Taxon: Eucalyptus nitens (H. Deane & Maiden) Maiden **Family:** Myrtaceae

Common Name(s): ribbon gum
shining gum
silvertop

Synonym(s): Eucalyptus goniocalyx F. Muell. ex Miq. var. nitens H. Deane & Maiden

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 26 Oct 2021

WRA Score: **0.0** **Designation:** L **Rating:** Low Risk

Keywords: Tall Tree, Naturalized Elsewhere, Cold Tolerant, Shade-Intolerant, Wind-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)	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	n=0, y = 1*multiplier (see Appendix 2)	y
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		
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)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
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	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
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	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[No evidence of domestication] "The more widespread E. nitens has a disjunct distribution in the Great Dividing Range and coastal ranges from northern and southern New South Wales to the Victorian high country."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). 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, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 22 Oct 2021]	"Native Australasia AUSTRALIA: Australia [New South Wales (e.), Victoria (e.)]"
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"The more widespread E. nitens has a disjunct distribution in the Great Dividing Range and coastal ranges from northern and southern New South Wales to the Victorian high country. In the north of its range, populations are small, disjunct and at altitudes to 1600 m (e.g. Point Lookout, Majors Point, Barren Mountain and Barrington Tops). Populations extending from Tallaganda State Forest in southern New South Wales to stands in the Victorian high country tend to be larger and at altitudes mainly of 800-1400 m."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 22 Oct 2021]	

203	**Broad climate suitability (environmental versatility)**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"In its natural habitat, E. nitens occurs on undulating tablelands and hills at an elevation of 600-1600 m. There the climate is cool to warm, humid to sub-humid with the mean maximum temperature of the hottest month 19-29°C and the mean minimum of the coldest month about -3°C to 7°C. Winter frosts are numerous and severe, with 50-150 annually. Snow occurs over most of the distribution and may remain on the ground for several days to a week or more at a time. The mean annual rainfall range is about 500-2160 mm with an even distribution; months with less than 50 mm are rare (Boland et al., 1984; Lindenmayer et al., 1996)."

204	**Native or naturalized in regions with tropical or subtropical climates**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"In its natural habitat, E. nitens occurs on undulating tablelands and hills at an elevation of 600-1600 m. There the climate is cool to warm, humid to sub-humid with the mean maximum temperature of the hottest month 19-29°C and the mean minimum of the coldest month about -3°C to 7°C. Winter frosts are numerous and severe, with 50-150 annually. Snow occurs over most of the distribution and may remain on the ground for several days to a week or more at a time. The mean annual rainfall range is about 500-2160 mm with an even distribution; months with less than 50 mm are rare (Boland et al., 1984; Lindenmayer et al., 1996)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 25 Oct 2021]	"Native Australasia AUSTRALIA: Australia [New South Wales (e.), Victoria (e.)]"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Preferred Climate/s: Dryland, Mediterranean"

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"In Australia, E. nitens has proved very vigorous in northern Tasmania, outside of its natural range, where it is grown mainly for pulpwood. It is also cultivated in many other countries including Argentina, Brazil, China, Chile, New Zealand, northern Portugal and Spain, South Africa and Zimbabwe (Jacobs, 1981; Miller et al., 1992; Jayawickrama et al., 1993). It has also shown promise in mountain areas near the Caspian Sea in Iran and has been planted in trials in the USA (California, Hawaii) (Turnbull and Pryor, 1984)."
	Skolmen, R.G. 1980. Plantings on the forest reserves of Hawaii: 1910–1960. Institute of Pacific Islands Forestry, Pacific Southwest Forest & Range Experiment Station, US Forest Service, Honolulu, HI	15 trees planted on Hawaii Island (Waiakea Forest Reserve) in 1959

