Taxon: Alstonia macrophylla

Family: Apocynaceae

Common Name(s): deviltree
hard alstonia
hard milkwood

Synonym(s): Alstonia batino
Alstonia brassii
Alstonia pangkorensis

Assessor: Chuck Chimera **Status:** Approved **End Date:** 11 Sep 2025

WRA Score: 8.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Naturalized Tree, Naturalized, Environmental Weed, Potentially Toxic, 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)	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	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	y = 2*multiplier (see Appendix 2), n = 0	n
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	y
305	Congeneric weed		
401	Produces spines, thorns or burrs	y = 1, n = 0	n
402	Allelopathic		
403	Parasitic	y = 1, n = 0	n
404	Unpalatable to grazing animals		
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
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	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y = 1, n = 0	y
411	Climbing or smothering growth habit	y = 1, n = 0	n
412	Forms dense thickets	y = 1, n = 0	y
501	Aquatic	y = 5, n = 0	n
502	Grass	y = 1, n = 0	n
503	Nitrogen fixing woody plant	y = 1, n = 0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y = 1, n = 0	n
601	Evidence of substantial reproductive failure in native habitat	y = 1, n = 0	n
602	Produces viable seed	y = 1, n = -1	y
603	Hybridizes naturally		
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)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y = 1, n = -1	n
702	Propagules dispersed intentionally by people	y = 1, n = -1	y
703	Propagules likely to disperse as a produce contaminant	y = 1, n = -1	n
704	Propagules adapted to wind dispersal	y = 1, n = -1	y
705	Propagules water dispersed		
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	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y = 1, n = -1	n
803	Well controlled by herbicides	y = -1, n = 1	y
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**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	[No evidence of domestication] "Distribution From Sri Lanka and Nicobar Islands, Thailand, Cambodia, Vietnam to Peninsular Malaysia, Sumatra, Borneo (Sabah), the Philippines, the Moluccas and New Guinea. Cultivated in India and Africa."
	WRA Specialist. (2025). Personal Communication	Cultivated but not highly domesticated.

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2025). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2025). 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**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"From Sri Lanka and Nicobar Islands, Thailand, Cambodia, Vietnam to Peninsular Malaysia, Sumatra, Borneo (Sabah), the Philippines, the Moluccas and New Guinea. Cultivated in India and Africa."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"From Sri Lanka and Nicobar Islands, Thailand, Cambodia, Vietnam to Peninsular Malaysia, Sumatra, Borneo (Sabah), the Philippines, the Moluccas and New Guinea. Cultivated in India and Africa."

203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Climatic amplitude (estimates) - Altitude range: 5 - 1000 m - Mean annual rainfall: 1700 - 3750 mm - Rainfall regime: bimodal; uniform - Dry season duration: 3 - 0 months - Mean annual temperature: 20 - 28ºC - Mean maximum temperature of hottest month: 25 - 40ºC - Mean minimum temperature of coldest month: 15 - 20ºC - Absolute minimum temperature: > 8ºC"

Qsn #	Question	Answer
	Middleton, D. J. (2007). Apocynaceae (Subfamilies Rauvolfioideae and Apocynoideae). Flora Malesiana, Series I, Volume 18. 1- 452	"Habitat & Ecology – Lowland to montane primary and secondary forests, on level lands, slopes or ridges, edge of mangrove, sometimes on flooded areas and heath forests, with the soil types sandy clay or loam, volcanic, or limestone. Altitude 0 - 2870 m."
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	[Broad elevation range in tropics, demonstrating some environmental versatility] "Alstonia macrophylla grows in a wide range of vegetation types and soils in primary and disturbed forest ranging from flooded areas to montane forest, on soils ranging from sandy clay to limestone, from sea-level to about 2900 m altitude."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"From Sri Lanka and Nicobar Islands, Thailand, Cambodia, Vietnam to Peninsular Malaysia, Sumatra, Borneo (Sabah), the Philippines, the Moluccas and New Guinea. Cultivated in India and Africa."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Latitude between 20°N and 10°S List of countries Asia Bangladesh natural and planted Bhutan natural and planted India natural and planted Indonesia natural and planted Malaysia natural and planted Philippines natural and planted Sri Lanka natural and planted Thailand natural and planted"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"Cultivated in India and Africa."
	Wetterer, J. K., & Calicchio, A. (2024). Naturalized populations of the deviltree, Alstonia macrophylla, in Palm Beach Co., Florida. Phytoneuron 2024-49: 1-9.	"The species has introduced populations in several regions outside of its native range, including Sri Lanka, India, Seychelles, Fiji, Hawaii, and Florida (Smith 1988; Fleischmann 1997; Wagner et al. 1997; Weerawardane and Dissanayake 2005). It is cultivated in some areas as an agroforestry species (e.g., in Sri Lanka; Subasinghe 2010). Due to its fast growth, it can invade and disrupt native forest restoration projects (Jayawardhane and Gunaratne 2022)."

