Taxon: Eucalyptus regnans F. Muell. **Family:** Myrtaceae

Common Name(s): Australian oak
mountain ash
stringy gum
swamp gum
Tasmanian oak
Victorian ash
white mountain ash

Synonym(s): Eucalyptus amygdalina var. regnans
Eucalyptus regnans var. fastigata

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 2 Nov 2021

WRA Score: **-3.0** **Designation:** L **Rating:** Low Risk

Keywords: Temperate Tree, Naturalized (NZ), Pure Stands, Self-Fertile, 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)	Low
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	y=1, n=0	y
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

Qsn #	Question	Answer Option	Answer
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	n
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	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**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"The main (perhaps only) breeding programs for Eucalyptus regnans are in Australia and New Zealand, and focus on frost resistance and rapid growth."
	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] "Mountain ash occurs in Victoria and Tasmania. In Victoria it is mainly restricted to the mountains of the eastern half of the State, south of the Great Dividing Range, with small occurrences at Mt Macedon and in the Otway Ranges south-west of Melbourne. In Tasmania the occurrence is principally in the north-east, southeast and in the valleys of the Huon and Derwent Rivers."

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"**	**Low**
	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	"Mountain ash occurs in Victoria and Tasmania. In Victoria it is mainly restricted to the mountains of the eastern half of the State, south of the Great Dividing Range, with small occurrences at Mt Macedon and in the Otway Ranges south-west of Melbourne. In Tasmania the occurrence is principally in the north-east, southeast and in the valleys of the Huon and Derwent Rivers."
	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 29 Oct 2021]	"Native Australasia AUSTRALIA: Australia [Tasmania, Victoria]"

Qsn #	Question	Answer
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 29 Oct 2021]	

203	Broad climate suitability (environmental versatility)	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	"Climate: Altitudinal range: 150–1100 m (Vic.), near sea level to 600 m (Tas.); Hottest/coldest months: 22–25°C/–2–4°C; Frost incidence: low to high (80 or more each year with snow at high elevations); Rainfall: 750–1700 mm per year, winter max."
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Eucalyptus regnans prefers a cool climate. It grows in areas with a mean annual temperature of 7–20°C, a mean maximum temperature of the warmest month of 17–29°C, and a mean minimum temperature of the coldest month of –2 to +10°C. The average annual rainfall is 650–2000 mm, with a dry season of 0–2 months. It is intolerant of drought and severe cold (below –7°C). In its natural distribution area it occurs from sea level up to 1100 m altitude, while in tropical countries it usually grows at 2000–3200 m altitude. In provenance trials with 18 Eucalyptus species at 0–2800 m altitude in the wet tropics of Antioquia, Colombia, Eucalyptus regnans was the best performer at 2400 m altitude, and one of the three best at 2800 m altitude."

204	Native or naturalized in regions with tropical or subtropical climates	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	"Mountain ash occurs in Victoria and Tasmania. In Victoria it is mainly restricted to the mountains of the eastern half of the State, south of the Great Dividing Range, with small occurrences at Mt Macedon and in the Otway Ranges south-west of Melbourne. In Tasmania the occurrence is principally in the north-east, southeast and in the valleys of the Huon and Derwent Rivers."
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	[In tropical countries, will grow at higher elevations] "Eucalyptus regnans prefers a cool climate. It grows in areas with a mean annual temperature of 7–20°C, a mean maximum temperature of the warmest month of 17–29°C, and a mean minimum temperature of the coldest month of –2 to +10°C. The average annual rainfall is 650–2000 mm, with a dry season of 0–2 months. It is intolerant of drought and severe cold (below –7°C). In its natural distribution area it occurs from sea level up to 1100 m altitude, while in tropical countries it usually grows at 2000–3200 m altitude."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in Hawaiian islands