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**y**
	Source(s)	**Notes**
	Webb, C. J., Sykes, W. R., Garnock-Jones, P. J., & Brownsey P. J. (1995). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 1988-1993. New Zealand journal of botany, 33(2), 151-182	"Eucalyptus nitens (Deane & Maiden) Maiden DISTRIBUTION: Known from a single site, Waiouru (C North Island). FIRST RECORD: New record, e.g., NZFRI 17965, Waiouru Military Camp Village, Ecroyd, 26 Nov 1988. REGION OF ORIGIN: S NSW, E Victoria. NOTES: Medium-sized to tall tree with bark persistent towards base but otherwise becoming smooth and rather mottled grey and white or cream. Juvenile leaves mostly opposite, amplexicaul, broadly oblong-lanceolate. Adult leaves more or less lanceolate or narrowly lanceolate, gradually tapering to more or less acuminate apex. Inflorescence 7-flowered; buds sessile with conical operculum. Capsules 5-6 mm long, more or less urceolate, shining; disc enclosed; valves to rim level. Closely related to E. cypellocarpa L. Johnson (treated as a minor entry in Volume IV) which has larger capsules, short pedicels, and less glossy leaves. Collected as seedlings growing on roadside in the vicinity of adult trees. E. nitens is known as shining gum in Australia."
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Champion, P. D. (2002). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 199 –2000. New Zealand Journal of Botany, 40(2): 155-174	"Eucalyptus nitens Maiden FIRST SOUTH ISLAND RECORD: CHR 536765, P. B. Heenan, Feb 2000, Canterbury, Christchurch, Hyde Park. NOTES: Occasional seedlings occur along a fence line, with the adult trees growing nearby. In the North Island known from Waiouru (Webb et al. 1995, p. 171)."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"References: New Zealand-N-280, New Zealand-N-15, New Zealand-N-823, New Zealand-N-919, Iberian Peninsular-N-1147, Australia-N-1845, New Zealand-N-2048, Australia-W-1977, Portugal-W-1977."
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	[Eucalyptus nitens] "Fully naturalised"
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	Not reported as naturalized in the Hawaiian Islands at time of publication

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

304	**Environmental weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

305	**Congeneric weed**	**y**
	Source(s)	**Notes**
	Henderson, L. (2001). Alien Weeds and Invasive Plants. Alien weeds and invasive plants: A Complete Guide to Declared Weeds and Invaders in South Africa. Agricultural Research Council, Pretoria	"Because of the many negative impacts that Eucalyptus species have on the environment, some taxa have been declared invaders in South Africa. According to the regulations of the National Environment Management: Biodiversity Act (NEM:BA, Act 10 of 2004, Department of Environmental Affairs, South African Government), six Eucalyptus species are currently listed as invasive (E. camaldulensis, E. cladocalyx, E. conferruminata S.G.M., E. diversicolor, E. grandis, and E. tereticornis Sm.); these species require regulation and management."
	Forsyth, G. G., Richardson, D. M., Brown, P. J., & Van Wilgen, B. W. (2004). A rapid assessment of the invasive status of Eucalyptus species in two South African provinces: working for water. South African Journal of Science, 100(1-2), 75-77	"Gum trees, or eucalypts (Eucalyptus species), have been targeted for invasive alien plant clearing programmes in many parts of South Africa. This has caused some dissatisfaction where the species concerned also have useful characteristics, and stakeholders contend that some of these useful species are not invasive. A rapid assessment of the invasive status of Eucalyptus species at 82 sites in South Africa (54 in the Western Cape and 28 in Mpumalanga) indicated that only Red River gum (E. camaldulensis) and flooded gum (E. grandis) are clearly invasive."

Qsn #	Question	Answer
	Simberloff, D. & Rejmánek, M. (2011). Encyclopedia of Biological Invasions. University of California Press, Berkeley & Los Angeles	"Over 800 species of eucalypts (Angophora, Corymbia, and Eucalyptus) are native to Australia and a few Pacific islands. These genera include some of the most important solid timber and paper pulp forestry trees in the world. Besides pines, eucalypts are the most commonly and widely cultivated exotic trees. Almost 20 million ha (200,000 km2) of eucalyptus plantations exist in tropical, subtropical, and temperate countries. In many countries, eucalypts are the most common and conspicuous nonnative trees. Over 70 species are naturalized (reproduce and maintain their populations) outside their native ranges. However, given the extent of cultivation, eucalypts are markedly less invasive than many other widely cultivated trees and shrubs. Reasons for this relatively low invasiveness are still not completely understood. Conclusions about positive or negative environmental and economic impacts of eucalypts are often anecdotal, highly controversial, and context dependent."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Eucalyptus globulus] "The tree invades neighbouring plant communities from initial plantings. By building dense bushes and forests, it displaces native plant species and their associated wildlife with extremely species-poor stands of blue gum. The trees produce a thick litter layer consisting of leaves, bark strips and branch lees, preventing germination and establishment of understorey plants. This is aided by allelochemicals released from leaves (Bossard et ai., 2000). Litter of blue gum is highly flammable and the trees accumulate large amounts of litter, increasing fire hazards. Drifting burning material is common in eucalyptus stands, thus the potential to ignite spot fires is very high"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	A large number of species are cited as naturalized and/or weeds

