

Family: *Rubiaceae*

Taxon: *Gardenia thunbergia*

Synonym: *Varneria thunbergia* (L. f.) Stuntz

Common Name: White gardenia
Forest gardenia
Wild gardenia
Starry gardenia

Questionnaire Status:	Assessor:	Data Entry Person:	Designation:
current 20090513 Assessor Approved	Chuck Chimera	Chuck Chimera	L WRA Score -4
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?	y=1, n=-1	
103	Does the species have weedy races?	y=1, n=-1	
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Intermediate
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	n
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)	
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic	y=1, n=0	
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
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	
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	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
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	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: L

WRA Score -4

Supporting Data:

101	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Is the species highly domesticated? No] "Derivation of the name & historical aspects The genus Gardenia was named in honour of Dr Alexander Garden (1730-1971) a Scottish physician who practiced in South Carolina, USA, and a correspondent of Linnaeus. This species was named after Carl Thunberg, pupil of Linnaeus and a well-known 18th century botanist and traveler in South Africa. The Afrikaans common name buffelsbal means buffalo testicles, a reference to the shape of the fruit. The Zulu name umvalasangweni means the back-gate closer and refers to the fact that it and other spiny shrubs and trees are used as the gates for cattle kraals. Gardenia thunbergia was the first of the South African gardenias to be known to botanists, and was introduced to Kew in 1773." [No evidence]
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Species suited to tropical or subtropical climate(s) 1-Intermediate] "Gardenia thunbergia occurs in a strip up the eastern coast of South Africa from near Grahamstown in Eastern Cape to Kosi Bay in the north of KwaZulu-Natal. It occurs primarily in evergreen forest and forest margin, occasionally in woodland and bushveld."
202	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Quality of climate match data 2-High]
203	1987. Clay, H.F./Hubbard, J.C.. The Hawaii Garden: Tropical Shrubs. University of Hawaii Press, Honolulu, HI	[Broad climate suitability (environmental versatility)? Yes] "Very adaptable; will even grow at the beach with some protection; grows also in the cool, moist valleys, and in either alkaline or acid soils."
203	1995. Sheat, B./Schofield, G.. Complete Gardening in Southern Africa. Struik Publishers, Cape Town, South Africa	[Broad climate suitability (environmental versatility)? Yes] "...succeeds best in temperate to subtropical areas."
203	2002. Johnson, D./Johnson, S.. Down to Earth: Gardening with Indigenous Trees. Struik Publishers, Cape Town, South Africa	[Broad climate suitability (environmental versatility)? Yes] "It grows well in almost any climate and is even used on road verges in Johannesburg."
203	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Broad climate suitability (environmental versatility)? Yes] "A hardy and adaptable species, stary gardenia is tolerant of wide variations in soils, pH, climate and moisture."
204	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Native or naturalized in regions with tropical or subtropical climates? Yes] "South Africa - Cape Province, KwaZulu-Natal; Swaziland" [marginally subtropical]
205	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Does the species have a history of repeated introductions outside its natural range? Yes] "In Hawaii, stary gardenia is planted as a specimen plant or small flowering tree."
205	2007. McCormack, G.. Cook Islands Biodiversity Database, Version 2007.2.. Cook Islands Natural Heritage Trust, Rarotonga http://cookislands.bishopmuseum.org	[Does the species have a history of repeated introductions outside its natural range? Yes] "COOK ISLANDS STATUS: Introduced - Recent, Not naturalised"
205	2012. Dave's Gardern. PlantFiles: Thunberg's Gardenia, Stary Gardenia - Gardenia thunbergia. http://davesgarden.com/guides/pf/go/58378/	[Does the species have a history of repeated introductions outside its natural range? Yes] "This plant has been said to grow in the following regions: La Mesa, California San Antonio Heights, California San Diego, California Solana Beach, California Naples, Florida Tampa, Florida Palm Valley, Texas"
301	2005. Wagner, W.L./Herbst, D.R./Lorence, D.H.. Flora of the Hawaiian Islands website. Smithsonian Inst., Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm	[Naturalized beyond native range? No] No evidence from Hawaiian Islands
301	2007. McCormack, G.. Cook Islands Biodiversity Database, Version 2007.2.. Cook Islands Natural Heritage Trust, Rarotonga http://cookislands.bishopmuseum.org	[Naturalized beyond native range? No evidence in Cook Islands] "COOK ISLANDS STATUS: Introduced - Recent, Not naturalised; S.Group (Rarotonga only, rare); Land, lowlands, gardens"