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Pascarella, J. B. (1994). Additions to the flora of south Florida: four new species of naturalized tropical trees. Florida Scientist, 57(4), 173-176	")Abstract: Four additional species of introduced tropical trees have naturalized in Dade County, Florida. The species are Alstonia macrophylla (Apocynaceae), Pittosporum pentandrum (Pittosporaceae), Ixora arborea (Rubiaceae), and Harpullia arborea (Sapindaceae). Brief descriptions, herbaria records, ornamental use, and potential spread are discussed."

Qsn #	Question	Answer
	Effendi, S., & Mustaqim, W. A. (2021). Alstonia macrophylla (Apocynaceae): A new record of naturalized species in Java, Indonesia. Floribunda, 6(6), 207-212	"Alstonia macrophylla (Apocynaceae), a Malesian widespread species tree, here for the first time is formally reported to be naturally found in Java. The report is based on plants growing in the Ciampea limestone hills, Ciampea sub-district, west of Bogor, West Java. Description, ecology, illustration and a brief discussion regarding the occurrence state of this species as naturalized species in Java are presented. A key to Alstonia species in Java is also given."
	Daehler, C. C. & Baker, R. F. (2006). New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mänoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	"Alstonia macrophylla Wall. ex G. Don Previously reported as naturalized from Hawai'i (Wagner et al. 1997: 51), and very recently reported on O'ahu from a single naturalized plant, collected near the Likelike Hwy. (Herbst et al. 2004: 3). Widely scattered individuals of all life stages of A. macrophylla can be found throughout the Arboretum and in unmanaged Psidium cattleianum and Ardisia elliptica forest surrounding the Arboretum. Seedlings appear to be tolerant of at least semi-shade. One 4 m tall plant was observed emerging from the center of a dense, 1- m high thicket of Dicranopteris linearis, where no other plants had been successful. In Ceylon, this species became rapidly naturalized following its introduction for timber, and it has become one of the most prominent secondary forest species there (Dassanayake & Fosberg 1983: 42). First planted in the Arboretum in 1933. Material examined: O'AHU: Off Likelike Hwy., growing with Dicranopteris linearis, Schefflera actinophylla, Psidium cattleianum, 11 Apr 2003, D. Souza s.n. (BISH); tree 5 m tall in Psidium cattleianum forest, along trail to second (upper) waterfall, above Lyon Arboretum, 23 Feb 2005, C. Daehler 1058 (BISH); sapling 1.5 m tall in uncleared palm thicket, 3 Mar 2005, C. Daehler 1090 (HAW)."
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2025). Plants of Hawai'i. http://www.plantsofhawaii.org. [Accessed 8 Sep 2025]	"Kaua'i Only found in cultivation O'ahu Naturalized Maui Naturalized Hawai'i Naturalized"
	Wetterer, J. K., & Calicchio, A. (2024). Naturalized populations of the deviltree, Alstonia macrophylla, in Palm Beach Co., Florida. Phytoneuron 2024-49: 1-9.	"The deviltree, Alstonia macrophylla (Apocynaceae), is an evergreen tree native to tropical Southeast Asia, where it is used extensively in traditional medicines. This species has been introduced to several regions outside of its native range, including Sri Lanka, India, Seychelles, Fiji, Hawaii, and Florida. Populations have escaped cultivation and become naturalized in Puerto Rico and perhaps Brazil. All published records of naturalized A. macrophylla populations in the USA are from Miami-Dade Co., Florida, where it is becoming widespread. Here, we document two large naturalized populations of A. macrophylla in Palm Beach Co., in Boynton Beach/Lantana and West Palm Beach, and one record of this species apparently extirpated in Boca Raton."
	Hung, S. M., et al. (2017). The vascular plant flora and vegetation of the islands associated with Singapore's first Marine Park (I): The Sisters' Islands. Nature in Singapore, 10, 7-24	"The naturalised tree, Alstonia macrophylla was found to be thriving on the Small Sister's Island. Several mature individuals have established themselves widely in disturbed areas that fringe the natural coastal forests. In 2012, the ecological study by Teo (2012) on Alstonia macrophylla recorded a high abundance of this naturalised species occurring on Small Sister's Island, with 45 fruiting individuals and several more juveniles, and five individuals standing at 6 m, 7 m, 8 m, 1.2 m and 14 m tall on Big Sister's Island during the time of survey. Two of the tallest trees on Big Sister's Island were fruiting then."

