

Taxon: Eucalyptus polyanthemus Schauer

Family: Myrtaceae

Common Name(s): red box

Synonym(s): Eucalyptus ovalifolia F.Muell. ex
Eucalyptus ovalifolia var. lanceolata
Eucalyptus polyanthemus subsp.

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 5 Jan 2021

WRA Score: -2.0

Designation: L

Rating: Low Risk

Keywords: Temperate Tree, Naturalized Elsewhere, Non-toxic, Wind-Dispersed, Resprouts

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		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
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	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)		
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] "Subsp. polyanthemus occurs widely on the central and south-western slopes and the lower altitudes of the Central and Southern Tablelands of New South Wales. Subsp. vestita is widespread in central and eastern Victoria from Ararat eastwards, extending into New South Wales north of Albury and at Bombala. Subsp. longior occurs along the foothills of far eastern Victoria from near Bairnsdale (e.g. Mt. Taylor) east to the New South Wales border. Red box grows on foothills, lowland ranges and gentle slopes between the open plains and higher mountain slopes. It is generally found on dry stony or gravelly soils and rather heavy, poor soils, generally of sedimentary origin."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2020). 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
	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: 120-780 m (polyanthemus, vestita), 120-450 m (longior); Hottest/coldest months: 23- 30 °C/1-4 °C (polyanthemus, vestita), 22-25 °C/2-4 °C (longior); Frost incidence: moderate to high, with up to 60 each winter at higher elevations (polyanthemus, vestita), moderate (longior); Rainfall: 450-970 mm per year, uniform and winter max. (polyanthemus, vestita), 800-1100 mm per year, uniform (longior)."
	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 4 Jan 2021]	"Native Australasia AUSTRALIA: Australia [New South Wales (e.), 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 4 Jan 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: 120-780 m (polyanthemos, vestita), 120-450 m (longior); Hottest/coldest months: 23- 30 °C/1-4 °C (polyanthemos, vestita), 22-25 °C/2-4 °C (longior); Frost incidence: moderate to high, with up to 60 each winter at higher elevations (polyanthemos, vestita), moderate (longior); Rainfall: 450-970 mm per year, uniform and winter max. (polyanthemos, vestita), 800-1100 mm per year, uniform (longior)."
	Martin, C.A. (2021). Virtual Library of Phoenix Landscape Plants - Eucalyptus polyanthemos. http://www.public.asu.edu . [Accessed 4 Jan 2021]	"Hardiness zones Sunset 5, 6, 8-24 USDA 8 (with cold protection), 9-11"

204	Native or naturalized in regions with tropical or subtropical climates	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 4 Jan 2021]	"Native Australasia AUSTRALIA: Australia [New South Wales (e.), Victoria]"
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans References: United States of America-E- 80, United States of America-N-101, Australia-E-358, Australia-N-7, United States of America-E-151, Ecuador-N-875, Mozambique-nC-943, Australia-N-354, United States of America-E-1736, China- N-1796, Australia-W-1977, India-W-1977, Portugal-W-1977, Rwanda-W-1977."
	Ritter, M., & Yost, J. (2009). Diversity, reproduction, and potential for invasiveness of Eucalyptus in California. <i>Madroño</i> , 56(3), 155-167	"Eucalyptus polyanthemos Schauer (Fig. 2A). Twisselmann 18559 (CAS 55013); Barber s.n. February 1894 (JEPS 1896). Leaves bluish-gray, ovate, elliptic, or orbicular; inflorescences terminal panicles; staminodes present. Very common landscaping tree throughout western California. Reproduces occasionally."

