

Taxon: Leucadendron argenteum (L.) R. Br.

Family: Proteaceae

Common Name(s): Cape silvertree
silvertree

Synonym(s): Protea argentea L.

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 21 May 2019

WRA Score: -3.0

Designation: L

Rating: Low Risk

Keywords: Dioecious Tree, Naturalized (NZ), Serotinous, Wind-Dispersed, Long-Lived Seeds

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)	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	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	n
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		
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	n

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	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	2
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	y
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)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
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
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	[Cultivated, but not domesticated] " <i>Leucadendron argenteum</i> is widely cultivated as an ornamental garden specimen. Its beautiful silver foliage is used in floristry and lasts well in the vase. The leaves have also long been collected, pressed and dried for decoration or as a souvenir. The dried female cones are decorative and the small silver balls of the dried male flower heads are used in dried floral arts and crafts, e.g. to make the body of mice or hedgehogs. In the 1600s and 1700s. <i>L. argenteum</i> was extensively used as firewood."

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"	Intermediate
	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 20 May 2019]	"Native Africa SOUTHERN AFRICA: South Africa [Cape Province (s.w.)]"

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 20 May 2019]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Dave's Garden. (2019). <i>Leucadendron</i> Species, Silver Tree - <i>Leucadendron argenteum</i> . https://davesgarden.com/guides/pf/go/57835/ . [Accessed 20 May 2019]	"Hardiness: USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"

Qsn #	Question	Answer
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	" <i>Leucadendron argenteum</i> occurs on cool, eastern and southerly slopes on granite-derived clay soils, at 100-150 m, and trees are conspicuous on the slopes above Kirstenbosch. There are eight populations spread over an 11 km range with a few outliers in Somerset West, Paarl and Stellenbosch. Only the populations at Rhodes Memorial and Tafelberg Road grow on shale derived soil. Historical records indicate that <i>Leucadendron argenteum</i> once grew from Lion's Head, across the lower northern slopes and along the eastern foothills of Table Mountain, and one report says all the way the way to Muizenberg, but this is not entirely believed as the most southerly known population is Vlakkenberg and the Muizenberg slopes are thought to be too hot for the silver tree."

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	" <i>Leucadendron argenteum</i> occurs on cool, eastern and southerly slopes on granite-derived clay soils, at 100-150 m, and trees are conspicuous on the slopes above Kirstenbosch. There are eight populations spread over an 11 km range with a few outliers in Somerset West, Paarl and Stellenbosch. Only the populations at Rhodes Memorial and Tafelberg Road grow on shale derived soil." [Cape Town, Table Mountain and the surrounding mountains of the south-western Cape have a Mediterranean climate, enjoying long warm and dry summers and a cool and wet but relatively short winter]

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	" <i>Leucadendron argenteum</i> is widely cultivated as an ornamental garden specimen. Its beautiful silver foliage is used in floristry and lasts well in the vase. The leaves have also long been collected, pressed and dried for decoration or as a souvenir."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Several species have been introduced to Hawai'i, most notably silver tree, <i>Leucadendron argenteum</i> ..."
	Dave's Garden. (2019). <i>Leucadendron Species, Silver Tree - Leucadendron argenteum</i> . https://davesgarden.com/guides/pf/go/57835/ . [Accessed 20 May 2019]	"This plant has been said to grow in the following regions: Big Sur, California Greenbrae, California Hayward, California San Francisco, California (2 reports) San Leandro, California Vieques, Puerto Rico"

