

Taxon: *Alphitonia excelsa* (A. Cunn. ex Fenzl) Reissek ex Benth. **Family:** Rhamnaceae

Common Name(s): Cooper's wood
leather jacket
mountain ash
pink almond
red almond
red ash
red tweedie
soaptree
white myrtle
whiteleaf

Synonym(s): *Colubrina excelsa* A. Cunn. ex Fenzl

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 19 Oct 2018

WRA Score: 5.0

Designation: H(HPWRA)

Rating: High Risk

Keywords: Tropical Tree, Naturalized, Pure Stands, Self-Incompatible, Bird-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)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	n
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	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
401	Produces spines, thorns or burrs	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y

Qsn #	Question	Answer Option	Answer
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
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	[No evidence of domestication] " <i>Alphitonia excelsa</i> is a very widespread and common species, occurring in eastern New South Wales, throughout much of Queensland, in the northern one-third of the Northern Territory and in the Kimberley region of Western Australia (Fig. 1). It also occurs in southern lowland New Guinea." ... " <i>Alphitonia excelsa</i> is a very polymorphic species, but despite its huge range of variability, it has not proved possible to split any species from it or distinguish subspecies within it."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2018. 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"	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Oct 2018]	"Native Asia-Tropical PAPUASIA: Indonesia, [Irian Jaya] Papua New Guinea MALESIA: Indonesia, [Celebes, Kalimantan, Lesser Sunda Islands, Moluccas] Malaysia, [Sabah, Sarawak] Philippines Australasia AUSTRALIA: Australia [New South Wales (e.), Queensland, Western Australia (n.), Northern Territory (n.)]"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Oct 2018]	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"A shrub or tree that tolerates a wide range of soil types and climatic conditions. It is both drought-resistant and moderately tolerant of frost." ... "A. excelsa tolerates a wide range of temperature and moisture conditions. Most of the distribution is in the warm sub-humid climatic zone but it extends into the hot and warm humid zones and into the higher rainfall regions of the warm and hot semi-arid zones. There is wide variability in the monthly mean temperature, the hottest being 29–38°C. The mean minimum of the coolest month is 3–8°C. The temperature exceeds 32°C on average 25–120 days per year, and 38°C on 1–25 days. Frosts are absent in coastal areas and the far north, but elsewhere average 1–18 per year."
	Florabank. (2018). <i>Alphitonia excelsa</i> . http://www.florabank.org.au . [Accessed 16 Oct 2018]	"Altitude: 0-1050 metres"
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"It grows over a wide range of climatic conditions. In more coastal areas, it grows on a range of well-drained sandy or loamy soils, usually in eucalypt forest, but sometimes on the edges of notophyll rainforest. In drier inland areas, it is confined to low-lying areas with very sandy soils or small sheltered gorges."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	" <i>Alphitonia excelsa</i> Reissek ex Endl. New naturalized record This tree, native to Australia and other parts of the Pacific, was first planted in the Arboretum in 1924 and was first noted as volunteering in the Lyon Arboretum 1939 annual report. It is characterized by ovate-elliptic leaves with white undersides, even in the seedling stage. Damaged young shoots emit an odor of sarsaparilla. The fruit is a bluish black drupe, ca. 1.3 cm in diameter (Anderson 1947: 249). Dozens of saplings and mature trees were found in Haukulu along with hundreds of seedlings. Material examined: OʻAHU: Edge of trail in <i>Psidium cattleianum</i> forest, upper Haukulu, Lyon Arboretum, 3 Mar 2005, C. Daehler 1088 (BISH); Lyon Arboretum (cultivated), 16 Apr 1969, K. Nagata 534 (BISH)."
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Oct 2018]	"Native Asia-Tropical PAPUASIA: Indonesia, [Irian Jaya] Papua New Guinea MALESIA: Indonesia, [Celebes, Kalimantan, Lesser Sunda Islands, Moluccas] Malaysia, [Sabah, Sarawak] Philippines Australasia AUSTRALIA: Australia [New South Wales (e.), Queensland, Western Australia (n.), Northern Territory (n.)]"