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "A tall to very tall tree with a straight bole and a crown often only of moderate size which is restricted to the top third of the tree. Mature height on good quality sites is 40-70 m, occasionally up to 90 m with a d.b.h. of 1-2 m or more. On poorer sites it may be smaller (15 to 20 m and up to 0.5 m d.b.h.). Typically of good forest form with clean, straight bole for one-half to two-thirds of tree height."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	Rejmánek, M. & Richardson, D.M. (2011). Eucalypts. Pp. 203-209 In D. Simberloff & M. Rejmánek, (eds.). Encyclopedia of Biological Invasions. University of California Press, Berkeley	[Unknown for E. nitens] "Allelopathic effects of eucalypts on native species are widely reported. Such reports are mostly based on laboratory bioassays. However, some field trials also point to decline of seed germination and increase of seedling mortality of some native species. If not chemical inhibition, then at least accumulation of dead material on the floor of eucalypt plantations retards regeneration of native species. Mixed-species plantations of eucalypts with native (mainly nitrogen-fixing) species have the potential to increase productivity while maintaining soil fertility and biodiversity."

403	Parasitic	n
	Source(s)	Notes
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"A tall to very tall tree with a straight bole and a crown often only of moderate size which is restricted to the top third of the tree." [Myrtaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Early browsing damage by wallabies can be severe in E. nitens plantations in Victoria and Tasmania (Montague, 1996). The need for seedlings to be protected against such damage to achieve site occupancy and full growth potential was confirmed in the study of Wilkinson and Neilsen (1995)."
	le Mar, K., & McArthur, C. (2005). Interactions between herbivores, vegetation and eucalypt tree seedlings in a plantation forestry environment. Australian Forestry, 68 (4), 281-290	"Foliage loss during plantation establishment of commercial Eucalyptus nitens and E. globulus tree seedlings by browsing mammals is a significant cost to the Tasmanian forestry industry (Wardlaw and de Little 2000). Damage is attributed to three native species: red-bellied pademelon (Thylogale billardierii), rednecked wallaby (Macropus rufogriseus rufogriseus), common brushtail possum (Trichosurus vulpecula fuliginosus) and to the introduced European rabbit (Oryctolagus cuniculus) (Gilbert 1961; Cremer 1969; Statham 1983; O'Reilly and McArthur 1997; Bulinski and McArthur 2000)."
	Orwa C,et al. (2009). Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 25 Oct 2021]	"The juvenile leaves of E. nitens are unpalatable to many pests, in some cases even to the leaf-cutting atta ants of Brazil and to the Australian opossums that in New Zealand eat the foliage. The pests attack the adult leaves."