Qsn #	Question	Answer
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	"E. regnans is grown in commercial plantations in both the North and South Islands of New Zealand, and in Chile for paper pulp production. Although it has been grown successfully on a small scale in southern Africa (e.g. in South Africa and Zimbabwe) limited availability of suitable sites has meant that this species is not a significant plantation species there (Jacobs, 1981). E. regnans has succeeded in trials in tropical countries such as Sri Lanka, India and Kenya when planted at higher altitudes (Turnbull and Pryor, 1984)."
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Eucalyptus regnans is native to south-eastern Australia (Victoria and Tasmania), where it occurs in original forests and extensive plantations. It is widely planted in subtropical regions around the world and in the mid-altitude tropics, for instance in the United States, Chile, Spain, India and Sri Lanka. In New Zealand it is one of the primary plantation species. In Africa Eucalyptus regnans has been planted in Ethiopia, Kenya, Tanzania, Zimbabwe and South Africa."
	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	17 trees planted in Mauna Kea and Pohakuloa Forest Reserves on Hawaii Island in 1957-1958

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	"Eucalyptus regnans ... Fully naturalised"
	Sykes, W. R. (1982). Checklist of dicotyledons naturalised in New Zealand 12. Haloragales, Myrtales, Proteales, Theales, Violales (excluding Violaceae). New Zealand Journal of Botany, 20(1), 73-80	"Eucalyptus regnans F.v. Muell. DISTRIBUTION: Cultivation escape in State forests, North & South Is, especially near Dunedin (Waitati). FIRST RECORD: Weston, G. C. N.Z.F.S. Bull.13: 24 (1957). REGION OF ORIGIN: Victoria, Tasmania."

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2021). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	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**
	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."
	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	[Eucalyptus camaldulensis] "Invades: Perennial, seasonal and intermittent watercourses. Origin: Australia (all states except Tasmania). Invasive status: Transformer. Declared invader (category 2)."
	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**

Qsn #	Question	Answer
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	[No evidence] "Evergreen, very large tree up to 105 m tall; bole straight, up to 300 cm in diameter; bark rough and fibrous for the lower 15 m of the trunk, smooth and white or grey-green above, decorticating in long strips; crown open. Leaves alternate, simple and entire; stipules absent; petiole channelled, 8–25 mm long; blade lanceolate, 9–23 cm × 1.5–5 cm, slightly oblique or tapering at the base, acuminate at the apex, glossy, concolorous, green, venation oblique. Inflorescence a simple, umbel-like dichasium, paired in leaf axils, 9–15-flowered; peduncle angular, 4–14 mm long. Flowers bisexual, regular, white; pedicel 2–7 mm long; flower buds obovoid, 4–7 mm × 2–4 mm, divided into an obconical hypanthium (lower part) c. 3 mm × 3–4 mm, and a conical operculum (upper part) 2–3 mm × 3–4 mm, shed at anthesis; stamens numerous; ovary inferior, usually 3-celled. Fruit an obconical to pear-shaped capsule 5–9 mm × 4–7 mm, opening with 3 valves. Seeds pyramidal, 1.5–3 mm long, brown. Seedling with epigeal germination. "

402	Allelopathic	y
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Eucalyptus regnans has allelopathic effects on understory plants, especially on its own seedlings growing near mature trees or in fields in which mature trees have grown. These effects are alternately believed to be due to a buildup of waxy lipids in the soil from decaying Eucalyptus regnans leaves, or to a rhizosphere fungus, Cylindrocarpon destructans. The resulting difficulty of re-planting plantations of Eucalyptus regnans after harvest is a likely reason for the preference of Eucalyptus globulus Labill. in many plantations."

403	Parasitic	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	"Mountain ash is one of the tallest tree species in the world, and is only exceeded in height by the redwoods of California." [Myrtaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Montague, T. L., Pollock, D. C., & Wright, W. (1990). An examination of the browsing animal problem in Australian eucalypt and pine plantations. Proceedings of the Vertebrate Pest Conference, 14(14): 203-208	[E. regnans was the most palatable relative to other Eucalyptus species evaluated] "Looking at the trend of all species and age classes (Fig. 2), old E. globulus was the least palatable (more resistant to browsing), followed by old E. nitens, young E. globulus, and young E. nitens, then old E. regnans, and finally young E. regnans."

Qsn #	Question	Answer
	Montague, T. L. (1994). Wallaby browsing and seedling palatability. Australian Forestry, 57(4), 171-175	[Seedlings browsed by wallabies] "Relative palatability of seedlings commonly used in silviculture in Gippsland were compared based on the survival of seedlings when exposed to captive swamp wallabies. Pinus radiata was significantly less browsed than the least browsed eucalypt species Eucalyptus globulus. The survival of 6-month-old E. regnans seedlings was significantly lower than that of 6 or 18-month-old E. nitens or E. globulus. Survival of eucalypt seedlings was not significantly increased by growing them under different fertiliser regimes nor by growing them in the presence of Anipel tablets which contain bitrex (ai). Browsing was almost significantly reduced (0.1 <P<0.05) by treating them with an aqueous solution containing 1 mg of selenium dioxide 4 weeks before exposing them to wallabies."