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes

Qsn #	Question	Answer
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	"This tree, native to Australia and other parts of the Pacific, was first planted in the Arboretum in 1924 and was first noted as volunteering in the Lyon Arboretum 1939 annual report."
	Global Register of Introduced and Invasive Species. 2018. <i>Alphitonia excelsa</i> . http://www.griis.org . [Accessed 18 Oct 2018]	Introduced in India

301	Naturalized beyond native range	y
	Source(s)	Notes
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	" <i>Alphitonia excelsa</i> Reissek ex Endl. New naturalized record. This tree, native to Australia and other parts of the Pacific, was first planted in the Arboretum in 1924 and was first noted as volunteering in the Lyon Arboretum 1939 annual report. It is characterized by ovate-elliptic leaves with white undersides, even in the seedling stage. Damaged young shoots emit an odor of sarsaparilla. The fruit is a bluish black drupe, ca. 1.3 cm in diameter (Anderson 1947: 249). Dozens of saplings and mature trees were found in Haukulu along with hundreds of seedlings. Material examined: OʻAHU: Edge of trail in <i>Psidium cattleianum</i> forest, upper Haukulu, Lyon Arboretum, 3 Mar 2005, C. Daehler 1088 (BISH); Lyon Arboretum (cultivated), 16 Apr 1969, K. Nagata 534 (BISH)."

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Florabank. (2018). <i>Alphitonia excelsa</i> . http://www.florabank.org.au . [Accessed 18 Oct 2018]	"Weediness: high potential based on its biology"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Listed as a weed. Unable to verify negative impacts outside native range

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 to date

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

305	Congeneric weed	
	Source(s)	Notes

Qsn #	Question	Answer
	Thomson, L. A. J., & Thaman, R. R. (2008). <i>Alphitonia zizyphoides</i> (toi), ver. 2.1. In: Elevitch, C.R. (ed.). <i>Species Profiles for Pacific Island Agroforestry</i> . Permanent Agriculture Resources (PAR), Hōlualoa, HI. http://www.traditionaltree.org . [Accessed]	[Regarded as potentially invasive] "It is likely to have a moderately high weed potential due to its pioneer characteristics." ... "The species is a potential invasive outside of its natural range. Given that members of the <i>A. excelsa</i> group, including <i>A. zizyphoides</i> , are widespread throughout the Pacific islands (and neighboring parts of Asia and Australia), there is an opportunity to plant it (or a very similar species) within its area of natural distribution and eliminate any potential hazard as an environmental weed."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"Tree 4–20 m high. Bark persistent, tessellated and dark at base of large trees; otherwise smooth, dappled white and grey. Primary branches ascending, with secondary and tertiary branches on different planes. Branchlets not prominently ridged near growing point; stipules 3–14 mm long, linear to narrowly-triangular. Juvenile stem indumentum in some forms dense, rusty, straight to flexuose, patent, to 0.6 mm high; in other forms with moderately dense white crisped hairs to 0.1 mm high, and scattered brown straight or flexuose hairs to 0.4 mm high. Juvenile leaves variable, sometimes broadly elliptical, lower surface with white hairs throughout, apex obtuse, petioles very short; sometimes narrowly ovate, lower surface with abundant rusty hairs on veins, apex acute to acuminate. Adult stem indumentum sparse to dense, grey to creamy-white, crisped hairs c. 0.1 mm high, and scattered erect flexuose hairs to 0.3 mm high. Leaves 2-ranked, elliptic, narrowly-elliptic, narrowly-ovate or lanceolate, 6.1–18.5 × 1.8–6 cm (L/B ratio 2.2–4.6), apex acute or obtuse, sometimes mucronate; base cuneate, occasionally obtuse, symmetrical or not; newly expanded leaves mid-brown to pale brown; petioles 0.8–2.3 cm long, hair cover 0.1–0.5 mm high. Upper leaf surface dark green, glossy, glabrous except when very young, when numerous white or pale brown tortuous hairs cover the surface; lower leaf surface with abundant tiny white crisped hairs in the areoles, obscuring the lamina, and scattered pale brown tortuous hairs to 0.6 mm long along the veins and veinlets."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	Nasrine, S. (2011). Allelochemicals from some medicinal and aromatic plants and their potential use as bioherbicides. PhD Dissertation. Badji Mokhtar University, Annaba	[Possibly Yes. Extracts exhibit allelopathic effects] "Allan and Adkins (2007) investigated the potential of bioactive chemicals in medicinal plants to inhibit plant growth using a Lemna (<i>Lemna aequinoctialis</i>) bioassay. Aqueous extracts from plant parts of eight test species, <i>Ageratum conyzoides</i> , <i>Acacia farnesiana</i> , <i>Acacia melanoxylon</i> , <i>Alphitonia excelsa</i> , <i>Castanospermum australe</i> , <i>Chamaesyce hyssoipifolia</i> , <i>Melaleuca quinquenervia</i> and <i>Phyllanthus virgatus</i> . Extracts from all eight species inhibited the growth of <i>L. aequinoctialis</i> with the strongest growth inhibition coming from leaf, stem and bark extract."