Qsn #	Question	Answer
	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	172 planted in the Kau (80 planted) and Olaa (92 planted) Forest Reserves, Hawaii Island in 1932

301	Naturalized beyond native range	Y
	Source(s)	Notes
	Ritter, M., & Yost, J. (2009). Diversity, reproduction, and potential for invasiveness of <i>Eucalyptus</i> in California. <i>Madroño</i> , 56(3), 155-167	" <i>Eucalyptus polyanthemus</i> Schauer (Fig. 2A). Twisselmann 18559 (CAS 55013); Barber s.n. February 1894 (JEPS 1896). Leaves bluish-gray, ovate, elliptic, or orbicular; inflorescences terminal panicles; staminodes present. Very common landscaping tree throughout western California. Reproduces occasionally."
	Galasso, G., et al. (2018). Notulae to the Italian alien vascular flora: 6. <i>Italian Botanist</i> 6: 65–90	" <i>Eucalyptus polyanthemus</i> Schauer subsp. <i>polyanthemus</i> (Myrtaceae) This Australian species, identified according to the Centre for Plant Biodiversity Research (2006) and Slee et al. (2015), was introduced in Sardegna for reforestation in the period 1914–1921. It shows a scarce tendency to naturalization, unlike <i>E. camaldulensis</i> Dehnh. subsp. <i>camaldulensis</i> and <i>E. globulus</i> Labill. subsp. <i>globulus</i> , occurring only with a dozen young trees near the reforestation site."
	Centre for Australian National Biodiversity Research. (2021). EUCLID <i>Eucalypts of Australia</i> Edition 4. https://apps.lucidcentral.org/euclid/text/intro/index.html . [Accessed 4 Jan 2021]	"In Western Australia <i>Eucalyptus polyanthemus</i> has escaped from plantings and become naturalised (Hussey et al., 1997)."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[Reported to be naturalized, but not all cited references were able to be corroborated] "References: United States of America-E-80, United States of America-N-101, Australia-E-358, Australia-N-7, United States of America-E-151, Ecuador-N-875, Mozambique-nC-943, Australia-N-354, United States of America-E-1736, China- N-1796, Australia-W-1977, India-W-1977, Portugal-W-1977, Rwanda-W-1977."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Brown, K. & Brooks, K. (2002). <i>Bushland Weeds. A Practical Guide to Their Management with Case Studies from the Swan Coastal Plain and Beyond</i> . Environmental Weeds Action Network, Greenwood, Australia	"Chapter 6 Trees, Shrubs and Climbers Weed Management Table" [<i>Eucalyptus polyanthemus</i> listed among *Eastern Australian natives naturalised in Western Australia. A possible environmental weed, but impacts have not been specified]
	Ritter, M., & Yost, J. (2009). Diversity, reproduction, and potential for invasiveness of <i>Eucalyptus</i> in California. <i>Madroño</i> , 56(3), 155-167	[No negative impacts described] " <i>Eucalyptus polyanthemus</i> Schauer (Fig. 2A). Twisselmann 18559 (CAS 55013); Barber s.n. February 1894 (JEPS 1896). Leaves bluish-gray, ovate, elliptic, or orbicular; inflorescences terminal panicles; staminodes present. Very common landscaping tree throughout western California. Reproduces occasionally."

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

304	Environmental weed	
	Source(s)	Notes
	Brown, K. & Brooks, K. (2002). Bushland Weeds. A Practical Guide to Their Management with Case Studies from the Swan Coastal Plain and Beyond. Environmental Weeds Action Network, Greenwood, Australia	"Chapter 6 Trees, Shrubs and Climbers Weed Management Table" [Eucalyptus polyanthemus listed among *Eastern Australian natives naturalised in Western Australia. A possible environmental weed, but impacts have not been specified]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Included in citations of environmental weeds, but impacts have not been verified] "References: United States of America-E- 80, United States of America-N-101, Australia-E-358, Australia-N-7, United States of America-E-151, Ecuador-N-875, Mozambique-nC-943, Australia-N-354, United States of America-E-1736, China- N-1796, Australia-W-1977, India-W-1977, Portugal-W-1977, Rwanda-W-1977."