405	Toxic to animals	n
	Source(s)	**Notes**
	Montague, T. L., Pollock, D. C., & Wright, W. (1990). An examination of the browsing animal problem in Australian eucalypt and pine plantations. Proceedings of the Vertebrate Pest Conference, 14(14): 203-208	[No evidence. E. regnans was the most palatable relative to other Eucalyptus species evaluated] "Looking at the trend of all species and age classes (Fig. 2), old E. globulus was the least palatable (more resistant to browsing), followed by old E. nitens, young E. globulus, and young E. nitens, then old E. regnans, and finally young E. regnans."
	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
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Phytophthora fallax is a fungal crown dieback disease of Eucalyptus regnans that occurs episodically in New Zealand, with individual trees showing differing degrees of susceptibility. Symptoms include leaf spots, petiole infection and branchlet lesions. Mycosphaerella cryptica is a leaf disease that can result in heavy defoliation and dieback. Certain provenances of Eucalyptus regnans are more susceptible than others, which implies that there is potential for breeding for resistance to the disease. No fungicides are known to give good control. Some fungi mainly affect seeds and seedlings, such as Penicillium spp., Fusarium spp., Phytophthora spp. and Botrytis cinerea, but they are not widely reported on Eucalyptus regnans, and good phytosanitary practices suffice to avoid them. Eucalyptus regnans is one of the Eucalyptus species susceptible to the eucalyptus snout beetle (Gonipterus scutellatus), which occurs on all continents and is known to be present in Kenya, Uganda, Zimbabwe, South Africa, Mauritius and Madagascar. The eucalyptus snout beetle can be controlled with the hymenopterous parasite Anaphoides nitens. The longicorn beetle Phoracantha semipunctata is a borer that attacks young trees, stressed trees, and stumps of recently harvested trees. It has been recorded from Zimbabwe and South Africa. Insecticides are not effective, so it must be controlled by the removal and burning of infected material. The principal pest in Eucalyptus regnans plantations in Tasmania is Chrysophtharta bimaculata, a leaf eating beetle. It is controlled with an integrated approach involving insecticides and natural predators and parasites, together with strict monitoring of population numbers and breeding of more resistant trees. In Africa termites are a risk in Eucalyptus nurseries and young plantations up to 3–4 years old."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Plants for a Future. (2021). Eucalyptus regnans. https://pfaf.org/user/Plant.aspx?LatinName=Eucalyptus+regnans. [Accessed 2 Nov 2021]	[Generic description] "Like many other Eucalyptus species, Eucalyptus regnans is very intolerant of competition for light and soil resources, which means that seedlings do not grow well under a pre-existing canopy. For this reason natural forests of Eucalyptus regnans are said to be self-thinning, i.e. the tallest, most dominant individuals shade out smaller individuals, which die. In native forests in south-eastern Australia "
	The Wood Database. (2021). Mountain Ash. https://www.wood-database.com/mountain-ash/. [Accessed 2 Nov 2021]	[Wood dust may cause reactions in susceptible individuals] "Allergies/Toxicity: Although severe reactions are quite uncommon, Mountain Ash has been reported to cause eye, skin, and respiratory irritation. See the articles Wood Allergies and Toxicity and Wood Dust Safety for more information."
	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
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Waters, D. A., Burrows, G. E., & Harper, J. D. I. (2010). Eucalyptus regnans (Myrtaceae): A fire-sensitive eucalypt with a resprouter epicormic structure. American Journal of Botany, 97(4), 545–556	[Burns, and could increase fuel load and fire risk in fire prone habitats] "Favorable environmental conditions of high, reliable rainfall (>1200 mm/yr) and deep, fertile soils can result in high fuel loads, infrequent high intensity fires, and the subsequent formation of pure, even-aged E. regnans stands (Ashton, 1981 a; Florence, 1996; Wardell-Johnson et al., 1997; Wood et al., 2008)."
	Bowd, E. J., Lindenmayer, D. B., Banks, S. C., & Blair, D. P. (2018). Logging and fire regimes alter plant communities. Ecological Applications, 28(3), 826–841	[Infrequent, high-intensity fires characterize E. regnans forests] "Fire regimes in Eucalyptus regnans forests are characterized by infrequent, high-intensity fires that historically had a return period of 75–150 yr(McCarthyetal.1999)."
	Tng, D. Y. P., Williamson, G. J., Jordan, G. J., & Bowman, D. M. J. S. (2012). Giant eucalypts–globally unique fire-adapted rain-forest trees?. New Phytologist, 196(4), 1001-1014	[Older forests may have reduced fire risk] "Indeed, there is evidence that the microclimate of humid tropical rain-forest understoreys renders the vegetation type less flammable than the adjacent and more open canopied E. grandis forests (Little et al., 2012), and this is probably the case for E. regnans forests (Jackson, 1968). It is possible that flammability of E. regnans varies with age of the trees (McCarthy et al., 2001); for instance Jackson (1968) believed that younger regrowth eucalypt forest had higher flammability than older mixed Nothofagus–E. regnans forest."