403	Parasitic	n
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"Tree 4–20 m high." [Rhamnaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. <i>Alphitonia excelsa</i> . https://www.anbg.gov.au/gnp/gnp6/alph-exc.html . [Accessed 16 Oct 2018]	"Apart from its value as an ornamental tree, <i>Alphitonia excelsa</i> serves as a fodder plant for both sheep and cattle, and is not as astringent as some edible species."
	Blair, G. J. (1990). The diversity and potential value of shrubs and tree fodders. Pp. 2-11 In <i>Shrubs and tree fodders for farm animals: Proceedings of a workshop in Denpasar, Indonesia, 24-29 July 1989</i> . IDRC, Ottawa, CA	"Appendix 1. Tree and shrub fodders documented as being useful animal fodders." [Includes <i>Alphitonia excelsa</i>]
	Doran, J. C. & Turnbull, J. W. 1997. <i>Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics</i> . ACIAR Monograph No. 24. Canberra, Australia	"The leaves and young shoots are grazed by stock (Swain 1928a; Floyd 1980). However Vercoe (1989) found that in vivo dry matter digestibility was low (27.6%) and certain key nutrients in the foliage were below stock maintenance levels."

Qsn #	Question	Answer
405	Toxic to animals	
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	[Used as a fish poison, but no evidence of toxicity to browsing or grazing animals] "The leaves and young shoots are grazed by stock (Swain 1928a; Floyd 1980). However Vercoe (1989) found that in vivo dry matter digestibility was low (27.6%) and certain key nutrients in the foliage were below stock maintenance levels." ... "Australian Aboriginal people used the crushed leaves, bark, root and wood of this tree medicinally, both internally as a bitter stomachic and externally for relief of muscle pain, headache and toothache (Aboriginal Communities of the Northern Territory 1993; Lassak and McCarthy 1983). They also used crushed leaves and fruit as a fish poison."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"Pests and diseases. Young trees can be defoliated and severely set back by grasshopper attacks, and wild trees are usually heavily attacked by leaf-eating insects (Hearne 1975)."
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. <i>Alphitonia excelsa</i> . https://www.anbg.gov.au/gnp/gnp6/alph-exc.html . [Accessed 16 Oct 2018]	"Specimens in the Australian National Botanic Gardens have shown little evidence of insect or disease attack, although the tree is semi-deciduous and during winter may give the false impression that it is suffering from one or both of these problems,"

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	[No evidence of toxicity to humans. Medicinal uses] "Aboriginal people used the crushed leaves, bark, root and wood of this tree medicinally, both internally as a bitter stomachic and externally for relief of muscle pain, headache and toothache (Aboriginal Communities of the Northern Territory 1993; Lassak and McCarthy 1983). They also used crushed leaves and fruit as a fish poison."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Fulton, C. & Nanshe, B. (2007). TIN topic # 13 Fire Retardant Plants. Trees in New Castle, New Castle, AU	"Following site preparation and mulching, the species recommended below would provide a suitable planting model. Remember that no plant is fire proof and retention of existing trees is preferred." [Includes <i>Alphitonia excelsa</i> . Regarded a fire retardant, suggesting it is unlikely to increase fire risk, even if occurring in fire prone ecosystems]

