or club-shaped stigma, from which the pollen is dispersed by insects; on the second or third day, the stigma lobes separate and become receptive in pollen from a different flower. The method of preventing self pollination is also characteristic of <i>Ixora</i> and some other Rubiaceae."
	East, E. M. 1940. The distribution of self-sterility in the flowering plants. Proceedings of the American Philosophical Society 82: 449-518	[Unknown, but <i>G. thunbergia</i> is self-incompatible] "The only strong self-incompatibility reactions were found in <i>Gardenia thunbergia</i> L. f. and <i>Mussaenda luteola</i> Delile, in both of which the pollen was extremely good."

605	Requires specialist pollinators	
	Source(s)	Notes
	Church, A. H. 1921. Introduction to the Systematy of Indian Trees. Oxford University Press, London	" <i>Gardenia latifolia</i> , a small tree, floral mechanism on large scale, distinct moth-type of pollination : corolla pale-yellow, fading orange ; petals 5-9, tube 2-3 in. long."
	Singh, J., & Singh, V. (1992). Phenology of seasonally dry tropical forest. Current Science, 63(11), 684-689	[Bat-pollinated] "Table 1. ... <i>Gardenia latifolia</i> ... Pollination Mechanism - Chiropterophily"

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Mahapatra, A. K. & Panda, P. C. 2009. Wild Edible Fruit Plants of Eastern India. Regional Plant Resource Centre,	"propagation from seeds, stem cuttings and by air-layering." [No evidence]
	Auroville Botanical Gardens. (2018). <i>Gardenia latifolia</i> . <a href="http://www.plantekey.com/plants/rubiaceae/gardenia-latifolia">http://www.plantekey.com/plants/rubiaceae/gardenia-latifolia</a> . [Accessed 20 Feb 2018]	[Seed. No evidence of vegetative spread] Propagation - Soak for 12hrs"

607	Minimum generative time (years)	

Qsn #	Question	Answer
	Source(s)	Notes
	Troup, R.S. 1921. The Silviculture of Indian Trees. Volume II. Leguminosae (Caesalpinieae) to Verbenaceae. Oxford University Press, London, UK	"The rate of growth is slow to moderate. ... for <i>G. latifolia</i> 8 rings per inch of radius, giving a mean annual girth increment 0.78 in. A cross-section of <i>G. latifolia</i> 1 ft. 0 1/4 in. in girth in the silvicultural museum at Dehra Dun had 28 rings, giving a mean annual girth increment of 0.44 in. A tree of the same species measured for a period of eight years in a sample plot in the Balaghat district. Central Provinces, showed a mean annual girth increment of 0.23 in." [Slow growth rate. Likely flowers in 3+ years]
	Rauch, F.D. & Weissich, P.R. 2009. Small Trees for the Tropical Landscape. University of Hawaii Press, Honolulu, HI	[Slow-growing. Time to maturity unspecified] "Hot, dry areas of southern India and Sri Lanka are home to this slow-growing shrub/tree, which will eventually attain 30 feet in height."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Khurana, E., Sagar, R., & Singh, J. S. (2006). Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. <i>Acta Oecologica</i> , 29(2), 196-204	[No evidence] "Table 1 – Seed weight, abundance, dispersal mode and shade tolerance of dry forest tree species of India. Seeds of some species are known to be dispersed both by birds and mammals." [ <i>Gardenia latifolia</i> - Predominant dispersal mode = M = mammal-dispersed]
	Cooke, T. (1903). The Flora of the Presidency of Bombay, Volume 1. Taylor and Francis, London, UK	[No means of external attachment] "Fruit nearly globose, 1 1/4 - 1 3/4 in. in diam., without ribs, appressedly pubescent when young, pale-green and speckled, surmounted by the calyx-limb, which is 1/2 in. or more long; epicarp dry, fleshy; endocarp bony, yellow, polished within, 3-valved. Seeds numerous, small, flattened, pale brown, in purplish-grey pulp"