409	**Is a shade tolerant plant at some stage of its life cycle**	**n**
	Source(s)	**Notes**
	Plants for a Future. (2021). Eucalyptus regnans. https://pfaf.org/user/Plant.aspx?LatinName=Eucalyptus+regnans. [Accessed 2 Nov 2021]	"It cannot grow in the shade."
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Like many other Eucalyptus species, Eucalyptus regnans is very intolerant of competition for light and soil resources, which means that seedlings do not grow well under a pre-existing canopy. For this reason natural forests of Eucalyptus regnans are said to be self-thinning, i.e. the tallest, most dominant individuals shade out smaller individuals, which die. In native forests in south-eastern Australia "

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**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	"Best development is found on sheltered aspects in mountainous country with rainfall greater than 1100 mm, on deep friable clay loam soils. Where soils are poorer and the rainfall lower, pure stands may be restricted to valleys and along watercourses. Rock substrates frequently include volcanics."
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"It requires a moderately fertile, well-drained soil, and is sensitive to salinity."

Qsn #	Question	Answer
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"The best development of E. regnans is on sheltered sites (shelter from hot and cold winds and free air drainage to reduce frost effect) in mountainous country with mean annual precipitation greater than 1200 mm, absence of long periods of water stress and on deep friable clay loam soils. Where there is less rainfall and the soil is less fertile, the pure stands are confined to valleys and along watercourses. It will not grow well on permanently saturated subsoils (Boland et al., 1984). In Tasmania E. regnans occurs on podsols, while in Victoria it is found mainly on upland and mountain podsols, and on krasnozems. Soils are derived from feldspathic sandstones and mudstones, granites and dolerite."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Evergreen, very large tree up to 105 m tall; bole straight, up to 300 cm in diameter; bark rough and fibrous for the lower 15 m of the trunk, smooth and white or grey-green above, decorticating in long strips; crown open."

412	Forms dense thickets	y
	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. CSIR(Publishing, Collingwood, Australia	"Mountain ash grows in tall open forests, mainly in pure stands."
	Waters, D. A., Burrows, G. E., & Harper, J. D. I. (2010). Eucalyptus regnans (Myrtaceae): A fire-sensitive eucalypt with a resprouter epicormic structure. American Journal of Botany, 97(4), 545–556	[Forms pure stands in some conditions] "Favorable environmental conditions of high, reliable rainfall (>1200 mm/yr) and deep, fertile soils can result in high fuel loads, infrequent high intensity fires, and the subsequent formation of pure, even-aged E. regnans stands (Ashton, 1981 a; Florence, 1996; Wardell-Johnson et al., 1997; Wood et al., 2008)."

501	Aquatic	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. CSIR(Publishing, Collingwood, Australia	[Terrestrial] "Best development is found on sheltered aspects in mountainous country with rainfall greater than 1100 mm, on deep friable clay loam soils."