409	Is a shade tolerant plant at some stage of its life cycle	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Shugart, H. (1987). Dynamic Ecosystem Consequences of Tree Birth and Death Patterns. <i>BioScience</i> , 37(8), 596-602	"Alphitonia-a soft-wooded, fast-growing, and shade-intolerant tree-is relatively short lived. The seeds are stored in the soil and germinate when exposed to sunlight."
	Florabank. (2018). <i>Alphitonia excelsa</i> . http://www.florabank.org.au . [Accessed 16 Oct 2018]	"Shade tolerance: grows best in full sunlight"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"A shrub or tree that tolerates a wide range of soil types and climatic conditions." ... "soils. <i>A. excelsa</i> is found in rugged ranges and plateaux of basalt, granite and sandstone, on undulating to low hills on shale and broad valley floors. It also occurs in coastal lowlands sometimes immediately behind the frontal sand dunes. Soils are frequently infertile and include red and yellow earths, red podsolics, yellow bleached duplexes, shallow sand soils, grey and brown and red cracking clays, and skeletal."
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"In more coastal areas, it grows on a range of well-drained sandy or loamy soils, usually in eucalypt forest, but sometimes on the edges of notophyll rainforest."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"Tree 4–20 m high."

412	Forms dense thickets	y
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"In the eastern New South Wales and Queensland rainforests, <i>A. excelsa</i> occurs locally in small mainly pure stands or in mixed forest dominated by such genera as <i>Ceratopetalum</i> , <i>Diploglottis</i> , <i>Schizomeria</i> , <i>Doryphora</i> , <i>Caldcluvia</i> , <i>Argyrodendron</i> , and <i>Drypetes</i> (Beadle 1981)." ... " <i>A. excelsa</i> is noted as being a colonising species in pure stands that occur early in a succession in regrowth after fire or in a clearing. It is rarely found in mature forests."

501	Aquatic	n
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	[Terrestrial] "Tree 4–20 m high." ... "In more coastal areas, it grows on a range of well-drained sandy or loamy soils, usually in eucalypt forest, but sometimes on the edges of notophyll rainforest. In drier inland areas, it is confined to low-lying areas with very sandy soils or small sheltered gorges."

Qsn #	Question	Answer
502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Oct 2018]	Family: Rhamnaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Oct 2018]	Family: Rhamnaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"Tree 4–20 m high."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	" <i>Alphitonia excelsa</i> is a very widespread and common species, occurring in eastern New South Wales, throughout much of Queensland, in the northern one-third of the Northern Territory and in the Kimberley region of Western Australia (Fig. 1). It also occurs in southern lowland New Guinea."

602	Produces viable seed	y
	Source(s)	Notes
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. <i>Alphitonia excelsa</i> . https://www.anbg.gov.au/gnp/gnp6/alph-exc.html . [Accessed 16 Oct 2018]	"Propagation is from seed which germinates fairly easily, and the species can be regarded as a comparatively fast growing tree."
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. <i>Bishop Museum Occasional Papers</i> 87: 3-18	"The fruit is a bluish black drupe, ca. 1.3 cm in diameter (Anderson 1947: 249). Dozens of saplings and mature trees were found in Haukulu along with hundreds of seedlings."

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	Bean, A. R. (2010). A revision of <i>Alphitonia</i> (Rhamnaceae) for Australia. <i>Muelleria</i> , 28(1), 3-17	"No hybridisation or intergradation between these species has been noted in the field or recorded on herbarium labels." [May not hybridize natural]

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Williams, G., & Adam, P. (2001). The insect assemblage visiting the flowers of the subtropical rainforest pioneer tree <i>Alphitonia excelsa</i> (Fenzl) Reiss. ex Benth. (Rhamnaceae). <i>Proceedings of the Linnean Society of New South Wales</i> 123: 235-260	"The slightly sticky pollen of <i>A. excelsa</i> is not easily displaced from the anthers, so it is unlikely that wind pollination occurs. The protandrous pattern of flower opening, and the recurving of petals which articulate the stamens away from the developing ovaries, may militate against self-fertilisation or interference with stigmatic function by self-pollen."
	Adam, P., & Williams, G. (2001). Dioecy, self-compatibility and vegetative reproduction in Australian subtropical rainforest trees and shrubs. <i>Cunninghamia</i> , 7(1), 89-100	"The species with no apparent capacity for automatic selfing also include pioneers (e.g. <i>Alphitonia excelsa</i> , <i>Rhodomyrtus psidioides</i>). In <i>Alphitonia excelsa</i> self-incompatibility may be a consequence of protandry, as the stamens, encapsulated by the petals, are carried away from the latter developing gynoecium as the petals recurve (Williams 1995)."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Williams, G., & Adam, P. (2001). The insect assemblage visiting the flowers of the subtropical rainforest pioneer tree <i>Alphitonia excelsa</i> (Fenzl) Reiss. ex Benth. (Rhamnaceae). <i>Proceedings of the Linnean Society of New South Wales</i> 123: 235-260	"There is no obvious adaptation of flowers to visits by specialised insects (e.g., long-tongued bees) and the shallow, readily accessible, perianth allows visitation by numerous insects, the majority of which are less than 6 mm in length. Pollination in <i>A. excelsa</i> appears to be a flexible general entomophilous system in which the contributions made by individual insect orders and lower rank taxa vary spatially and temporally. Primack (1978) considered that unspecialised floral syndromes may be an adaptation to highly variable pollinator assemblages. Unspecialised flower structures permit visits by a broad range of pollinators, and this flexibility in the use of available pollination vectors facilitates colonisation of new areas (Primack 1978)."