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 (<i>Eucalyptus</i> 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 <i>Eucalyptus</i> species at 82 sites in South Africa (54 in the Western Cape and 28 in Mpumalanga) indicated that only Red River gum (<i>E. camaldulensis</i>) and flooded gum (<i>E. grandis</i>) are clearly invasive."
	Simberloff, D. & Rejmánek, M. (2011). Encyclopedia of Biological Invasions. University of California Press, Berkeley & Los Angeles	"Over 800 species of eucalypts (<i>Angophora</i> , <i>Corymbia</i> , and <i>Eucalyptus</i>) 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 km ²) 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."

Qsn #	Question	Answer
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CAB International, Wallingford, UK	[<i>Eucalyptus globulus</i>] "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 al., 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
	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] "Red box is a medium-sized tree 15-25 m in height and 0.5-1 m dbh under favourable conditions, and under poorer conditions may only be about 10 m in height with dbh 0.3-0.4 m. The trunk is often short and of mediocre form, and the crown generally rounded and quite dense. It consists of three subspecies, the typical, subsp. <i>vestita</i> and subsp. <i>longior</i> ."

402	Allelopathic	n
	Source(s)	Notes
	Coppen, J.J.W. (2002). <i>Eucalyptus: The Genus Eucalyptus</i> . Taylor and Francis, London	[Potentially. Members of genus may possess allelopathic chemicals] "Trees of the genus <i>Eucalyptus</i> are frequently surrounded by a grass-free zone and this has led to a search for possible allelochemicals in <i>Eucalyptus</i> species. The results to date indicate that eucalypts may well be a practical, commercial source of such chemicals in the future. In its simplest form this might entail use of the powdered leaves as a natural herbicide. Alternatively, and with a greater understanding of their mode of action, the allelochemicals themselves or suitable derivatives could be used as selective herbicides."

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	"Red box is a medium-sized tree 15-25 m in height and 0.5-1 m dbh under favourable conditions, and under poorer conditions may only be about 10 m in height with dbh 0.3-0.4 m. The trunk is often short and of mediocre form, and the crown generally rounded and quite dense. It consists of three subspecies, the typical, subsp. <i>vestita</i> and subsp. <i>longior</i> ." [Myrtaceae. No evidence]

404	Unpalatable to grazing animals	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Simmonds, H., Holst, P. & Bourke, C. 2000. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	"The palatability* of weeds (not necessarily endemic to Australia) to goats when the weeds are grown in Australia." [Eucalyptus polyanthemos - M = moderate palatability; F = eaten at flowering]

405	Toxic to animals	n
	Source(s)	Notes
	SelecTree. (2021). "Eucalyptus polyanthemos Tree Record." 1995-2021. https://selectree.calpoly.edu/tree-detail/eucalyptus-polyanthemos . [Accessed 4 Jan 2021]	"None Known Health Hazard"
	Simmonds, H., Holst, P. & Bourke, C. 2000. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	"The potential toxicity of weeds to goats." [Eucalyptus polyanthemos ☒ no known risk]
	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	n
	Source(s)	Notes
	Martin, C.A. (2021). Virtual Library of Phoenix Landscape Plants - Eucalyptus polyanthemos. http://www.public.asu.edu . [Accessed 5 Jan 2021]	"Disease and pests: None"
	SelecTree. (2021). "Eucalyptus polyanthemos Tree Record." 1995-2021. https://selectree.calpoly.edu/tree-detail/eucalyptus-polyanthemos . [Accessed 5 Jan 2021]	"Pests & Disease Information Resistant to Texas Root Rot and Verticillium. Susceptible to Beetle Borers, Armillaria and Root Rot."
	ACT Government. (2020). Design Standards for Urban Infrastructure. Plant Species for Urban Landscape Projects in Canberra - Botanical Name: Eucalyptus polyanthemos subsp. polyanthemos (Epo). https://www.cityservices.act.gov.au . [Accessed 5 Jan 2021]	"Usually free from pests and diseases, although may be affected by some scale, lerp and leaf blister sawfly"
	Keane, P.J., Kile, G.A. & Podger, F.D. (2000). Diseases and Pathogens of Eucalypts. CSIRO Publishing, Collingwood, Australia	The following fungal diseases or pathogens have been recorded on Eucalyptus polyanthemos (importance unverified): Ring infections (Phaeothyriolum microthyrioides and similar fungi); Sarcostroma brevilatum, Macrohilum eucalypti, Armillaria root disease in eucalypt plantations and amenity plantings, Piptoporus portentosus (Fungi closely associated with heartwood rot in the butt and major roots of living eucalypts in Australia); Postia pelliculosa