302	2012. WRA Specialist. Personal Communication.	[Garden/amenity/disturbance weed? No] No evidence
303	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Agricultural/forestry/horticultural weed? No] No evidence
304	2000. Daehler, C.C./Carino, D.A.. Predicting invasive plants: prospects for a general screening system based on current regional models. <i>Biological Invasions</i> . 2: 93-102.	[Environmental weed? No] "Appendix 2. Plant species that have not invaded natural areas (non-invaders) in the Hawaiian Islands, and their evaluation using three screening systems. Only woody species were evaluated with the Reichard and Hamilton, and Tucker and Richardson systems. Number in parentheses in the Tucker and Richardson column indicates the module number (as given in Tucker and Richardson 1995) which led to the prediction of low risk." [Gardenia thunbergia rated "Accept" with a WRA Score = -3. Assessment not available from this publication]
304	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Environmental weed? No] No evidence
305	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Congeneric weed? Possibly] Gardenia angusta, Gardenia augusta. Gardenia jasminoides. Gardenia taitensis listed as naturalized or as weeds, but evidence of impacts is insufficient or unspecified
401	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Produces spines, thorns or burrs? No] "This is an evergreen shrub or small tree, 2 to 5 m in height, with a smooth, whitish, usually straight main stem up to 250 to 300 mm in diameter, and short, rigid branchlets. The leaves are carried in whorls of 3 or 4 crowded near the ends of the branchlets. They are a glossy light green, hairless, softly to thinly leathery and conspicuously veined. Simple with an entire, wavy margin, variable in size, up to 140 x 60 mm but usually smaller, mostly oval, tapering abruptly to a rounded or blunt tip while the base tapers onto the stalk."
402	2012. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Parasitic? No] "This is an evergreen shrub or small tree, 2 to 5 m in height, with a smooth, whitish, usually straight main stem up to 250 to 300 mm in diameter, and short, rigid branchlets." [Rubiaceae]
404	2002. Johnson, D./Johnson, S.. Down to Earth: Gardening with Indigenous Trees. Struik Publishers, Cape Town, South Africa	[Unpalatable to grazing animals? No] "elephants, antelopes and buffalo eat the foliage."
404	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Unpalatable to grazing animals? No] "The fruits are hard and woody, and heavily fibrous inside, and where not being browsed by large antelope, can remain on the bush for years. Each fruit is egg-shaped, greyish green, 50-75 x 35 mm, when mature roughly dotted with whitish encrustations."
405	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Toxic to animals? No] "The fruits are hard and woody, and heavily fibrous inside, and where not being browsed by large antelope, can remain on the bush for years. Each fruit is egg-shaped, greyish green, 50-75 x 35 mm, when mature roughly dotted with whitish encrustations." [No evidence]
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No] No evidence
406	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Host for recognized pests and pathogens? No] "Pests are seldom serious but include scales, mealybugs, and sooty mold; also, caterpillars of the oleander hawk moth feed on the foliage."
406	2006. Kobayashi, K.D./Kaufman, A.J.. Common Gardenia - Ornamentals and Flowers OF-32. UH-CTAHR, Honolulu	[Host for recognized pests and pathogens? Nematode resistant] "Where root-knot nematodes are a problem, graft scions from a desired cultivar onto seedlings of a nematode resistant rootstock such as Gardenia thunbergia. G. thunbergia is grown principally as a rootstock and imparts vigor to species grafted on it. G. thunbergia can be started by seeds, cuttings, or air layering."

407	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Causes allergies or is otherwise toxic to humans? No] "Roots are widely used in Africa to treat skin diseases, and skin lesions caused by leprosy. The roots are also used as an emetic against fever. The rootbark is used as an emetic for biliousness, and to treat gall bladder problems. The roots and leaves are used in various parts of Africa to treat syphilis, and the latex is used as a purgative. The wood is heavy, dense and extraordinarily hard, a pleasing yellowish colour, and it presents a high lustre when polished. It also has the unusual ability to bend without breaking, but its use is limited because it is difficult to find large pieces. It is used for making buttons, tools, clubs, yokes, axles and implement handles. The fruits would make novel Xmas baubles." [No evidence of toxicity despite medical and other human uses.]
407	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No] No evidence
408	2002. Johnson, D./Johnson, S.. Down to Earth: Gardening with Indigenous Trees. Struik Publishers, Cape Town, South Africa	[Creates a fire hazard in natural ecosystems? No] "This is a coastal and mist-belt species, ranging from Port Elizabeth to northern Zululand." [No evidence, and unlikely if occurring in mist-belt]
409	1991. Pienaar, K.. Gardening with indigenous plants. Struik, Cape Town, S.A.	[Is a shade tolerant plant at some stage of its life cycle? Possibly No] "...it prefers full sun..."
409	2002. Johnson, D./Johnson, S.. Down to Earth: Gardening with Indigenous Trees. Struik Publishers, Cape Town, South Africa	[Is a shade tolerant plant at some stage of its life cycle? Possibly Yes] "It occurs in evergreen forest, usually in the shady interior." ... "It thrives and flowers in semi-shade."
409	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Is a shade tolerant plant at some stage of its life cycle? Possibly] "It does best in sun or semi-shade, in slightly acid, light, well-drained soil with plenty of organic matter added and regular deep watering."
410	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Tolerates a wide range of soil conditions ? Possibly] "It does best in sun or semi-shade, in slightly acid, light, well-drained soil with plenty of organic matter added and regular deep watering."
410	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Tolerates a wide range of soil conditions? Yes] "A hardy and adaptable species, starry gardenia is tolerant of wide variations in soils, pH, climate and moisture."
411	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Climbing or smothering growth habit? No] "This is an evergreen shrub or small tree, 2 to 5 m in height, with a smooth, whitish, usually straight main stem up to 250 to 300 mm in diameter, and short, rigid branchlets." [Rubiaceae]
412	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Forms dense thickets? No] No evidence
412	2005. Loffler, L./Loffler, P.. Swaziland Tree Atlas—including selected shrubs and climbers. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria, S.A.	[Forms dense thickets? No] No evidence
501	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Aquatic? No] Terrestrial shrub
502	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Grass? No] Rubiaceae
503	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Nitrogen fixing woody plant? No] Rubiaceae