301	Naturalized beyond native range	y
	Source(s)	Notes

Qsn #	Question	Answer
	Beever, R. E., Esler, A. E., & Wright, A. E. (1984). Botany of the large islands of the eastern Bay of Islands, northern New Zealand. <i>Tane</i> , 30, 251-273	"Exotic species that have become naturalised include Tasmanian blackwood (* <i>Acacia melanoxylon</i>) and silver tree {* <i>Leucadendron argenteum</i> R.Br.}; the latter has not previously been reported as naturalised in New Zealand."
	Webb, C.J., Sykes, W.R., Garnock-Jones, P.J., Given, D.R., & Brownsey, P.J. (1989). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised in New Zealand: Additional records and corrections. <i>New Zealand Journal of Botany</i> 27(2): 139-162	" <i>Leucadendron argenteum</i> (L.) R. Br. Cape silver tree DISTRIBUTION: Motukiekie I. (Bay of Islands). FIRST RECORD: Beever, R. E., Esler, A. E. and Wright, A. E. <i>Tane</i> 30:259 (1984). REGION OF ORIGIN: South Africa. <i>Telopea oreades</i> F. MueU. Victorian waratah DISTRIBUTION: Taupo County (Paurini Scenic Reserve on west bank Tongariro R.); a very rare cultivation escape. FIRST RECORD: Bangerter, E. B. <i>Rec. Auck. Inst. Mus.</i> 22:42 (1985). REGION OF ORIGIN: Victoria and N.S.W."
	Heenan, P. B., de Lange, P. J., Cameron, E. K., Ogle, C. C., & Champion, P. D. 2004. Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2001–2003. <i>New Zealand Journal of Botany</i> , 42(5): 797-814	" <i>Leucadendron argenteum</i> (L.) R.Br. ADDITIONAL RECORDS : AK 2 56210, P. J. de Lange 5398 & T.T. Armstrong, 22 Mar 2002, North Auckland, Kaipara, Babylon Coast Road; AK 256211, P.J.de Lange 5400 & T.T. Armstrong, 22 Mar 2002, North Auckland, Kaipara, Babylon Coast Road. NOTES: Adults, saplings, and seedlings present at two locations within gumland scrub. For reference see Webbetal. (1988, p. 996)."
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	" <i>Leucadendron argenteum</i> ... Fully naturalized"

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

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

304	Environmental weed	n
	Source(s)	Notes
	Global Register of Introduced and Invasive Species. (2019). <i>Leucadendron argenteum</i> . http://griis.org/ . [Accessed 20 May 2019]	Country = India; Evidence of Impacts (Y/N) = No
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
305	Congeneric weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Leucadendron ericifolium, Leucadendron rubrum, Leucadendron tinctum and Leucadendron verticillatum listed as naturalized or weedy. Evidence of negative impacts has not been verified

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). Leucadendron argenteum. PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 17 May 2019]	[No evidence] "Leucadendron argenteum is an erect, well-proportioned, ornamental tree, 7 - 10 m tall, with a stout trunk and thick, grey bark. The upright branches are covered with large lance-shaped leaves, up to 150 x 20 mm, which overlap each other up the stem, concealing the thick branches. The leaves are silver-grey, covered on both surfaces with thousands of tiny, soft, silvery hairs and fringed with long white hairs."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. & Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"Leucadendron ... Shrubs or trees." [Proteaceae. No evidence in genus or family]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). Leucadendron argenteum. PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	[Unknown. Browsing or grazing animals not listed among threats to this species] "The threats that Leucadendron argenteum faces today are urbanization, timber plantations, the transformation of its habitat from fynbos to forest due to fire exclusion, fragmentation of the remaining populations, invasion of its habitat by alien plants, predation of its seed bank by alien squirrels, too-frequent fires, and the root rot fungus Phytophthora."
	WRA Specialist. (2019). Personal Communication	Unknown. No information on palatability found