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	SelecTree. (2021). "Eucalyptus polyanthemos Tree Record." 1995-2021. https://selectree.calpoly.edu/tree-detail/eucalyptus-polyanthemos . [Accessed 4 Jan 2021]	"None Known Health Hazard"

Qsn #	Question	Answer
	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
	SelecTree. (2021). "Eucalyptus polyanthemus Tree Record." 1995-2021. https://selecttree.calpoly.edu/tree-detail/eucalyptus-polyanthemus . [Accessed 5 Jan 2021]	"Fire Resistance is Favorable"
	ACT Government. (2020). Design Standards for Urban Infrastructure. Plant Species for Urban Landscape Projects in Canberra - Botanical Name: Eucalyptus polyanthemus subsp. polyanthemus (Epo). https://www.cityservices.act.gov.au . [Accessed 5 Jan 2021]	"Moderate flammability"
	Woolshed Thurgoona Landcare Group. (2021). Eucalyptus polyanthemus. https://wtlandcare.org/details/eucalyptus-polyanthemus/ . [Accessed 5 Jan 2021]	"Regenerates well from lignotuber after fire, browsing or cutting." [Contribution to fuel load unspecified]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	SelecTree. (2021). "Eucalyptus polyanthemus Tree Record." 1995-2021. https://selecttree.calpoly.edu/tree-detail/eucalyptus-polyanthemus . [Accessed 5 Jan 2021]	"Exposure Full Sun to Partial Shade."
	Martin, C.A. (2021). Virtual Library of Phoenix Landscape Plants - Eucalyptus polyanthemus. http://www.public.asu.edu . [Accessed 5 Jan 2021]	"Light: Full sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	The University of Arizona. (2021). Campus Arboretum. Eucalyptus polyanthemus. https://apps.cals.arizona.edu/arboretum/taxon.aspx?id=109 . [Accessed 5 Jan 2021]	"E. polyanthemus thrives in areas where the mean annual rainfall is between 18-31 inches (3), and in a multitude of soil types such as: clay-containing rich soil, loam, or sand (4)."
	Martin, C.A. (2021). Virtual Library of Phoenix Landscape Plants - Eucalyptus polyanthemus. http://www.public.asu.edu . [Accessed 5 Jan 2021]	"Soil: Well-drained soil is an absolute must! In Phoenix, leaf chlorosis is common when growing in heavy irrigated soils."
	SelecTree. (2021). "Eucalyptus polyanthemus Tree Record." 1995-2021. https://selecttree.calpoly.edu/tree-detail/eucalyptus-polyanthemus . [Accessed 5 Jan 2021]	"Wet to Dry Soil. Drought tolerant. Clay, Loam or Sand Texture. Slightly Acidic to Highly Alkaline Soil pH."

411	Climbing or smothering growth habit	n
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Qsn #	Question	Answer
	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	"Red box is a medium-sized tree 15-25 m in height and 0.5-1 m dbh under favourable conditions, and under poorer conditions may only be about 10 m in height with dbh 0.3-0.4 m. The trunk is often short and of mediocre form, and the crown generally rounded and quite dense. It consists of three subspecies, the typical, subsp. vestita and subsp. longior."