504	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "This is an evergreen shrub or small tree, 2 to 5 m in height, with a smooth, whitish, usually straight main stem up to 250 to 300 mm in diameter, and short, rigid branchlets. The leaves are carried in whorls of 3 or 4 crowded near the ends of the branchlets. They are a glossy light green, hairless, softly to thinly leathery and conspicuously veined. Simple with an entire, wavy margin, variable in size, up to 140 x 60 mm but usually smaller, mostly oval, tapering abruptly to a rounded or blunt tip while the base tapers onto the stalk."
601	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Evidence of substantial reproductive failure in native habitat? No] No evidence
601	2005. Loffler, L./Loffler, P.. Swaziland Tree Atlas—including selected shrubs and climbers. Southern African Botanical Diversity Network Report No. 38. SABONET, Pretoria, S.A.	[Evidence of substantial reproductive failure in native habitat? Yes in Swaziland] "Conservation Status: Critically Endangered" ... "General: The species is found along a footpath which is being widened and used more frequently by people and cattle. Invading alien weeds pose a large threat to the area."
601	2012. Kew Royal Botanic Gardens. Plants & Fungi - Gardenia thunbergia (white gardenia). http://www.kew.org/plants-fungi/Gardenia-thunbergia.htm	[Evidence of substantial reproductive failure in native habitat? No] "Conservation Status: Least Concern (LC) according to Red List of South African Plants 2009, following the IUCN Red List criteria."
602	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Produces viable seed? Yes] "It is easily propagated from seed, cuttings or truncheon cuttings. Seed can be sown in spring to early summer, even in late summer if your winters are mild. Germination should take 4-6 weeks."
603	1979. Verdcourt, B.. Notes on African Gardenia (Rubiaceae). Kew Bulletin. 34(2): 345-360.	[Hybridizes naturally? Unknown]
604	1940. East, E.M.. The distribution of self-sterility in the flowering plants. Proceedings of the American Philosophical Society. 82: 449-518.	[Self-compatible or apomictic? No] "The only strong self-incompatibility reactions were found in Gardenia thunbergia L. f. and Mussaenda luteola Delile, in both of which the pollen was extremely good."
605	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Requires specialist pollinators? No] "Moths are attracted to the flowers and are probably the pollinators."
605	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Requires specialist pollinators? No] "In its homeland, the fragrant flowers are produced in profusion and pollinated at night by hawk moths."
606	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Reproduction by vegetative fragmentation? No] "It is easily propagated from seed, cuttings or truncheon cuttings. Seed can be sown in spring to early summer, even in late summer if your winters are mild. Germination should take 4-6 weeks. Cuttings can be taken at any time of the year, but best results are obtained in summer. Rooting of cuttings is best under mist, using a 100-120 mm piece of young (approx. 2 month old) growth with 2 or 3 sets of leaves. There is no need to remove the leaves as it appears to slow the rooting process down. Truncheon cuttings are best taken in early spring, and placed in well drained, sandy soil in a cool, shady spot and kept damp but not wet."
607	2002. Johnson, D./Johnson, S.. Down to Earth: Gardening with Indigenous Trees. Struik Publishers, Cape Town, South Africa	[Minimum generative time (years)? 3] "Growth rate is about 30 cm per year, but flowering and fruiting, even outside the natural range, begin at three years."
607	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrika.com/plantefg/gardenthun.htm	[Minimum generative time (years)? Probably 4+] "Gardenia thunbergia is easy to grow, although it is slow-growing."
607	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Minimum generative time (years)? 3+] "Starry gardenia is said to grow readily but slowly from seed; cuttings are preferred because they are a faster method of obtaining flowering-sized plants."
607	2012. Dave's Gardern. PlantFiles: Thunberg's Gardenia, Starry Gardenia - Gardenia thunbergia. http://davesgarden.com/guides/pf/go/58378/	[Minimum generative time (years)? 3+] "Although this plant appears healthy, I have yet to have it bloom in the three years it has been in my garden."