405	Toxic to animals	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	No evidence

Qsn #	Question	Answer
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	"A typical feature of a population of silver trees is the occasional dead plant in amongst the living. Some die of old age but often death of younger plants is caused by the root rot fungus <i>Phytophthora</i> . <i>Leucadendron argenteum</i> is very susceptible to this fungus, and it causes the death of 1-5% of wild populations every year. The fungus invades the root system, entering where they have been damaged or broken, and impairs the tree's ability to take up water. Infected trees appear to die very suddenly. An infected tree can cope when the weather is cool and wet and appears to be healthy, but on the first hot, dry days in spring, or if the hot and drying berg winds blow, the damaged roots cannot get enough water to the leaves, and they wilt and die, sometimes within hours. Wild plants are also attacked by a beetle, the Silver Tree Borer, also known as the Protea Jewel Beetle, <i>Sphenoptera sinuosa</i> , which bores tunnels in the roots and increases the chances of <i>Phytophthora</i> infection."
	Heelemann, S., Daniels, F., Rebelo, A. G., Poschlod, P., & Reisch, C. (2013). Conservation genetics of <i>Leucadendron argenteum</i> (Silver tree)—A flag ship species of the Cape Peninsula. <i>South African Journal of Botany</i> , 88, 361-366	"From 5 to 8 years of age, stands become infected with <i>Phytophthora cinnamomi</i> Rands (root rot), which kills 5–10% of populations per year (Van Wyk, 1973; Von Broembsen and Kruger, 1985), but most plants have set seed before succumbing to the obvious symptoms which result in death within hours."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	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
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes

Qsn #	Question	Answer
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	[Occurs in fire prone habitat, but no evidence that tree itself increases fire risk or frequency] "Silver trees thrive on the forest margin where fires are infrequent, but it is also thought that the fire-exclusion management of land that contains natural populations has caused these populations to become moribund with mostly older trees and few saplings and overall fewer individuals over time." ... "To survive in the fire-prone fynbos, <i>Leucadendron argenteum</i> has evolved the reseeding strategy. Despite its thick bark, adult trees are usually killed by fire and only the seeds survive."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	"Aspect: Full Sun, Morning Sun (Semi Shade)"
	Brown, N. & Duncan, G. 2006. <i>Grow Fynbos Plants</i> . South African National Biodiversity Institute, Cape Town	"They require acid, well-drained soil in full sun and are sensitive to root disturbance."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	" <i>Leucadendron argenteum</i> occurs on cool, eastern and southerly slopes on granite-derived clay soils, at 100-150 m" ... "The silver tree has the reputation of being difficult in cultivation, mainly because it is very susceptible to the root rot fungus <i>Phytophthora</i> and like most members of the protea family dislikes soggy soils, still, humid air and strong fertilizers." ... "In cultivation they tolerate most conditions and grow well in several soil types, but the soil must be well-drained. They need a sunny position, with good air circulation, well-drained (sandy) soil, plenty of water, particularly in autumn-winter-spring and protection from frost. They do well in moderately fertile soil, but may be burned by heavy manure or strong doses of chemical fertilizer. They do best with well-rotted compost, low-dose or slow-release fertilizer and the soil around their base and inside their drip line should be left undisturbed particularly in areas where <i>Phytophthora</i> is known to occur."
	Rebello, A. G. (Ed.). (2008). <i>The Protea Atlas of southern Africa</i> . South African National Biodiversity Institute, Kirstenbosch. https://www.proteaatlas.org.za/atlas_final08j.htm . [Accessed 21 May 2019]	"Soil Type (154 records): 44% loamy, 33% sandy, 12% gravelly, 11% clayey."
	Brown, N. & Duncan, G. 2006. <i>Grow Fynbos Plants</i> . South African National Biodiversity Institute, Cape Town	"They require acid, well-drained soil in full sun and are sensitive to root disturbance."

411	Climbing or smothering growth habit	n
	Source(s)	Notes

Qsn #	Question	Answer
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 17 May 2019]	" <i>Leucadendron argenteum</i> is an erect, well-proportioned, ornamental tree, 7 - 10 m tall, with a stout trunk and thick, grey bark."