405	Toxic to animals	
	Source(s)	Notes

Qsn #	Question	Answer
	Bleaney, A., Hickey, C. W., Stewart, M., Scammell, M., & Senjen, R. (2015). Preliminary investigations of toxicity in the Georges Bay catchment, Tasmania, Australia. International Journal of Environmental Studies, 72(1), 1-23	[Leaf leachates possibly toxic to aquatic organisms] "North-eastern Tasmania, Australia has been an area of major production for Pacific oysters (Crassostrea gigas) for over 25 years. Since the mid-1990s, increased oyster mortality has been observed. The purpose of the present study was to identify the agent causing aquatic toxicity and to investigate whether there is a chemical and/or toxicological link between river foam and monoculture timber plantation forests of exotic eucalypts (Eucalyptus nitens) present in the catchment area. Foam samples from the George River catchment demonstrated high toxicity to a freshwater cladoceran and larvae of a marine blue mussel species. After filtration to remove most particulates, foam samples also demonstrated a marked reduction in toxicity to blue mussels, which suggested that the toxicity is particle associated. Foam and leaf extracts of E. nitens were then fractionated using HPLC and size exclusion chromatography and the resulting fractions were screened for cladoceran and blue mussel toxicity. Toxicity was detected in fractions common to both the foam and the leaf extracts. This study suggests that there may be a chemical and toxicological relationship between foam and E. nitens leaf components."
	Denholm, M. (2010). Toxic water linked to forestry trees. The Australian. News Limited, 21 February 2010. https://www.theaustralian.com.au. [Accessed 26 Oct 2021]	[Leaves suspected of poisoning water] "It has been suggested that a toxin caused by Eucalyptus nitens leaves has been found in a Tasmanian river that is used for drinking water. A study conducted by Tasmanian local GP, Dr. Alison Bleaney and Sydney scientist, Dr. Marcus Scammell, found that water samples from George River were toxic to water fleas, oyster larvae, and sea urchins. University of New South Wales environmental toxicologist Christian Khalil said whatever agent was in the water was 100 per cent toxic to human skin, liver and lung cells as well, although the extent of the impact on the entire body is unknown. New Zealand ecotoxicologist Chris Hickey reviewed and repeated the tests using foam from the river, including from a site near the drinking water intake for the town of St Helens. He found the foam toxic to mussel larvae. A Tasmanian government investigation came to the same conclusion but have concluded that it is not an issue since it's naturally occurring."
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	A number of pests and pathogens are reported to affect Eucalyptus nitens, but it is unlikely to become the exclusive host given the large number of Eucalyptus species growing in the Hawaiian Islands.

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Denholm, M. (2010). Toxic water linked to forestry trees. The Australian. News Limited, 21 February 2010. https://www.theaustralian.com.au. [Accessed 26 Oct 2021]	"It has been suggested that a toxin caused by Eucalyptus nitens leaves has been found in a Tasmanian river that is used for drinking water. A study conducted by Tasmanian local GP, Dr. Alison Bleaney and Sydney scientist, Dr. Marcus Scammell, found that water samples from George River were toxic to water fleas, oyster larvae, and sea urchins. University of New South Wales environmental toxicologist Christian Khalil said whatever agent was in the water was 100 per cent toxic to human skin, liver and lung cells as well, although the extent of the impact on the entire body is unknown."
	Bleaney, A., Hickey, C. W., Stewart, M., Scammell, M., & Senjen, R. (2015). Preliminary investigations of toxicity in the Georges Bay catchment, Tasmania, Australia. International Journal of Environmental Studies, 72(1), 1-23	[E. nitens leaf components suspected of contaminating water that could be harmful to humans and aquatic organisms] "These findings indicate the potential for contamination of water catchments and associated estuaries from toxic chemicals and metabolites from monoculture plantations of E. nitens. The extent and magnitude of ecological risk posed by growing large acreages of monoculture E. nitens in water catchments has yet to be established, not only with regard to the George River and Georges Bay ecosystems, but for all other water catchments and ecosystems associated with E. nitens monoculture plantations. Water pollution not only directly affects aquatic organisms, but also may adversely impact environmental and human health through bio-accumulation and food-chain pathways [19]."
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"E. nitens does not develop lignotubers; young trees are sensitive to fire, but the basal stocking on older trees gives some protection." [No information on fire regime or frequency]
	Orwa C,et al. (2009). Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 26 Oct 2021]	"It is very sensitive to fire and is killed even by light wild fire. But if sufficient seed is available, the regeneration is prolific, and regrowth develops rapidly on the resulting ash beds."