Qsn #	Question	Answer
	Wagner, W.L., Shannon, R.K. & Herbst, D.R. (1997). Contributions to the Flora of the Hawai'i. VI. Bishop Museum Occasional Papers 48: 51-65	[Hawaii island] "Alstonia macrophylla Wall. ex G. Don New state record This species was cultivated in the Hawaiian Islands prior to 1949. There are collections at BISH from Lawa'i Kai, Kaua'i; the Waimea Arboretum and Botanical Gardens, O'ahu; and the Shipman estate, Kea'au, Hawai'i (the label on this specimen, collected by L.W. Bryan, 2 Aug. 1949, states that, "this tree came from nursery at Foster Gardens many years ago"). It has recently become naturalized on Hawai'i. Specimens det. by A.J.M. Leeuwenberg. Material examined. HAWAI'I: Pepe'ekeo, mauka of Highway 19, directly across from Hilo Processing Co. quarry site, near entrance to D. Carlsmith estate, in pasture with exotics such as guava and rose apple, ca. 550 ft., 25 Feb. 1991, Takiue s.n. (BISH); Hilo, invasive weed tree on various substrates, 76 m, March 1993, Paul s.n. (BISH); South Hilo Dist., Waiakea, Keaukaha Military Reservation, along jeep road through mixed native/alien forest, occasional, 60 ft., 5 July 1996, Herbst & Hopper 9783a (BISH)."
	Herbst, D.R., Staples, G.W. & Imada, C.T. (2004). New Hawaiian plant records for 2002-2003. Bishop Museum Occasional Papers 78: 3-12	[O'ahu] "Alstonia macrophylla Wall. ex G. Don New island record Although grown in botanical gardens on the islands of Kaua'i and O'ahu and sparingly cultivated in gardens on the island of Hawai'i, the species had become naturalized only in the Waiäkea, Hilo, and Pepe'ekeo areas of Hawai'i Island (Wagner et al., 1997: 51). The following collection is the first documented naturalized plant on the island of O'ahu. Material examined. O'AHU: Off Likelike Hwy, growing with Dicranopteris linearis, Schefflera actinophylla, Psidium cattleianum, 750-1000 ft, 11 Apr 2003, D. Souza s.n. (BISH 695057)."

302	Garden/amenity/disturbance weed	
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	[A disturbance weed with potential environmental impacts]. See 3.04] "In Sri Lanka, it rapidly colonises open areas including secondary forests in the lowland wet zone (Tomimura et al. 2012). Moreover, it has spread to Caribbean pine plantations in the buffer zone of Sinharaja Forest Reserve in southwest Sri Lanka (Tomimura 2008)."

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	WRA Specialist. (2025). Personal Communication	Alstonia macrophylla is not a major weed of agriculture or horticulture but is considered invasive in forestry and environmental contexts, particularly in disturbed forests and tropical ecosystems.

304	Environmental weed	y
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2016). Over Dominance of Alstonia macrophylla Walla. ex G. Don in Pine Plantations at Lower Hantana, Sri Lanka. Pp. 120-123 in Proceedings of the 3rd International Conference of Agricultural Sciences, Sabaragamuwa University of Sri Lanka	"A. macrophylla which is an invasive species in Sri Lanka is dominating in the RP and UP plantations at lower Hantana, Sri Lanka. The over dominance of this species may threat the regeneration of the native plant species in these stands. Thus sound management practices are needed to manage them to achieve success in restoration program."