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Rauch, F.D. & Weissich, P.R. 2009. Small Trees for the Tropical Landscape. University of Hawaii Press, Honolulu, HI	"Flowers are white, fragrant, and plentiful during the summer months." ... "Use it as a small shade tree, hedge, or screen planted where its flowers may be appreciated."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Mahapatra, A. K. & Panda, P. C. 2009. Wild Edible Fruit Plants of Eastern India. Regional Plant Resource Centre,	[No evidence] "Fruit globose, slightly scabrous and scaly, with hard endocarp and fleshy mesocarp." ... "The fleshy purplish-coloured pulp of the fruit is edible. Birds and animals also consume the fruit in large quantity."

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes

Qsn #	Question	Answer
	Cooke, T. (1903). The Flora of the Presidency of Bombay, Volume 1. Taylor and Francis, London, UK	"Fruit nearly globose, 1 1/4 - 1 3/4 in. in diam., without ribs, appressedly pubescent when young, pale-green and speckled, surmounted by the calyx-limb, which is 1/2 in. or more long; epicarp dry, fleshy ; endocarp bony, yellow, polished within, 3-valved. Seeds numerous, small, flattened, pale-brown, in purplish-grey pulp"
	Khurana, E., Sagar, R., & Singh, J. S. (2006). Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. Acta Oecologica, 29(2), 196-204	"Table 1 – Seed weight, abundance, dispersal mode and shade tolerance of dry forest tree species of India. Seeds of some species are known to be dispersed both by birds and mammals. Here we have taken only the predominant mode for each species." [Gardenia latifolia - Predominant dispersal mode - M = mammal-dispersed]

705	Propagules water dispersed	
	Source(s)	Notes
	Reddy, K. N., Subbaraju, G. V., Reddy, C. S., & Raju, V. S. (2006). Ethnoveterinary medicine for treating livestock in Eastern Ghats of Andhra Pradesh. Indian Journal of Traditional Knowledge 5(3): 368-372	[Natural occurrence along streams suggests potential dispersal by water] "Gardenia latifolia Ait., (Rubiaceae), Local name: Pedda Karinga; Fl & Fr: April – October; Densely foliaceous, deciduous tree; common in deciduous forests along the streams."

706	Propagules bird dispersed	y
	Source(s)	Notes
	Jain, S. K. (1964). Wild plant foods of the tribals of Bastar. Khadi Gramodyog, 10, 557-561	"Gardenia latifolia ... Fruits are generally eaten by birds and monkeys."
	Khurana, E., Sagar, R., & Singh, J. S. (2006). Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. Acta Oecologica, 29(2), 196-204	"Table 1 – Seed weight, abundance, dispersal mode and shade tolerance of dry forest tree species of India. Seeds of some species are known to be dispersed both by birds and mammals." [Gardenia latifolia - Predominant dispersal mode = M = mammal-dispersed]
	Cooke, T. (1903). The Flora of the Presidency of Bombay, Volume 1. Taylor and Francis, London, UK	[Fruit with fleshy pulp] "Fruit nearly globose, 1 1/4 - 1 3/4 in. in diam., without ribs, appressedly pubescent when young, pale-green and speckled, surmounted by the calyx-limb, which is 1/2 in. or more long; epicarp dry, fleshy ; endocarp bony, yellow, polished within, 3-valved. Seeds numerous, small, flattened, pale brown, in purplish-grey pulp"
	Troup, R.S. 1921. The Silviculture of Indian Trees. Volume II. Leguminosae (Caesalpinieae) to Verbenaceae. Oxford University Press, London, UK	[Seeds germinate in trees, suggesting bird dispersal] "The fruits are fleshy, and those of some species at least are eaten by birds and animals, the seeds being disseminated by their agency." ... "The seeds of G. latifolia sometimes germinate in crevices in boulders and in forks or hollows of trees, and the plants grow and persist in such places : one plant was noticed in the Singhbhum district growing out of the side of a hollow Bridelia retusa tree about 10 ft. from the ground, appearing at firstsight as if it had been grafted ; the roots penetrated the inside of the Bridelia down to the ground."