Qsn #	Question	Answer
606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. <i>Alphitonia excelsa</i> . https://www.anbg.gov.au/gnp/gnp6/alph-exc.html . [Accessed 18 Oct 2018]	"Propagation is from seed which germinates fairly easily, and the species can be regarded as a comparatively fast growing tree." [No reports of vegetative spread]
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	[No evidence of natural vegetative spread] "Silvicultural features. A pioneer species that will tolerate dry, infertile sites and withstand coastal exposure. It coppiced poorly in trials in southeastern Queensland (Ryan and Bell 1989). When grown as a solitary feature tree it forms a dome-shape crown with widely-spaced branches. In colder areas the leaves tend to be shed in winter."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"The seed is not easy to extract from the fruit and gives off a fine irritating dust. The first flower buds appear 1–2 years after planting."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"Fruit is a dryish drupe, globular, 6–10 mm diameter, usually containing two glossy dark brown seeds. The fruit walls split and are shed when mature, leaving the seed, enclosed in a bright red aril, persistent on the branchlets until removed by birds." [No evidence. No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2018). Growing Native Plants. <i>Alphitonia excelsa</i> . https://www.anbg.gov.au/gnp/gnp6/alph-exc.html . [Accessed 18 Oct 2018]	"Apart from its value as an ornamental tree, <i>Alphitonia excelsa</i> serves as a fodder plant for both sheep and cattle, and is not as astringent as some edible species. Its wood is useful for tool handles, cabinet work and building purposes, and when first cut is a light colour, gradually darkening at the heart."
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, O'ahu. Bishop Museum Occasional Papers 87: 3-18	"This tree, native to Australia and other parts of the Pacific, was first planted in the Arboretum in 1924 and was first noted as volunteering in the Lyon Arboretum 1939 annual report."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes

Qsn #	Question	Answer
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"Fruit is a dryish drupe, globular, 6–10 mm diameter, usually containing two glossy dark brown seeds. The fruit walls split and are shed when mature, leaving the seed, enclosed in a bright red aril, persistent on the branchlets until removed by birds." [No evidence. Unlikely given persistence of seeds on branchlets]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"Fruit is a dryish drupe, globular, 6–10 mm diameter, usually containing two glossy dark brown seeds. The fruit walls split and are shed when mature, leaving the seed, enclosed in a bright red aril, persistent on the branchlets until removed by birds."

705	Propagules water dispersed	
	Source(s)	Notes
	Williams, C. 2012. Medicinal Plants in Australia Volume 3: Plants, Potions and Poisons. Rosenberg Publishing, Kenthurst NSW	"The Soap Tree or Red Ash (<i>Alphitonia excelsa</i>) is perhaps the most familiar of the genus. While it usually favours a riverine habitat, it can extend its distribution into drier areas." [Buoyancy of fruit & seeds unknown. Distribution in riverine habitat may result in water dispersal]

706	Propagules bird dispersed	y
	Source(s)	Notes
	Beasley, J. (2006). Plants of Tropical North Queensland: The Compact Guide. Footloose Publications, Kuranda	" <i>Alphitonia excelsa</i> bears dark green leaves with very white undersides. If rubbed in water they produce a soapy froth, hence its other common name, Soap Bush. Red Ash grows in a wide range of soils and situations, often as a small tree or shrub. Here (Right) it shows thin, dry season foliage just behind the coastal sand dunes at Palm Cove. The flowers are greenish-white and the fruits turn from green to black, falling away to leave only the orange to red seeds, eaten by some birds."
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"Fruit is a dryish drupe, globular, 6–10 mm diameter, usually containing two glossy dark brown seeds. The fruit walls split and are shed when mature, leaving the seed, enclosed in a bright red aril, persistent on the branchlets until removed by birds."
	Woodford, R. (2000). Converting a dairy farm back to a rainforest water catchment. Ecological Management & Restoration, 1(2), 83-92	"Table 1. Species recorded in 1985 regenerating under the Blackwood grove, Rocky Creek Dam." [<i>Alphitonia excelsa</i> - Dispersal mechanism = Flying frugivores]