Qsn #	Question	Answer
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 29 Oct 2021]	Genus: Eucalyptus Subgenus: Eucalyptus Section: Eucalyptus Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

503	**Nitrogen fixing woody plant**	**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 29 Oct 2021]	Genus: Eucalyptus Subgenus: Eucalyptus Section: Eucalyptus Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Evergreen, very large tree up to 105 m tall; bole straight, up to 300 cm in diameter; bark rough and fibrous for the lower 15 m of the trunk, smooth and white or grey-green above, decorticating in long strips; crown open."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	[No evidence] "Eucalyptus regnans is native to south-eastern Australia (Victoria and Tasmania), where it occurs in original forests and extensive plantations. It is widely planted in subtropical regions around the world and in the mid-altitude tropics, for instance in the United States, Chile, Spain, India and Sri Lanka. In New Zealand it is one of the primary plantation species. In Africa Eucalyptus regnans has been planted in Ethiopia, Kenya, Tanzania, Zimbabwe and South Africa."

Qsn #	Question	Answer
602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Eucalyptus regnans is usually propagated by seed. The 1000-seed weight is 5.5–12.5 g. Seed can be stored for several years in airtight containers under dry (5–8% moisture content) and cool (3–5°C) conditions. Cold and moist stratification of the seed at 3–5°C for 3 weeks is recommended to break dormancy and promote even germination. Germination is optimal at 15–20°C and usually takes 10–20 days. Seedlings raised in nurseries can be planted out after 8–9 months. "

603	**Hybridizes naturally**	**y**
	Source(s)	**Notes**
	Ashton, D. H., & Sandiford, E. M. (1988). Natural hybridisation between Eucalyptus regnans F. Muell. and E. macrorhyncha F. Muell. in the Cathedral Range, Victoria. Australian Journal of Botany, 36(1), 1-22	Intermediates between E. regnans and E. macrorhyncha occur in E. macrorhyncha forests on the Cathedral Range sandstones up to 5 km from the nearest stands of E. regnans. Such intermediates are regarded as F1 hybrids, primarily because of their low variability. Except for one site adjacent to E. regnans, no introgression to E. macrorhyncha is found, suggesting that hybridization is a rare event. The presence of hybrids is likely to be a result of a 'third order reaction' requiring heavy synchronous flowering, attraction of suitable pollinators and the occurrence of bushfires within the retention time of capsules in the canopies. Intermediate trees exhibit water relation characteristics and essential oil contents similar to those of E. macrorhyncha but morphological features closer to those of E. regnans. Progeny of intermediates display wide variability, both morphologically and physiologically, between the putative parent species. Such rare, widely dispersed hybrid events may eventually lead to increased local variation of E. macrorhyncha and as such may have implications for evolution of eucalypt taxa in diverse habitats."

604	**Self-compatible or apomictic**	**y**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	[Yes, with reduced seed set] "Flowering is protandrous and the flowers are pollinated by insects or birds. Both outcrossing and self-pollination occur. In controlled-pollination experiments seedlings produced after self-pollination showed reduced growth compared to those raised from open-pollinated seed."

605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Flowering is protandrous and the flowers are pollinated by insects or birds. Both outcrossing and self-pollination occur. In controlled-pollination experiments seedlings produced after self-pollination showed reduced growth compared to those raised from open-pollinated seed."

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**n**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Unlike many other Eucalyptus species, Eucalyptus regnans does not regenerate from lignotubers. This means that mature trees are sensitive to intense fires, and that coppice harvests are usually not possible after the first harvest." ... "Eucalyptus regnans is usually propagated by seed. The 1000-seed weight is 5.5–12.5 g. Seed can be stored for several years in airtight containers under dry (5–8% moisture content) and cool (3–5°C) conditions. Cold and moist stratification of the seed at 3–5°C for 3 weeks is recommended to break dormancy and promote even germination. Germination is optimal at 15–20°C and usually takes 10–20 days. Seedlings raised in nurseries can be planted out after 8–9 months. In New Zealand Eucalyptus regnans seedlings are often grown in nursery beds for a year before bare-rooted seedlings are planted out in the field. Growing in polyethylene bags in the nursery is also possible. In-vitro propagation with microcuttings obtained from node-derived shoot cultures is possible."

607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Booth, T. H. (2017). Going nowhere fast: a review of seed dispersal in eucalypts. Australian Journal of Botany, 65(5), 401-410	"Some fast-growing eucalypts may produce seeds in as little as 3 years, but slow-growing species such as E. regnans F.Muell. may take 15–20 years (Gill 1981)."