Qsn #	Question	Answer
	Winoto-Lewin, S., Sanger, J. C., & Kirkpatrick, J. B. (2020). Propensities of old growth, mature and regrowth wet eucalypt forest, and Eucalyptus nitens plantation, to burn during wildfire and suffer fire-induced crown death. Fire, 3 (2), 13	[Plantations of E. nitens may decrease fire risk. Paper has been retracted] "Abstract: There are conflicting conclusions on how the flammability of wet eucalypt forests changes in the time after disturbances such as logging or wildfire. Some conclude that forests are most flammable in the decades following disturbance, while others conclude that disturbance has no effect on flammability. The comparative flammability of Eucalyptus nitens plantations in the same environment as wet eucalypt forest is not known. We determined fire incidence and fire severity in regrowth, mature and old growth wet eucalypt forest, and E. nitens plantation, in the Huon Valley, Tasmania after the January–February 2019 wildfire. To control for topographic variation and fire weather, we randomly selected sites within the fire footprint, then randomly located a paired site for each in different forest types in the same topographic environment within 3 km. Each pair of sites was burned on the same day. Old growth forest and plantations were the least likely to burn. Old growth and mature forest exhibited scorched eucalypt crowns to a much lesser degree than regrowth forests. In a comparison of paired sites, plantation forest was less likely to burn than combined mature and old growth forests, but in all cases of detected ignition the canopy of plantation was scorched. The lower flammability of older forests, and their importance as an increasing store of carbon, suggests that a cessation of logging outside plantations might have considerable benefits." ... "We found that plantations were less likely to burn than other forest types, but if ignition was detected, the incidence of crown scorch or consumption was 100%. Eucalyptus globulus plantations in southern Australia can support a crown consuming fire at six years after planting. At this age there is ample leaf litter and ribbons of oil-rich bark hanging from the trees [46,47]. Eucalyptus nitens trees have similarly ribboning bark. The low observed occurrence of fire in plantations in our study may reflect the highly managed state of plantation forests, with surrounding roads and tracks acting as fire breaks and little understorey and no self-thinning, as well as the recency of establishment of some of the plantations. The dense canopy of older plantations may have reduced ability to detect understorey fires from aerial imagery."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	**Notes**
	Yarra Ranges Council. (2021). Eucalyptus nitens. https://www.yarraranges.vic.gov.au/PlantDirectory/Trees/Trees-5m/Eucalyptus-nitens. [Accessed 26 Oct 2021]	"Growing conditions: Deep moist soil at high altitude. Frost and snow tolerant. Full sun."
	Medhurst, J. L., & Beadle, C. L. (2001). Crown structure and leaf area index development in thinned and unthinned Eucalyptus nitens plantations. Tree Physiology, 21(12-13), 989-999	"It is possible that shade-intolerant species such as E. nitens (Boland et al. 1984) have less plasticity in branching structure, and branch morphology is more an expression of genotype (Colin et al. 1993)."
	Dave's Garden. (2021). Eucalyptus nitens. https://davesgarden.com/guides/pf/go/204419. [Accessed 26 Oct 2021]	"Sun Exposure: Full Sun"

Qsn #	Question	Answer
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"E. nitens prefers deep, moist loams, but it will grow satisfactorily on a wide range of moderately fertile soils, especially if there is clay in the subsoil (Turnbull and Pryor, 1984). The sites are usually well drained and their pH values fall within the range of 4.5 to 6.0. The parent material frequently includes granite and granodiorite but also basalt, rhyodacite and various rocks of sedimentary origin (Turnbull and Pryor, 1984)."
	Orwa C,et al. (2009). Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 25 Oct 2021]	"Soil type: Best growth is on well-drained, deep, rich, moist loamy soils over clay, but it will grow satisfactorily on a wide range of moderately fertile soils."

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"A tall to very tall tree with a straight bole and a crown often only of moderate size which is restricted to the top third of the tree."

412	**Forms dense thickets**	**y**
	Source(s)	**Notes**
	Orwa C,et al. (2009). Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed]	"E. nitens occurs in the hills and valleys in mountain areas, sometimes as small pure stands and often forming part of a mosaic of Eucalyptus species."

501	**Aquatic**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Terrestrial] "E. nitens is a relatively uncommon species of the higher parts of the mountains of south-eastern Australia."

502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 25 Oct 2021]	Genus: Eucalyptus Subgenus: Symphyomyrtus Section: Maidenaria Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

503	**Nitrogen fixing woody plant**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 25 Oct 2021]	Genus: Eucalyptus Subgenus: Symphyomyrtus Section: Maidenaria Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Tall, non-lignotuberous forest trees of good form"

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "E. nitens is a relatively uncommon species of the higher parts of the mountains of south-eastern Australia. Its disjunct distribution is in a large number of small populations from 38°S in central and eastern Victoria to 30°S in northern New South Wales (Eldridge et al., 1993). The largest total area of the species is the sum of many small stands in three areas in the eastern part of the Central Highlands of Victoria, designated by Pederick (1979) as the Toorongo, Rubicon and Macalister provenances. The range of altitude for the species in Victoria is 670 to 1280 m up to almost 1600 m in northern New South Wales where the species is found near Ebor and Barrington Tops. In southern New South Wales, E. nitens occurs in small, almost continuous populations along the Great Dividing Range. They are usually grouped for convenience into three geographic areas of provenance referred to as Tallaganda, Badja Mountain and Brown Mountain."