412	Forms dense thickets	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	" <i>Leucadendron argenteum</i> occurs on cool, eastern and southerly slopes on granite-derived clay soils, at 100-150 m, and trees are conspicuous on the slopes above Kirstenbosch. There are eight populations spread over an 11 km range with a few outliers in Somerset West, Paarl and Stellenbosch. Only the populations at Rhodes Memorial and Tafelberg Road grow on shale derived soil. Historical records indicate that <i>Leucadendron argenteum</i> once grew from Lion's Head, across the lower northern slopes and along the eastern foothills of Table Mountain, and one report says all the way the way to Muizenberg, but this is not entirely believed as the most southerly known population is Vlakkenberg and the Muizenberg slopes are thought to be too hot for the silver tree. The largest populations are at Kirstenbosch, Wynberg Hill and Lion's Head. More than half of the wild trees grow in the Kirstenbosch population."
	Mucina, L., & Rutherford, M. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. <i>Strelitzia</i> 19. South African National Biodiversity Institute, Pretoria	[<i>Leucadendron argenteum</i> is not reported to form dense thickets within its native range. Fire and soil limitations prevent establishment of most trees and thickets] "Most of the fynbos—with the exception of the dry northern types and possible exception of dry asteraceous fynbos on sandstone and quartzite—is bioclimatically suitable for afrotemperate forest (Campbell 1985, Masson & Moll 1987, Manders 1990a, b, Manders & Richardson 1992, Manders et al. 1992). It is mainly the action of regular fire that excludes forest and allows fynbos to dominate the landscape (Figure 4.2). This is because trees are effectively excluded from fynbos by the slow growth rates due to the nutrient-poor soils and the relatively high fire-return intervals." ... "Only one fynbos species regularly attains a tree form: <i>Protea nitida</i> (waboom), although trees exist among fire avoider species such as <i>Widdringtonia cederbergensis</i> and <i>W. schwarzii</i> in rocky outcrops, and <i>Leucadendron argenteum</i> and species of <i>Virgilia</i> on the forest/fynbos interface."

501	Aquatic	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 17 May 2019]	[Terrestrial] " <i>Leucadendron argenteum</i> occurs on cool, eastern and southerly slopes on granite-derived clay soils, at 100-150 m, and trees are conspicuous on the slopes above Kirstenbosch."

502	Grass	n
	Source(s)	Notes

Qsn #	Question	Answer
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 17 May 2019]	Family: Proteaceae

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 17 May 2019]	Family: Proteaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	" <i>Leucadendron argenteum</i> is an erect, well-proportioned, ornamental tree, 7 - 10 m tall, with a stout trunk and thick, grey bark. The upright branches are covered with large lance-shaped leaves, up to 150 x 20 mm, which overlap each other up the stem, concealing the thick branches. The leaves are silver-grey, covered on both surfaces with thousands of tiny, soft, silvery hairs and fringed with long white hairs."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	[Habitat destruction and transformation accounts for rarity] "The threats that <i>Leucadendron argenteum</i> faces today are urbanization, timber plantations, the transformation of its habitat from fynbos to forest due to fire exclusion, fragmentation of the remaining populations, invasion of its habitat by alien plants, predation of its seed bank by alien squirrels, too-frequent fires, and the root rot fungus <i>Phytophthora</i> ."

602	Produces viable seed	y
	Source(s)	Notes
	Brown, N. & Duncan, G. 2006. <i>Grow Fynbos Plants</i> . South African National Biodiversity Institute, Cape Town	"The fruits remain in the cone for a year or longer. Each bi-convex fruit or seed is equipped with a 'parachute'-made up of the persisting style and the plumed perianth, which aids dispersal by the wind." ... "Sow seeds in late autumn."