Qsn #	Question	Answer
707	<b>Propagules dispersed by other animals (externally)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Mahapatra, A. K. & Panda, P. C. 2009. Wild Edible Fruit Plants of Eastern India. Regional Plant Resource Centre,	"often grows in rock crevices and tree trunks through seed dispersal by birds." ... "The fleshy purplish-coloured pulp of the fruit is edible. Birds and animals also consume the fruit in large quantity."

708	Propagules survive passage through the gut	y
	<b>Source(s)</b>	<b>Notes</b>
	India Biodiversity Portal. (2018). <i>Gardenia latifolia</i> Aiton. <a href="http://indiabiodiversity.org/species/show/265178">http://indiabiodiversity.org/species/show/265178</a> . [Accessed 20 Feb 2018]	"Fruit - A globose berry, with a crown of calyx; seeds many, rugose. Fruiting throughout the year."
	Jain, S. K. (1964). Wild plant foods of the tribals of Bastar. <i>Khadi Gramodyog</i> , 10, 557-561	" <i>Gardenia latifolia</i> ... Fruits are generally eaten by birds and monkeys."
	Khurana, E., Sagar, R., & Singh, J. S. (2006). Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. <i>Acta Oecologica</i> , 29(2), 196-204	[Presumably Yes] "Table 1– Seed weight, abundance, dispersal mode and shade tolerance of dry forest tree species of India. Seeds of some species are known to be dispersed both by birds and mammals." [ <i>Gardenia latifolia</i> - Predominant dispersal mode = M = mammal-dispersed]

801	Prolific seed production (>1000/m2)	n
	<b>Source(s)</b>	<b>Notes</b>
	Choudhary, P. 1994. Seed germination studies of certain forest tree seed of Rubiaceae. PhD Dissertation. GoCur University	[No evidence. Unlikely] "Seeds from ripe fruits are collected from standing trees in winter i.e. December to January. Each fruit is 3.5 to 5 cm. long and contains numerous seeds which germinate with the onset of monsoon." ... "Germination is reported to be only fifteen to twenty percent in the field."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	<b>Source(s)</b>	<b>Notes</b>
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 20 Feb 2018]	"Storage Behaviour: Orthodox? Storage Conditions: Little loss in viability after 1 year hermetic storage at room temperature (Dent, 1948)"
	Baskin, C.C. & Baskin, J.M. 2014. <i>Seeds Ecology, Biogeography, and Evolution of Dormancy and Germination</i> . Second Edition. Academic Press, San Francisco, CA	[Longevity in natural environment unknown] "TABLE 9.18 Dormancy class or nondormancy (D/ND) in seeds of trees in tropical deciduous forests." [ <i>Gardenia latifolia</i> - PD = physiological dormancy]

803	Well controlled by herbicides	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2018. Personal Communication	Unknown. No information found on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Rauch, F.D. & Weissich, P.R. 2009. Small Trees for the Tropical Landscape. University of Hawaii Press, Honolulu, HI	"Pruning will hasten its developing into a real tree."

<b>805</b>	<b>Effective natural enemies present locally (e.g. introduced biocontrol agents)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2018. Personal Communication	Unknown

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Thrives in tropical climates
- Reported to be naturalized in Nigeria
- Reproduces by seeds
- Seeds dispersed by birds, fruit-eating mammals & intentionally by people
- Limited ecological information reduces accuracy of risk prediction

## Low Risk Traits

- No reports of invasiveness, but limited evidence of widespread introduction outside native range
- Unarmed (no spines, thorns, or burrs)
- Foliage palatable to browsing animals
- Ornamental
- Thrives in full sun (may limit ability to spread into intact forest)
- Not reported to spread vegetatively