Qsn #	Question	Answer
707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"Fruit is a dryish drupe, globular, 6–10 mm diameter, usually containing two glossy dark brown seeds. The fruit walls split and are shed when mature, leaving the seed, enclosed in a bright red aril, persistent on the branchlets until removed by birds." [Possible that rats may carry seeds externally for consumption, but seeds lack means of external attachment]
708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	[Presumably Yes] "Fruit is a dryish drupe, globular, 6–10 mm diameter, usually containing two glossy dark brown seeds. The fruit walls split and are shed when mature, leaving the seed, enclosed in a bright red aril, persistent on the branchlets until removed by birds."
801	Prolific seed production (>1000/m²)	
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR Monograph No. 24. Canberra, Australia	"There are about 4500 viable seeds/kg and germination is promoted by scarification or treatment with boiling water or a weak acid." [Soil seed densities unknown]
802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Smith, N. J. C., Zahid, D. M., Ashwath, N., & Midmore, D. J. (2008). Seed ecology and successional status of 27 tropical rainforest cabinet timber species from Queensland. Forest ecology and management, 256(5), 1031-1038	"Abdulahadi and Lamb (1987) reported sporadic germination of <i>A. melanoxylon</i> and <i>A. excelsa</i> seed over 36 weeks in a study of soil seed banks in regenerating forests in south-east Queensland. In comparison, germination of these species in the control treatment was complete by 12 weeks in our study."
	Russell-Smith, J., & Setterfield, S. A. (2006). Monsoon rain forest seedling dynamics, northern Australia: contrasts with regeneration in eucalypt-dominated savannas. Journal of Biogeography, 33(9), 1597-1614	"Few seedlings of a variety of other rain forest taxa were recruited, despite relatively large seed rain inputs particularly from pioneer species that are observed here or elsewhere (e.g. Russell-Smith & Lucas, 1994) to possess capacity for extended seed dormancy (e.g. <i>Acacia auriculiformis</i> , <i>Alphitonia excelsa</i> , <i>Alstonia actinophylla</i> , <i>Ficus</i> spp., <i>Livistona benthamii</i> , <i>Melastoma affine</i> , <i>Nauclea orientalis</i> , <i>Terminalia microcarpa</i> , <i>Timonius timon</i> and <i>Trema tomentosa</i>)."
	Northern Land Manager. 2011. Fire responses of <i>Alphitonia excelsa</i> . http://www.landmanager.org.au/fire-responses-alphitonia-excelsa . [Accessed 16 Oct 2018]	"Most seeds survive fire: In soil - persistent seed bank"

Qsn #	Question	Answer
	Thusithana, V., Bellairs, S. M., & Bach, C. S. (2018). Seed germination of coastal monsoon vine forest species in the Northern Territory, Australia, and contrasts with evergreen rainforest. <i>Australian Journal of Botany</i> , 66(3), 218-229	"Once dormancy is identified, knowledge of the location of dormancy and suitable dormancy breaking treatments is important to enable propagation of species for forest rehabilitation. Without treatment no viable seeds of <i>Abrus precatorius</i> and few viable seeds of <i>Dodonaea platyptera</i> and <i>Alphitonia excelsa</i> germinated, due to physical dormancy. Therefore, manual scarification or hot-water treatments are useful to break PY in these three species."
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed 18 Oct 2018]	"Storage Behaviour: Orthodox Storage Conditions: (Langkamp & Plaisted, 1987); 74% germination following 12 years open storage (Ewart, 1908)"