Qsn #	Question	Answer
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"Trees can be propagated from seeds or cuttings. The best time to sow seed is in autumn, the start of the rainy season in the Cape. Sow fresh seeds in open seedbeds or trays filled with a well-drained medium and place in a sunny position. Broadcast the seed evenly, firm down and cover with clean sand or milled bark to the depth of approximately 10 mm. Keep the soil moist. Germination takes about 3 to 6 weeks. Seedlings are ready to transplant into individual containers when the first pair of true leaves appear. Use a medium with good drainage, water thoroughly and place in a well ventilated, sunny position to grow on. The young seedlings grow fast and should be ready to be planted out after a year."

603	Hybridizes naturally	
	Source(s)	Notes
	Rhode, A. (2004). Studies on fertility and crossability of species in the genus <i>Leucadendron</i> . MSc Thesis. Stellenbosch University, Stellenbosch	[Unknown. Hybridization documented in genus] " <i>Leucadendron</i> stems for fresh flower bouquets are predominantly harvested from the wild or from broadcast seed sown blocks (Coetzee and Middelman, 1997). Uniform stems exported as single stem bunches are harvested from organized cultivated blocks and contribute 40% of the cut flowers from South Africa (Littlejohn and Robyn, 2000). Cultivars are usually superior species selections or interspecific hybrids that outperform their wild relatives in vigor, yield and aesthetic appeal (Van den Berg and Brits, 1995). Some of the cultivars are probably chance hybrids discovered in seedling blocks by farmers, but many more are the result of controlled pollinations. Interspecific hybrids selected from seedling populations resulted in the release of a number of cultivars from Australia and New Zealand such as the cultivars 'Safari Sunset', 'Silvan Red', 'Long Tom', 'Inca Gold' and 'Pisa' (Matthews and Carter, 1983). Other hybrid cultivars such as 'Chameleon' (<i>L. salignum</i> XL. <i>eucalyptifolium</i>) and 'Rosette' (<i>L. laureolum</i> XL. <i>elimense</i>) (Littlejohn et al., 1998) were released in South Africa."

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 17 May 2019]	"Like all <i>leucadendrons</i> , it is dioecious, meaning that the male and female flowers are borne on separate plants. The flowers are in dense heads at the branch tips. The leaves that surround the flower heads, known as the involucreal leaves, do not change colour while the tree is in flower, but they open wider, thus catching the light at a different angle and shining brighter silver than the rest of the leaves."
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"Shrubs or trees. Plants dioecious." [Genus description]

605	Requires specialist pollinators	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Heelemann, S., Daniels, F., Rebelo, A. G., Poschlod, P., & Reisch, C. (2013). Conservation genetics of <i>Leucadendron argenteum</i> (Silvertree)—A flag ship species of the Cape Peninsula. <i>South African Journal of Botany</i> , 88, 361-366	"Although the flowerheads are large, pollination is by minute beetles, with no evidence of wind pollination."
	Welsford, M. R., Midgley, J. J., & Johnson, S. D. (2014). Experimental evaluation of insect pollination versus wind pollination in <i>Leucadendron</i> (Proteaceae). <i>International Journal of Plant Sciences</i> , 175(3), 296-306	"Beetles (Coleoptera) were the most frequent visitors to both female and male inflorescences of the 14 <i>Leucadendron</i> species examined. On female inflorescences, beetles made up 60% of all floral visitors, followed by Hymenoptera and Hemiptera, totaling 14% each"
	Rebelo, A. G. (Ed.). (2008). <i>The Protea Atlas of southern Africa</i> . South African National Biodiversity Institute, Kirstenbosch. https://www.proteaatlas.org.za/atlas_final08j.htm . [Accessed 21 May 2019]	"Pollinators (1 record): 100% bees or wasps."
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	"The flower heads have a faint, pleasant scent, which attracts the small beetles that do the job of pollination."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	[No evidence] "To survive in the fire-prone fynbos, <i>Leucadendron argenteum</i> has evolved the reseeding strategy. Despite its thick bark, adult trees are usually killed by fire and only the seeds survive. The seeds are kept safe in the large woody cones on the plant and are released en masse after a fire. A small percentage of the seeds are released during the lifetime of the tree, which keeps the population healthy by producing a steady supply of young plants in the absence of fire." ... "Trees can be propagated from seeds or cuttings." ... "Short cuttings from the tip of the branches can be made in autumn."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Rebelo, A. G. (Ed.). (2008). <i>The Protea Atlas of southern Africa</i> . South African National Biodiversity Institute, Kirstenbosch. https://www.proteaatlas.org.za/atlas_final08j.htm . [Accessed 21 May 2019]	"Age to first flowering: First flowers recorded at 2 years, 50% estimated at 4-6 years, and 100% recorded at 8 years. Flowering sporadic after 16 years."
	Moodley, D. (2013). Determinants of introduction and invasion success for Proteaceae. MSc Thesis. Stellenbosch University, Stellenbosch, South Africa	"Table S4. Raw data of all introduced, naturalized and invasive species and the fourteen traits that were measured." [<i>Leucadendron argenteum</i> - Maturity - The number of years a species takes to first flowering = 2]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n