Qsn #	Question	Answer
	Fleischmann, K. (1997). Invasion of alien woody plants on the islands of Mahé and Silhouette, Seychelles. Journal of Vegetation Science, 8(1), 5-12	"Still, the majority of alien species have established only in confined habitats, where they can form a dominant component of the vegetation, notably (in descending order of their prominence): Tabebuia pallida, Sandoricum indicum and Alstonia macrophylla."..."Though the very invasive Cinnamomum zeylanicum and Alstonia macrophylla are able to colonise Glacis habitats, very high degrees of native rejuventation (mostly >66%) suggest that these habitats are not seriously endangered by invasive alien plants in the near future" [This suggests that Alstonia is not having a lasting environmental impact on native habitat in Seychelles]
	Wetterer, J. K., & Calicchio, A. (2024). Naturalized populations of the deviltree, Alstonia macrophylla, in Palm Beach Co., Florida. Phytoneuron 2024-49: 1-9.	"The Florida Invasive Species Council (FLEPPC 2019) lists it as a Category II invasive, defined as "Species that have shown a potential to disrupt native plant communities. These species may become ranked as Category I, but have not yet demonstrated disruption of natural Florida communities."
	Bandumala S.H. (2018). Management of Forest Invasive Species in Sri Lanka. Forest Department, Sri Lanka. https://apfisn.org/wp-content/uploads/2018/07/Ms-S-H-Bandumala.pdf. [Accessed 8 Sep 2025]	"The plant forms dense stands and other native plants have compete for nutrients from the soil so that few plants under its canopy can survive. Shade out other native species by sapling layer on the forest flow and thereby reduce the bio diversity of rainforest"
	Kueffer, C. & Vos, P. (2004). Case Studies on the Status of invasive Woody Plant Species in the Western Indian Ocean: 5. Seychelles. Forest Health & Biosecurity Working Papers FBS/4-5E. FAO Forestry Dept., Rome, Italy	"The tree Alstonia macrophylla, although currently restricted to a few of the small islands and rarely found in forest vegetation, showed potential for becoming an aggressive invader where it was present. It exhibited a rapid natural increase in dry, exposed environments on scrub-covered hillsides on North and glacis on Frégate...Other species (notably Alstonia macrophylla) are more recent introductions but current behaviour (number of propagules produced, speed of growth) suggests that they could become important problem species in the future."
	Kueffer, C., Vos, P., Lavergne, C., & Mauremootoo, J. (2004). Woody invasive species in the Western Indian Ocean: A regional assessment. Forest Genetic Resources No. 31: 25-30	"The woody invasive species that are very problematic in at least one country of the Western Indian Ocean region [Seychelles: Alstonia macrophylla listed under category of "most problematic invasive"]…Alstonia macrophylla also able to invade Inselbergs (Seychelles)...Rocky granitic outcrops with a very high endemism and an abundance of exotics below 10% [This habitat is characterized among those "Habitat types that show a high resistance to invasions (low invasibility), and the few exotic species that are able to invade them."]
	Horvitz, C. C., Pascarella, J. B., McMann, S., Freedman, A., & Hofstetter, R. H. (1998). Functional roles of invasive non-indigenous plants in hurricane-affected subtropical hardwood forests. Ecological Applications, 8(4), 947-974.	Alstonia macrophylla categorized as germinating from a seed bank and functioning as a post-hurricane "canopy-layer thief" in Florida [Table 6]. A canopy-layer thief is described as one that "Regrows new branches from damaged standing trunk faster than damaged, standing native trees" [Table 7]
	WRA Specialist. (2025). Personal Communication	Alstonia macrophylla is an environmental weed in parts of its non-native range, particularly in island ecosystems (Sri Lanka, Seychelles, Hawai'i), where it competes with native vegetation and alters forest structure.

Qsn #	Question	Answer
305	Congeneric weed	
	Source(s)	Notes
	Langeland, K.A.& Stocker, R.K. (2001). Control of Non-native Plants in Natural Areas of Florida. SP 242. Institute of Food & Agricultural Sciences, University of Florida, Gainesville, FL	[Alstonia scholaris also listed as invasive and controlled in Florida] "Alstonia macrophylla Alstonia scholaris Devil tree Scholar tree Treatment: Basal bark application of 10% Garlon 4 or cut stump application of 50% Garlon 3A. Comments: Both species Invade hammocks, pinelands and disturbed sites; leaves are reportedly toxic to eat; A. macrophylla is becoming widespread in Dade county."
	University of Florida, IFAS. (2025). Assessment of Non-Native Plantsin Florida's Natural Areas. https://assessment.ifas.ufl.edu/. [Accessed 9 Sep 2025]	Categorized as "Not a problem species (un-documented)" in South, Central, and North Florida as of 2019

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wu, Z. Y. & P. H. Raven, eds. (1995). Flora of China. Vol. 16 (Gentianaceae through Boraginaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Trees to 20 m tall. Bark smooth; branches nearly 4-angled. Leaves in whorls of 3 or 4; petiole 1–4 cm; leaf blade narrowly obovate or narrowly elliptic, 10–53 × 4–19 cm, leathery, pubescent abaxially, apex usually acuminate; lateral veins 16–33 pairs, at 60–70° to midvein. Cymes terminal, 3-branched, 5–9 together, pubescent; peduncle 4–6 cm. Pedicel 4–5 mm. Corolla tube slightly longer than lobes, 4.5–6 mm; lobes overlapping to right, ciliate; disc absent. Ovaries distinct, glabrous. Follicles linear, to 61 cm × 2–5 mm. Seeds pubescent, ends with deltoid wings, with long stiff hairs all around."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2025). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y. & P. H. Raven, eds. (1995). Flora of China. Vol. 16 (Gentianaceae through Boraginaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees to 20 m tall." [No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Dunson, W. A. (1974). Some aspects of salt and water balance of feral goats from arid islands. American Journal of Physiology, 226(3), 662-669	"It is interesting that the goats eat Alstonia, the milky pine, which has a whitish sap containing an alkaloid, which is very bitter to the human taste" [Unknown. Goats eat a related species, Alstonia scholaris, with alkaloids in sap]