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Fruit an obconical to pear-shaped capsule 5–9 mm × 4–7 mm, opening with 3 valves. Seeds pyramidal, 1.5–3 mm long, brown. Seedling with epigeal germination." [No means of attachment]
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds."

Qsn #	Question	Answer
702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Eucalyptus regnans is native to south-eastern Australia (Victoria and Tasmania), where it occurs in original forests and extensive plantations. It is widely planted in subtropical regions around the world and in the mid-altitude tropics, for instance in the United States, Chile, Spain, India and Sri Lanka. In New Zealand it is one of the primary plantation species. In Africa Eucalyptus regnans has been planted in Ethiopia, Kenya, Tanzania, Zimbabwe and South Africa."
	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	17 trees planted in Mauna Kea and Pohakuloa Forest Reserves on Hawaii Island in 1957-1958

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans, Wind"
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds."

704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans, Wind"
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds. Seed-trapping studies over several years have shown that dissemination is poor from the edge of a dense forest, but much better from isolated trees. The degree to which the local winds are deflected and obstructed is obviously important. It is concluded that adequate coverage of self-sown seed cannot be expected on completely felled areas which are more than two or three chains wide. Adequate distribution of seed from isolated trees probably depends more on amount of available seed than on efficiency of dissemination."

705	**Propagules water dispersed**	
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans, Wind"
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds."

Qsn #	Question	Answer
	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	[No evidence for the wind-dispersed seeds of Eucalyptus regnans, but buoyancy unknown. May be able to become secondarily dispersed by overland flow following heavy rains, or by water currents if grown near riparian habitats] "Eucalypts should not be planted near rivers/streams. Temporarily flooded or eroded river/stream banks are suitable habitat for spontaneous establishment of seedlings. Additionally, their seeds can be dispersed for long distances by running water."
	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. CSIR(Publishing, Collingwood, Australia	[Not a primarily riparian species, but may be water dispersed when established along watercourses] "Mountain ash occurs in Victoria and Tasmania. In Victoria it is mainly restricted to the mountains of the eastern half of the State, south of the Great Dividing Range, with small occurrences at Mt Macedon and in the Otway Ranges south-west of Melbourne." ... "Where soils are poorer and the rainfall lower, pure stands may be restricted to valleys and along watercourses."

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. CSIR(Publishing, Collingwood, Australia	"Fruits: Pedicellate, obconical to hemispherical, 0.5–0.9 × 0.4–0.7 cm; disc relatively broad, more or less level; valves 3, to rim level or slightly enclosed, occasionally very slightly exserted. Seeds pyramidal or obliquely pyramidal, brown, hilum terminal."
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds."

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. CSIR(Publishing, Collingwood, Australia	"Fruits: Pedicellate, obconical to hemispherical, 0.5–0.9 × 0.4–0.7 cm; disc relatively broad, more or less level; valves 3, to rim level or slightly enclosed, occasionally very slightly exserted. Seeds pyramidal or obliquely pyramidal, brown, hilum terminal." [No means of external attachment]
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds."

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Cremer, K. W. (1966). Dissemination of seed from Eucalyptus regnans. Australian Forestry, 30(1), 33-37	"Wind is the only important agent of dispersal of E. regnans F. Muell. seed and most seed is disseminated in the direction of the locally prevailing winds." [No evidence of ingestion or internal dispersal]