Qsn #	Question	Answer
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The fruits remain in the cone and on the tree until it dies, although a small percentage of the cones open and release their seeds in hot, dry weather. " ... "The seed is a large nut (10 x 8.5 x 5.5 mm). Each seed is equipped with a plumed parachute-like appendage, which aids in dispersal of the seed. This plumed parachute is the dried remains of the flower, still attached to the seed." [No evidence of unintentional dispersal. Wind-dispersed seeds large and lack means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Several species have been introduced to Hawai'i, most notably silver tree, <i>Leucadendron argenteum</i> ..."
	Dave's Garden. (2019). <i>Leucadendron Species, Silver Tree - Leucadendron argenteum</i> . https://davesgarden.com/guides/pf/go/57835/ . [Accessed 20 May 2019]	"This plant has been said to grow in the following regions: Big Sur, California Greenbrae, California Hayward, California San Francisco, California (2 reports) San Leandro, California Vieques, Puerto Rico"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The fruits remain in the cone and on the tree until it dies, although a small percentage of the cones open and release their seeds in hot, dry weather. " ... "The seed is a large nut (10 x 8.5 x 5.5 mm). Each seed is equipped with a plumed parachute-like appendage, which aids in dispersal of the seed. This plumed parachute is the dried remains of the flower, still attached to the seed." [No evidence. Unlikely. Seeds large and most remain in cones on tree]

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Brown, N. & Duncan, G. 2006. <i>Grow Fynbos Plants</i> . South African National Biodiversity Institute, Cape Town	"Each bi-convex fruit or seed is equipped with a 'parachute'-made up of the persisting style and the plumed perianth, which aids dispersal by the wind."
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"Seeds are dispersed by wind. Although the seeds are large, relatively heavy nuts, they are equipped with a plumed parachute-like appendage, the dried remains of the flower, which carries it a considerable distance from its parent plant."

705	Propagules water dispersed	n
	Source(s)	Notes

Qsn #	Question	Answer
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The fruits remain in the cone and on the tree until it dies, although a small percentage of the cones open and release their seeds in hot, dry weather." ... "The seed is a large nut (10 x 8.5 x 5.5 mm). Each seed is equipped with a plumed parachute-like appendage, which aids in dispersal of the seed. This plumed parachute is the dried remains of the flower, still attached to the seed."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"Seeds are dispersed by wind. Although the seeds are large, relatively heavy nuts, they are equipped with a plumed parachute-like appendage, the dried remains of the flower, which carries it a considerable distance from its parent plant. The seeds are also eaten by rodents, which collect and store the seeds in underground caches where many remain uneaten, and viable for many decades."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The seeds are also eaten by rodents, which collect and store the seeds in underground caches where many remain uneaten, and viable for many decades. Seeds have been known to survive in the soil for 80 years. The alien grey squirrels also eat the seeds, taking them from cones as they are opening." [Non-native rodents in the Hawaiian Islands could possibly cache seeds and disperse a subset of seeds that escape predation]