412	Forms dense thickets	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 indication from native range] "Subsp. polyanthemus occurs widely on the central and south-western slopes and the lower altitudes of the Central and Southern Tablelands of New South Wales. Subsp. vestita is widespread in central and eastern Victoria from Ararat eastwards, extending into New South Wales north of Albury and at Bombala. Subsp. longior occurs along the foothills of far eastern Victoria from near Bairnsdale (e.g. Mt. Taylor) east to the New South Wales border. Red box grows on foothills, lowland ranges and gentle slopes between the open plains and higher mountain slopes. It is generally found on dry stony or gravelly soils and rather heavy, poor soils, generally of sedimentary origin."

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. CSIRO Publishing, Collingwood, Australia	[Terrestrial] "Red box grows on foothills, lowland ranges and gentle slopes between the open plains and higher mountain slopes. It is generally found on dry stony or gravelly soils and rather heavy, poor soils, generally of sedimentary origin."

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 4 Jan 2021]	Subgenus: Symphyomyrtus Section: Adnataria 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 4 Jan 2021]	Subgenus: Symphyomyrtus Section: Adnataria Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

Qsn #	Question	Answer
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	"Red box is a medium-sized tree 15-25 m in height and 0.5-1 m dbh under favourable conditions, and under poorer conditions may only be about 10 m in height with dbh 0.3-0.4 m. The trunk is often short and of mediocre form, and the crown generally rounded and quite dense. It consists of three subspecies, the typical, subsp. vestita and subsp. longior."

601	Evidence of substantial reproductive failure in native habitat	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] "Subsp. polyanthemus occurs widely on the central and south-western slopes and the lower altitudes of the Central and Southern Tablelands of New South Wales. Subsp. vestita is widespread in central and eastern Victoria from Ararat eastwards, extending into New South Wales north of Albury and at Bombala. Subsp. longior occurs along the foothills of far eastern Victoria from near Bairnsdale (e.g. Mt. Taylor) east to the New South Wales border."

602	Produces viable seed	y
	Source(s)	Notes
	Martin, C.A. (2021). Virtual Library of Phoenix Landscape Plants - <i>Eucalyptus polyanthemus</i> . http://www.public.asu.edu . [Accessed 4 Jan 2021]	"Propagation: Seed"
	Woolshed Thurgoona Landcare Group. (2021). <i>Eucalyptus polyanthemus</i> . https://wtlandcare.org/details/eucalyptus-polyanthemus/ . [Accessed 5 Jan 2021]	"Regeneration - From seed, particularly in absence of competitive exotic grasses or weeds, during wet summers. Regenerates well from lignotuber after fire, browsing or cutting. Establishes when direct seeded, but not vigorously."
	Ritter, M., & Yost, J. (2009). Diversity, reproduction, and potential for invasiveness of <i>Eucalyptus</i> in California. <i>Madroño</i> , 56(3), 155-167	"Very common landscaping tree throughout western California. Reproduces occasionally."