Qsn #	Question	Answer
405	Toxic to animals	
	Source(s)	Notes
	Khare, C. (2004). Indian Herbal Remedies: Rational Western Therapy, Ayurvedic and Other Traditional Usage, Botany. Germany: Springer Berlin Heidelberg	[Potentially, although unclear if animals will consume the plant] "Toxic in large doses, Alstonia spp. Are subject to legal restrictions in some countries."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Pests recorded Fungus diseases: Cercospora alstoniae"
	WRA Specialist. (2025). Personal Communication	Unknown. While Alstonia macrophylla is not documented as a major host for pests or pathogens in the provided sources, its natural resistance to insects and antimicrobial properties may contribute to its low susceptibility. However, more specific studies would be needed to fully assess its role as a host for plant diseases or pests.

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Khare, C. (2004). Indian Herbal Remedies: Rational Western Therapy, Ayurvedic and Other Traditional Usage, Botany. Germany: Springer Berlin Heidelberg	"Toxic in large doses, Alstonia spp. Are subject to legal restrictions in some countries."
	Raffauf, R. F. (1996). Plant Alkaloids: A Guide to Their Discovery and Distribution. United States. The Haworth Press, New York	[Unknown whether contact with sap will cause allergic reaction or poisoning, but plants contain poisonous alkaloids in sap that are used medicinally] "Apocynaceae: This family is almost cosmopolitan but chiefly tropical with some representatives in the temperate zones. It is noted for many ornamentals...Many are toxic. The Apocynaceae is probably the most thoroughly investigated family for alkaloidal plants; about 1000 of these compounds have been isolated from its many members...Many of the species recognized as alkaloidal by other investigators were confirmed as such:...Alstonia macrophylla"

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Weerawardane, N.D.R. & Dissanayake, J. (2005). Status of forest invasive species in Sri Lanka. In McKenzie, P., Brown, C., Jianghua, S. & Jian, W. (eds.). The unwelcome guests Proceedings of the Asia-Pacific Forest Invasive Species Conference. Kunming, Yunnan Province, China 17 - 23 August 2003. FAO, Bangkok	"Alstonia macrophylla(tree): Wet and Intermediate zones" [Invades forests which are unlikely to carry fire]
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Tolerates drought; fire; wind; weeds" [No evidence of increased fire risk]
	WRA Specialist. (2025). Personal Communication	Alstonia macrophylla is a broadleaf evergreen tree with large, fleshy leaves and a canopy that retains moisture. There are no reports in the scientific or invasive species literature indicating that this species increases fuel loads or fire risk in invaded ecosystems. Unlike some grasses or shrubs that dry out seasonally and promote fire, A. macrophylla does is not reported to produce highly flammable litter or dense, resinous foliage. Its invasion impacts are mainly through competition and displacement of native vegetation, not through alteration of fire regimes.

409	Is a shade tolerant plant at some stage of its life cycle	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	De Costa, W. A. J. M., & Rozana, M. F. (2000). Effects of shades and water stress on growth and related physiological parameters of the seedlings of five forest tree species. Journal of the National Science Foundation of Sri Lanka, 28(1): 43-62	"Abstract: The main objective of the present study was to investigate the effects of different levels of shade and water availability on tree seedling growth and on some related physiological parameters. The five tree species were selected to represent two early successional species (i.e. Alstonia macrophylla ... Alstonia had the highest relative growth rates under all shade x water regime combinations whereas Azadiracta had the lowest."
	Daehler, C. C. & Baker, R. F. (2006). New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mänoa Valley, O'ahu. Bishop Museum Occasional Papers 87: 3-18	"Widely scattered individuals of all life stages of A. macrophylla can be found throughout the Arboretum and in unmanaged Psidium cattleianum and Ardisia elliptica forest surrounding the Arboretum. Seedlings appear to be tolerant of at least semi-shade. One 4 m tall plant was observed emerging from the center of a dense, 1- m high thicket of Dicranopteris linearis, where no other plants had been successful."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"Alstonia macrophylla grows in a wide range of vegetation types and soils in primary and disturbed forest ranging from flooded areas to montane forest, on soils ranging from sandy clay to limestone, from sea-level to about 2900 m altitude."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Soil descriptors - Soil texture: light; medium - Soil drainage: free - Soil reaction: acid; neutral - Special soil tolerances: shallow; infertile"