701	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No] "The fruits do not burst or split open, or drop, and can remain on the bush for years. They are adapted to being eaten by elephants, large antelope and buffalo, and the seed coats are tough enough to pass through their digestive systems unscathed. Unless man intervenes, the seeds will not be released from the fruits and dispersed unless these animals eat them. Harvesting Gardenia thunbergia seed is hard work." [No evidence, and not likely if fruits remain on shrub]
702	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules dispersed intentionally by people? Yes] "Gardenia thunbergia is a beautiful flowering shrub or small tree, with showy, heavily perfumed flowers and decorative fruits."
703	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules likely to disperse as a produce contaminant? No] "The fruits do not burst or split open, or drop, and can remain on the bush for years. They are adapted to being eaten by elephants, large antelope and buffalo, and the seed coats are tough enough to pass through their digestive systems unscathed. Unless man intervenes, the seeds will not be released from the fruits and dispersed unless these animals eat them. Harvesting Gardenia thunbergia seed is hard work. The secateurs we use to cut off the fruits are blunted by the end of the Fruitsprocess, not to mention our hands that are also worn out. We have to use hammers, or any heavy, blunt instrument we can find to break the fruits open, and nails and heavy duty spoons to scoop the seeds out. It is heavy, laborious, unpopular work!" [Unlikely as seeds remain on shrub/tree without assistance or intervention]
704	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules adapted to wind dispersal? No] "The fruits are hard and woody, and heavily fibrous inside, and where not being browsed by large antelope, can remain on the bush for years. Each fruit is egg-shaped, greyish green, 50-75 x 35 mm, when mature roughly dotted with whitish encrustations."
705	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules water dispersed? No evidence] "The fruits do not burst or split open, or drop, and can remain on the bush for years. They are adapted to being eaten by elephants, large antelope and buffalo, and the seed coats are tough enough to pass through their digestive systems unscathed."
706	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules bird dispersed? No] "The fruits do not burst or split open, or drop, and can remain on the bush for years. They are adapted to being eaten by elephants, large antelope and buffalo, and the seed coats are tough enough to pass through their digestive systems unscathed. Unless man intervenes, the seeds will not be released from the fruits and dispersed unless these animals eat them. Harvesting Gardenia thunbergia seed is hard work."
707	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules dispersed by other animals (externally)? No] "The fruits do not burst or split open, or drop, and can remain on the bush for years. They are adapted to being eaten by elephants, large antelope and buffalo, and the seed coats are tough enough to pass through their digestive systems unscathed."
708	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Propagules survive passage through the gut? Yes] "The fruits do not burst or split open, or drop, and can remain on the bush for years. They are adapted to being eaten by elephants, large antelope and buffalo, and the seed coats are tough enough to pass through their digestive systems unscathed."
801	2003. South African National Biodiversity Institute. PlantzAfrica.com - Gardenia thunbergia. http://www.plantzafrica.com/plantefg/gardenthun.htm	[Prolific seed production (>1000/m2)? Probably No] "This is an evergreen shrub or small tree, 2 to 5 m in height, with a smooth, whitish, usually straight main stem up to 250 to 300 mm in diameter, and short, rigid branchlets." ... "The fruits are hard and woody, and heavily fibrous inside, and where not being browsed by large antelope, can remain on the bush for years. Each fruit is egg-shaped, greyish green, 50-75 x 35 mm, when mature roughly dotted with whitish encrustations." [Small tree with large fruits. Unlikely to produce such high seed densities]
802	1987. Clay, H.F./Hubbard, J.C.. The Hawaii Garden: Tropical Shrubs. University of Hawaii Press, Honolulu, HI	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "Large, woody, 4-inch seedpods ripen after about 1 year on the plant." [Propagules persistent on the plant]
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information found on herbicide efficacy or chemical control of this species
804	1987. Clay, H.F./Hubbard, J.C.. The Hawaii Garden: Tropical Shrubs. University of Hawaii Press, Honolulu, HI	[Tolerates, or benefits from, mutilation, cultivation, or fire? Possibly] "Prune to shape and to induce new growth and flowering." [Unknown if able to tolerate heavy pruning]
805	1987. Clay, H.F./Hubbard, J.C.. The Hawaii Garden: Tropical Shrubs. University of Hawaii Press, Honolulu, HI	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown] "Susceptible to scale, mealybugs, and sooty mold."