603	Hybridizes naturally	
	Source(s)	Notes

Qsn #	Question	Answer
	Keatley, M. R., Hudson, I. L., & Fletcher, T. D. (2004). Long-term flowering synchrony of box-ironbark eucalypts. <i>Australian Journal of Botany</i> , 52(1), 47-54	[Possibly] "With the exception of <i>E. polyanthemus</i> , hybridisation has been reported between each of these species (Pryor 1953; Willis 1972; Quinn 1976)." ... "Hybrids of <i>E. polyanthemus</i> have been reported (Griffin et al. 1988), although the other parent has not been any of the species considered in this study. This may be partially explained for two of the species, <i>E. microcarpa</i> and <i>E. tricarpa</i> , by their low long-term synchrony with <i>E. polyanthemus</i> . The possibility of overlap between <i>E. polyanthemus</i> and <i>E. leucoxyton</i> was, however, considered medium over the long term. Hence, the lack of reported occurrence of hybrids between these species is most probably because of their being in different taxonomic series. Small-flowered species may also have a structural barrier, with their pollen tubes being incapable of growing the full length of the style in larger flowers (Gore et al. 1990). The difference in flower sizes (<i>E. polyanthemus</i> —7 × 4 mm, compared with <i>E. leucoxyton</i> —10 × 7 mm) may therefore be a factor in preventing hybridisation."
	Doran, J. C. (2002). Genetic improvement of eucalypts With special reference to oil-bearing species. In J. J.W. Coppen (ed.). <i>Eucalyptus The Genus Eucalyptus</i> . Taylor & Francis	[Unknown. Possible within genus] "Hybridising ability: Griffin et al. (1988) reviewed the occurrence of natural and manipulated interspecific hybrids within the genus <i>Eucalyptus</i> , and confirmed the long-standing hypothesis that within sub-genera there are generally no strong barriers to the production of hybrid seed following cross pollination. Hybrids may be desirable because they are heterotic or because they combine traits that were not found together in either parental species (Griffin 1989b). Sites which are marginal for pure species have provided, so far, the most successful habitats for use of eucalypt hybrids. For example, hybrids of <i>E. grandis</i> with hardier species such as <i>E. urophylla</i> , <i>E. camaldulensis</i> and <i>E. tereticornis</i> are showing great promise on sites in South Africa which, because of drought, are marginal for growing pure <i>E. grandis</i> (Van Wyk et al. 1989)."

604	Self-compatible or apomictic	
	Source(s)	Notes
	Potts, B. M., & Gore, P. L. (1995). Reproductive biology and controlled pollination of <i>Eucalyptus</i> -a review. School of Plant Science, University of Tasmania, Hobart, Tasmania	[Unknown for <i>E. polyanthemus</i>] "Eucalypts are generally preferentially outcrossing (Pryor 1976; Griffin et al 1987), with high outcrossing rates (e.g. 0.69- 0.84 Moran and Bell 1983; Prober et al. 1990) maintained by varying degrees of self-fertility (Pryor 1976), aided by protandry (Griffin and Hand 1979; Fig. 3.2) and reinforced by selection against the products of self-fertilization in later stages of the life cycle (Potts et at. 1987; Hardner and Potts 1995). Self fertility Most species exhibit a marked reduction in seed yield following self-pollination compared to outcrossing, although within species there is considerable variation in the level of self-fertility (Pryor 1957; Pryor 1976; Table 4.2). In most of the species examined to date, the majority of individuals are partially self-fertile, but individuals range from fully self incompatible to fully self-fertile. Post-mating barriers to self-fertilization are thus rarely complete, and (Eldridge 1976) notes that "persistent attempts at artificial self-pollination have been successful to some degree on almost every tree tested".

Qsn #	Question	Answer
605	Requires specialist pollinators	n
	Source(s)	Notes
	Woolshed Thurgoona Landcare Group. (2021). <i>Eucalyptus polyanthemus</i> . https://wtlandcare.org/details/eucalyptus-polyanthemus/ . [Accessed 5 Jan 2021]	"Excellent habitat. Flowers are a nectar source for various native birds and insects. Insect-eating birds attracted. Birds such as treecreepers and sittellas glean bark. Native birds eat seeds and fruits. "
	Jones, W. R. (2002). Breeding systems of some cold tolerant eucalyptus species. MSc Thesis. University of Natal, Pietermaritzburg	"The Australian members of the Myrtaceae show a great deal of diversity in pollination mechanisms and pollinators (Beardsell et al. 1993). According to Pryor (1976) eucalypts are pollinated by a diverse number of insects and birds. Individual species may attract Hymenoptera, Diptera, Coleoptera, Thysanoptera and Lepidoptera, others may attract birds, bats and a range of marsupials (Armstrong 1979). Most species appear to be pollinated by insects that are attracted to the nectar secreted into the bowl shaped flowers of many species (Beardsell et al. 1993)."
	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. <i>Forest Trees of Australia</i> . CSIRO Publishing, Collingwood, Australia	[Flowers unspecialized] "Inflorescences: Axillary or terminal panicles, unit inflorescences 7-flowered; peduncles terete, often pruinose, 0.5 -1.5 cm long; pedicels angular, often pruinose, 0.1-0.9 cm long; buds ovoid to clavate, often pruinose, 0.5-0.6 × 0.3-0.4 cm; opercula conical or more or less hemispherical-apiculate, narrower than the hypanthia at the join. Flowers Sept.-Dec."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Woolshed Thurgoona Landcare Group. (2021). <i>Eucalyptus polyanthemus</i> . https://wtlandcare.org/details/eucalyptus-polyanthemus/ . [Accessed 5 Jan 2021]	"Regeneration - From seed, particularly in absence of competitive exotic grasses or weeds, during wet summers. Regenerates well from lignotuber after fire, browsing or cutting. Establishes when direct seeded, but not vigorously."
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Vegetative spread: No"