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"A small to medium-sized tree up to 30(–50) m tall, bole straight, up to 100 cm in diameter, sometimes fluted at the base or with small buttresses"

412	**Forms dense thickets**	**y**
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2016). Over Dominance of Alstonia macrophylla Walla. ex G. Don in Pine Plantations at Lower Hantana, Sri Lanka. Pp. 120-123 in Proceedings of the 3rd International Conference of Agricultural Sciences, Sabaragamuwa University of Sri Lanka	"A. macrophylla which is an invasive species in Sri Lanka is dominating in the RP and UP plantations at lower Hantana, Sri Lanka. The over dominance of this species may threat the regeneration of the native plant species in these stands. Thus sound management practices are needed to manage them to achieve success in restoration program." [In restored pine plantations (RP) and unrestored pine plantations (UP) in Sri Lanka, Alstonia macrophylla was found to have high densities, with a mean density of 9.54 individuals per square meter in RP and 2.51 individuals per square meter in UP. It was also the most abundant species with the highest frequency across all plots (73.3% in RP, 61.3% in UP)]
	Bandumala S.H. (2018). Management of Forest Invasive Species in Sri Lanka. Forest Department, Sri Lanka. https://apfisn.org/wp-content/uploads/2018/07/Ms-S-H-Bandumala.pdf. [Accessed]	"The plant forms dense stands and other native plants have compete for nutrients from the soil so that few plants under its canopy can survive. ◦ Shade out other native species by sapling layer on the forest flow and thereby reduce the bio diversity of rainforest"

Qsn #	Question	Answer
501	Aquatic	n
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	[Terrestrial] "Alstonia macrophylla grows in a wide range of vegetation types and soils in primary and disturbed forest ranging from flooded areas to montane forest, on soils ranging from sandy clay to limestone, from sea-level to about 2900 m altitude."

502	Grass	n
	Source(s)	**Notes**
	Wu, Z. Y. & P. H. Raven, eds. (1995). Flora of China. Vol. 16 (Gentianaceae through Boraginaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	Apocynaceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	Wu, Z. Y. & P. H. Raven, eds. (1995). Flora of China. Vol. 16 (Gentianaceae through Boraginaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	Apocynaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors). (2001). Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia	"A small to medium-sized tree up to 30(–50) m tall, bole straight, up to 100 cm in diameter, sometimes fluted at the base or with small buttresses"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	[No evidence] "This species is native to Indonesia, Malaysia, the Philippines, Thailand and Vietnam and it was intentionally introduced to Sri Lanka from Malaysia for its good quality timber, which is widely used for construction purposes, furniture and flooring (Wijesundara 2010)."

602	Produces viable seed	y
	Source(s)	**Notes**
	Weerasinghe, M., Ashton, M. S., Hooper, E. R., & Singhakumara, B. M. (2019). Floristics of soil seed banks on agricultural and disturbed land cleared of tropical forests. Restoration Ecology, 27(1), 138-147	"Only 59 tree seedling germinants were recorded, which belong to four different early-successional pioneers; overwhelmingly dominated by the non-native tree Alstonia macrophylla. This comprises about 250 viable seeds/m2 of which 88% are exotic; only 22 viable seeds/m2 comprise native pioneer trees."
	Raich, J. W., & Khoon, G. W. (1990). Effects of canopy openings on tree seed germination in a Malaysian dipterocarp forest. Journal of Tropical Ecology, 6(2), 203-217	"The germination of 43 tree species native to the lowland forests of Malaysia was monitored on forest soil in trays placed in closed-canopy forest, an artificial forest gap, and a large clearing...Non-pioneer species exhibited a variety of responses to the different habitats...Alstonia...germinated equally well in the forest understorey and in the clearing in at least one experiment."

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. (2025). Personal Communication	Unknown. There is no evidence that Alstonia species form interspecific hybrids. Further research beyond these sources would be required to explore this possibility.