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"E. nitens is usually propagated by seed. The small, black seed is orthodox and will remain viable in storage for several years if kept dry (5-8% moisture content) in air-tight containers in the refrigerator (3-5°C) (Australian Tree Seed Centre records, 1998 unpublished). There are, on average, 271,000 viable seed/kg of seed and red-brown chaff mix (Turnbull and Doran, 1987). Cold moist stratification of seed at 3-5°C for three weeks is recommended to break dormancy and promote rapid and even germination on sowing. Germination takes place over two weeks under moist, warm conditions (20°C is optimal in the laboratory) in the presence of light (Boland et al., 1980; Turnbull and Doran, 1987). Germination is epigeal."

Qsn #	Question	Answer
603	**Hybridizes naturally**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Reputed natural hybrids have been observed between E. nitens and E. badjensis, and E. cypellocarpa (Griffin et al., 1988) and E. viminalis. A wide range of manipulated hybrids involving E. nitens have been produced for forestry trials."
	Potts, B. M., Barbour, R. C., Hingston, A. B., & Vaillancourt, R. E. (2003). Genetic pollution of native eucalypt gene pools—identifying the risks. Australian Journal of Botany, 51(1), 1-25	"The potential for plantation and native forest eucalypts to hybridise has already been demonstrated on the island of Tasmania (Barbour et al. 2002). Four per cent of seedlings grown from open-pollinated seed collected from native E. ovata trees in a stream reserve were found to be F1 hybrids with the exotic E. nitens. These trees were within 300 m of a small, mature E. nitens plantation. All 11 E. ovata trees sampled produced hybrids, with individual tree values ranging from 0.1 to 16%. In contrast, no hybrids were found involving the adjacent E. viminalis that does not overlap in flowering time with E. nitens at this site (Barbour et al. 2002). Whether these hybrids will survive to reproductive maturity and backcross with native trees is yet to be determined. Nevertheless, these first results clearly indicate the potential for pollen flow from exotic plantings into the range of an adjacent native species."

604	**Self-compatible or apomictic**	**y**
	Source(s)	**Notes**
	Orwa C,et al. (2009). Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org. [Accessed 26 Oct 2021]	"A high degree of selfing is suspected. E. nitens is a late and light seed producer."
	Pound, L. M., Wallwork, M. A., Potts, B. M., & Sedgley, M. (2003). Pollen tube growth and early ovule development following self-and cross-pollination in Eucalyptus nitens. Sexual Plant Reproduction, 16(2), 59-69	[Selfing is possible, with reduced seed set] "The production of self-pollinated seed is of concern to eucalypt breeders due to the detrimental effects of inbreeding. Selfpollination in E. nitens results in reduced capsule set and seed yield (Tibbits 1989), reduced seed viability and a higher incidence of abnormality and mortality in developing seedlings (Tibbits 1988). At later developmental stages, E. nitens trees derived from self-pollination show inbreeding depression for the growth parameters of height, diameter at breast height, trunk basal area and volume, and show reduced flower bud production at reproductive maturity (Hardner and Tibbits 1998)." ... "In conclusion, E. nitens trees vary greatly in their ability to produce self-pollinated seed. Such variation in self-pollinated seed set highlights the importance of determining the level to which individual trees within E. nitens seed orchards set self-pollinated seed to maximise the production of outcrossed seed. The reduction in self-pollinated seed set compared with cross-pollinated seed set observed in these trees appears to be controlled by post-zygotic abortion of self-pollinated ovules. Differences in ovule size following pollination may assist in assessing the potential of individual trees to set self-pollinated seed."