607	Minimum generative time (years)	
	Source(s)	Notes
	Woolshed Thurgoona Landcare Group. (2021). <i>Eucalyptus polyanthemus</i> . https://wtlandcare.org/details/eucalyptus-polyanthemus/ . [Accessed 5 Jan 2021]	"Moderate growth rate."
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Primary juvenile period:" [Unknown]
	ACT Government. (2020). Design Standards for Urban Infrastructure. Plant Species for Urban Landscape Projects in Canberra - Botanical Name: <i>Eucalyptus polyanthemus</i> subsp. <i>polyanthemus</i> (Epo). https://www.cityservices.act.gov.au . [Accessed 5 Jan 2021]	"Slow to moderate growth rate"

Qsn #	Question	Answer
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Fruit/seed: Woody capsule 4–7 mm long. Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism."
	Williams, J.E. & Woinarski, J. (1997). <i>Eucalypt Ecology: Individuals to Ecosystems</i> . Cambridge University Press, Cambridge, UK	"The movement of seed once deposited on the ground is probably fairly limited in most species (see, for example, Battaglia and Reid 1993a), although extensive seed harvesting by ants (reviewed by Stoneman 1994) no doubt results in some effective dispersal."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Ritter, M., & Yost, J. (2009). Diversity, reproduction, and potential for invasiveness of <i>Eucalyptus</i> in California. <i>Madroño</i> , 56(3), 155-167	" <i>Eucalyptus polyanthemos</i> Schauer (Fig. 2A). Twisselmann 18559 (CAS 55013); Barber s.n. February 1894 (JEPS 1896). Leaves bluish-gray, ovate, elliptic, or orbicular; inflorescences terminal panicles; staminodes present. Very common landscaping tree throughout western California. Reproduces occasionally."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Forestry, Herbal, Ornamental Dispersed by: Humans"
	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	172 planted in the Kau (80 planted) and Olaa (92 planted) Forest Reserves, Hawaii Island in 1932

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Fruit/seed: Woody capsule 4–7 mm long. Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism."

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Brown, K. & Brooks, K. (2002). <i>Bushland Weeds. A Practical Guide to Their Management with Case Studies from the Swan Coastal Plain and Beyond</i> . Environmental Weeds Action Network, Greenwood, Australia	"Chapter 6 Trees, Shrubs and Climbers Weed Management Table" [<i>Eucalyptus polyanthemos</i> - Dispersal agent = wind]
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Fruit/seed: Woody capsule 4–7 mm long. Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism."
	Simberloff, D. & Rejmánek, M. (2011). <i>Encyclopedia of Biological Invasions</i> . University of California Press, Berkeley & Los Angeles	"Seeds of planted eucalypts are very small, but they have no adaptations for dispersal (wings or fleshy tissues) that would help them to proceed from local establishment (naturalization) to invasion. The passive release of seeds is undoubtedly aided by wind. However, all rigorous studies of eucalypt seed dispersal and seedling spatial distribution show that in general, seeds are dispersed over quite short distances."