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The seeds are also eaten by rodents, which collect and store the seeds in underground caches where many remain uneaten, and viable for many decades. Seeds have been known to survive in the soil for 80 years. The alien grey squirrels also eat the seeds, taking them from cones as they are opening." [Seeds that escape predation may be dispersed externally. No evidence of seed survival following ingestion]

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The fruits remain in the cone and on the tree until it dies, although a small percentage of the cones open and release their seeds in hot, dry weather." ... "The seed is a large nut (10 x 8.5 x 5.5 mm). Each seed is equipped with a plumed parachute-like appendage, which aids in dispersal of the seed. This plumed parachute is the dried remains of the flower, still attached to the seed." [Unlikely. Seeds large and remain on tree]

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 20 May 2019]	"The seeds are also eaten by rodents, which collect and store the seeds in underground caches where many remain uneaten, and viable for many decades. Seeds have been known to survive in the soil for 80 years."
	Heelemann, S., Daniels, F., Rebelo, A. G., Poschlod, P., & Reisch, C. (2013). Conservation genetics of <i>Leucadendron argenteum</i> (Silvertree)—A flag ship species of the Cape Peninsula. <i>South African Journal of Botany</i> , 88, 361-366	"The Silvertree is partly serotinous, but its seeds are released under hot conditions. The fruit is a large rounded nut, and has a parachute-type dispersal mechanism, but dispersal distances are typically only a few metres (Notten and Van der Walt, 2008). Secondary caching by rodents also occurs. Anecdotal evidence suggests that fruit may stay dormant for at least 80 years."

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	n
	Source(s)	Notes
	Heelemann, S., Daniels, F., Rebelo, A. G., Poschlod, P., & Reisch, C. (2013). Conservation genetics of <i>Leucadendron argenteum</i> (Silvertree)—A flag ship species of the Cape Peninsula. <i>South African Journal of Botany</i> , 88, 361-366	"Plants may survive for up to 80 years, but typically are killed by fires at an average of 15 years of age."
	Notten, A. & van der Walt, L. (2008). <i>Leucadendron argenteum</i> . PlantZAfrica. SANBI. http://pza.sanbi.org/leucadendron-argenteum . [Accessed 21 May 2019]	[Does not tolerate fire or root disturbance] "To survive in the fire-prone fynbos, <i>Leucadendron argenteum</i> has evolved the reseeding strategy. Despite its thick bark, adult trees are usually killed by fire and only the seeds survive. " ... "When growing silver trees, remember that they are very sensitive to any root disturbance and do not dig around their base or inside their drip line. Unfortunately once it is noticed that a tree is infected, the roots will already have been badly damaged and it is too late to save the tree. It is thus best to practice preventative measures. It is a waste of time, and a tree, to transplant an established tree."

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

Naturalized in New Zealand (but no evidence in the Hawaiian Islands to date)

Other *Leucadendron* species are naturalized and may be weedy

Tolerates many soil types as long as they are well-drained

Reproduces by seeds

Can reach maturity in as little as 2 years

Seeds dispersed by wind, possibly by rodents and intentionally by people

Seeds remain in cones on tree for a year or more, and may persist in the soil for 80 years

Low Risk Traits

Native to a region with a Mediterranean climate; could limit ability to spread in Hawaiian Islands or other tropical island ecosystems

No reports of negative impacts where naturalized or introduced

Unarmed (no spines, thorns, or burrs)

Non-toxic

Prefers full sun (would limit spread into dense forests)

Dioecious

Not reported to spread vegetatively

Large seeds are wind-dispersed only short distances and are unlikely to be accidentally dispersed

Serotinous seeds remain in tree cones until fire, or hot dry conditions cause them to be released (limits ability to disperse and naturalize)

Killed by fire and disturbance to roots (traits which would minimize invasiveness)