801	Prolific seed production (>1000/m2)	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wang, L. (1997). The soil seed bank and understorey regeneration in Eucalyptus regnans forest, Victoria. Australian Journal of Ecology, 22(4), 404-411	"Abstract The soil seed bank and its relation to the extant vegetation in a Eucalyptus regnans F. Muell. forest in the Central Highlands of Victoria were examined. The average seed density was 430 germinable seeds m"^ to a depth of 2 cm. There was a polynomial regression relationship between the density and species richness of seeds in soil and forest age (0.6-54 years). Species richness was not significantly different among soil depths (0-2, 2-5, 5-10 and 10-20 cm) in the forest stand of 54 years old. More seeds germinated from the 5-10 cm depth than from the other depths. Forbs accounted for 73% of the total germinable seeds and there was no germination of E. regnans. The number of species, particularly woody plant species, germinating from the soil seed bank were significantly lower than in the extant vegetation. However, almost all species present in the soil seed bank were present in the vegetation. The soil seed bank provides an important source for the rapid regeneration of understorey vegetation following clear-cutting and slash-burning in the E. regnans forest. The rapid understorey establishment may play an important role in protecting soil from erosion, in nutrient conservation, replacement and redistribution. The soil seed bank may also be a necessary source of maintaining genetic diversity in the forest over the long term."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"E. regnans is not a prolific seeder with heavy crops produced at intervals of 2-4 years (Ashton, 1975a; Cunningham, 1960)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	**Notes**
	Tng, D. Y. P., Williamson, G. J., Jordan, G. J., & Bowman, D. M. J. S. (2012). Giant eucalypts–globally unique fire-adapted rain-forest trees?. New Phytologist, 196(4), 1001-1014	"E. regnans has an aerial seed bank in the form of woody capsules (i.e. Fig. 3d) that protect seeds from the heat of a fire (Ashton, 1981a), limited epicormic regrowth and no lignotubers (Nicolle, 2006; Waters et al., 2010)."
	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."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"The small, brown 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)."
	Ashton, D. H., & Martin, D. G. (1996). Regeneration in a pole-stage forest of Eucalyptus regnans subjected to different fire intensities in 1982. Australian Journal of Botany, 44(4), 393-410	[Transient seed bank] "Soil storage of E, regnans seed is almost non-existent (Ashton 1979), hence its germination from the soil is a result of relatively recent seed fall."

803	Well controlled by herbicides	
	Source(s)	**Notes**

Qsn #	Question	Answer
	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."
	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	n
	Source(s)	**Notes**
	Brink, M. & Achigan-Dako, E.G. (2012). Fibres. Plant Resources of Tropical Africa. Volume 16. PROTA, Wageningen, Netherlands	"Unlike many other Eucalyptus species, Eucalyptus regnans does not regenerate from lignotubers. This means that mature trees are sensitive to intense fires, and that coppice harvests are usually not possible after the first harvest."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	**Notes**
	Zauza, E. A., Alfenas, A. C., Old, K., Couto, M. M., Graça, R. N., & Maffia, L. A. (2010). Myrtaceae species resistance to rust caused by Puccinia psidii. Australasian Plant Pathology, 39(5), 406-411	[Susceptible to Austropuccinia psidii] "Abstract. Seeds from different species and provenances of Myrtaceae, collected from wild populations in Australia, were screened for resistance to rust caused by Puccini psidii. Seedlings were inoculated with a suspension of rust inoculum and incubated in a mist chamber in the dark for 24 h. Subsequently, the plants were transferred to a growth chamber and rust reaction was evaluated 12 days later. Inter- and intra-specific variability was observed among and within the myrtaceae species. Independent of the provenance, the most resistant species were: Corymbia calophylla 'rosea', C. tesselaris, Melaleuca ericifolia, Eucalyptus tereticornis, E. resinifera, E. scias subsp. scias, E. paniculata, E. pellita and C. intermediata. In contrast, M. nesophila, M. alternifolia, M. cajuputi subsp. cajuputi, M. leucadendra, M. quinquenervia, E. cloeziana, E. diversicolor, E. regnans and E. grandis displayed the highest number of susceptible plants. Among those additional myrtaceaceous genera which were tested for their reaction to rust the most resistant were Asteromyrtus dulcia, A. tenuifolia, Gossia fragrantissima, Lophostemon confertus, Syzygium australe, S. wilsonii subsp. cryptophlebium, Archirhodomytus beckleri, Acmena smithii and Syzygium alatoramulum. Pericalymma ellipticum, Kunzea baxteri, Astartea heteranthera, Regelia ciliata, Rhodomyrtus psidioides and Syncarpia glomulifera were the most susceptible species."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Naturalized in New Zealand
• Other Eucalyptus species are invasive
• Allelopathic
• Tolerates many soil types
• Forms small, pure stands within native range (often after fires)
• Reproduces by seeds
• Hybridizes with other Eucalyptus species
• Capable of selfing (with reduced seed set)
• Seeds dispersed by wind and intentionally by people

Low Risk Traits
• No reports of naturalization in Hawaii, or invasiveness where cultivated
• 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
• Reaches maturity in 15-20 years
• Limited seed set
• Forms a short-lived seed bank