605	**Requires specialist pollinators**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Hingston, A. B., McQuillan, P. B., & Potts, B. M. (2004). Pollinators in seed orchards of Eucalyptus nitens (Myrtaceae). Australian Journal of Botany, 52(2), 209-222	"Abstract. Flowers of the commercially important tree Eucalyptus nitens (Deane & Maiden) Maiden were visited by a diverse array of insects, but not by birds, in Tasmanian seed orchards. Most species of insects that visited the flowers of E. nitens are likely to be effective pollinators because all common species of visitors carried many grains of Eucalyptus pollen, and the open floral structure facilitates frequent insect contact with stigmas. Seed production also suggested that a wide variety of insects were effective pollinators because flowers were consistently well pollinated, despite differences in flower-visitor communities among orchards and particular branches of flowers. The generalised entomophilous pollination system of E. nitens suggests that effective pollinators should occur in seed orchards of this tree throughout the world, provided that flowering occurs at a time of year conducive to insect activity. Although a wide variety of insects appear to be effective pollinators of E. nitens, introduced honeybees, Apis mellifera L., that are often deployed as pollinators in seed orchards were consistently not attracted to the flowers. The reliance on wild insects as pollinators suggests that seed production in E. nitens may benefit from reduced use of broad-spectrum insecticides in, and near, seed orchards."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Turnbull, J. W., & Booth, T. H. (2002). Eucalypts in cultivation: an overview. Pp. 66-88 in J.J.W. Coppen (ed.). Eucalyptus. The Genus Eucalyptus. Taylor & Francis, London	"The most important propagation characteristic of a species or clone is its rooting ability, and the cuttings of some eucalypts, for example, E. globulus and E. nitens, are very difficult to root."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Artificial vegetative propagation possible, but with difficulty] "E. nitens is usually propagated by seed." ... "E. nitens will strike roots from stem cuttings (Maile and Nieuwenhuis, 1995), but the technique is not yet applied operationally as there are still many research and development issues to be fully explored. One of the problems is the variable and mainly low root strike of many genotypes even when using ideal, glasshouse-raised, seedling stock plants."

Qsn #	Question	Answer
607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Doran, J. C. (2002). Genetic improvement of eucalypts With special reference to oil-bearing species. In J. J.W. Coppen (ed.). Eucalyptus The Genus Eucalyptus. Taylor & Francis	"The earlier an orchard flowers the sooner a breeder can move from the first to the second and subsequent generations. Some species, such as E. nitens and E. regnans, cannot be relied upon to flower until aged six or more years."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Under natural conditions, E. nitens seedlings are slow to mature sexually taking at least 5 years to initiate floral buds and up to 10 years before a good seed crop is produced (Moncur et al., 1994b). Even in grafted seed orchards it may take 4 years or more before it begins to flower and seed yields from early orchard flowerings in Tasmania have been disappointing (Moncur et al., 1994b)."

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Sessile, ovoid, often faintly ribbed, 0.4-0.7 × 0.4-0.6 cm, with a glossy surface; disc narrow, descending; valves 3 or 4, about rim level or slightly exserted. Seeds flattened-ellipsoidal, brown to brown-black, hilum ventral." [No means of external attachment]
	Young, A., Boshier, D., & Boyle, T. (2000). Forest Conservation Genetics: Principles and Practice. CSIRO Publishing, Collingwood, AU	"wind-dispersed Eucalyptus nitens"

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"In Australia, E. nitens has proved very vigorous in northern Tasmania, outside of its natural range, where it is grown mainly for pulpwood. It is also cultivated in many other countries including Argentina, Brazil, China, Chile, New Zealand, northern Portugal and Spain, South Africa and Zimbabwe (Jacobs, 1981; Miller et al., 1992; Jayawickrama et al., 1993). It has also shown promise in mountain areas near the Caspian Sea in Iran and has been planted in trials in the USA (California, Hawaii) (Turnbull and Pryor, 1984)."

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	No evidence, and unlikely. A wind-dispersed tree reaching maturity in 5+ years.

Qsn #	Question	Answer
704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Young, A., Boshier, D., & Boyle, T. (2000). Forest Conservation Genetics: Principles and Practice. CSIRO Publishing, Collingwood, AU	wind-dispersed

705	**Propagules water dispersed**	
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Common habitats for E. nitens are slopes and mountain tops with best development of the species occurring on undulating tablelands." [Unknown, but not reported naturally from riparian habitats]
	Rejmánek, M. & Richardson, D.M. (2011). Eucalypts. Pp. 203-209 In D. Simberloff & M. Rejmánek, (eds.). Encyclopedia of Biological Invasions. University of California Press, Berkeley	[General description of Eucalyptus species] "Considering the amount of planting, eucalypts are relatively noninvasive species. If their potential spread is the only concern, then eucalypts should not be planted near rivers and streams. Temporarily flooded or eroded banks are suitable habitats for spontaneous establishment of their seedlings (Fig. 2). Moreover, their seeds can be dispersed for long distances by running water. However"