604	Self-compatible or apomictic	
	Source(s)	Notes
	Chauhan, S., & Nisha. (2018). Reproductive biology of Alstonia scholaris (L.) R. Br.(Apocynaceae). The International Journal of Plant Reproductive Biology 10(2): 119-126	[Possibly. Related species can undergo self-pollination between different flowers on the same plant (geitonogamy), but will also cross-pollinate (xenogamy) with other plants when pollinators facilitate it] "Reproductive biology of Alstonia scholaris (Apocynaceae) a medium to large evergreen ornamental tree was studied. It is commonly known as saptaparna or devils tree. Flowering commenced in September and continued till the end of January with the maximum was during the months of November to December. Flowers were protandrous and large amount of pollen and nectar attracted a wide variety of insects during the entire flowering period. Honeybees (Apis dorsata and Apis indica), small bees (Mellipona spp.), butterflies (Danaus genutia, Eurema laeta, and Parantica aglea), black ant (Componotus compestris), wasps (Polistes hebraeus and Vespa spp.), beetle, moth (Achoria grisella) and white and yellow spiders forage either for both nectar and pollen or nectar alone. Apis dorsata, A. indica and Mellipona were the main pollinators of this ornamental tree as they obtained both pollen and nectar by their frequent inter-plant movements to facilitate cross-pollination. The other insects were nectar thieves. Fruit formation started in December and mature fruits dehisced in February. The pollen: ovule ratio and hand pollination experiments indicated facultative geitonogamy. The fruits were green, long double follicles. The mature follicles turned brown and dehisced longitudinally from the base into two halves and large number of compressed and small seeds with a tuft of brown hairs on both the ends were liberated."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	"Alstonia macrophylla (Apocynaceae) or devil tree is a medium-sized tree (20 m) with blackish green stem, leaves arranged in whorls in 4-angled branches, smooth bark with milky latex, yellowish-white terminal cymes in umbels with a pleasant smell (pollinated by insects) and pendulant double follicles with flat wind-dispersed seeds"
	Chauhan, S., & Nisha. (2018). Reproductive biology of Alstonia scholaris (L.) R. Br.(Apocynaceae). The International Journal of Plant Reproductive Biology 10(2): 119-126	[Related taxa do not require specialist pollinators] "Honeybees (Apis dorsata and Apis indica), small bees (Mellipona spp.), butterflies (Danaus genutia, Eurema laeta, and Parantica aglea), black ant (Componotus compestris), wasps (Polistes hebraeus and Vespa spp.), beetle, moth (Achoria grisella) and white and yellow spiders forage either for both nectar and pollen or nectar alone. Apis dorsata, A. indica and Mellipona were the main pollinators of this ornamental tree as they obtained both pollen and nectar by their frequent inter-plant movements to facilitate cross-pollination. The other insects were nectar thieves."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes

Qsn #	Question	Answer
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	[Regenerates from basal stems, but not reported to spread vegetatively] "Bandumala (2018) suggested hand pulling, digging, de-barking and basal cutting to control the spread, growth and density of A. macrophylla. However, during the research it was observed that basal cuttings did not effectively eliminate the species because the plants that had been damaged by animals or humans were re-generating faster from their basal stems."

607	Minimum generative time (years)	2
	Source(s)	**Notes**
	The Forest Restoration Research Unit. (2008). A technical strategy for restoring Krabi's lowland tropical forest (S. Elliott, C. Kuaraksa, P. Tunjai, T. Polchoo, T. Kongho, J. Thongtao, & J. F. Maxwell, Eds.). Biology Department, Science Faculty, Chiang Mai University	"This species is very hardy in the harsh conditions of deforested sites. It had the highest survival and growth rates of all species tested in field trials. Flowering and fruiting occurred 2½ years after planting and birds' nest in the young trees."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Middleton, D. J. (2007). Apocynaceae (Subfamilies Rauvolfioideae and Apocynoideae). Flora Malesiana, Series I, Volume 18. 1- 452	"Fruit a pair of follicles, 25-62 cm by 2-4(-4.5) mm, glabrous. Seeds elliptic (sometimes slightly ovate), 5-10.5(-12) by 1.6-2.5 mm, pubescent on both sides, one end acuminate with an acumen 1-5 mm long (sometimes bifid at the apex), the other end rounded (rarely obtuse); longest cilia 5-10 mm long, becoming gradually shorter along the margins."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Land use, environmental and service aspects: Descriptors: agroforestry; revegetation; soil conservation; erosion control; hedges"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Middleton, D. J. (2007). Apocynaceae (Subfamilies Rauvolfioideae and Apocynoideae). Flora Malesiana, Series I, Volume 18. 1- 452	"Seeds elliptic (sometimes slightly ovate), 5-10.5(-12) by 1.6-2.5 mm, pubescent on both sides, one end acuminate with an acumen 1-5 mm long (sometimes bifid at the apex), the other end rounded (rarely obtuse); longest cilia 5-10 mm long, becoming gradually shorter along the margins." [No evidence. Seeds relatively large and adapted for wind dispersal]

Qsn #	Question	Answer
704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	"Alstonia macrophylla (Apocynaceae) or devil tree is a medium-sized tree (20 m) with blackish green stem, leaves arranged in whorls in 4-angled branches, smooth bark with milky latex, yellowish-white terminal cymes in umbels with a pleasant smell (pollinated by insects) and pendulant double follicles with flat wind-dispersed seeds (Figure 1)."
	Middleton, D. J. (2007). Apocynaceae (Subfamilies Rauvolfioideae and Apocynoideae). Flora Malesiana, Series I, Volume 18. 1- 452	"in subfamily Apocynoideae (with the exception of Eucorymbia), plus Alstonia and Dyera from subfamily Rauvolfioideae, have dehiscent fruits and wind blown seeds."