803	Well controlled by herbicides	
	Source(s)	Notes
	Dow AgroSciences Australia. (2017). Woody Weed Control Guide. https://www.woodyweedspecialists.com.au/woody-weed-control-guide/ . [Accessed 19 Oct 2018]	[Controlled as a woody weed with herbicide. Efficacy unspecified. Presumably works] WOODY WEED - RED ASH (White myrtle) <i>Alphitonia excelsa</i> METHOD OF APPLICATION - Basal bark and Cut stump PRODUCT - ACCESS RATE - 1:60 with diesel or Biosafe

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Doran, J. C. & Turnbull, J. W. 1997. <i>Australian Trees and Shrubs: species for land rehabilitation and farm planting in the tropics</i> . ACIAR Monograph No. 24. Canberra, Australia	"It coppiced poorly in trials in southeastern Queensland (Ryan and Bell 1989)."
	Watson, P. (2001). The role and use of fire for biodiversity conservation in Southeast Queensland. South-east Queensland Fire & Biodiversity Consortium, Brisbane	"Most adults of sprouting species, also called "resprouters" or "fire tolerant plants", regrow from shoots after a fire. These shoots may come from root suckers or rhizomes, from lignotubers, from epicormic buds, or from active pre-fire buds (Gill 1981). Some resprouters, ie those which regrow from root suckers or rhizomes (such as blady grass and bracken), can increase vegetatively after a fire. However other resprouters cannot increase vegetatively, and therefore need to establish new plants to maintain population numbers, as adults will eventually age and die. <i>Banksia spinulosa</i> , <i>Eucalyptus planchoniana</i> , <i>Alphitonia excelsa</i> , <i>Strangea linearis</i> and <i>Boronia rosmarinifolia</i> are examples of resprouting species in south-east Queensland."
	Northern Land Manager. 2011. Fire responses of <i>Alphitonia excelsa</i> . http://www.landmanager.org.au/fire-responses-alphitonia-excelsa . [Accessed 16 Oct 2018]	"Most seeds survive fire: In soil - persistent seed bank Adult fire response: Resprouter (<30% mortality when subject to 100% leaf scorch)"
	Williams, P. R. (2000). Fire-stimulated rainforest seedling recruitment and vegetative regeneration in a densely grassed wet sclerophyll forest of north-eastern Australia. <i>Australian Journal of Botany</i> , 48(5), 651-658	[Resprouts after fire] "Table 2. Percentage resprouting plants after fire and numbers of post-fire seedlings for trees and shrubs in permanent sites (100 m ² each) at Walla man Falls" [After Nov. 1996 fire Sites 1 and 2 - Percentage resprouting (no. individuals before fire) <i>Alphitonia excelsa</i> = 100% (4 trees)]

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	

Qsn #	Question	Answer
	Source(s)	Notes
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	[Unknown. No pests or pathogens reported in this publication] "This tree, native to Australia and other parts of the Pacific, was first planted in the Arboretum in 1924 and was first noted as volunteering in the Lyon Arboretum 1939 annual report. It is characterized by ovate-elliptic leaves with white undersides, even in the seedling stage. Damaged young shoots emit an odor of sarsaparilla. The fruit is a bluish black drupe, ca. 1.3 cm in diameter (Anderson 1947: 249). Dozens of saplings and mature trees were found in Haukulu along with hundreds of seedlings."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability, and elevation range exceeds 1000 m, demonstrating environmental versatility
- Grows in tropical climates
- Possibly naturalizing in Lyon Arboretum, Oahu, Hawaiian Islands
- Concerns raised in native range over potential to become a weed
- Other *Alphitonia* species may be invasive
- Tolerates many soil types
- Forms pure stands in native range
- Reproduces by seeds
- Reaches maturity in 1-2 years
- Seeds dispersed by birds & intentionally by people
- Seeds form a persistent seed bank (longevity unknown)
- Able to resprout after fires

Low Risk Traits

- No reports of negative impacts
- Unarmed (no spines, thorns, or burrs)
- Provides fodder for livestock (palatable)
- Ornamental
- Shade-intolerant pioneer species
- Not reported to spread vegetatively
- Herbicides may provide effective control

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Shade-intolerant but forms pure stands in native range.

(B) Bird or clearly wind-dispersed?> Dispersed by birds

(C) Life cycle <4 years? Yes. Reaches maturity in 1-2 years

Outcome = Reject (High Risk)

TAXON: *Alphitonia excelsa* (A.
Cunn. ex Fenzl) Reissek ex Benth.

SCORE: 5.0

RATING: *High Risk*