706	**Propagules bird dispersed**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[Not fleshy fruited] "Fruits: Sessile, ovoid, often faintly ribbed, 0.4-0.7 × 0.4-0.6 cm, with a glossy surface; disc narrow, descending; valves 3 or 4, about rim level or slightly exserted. Seeds flattened-ellipsoidal, brown to brown-black, hilum ventral."
	Young, A., Boshier, D., & Boyle, T. (2000). Forest Conservation Genetics: Principles and Practice. CSIRO Publishing, Collingwood, AU	wind-dispersed

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Sessile, ovoid, often faintly ribbed, 0.4-0.7 × 0.4-0.6 cm, with a glossy surface; disc narrow, descending; valves 3 or 4, about rim level or slightly exserted. Seeds flattened-ellipsoidal, brown to brown-black, hilum ventral." [No means of external attachment]

708	**Propagules survive passage through the gut**	**n**
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Fruits: Sessile, ovoid, often faintly ribbed, 0.4-0.7 × 0.4-0.6 cm, with a glossy surface; disc narrow, descending; valves 3 or 4, about rim level or slightly exserted. Seeds flattened-ellipsoidal, brown to brown-black, hilum ventral." [Wind, or gravity-dispersed seeds unlikely to be consumed]

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Seed production in the natural stands of E. nitens is often small and irregular." ... "Enthusiasm for planting E. nitens is tempered by shortage of seed, some concerns about persistent branches and susceptibility to defoliation by insects."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**n**
	Source(s)	**Notes**
	Rejmánek, M. & Richardson, D.M. (2011). Eucalypts. Pp. 203-209 In D. Simberloff & M. Rejmánek, (eds.). Encyclopedia of Biological Invasions. University of California Press, Berkeley	"The fact that eucalypt seeds do not have dormancy, with seed storage in the soil lasting less than a year, makes local eradication an achievable goal."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	Rejmánek, M. & Richardson, D.M. (2011). Eucalypts. Pp. 203-209 In D. Simberloff & M. Rejmánek, (eds.). Encyclopedia of Biological Invasions. University of California Press, Berkeley	"Herbicide applications (triclopyr or glyphosate) to freshly cut stumps can greatly reduce resprouting." [Herbicides have been used to effectively control other Eucalyptus species]
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Methods to control Eucalyptus globulus would likely be effective on other species] "Treating freshly cut stumps with triclopyr or glyphosate prevents resprouting. Foliar sprays are less effective due to the waxy leaves. However, repeated sprays to sprouts may eventually kill the tree (Bossard et al., 2000)."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Coppices. Young plants do not tolerate fire] "E. nitens does not develop lignotubers; young trees are sensitive to fire, but the basal stocking on older trees gives some protection. While E. nitens can coppice, coppicing is not usually considered to be a reliable means of regenerating E. nitens crops and is not applied operationally."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	New Zealand Plant Conservation Network. (2021). Eucalyptus nitens. https://www.nzpcn.org.nz/flora/species/eucalyptus-nitens/. [Accessed 25 Oct 2021]	"This taxon may be prone to Myrtle Rust (Austropuccinia psidii) is an invasive fungus which threatens myrtle species - learn more myrtlerust.org.nz"

Summary of Risk Traits:

High Risk / Undesirable Traits
• Naturalized in New Zealand, and possibly elsewhere (but not in the Hawaiian Islands to date)
• Other Eucalyptus species are invasive
• Leaf leachates may be toxic to aquatic wildlife and possibly humans
• Tolerates many soil types
• Forms small, pure stands within native range
• Reproduces by seeds
• Hybridizes with other Eucalyptus species
• Capable of selfing (with reduced seed set)
• Seeds dispersed by wind and intentionally by people
• Coppices after cutting, but reported to be killed by fire

Low Risk Traits
• Despite naturalization, no negative impacts described from introduced range
• Unarmed (no spines, thorns, or burrs)
• May be browsed by animals
• Thrives in full sun (dense shade may limit ability to establish and spread)
• Not reported to spread vegetatively
• Limited seed set
• Forms a short-lived seed bank