Qsn #	Question	Answer
	Williams, J.E. & Woinarski, J. (1997). <i>Eucalypt Ecology: Individuals to Ecosystems</i> . Cambridge University Press, Cambridge, UK	[Generic description] "Seed is mainly dispersed by wind and gravity following release from canopy--stored capsules (Cremer 1977). The distance of seed fall is essentially proportional to canopy height, seed weight (i.e. terminal velocity) and wind speed (Cremer 1977), with virtually all seed deposited within a radius of twice the tree or canopy height (Cremer 1966)."

705	Propagules water dispersed	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). <i>Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia</i> 5(4): 808-987	"Fruit/seed: Woody capsule 4–7 mm long. Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism." ... "Habitat: Stony slopes" [Buoyancy of seeds unknown, but not naturally occurring in riparian areas]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). <i>Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia</i> 5(4): 808-987	"Fruit/seed: Woody capsule 4–7 mm long. Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). <i>Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia</i> 5(4): 808-987	"Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism."

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). <i>Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia</i> 5(4): 808-987	"Fruit/seed: Woody capsule 4–7 mm long. Dispersal, establishment & growth: Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism." [No evidence of consumption or internal dispersal]

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Woolshed Thurgoona Landcare Group. (2021). <i>Eucalyptus polyanthemos</i> . https://wtlandcare.org/details/eucalyptus-polyanthemos/ . [Accessed 5 Jan 2021]	"Propagation - From seed (±465 viable seeds per gram)."

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Diaspore: seed, dispersed locally by wind or gravity, no dormancy mechanism."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. <i>Cunninghamia</i> 5(4): 808-987	"Lignotubers developed in seedlings 9–12 weeks old and 9–16 cm high in greenhouse conditions (Kerr 1925)."
	Woolshed Thurgoona Landcare Group. (2021). <i>Eucalyptus polyanthemus</i> . https://wtlandcare.org/details/eucalyptus-polyanthemus/ . [Accessed 5 Jan 2021]	"Regenerates well from lignotuber after fire, browsing or cutting."
	Pickup, M., Wilson, S., Freudenberger, D., Nicholls, N., Gould, L., Hnatiuk, S., & Delandre, J. (2013). Post-fire recovery of revegetated woodland communities in south-eastern Australia. <i>Austral Ecology</i> , 38(3), 300-312	"Table 2. Survival (Surv.) of tree and shrub species in burnt and unburnt revegetation sites in 2003 (6 months after fire)" [<i>Eucalyptus polyanthemus</i> - Fire response = Resprouter]
	Collins, L. (2020). Eucalypt forests dominated by epicormic resprouters are resilient to repeated canopy fires. <i>Journal of Ecology</i> , 108(1), 310-324	"The dominant eucalypt species across the study sites were <i>Eucalyptus consideriana</i> , <i>Eucalyptus sieberi</i> , <i>Eucalyptus muelleriana</i> and <i>Eucalyptus tricarpa</i> . Species recorded less frequently included <i>Eucalyptus ignorabilis</i> , <i>Eucalyptus globoidea</i> , <i>Eucalyptus obliqua</i> , <i>Eucalyptus radiata</i> , <i>Eucalyptus dives</i> , <i>Eucalyptus cypellocarpa</i> and <i>Eucalyptus polyanthemus</i> . Mature forms (e.g. diameter at breast height >10 cm) of these species display the capacity to resprout epicormically in response to high intensity fire."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Naturalized in California, Australia (outside natural range), and possibly elsewhere (but no evidence in Hawaiian Islands to date)
- Possibly weed, although no negative impacts have been identified
- Other *Eucalyptus* species are invasive
- Moderate flammability may increase fire risk
- Tolerates many soil types
- Reproduces by wind and gravity-dispersed seeds
- Able to resprout after fire

Low Risk Traits

- No confirmed reports of negative impacts where cultivated
- Unarmed (no spines, thorns, or burrs)
- Palatable to goats
- Non-toxic
- Thrives in full sun (deep shade may limit ability to spread)
- Not reported to spread vegetatively
- Seeds lack dormancy