705	**Propagules water dispersed**	
	Source(s)	**Notes**
	Middleton, D. J. (2007). Apocynaceae (Subfamilies Rauvolfioideae and Apocynoideae). Flora Malesiana, Series I, Volume 18. 1- 452	[Unknown. Wind-dispersed seeds may have some buoyancy that allows for some secondary dispersal in flooded or riparian areas] "Lowland to montane primary and secondary forests, on level lands, slopes or ridges, edge of mangrove, sometimes on flooded areas and heath forests, with the soil types sandy clay or loam, volcanic, or limestone. Altitude 0-2870 m."

706	**Propagules bird dispersed**	**n**
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	[No evidence] "yellowish-white terminal cymes in umbels with a pleasant smell (pollinated by insects) and pendulant double follicles with flat wind-dispersed seeds"

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Middleton, D. J. (2007). Apocynaceae (Subfamilies Rauvolfioideae and Apocynoideae). Flora Malesiana, Series I, Volume 18. 1- 452	"Seeds elliptic (sometimes slightly ovate), 5–10.5(-12) by 1.6–2.5 mm, pubescent on both sides, one end acuminate with an acumen 1–5 mm long (sometimes bifid at the apex), the other end rounded (rarely obtuse); longest cilia 5–10 mm long, becoming gradually shorter along the margins." [No indication that hairs enable seeds to adhere to animals externally]

708	**Propagules survive passage through the gut**	**n**
	Source(s)	**Notes**
	Jayawardhane, J., & Gunaratne, A. M. T. A. (2022). Influence Of Alstonia Macrophylla Spread On The Restoration Success Of Pine Conversion Programs In Sri Lanka. Journal of Tropical Forest Science, 34(3), 285-295	"yellowish-white terminal cymes in umbels with a pleasant smell (pollinated by insects) and pendulant double follicles with flat wind-dispersed seeds" [Unlikely. No evidence seeds are consumed and internally dispersed]

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	y
	Source(s)	**Notes**
	Dayan, M., Reaviles, R. S., & Bandian, D. B. (2006). Indigenous forest tree species in Laguna province. DENR Recommends, 15a. Ecosystems Research and Development Bureau, Department of Environment and Natural Resources, Laguna	"A medium to large tree, it reaches height of 25 m and a diameter of 30 m" [Seeds per fruit range from three to 62, with each seed measuring 4-5 mm x 1-2 mm…Seed count 365,000/kg]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	n
	Source(s)	**Notes**
	Dayan, M., Reaviles, R. S., & Bandian, D. B. (2006). Indigenous forest tree species in Laguna province. DENR Recommends, 15a. Ecosystems Research and Development Bureau, Department of Environment and Natural Resources, Laguna	"Seed germination Seeds were sown in sterilized soil in plastic trays, then were covered with fine sterilized soil. They started to germinate 10-14 days after sowing. Complete germination occurred after 20 days with 95% germination. Storage Seeds with 10.5% MC can be stored at room temperature for six months with 76% germination. It was observed that beyond six months, germination started to decline and 0% germination was noted after the 9th month of storage. Seeds with the same MC and stored in the refrigerator at 7°C had a lower germination percentage (25.5-48%) during the first six months of storage but increased to 88.4% after the 9th month and 87% on the 12th month of storage. These results came about after the ripening of the seed embryo. Seeds, stored in the refrigerator at 7°C for 24 months with 7.5% MC, still reached 31.5% germination."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Seed storage orthodox"
	Iralu, V., Barbhuyan, H. S. A., & Upadhaya, K. (2019). Ecology of seed germination in threatened trees: a review. Energy, Ecology and Environment, 4(4), 189-210	"Table 1 Seed type, germination treatments required and seed viability of threatened species" [Alstonia macrophylla - Seed viability (day/months) = ND]

803	**Well controlled by herbicides**	y
	Source(s)	**Notes**
	Kaiser-Bunbury, C. N., Mougal, J., Valentin, T., Gabriel, R., & Blüthgen, N. (2015). Herbicide application as a habitat restoration tool: impact on native island plant communities. Applied Vegetation Science 18(4), 650-660	"Table 1. Percentage resprout of invasive alien plant species used to test the effect of 5%, 10% and 15% herbicide concentration and the cut treatment on survival of target plants. Asterisks annotate significance levels between all herbicide treatments pooled and cut treatment." [0% of Alstonia macrophylla plants resprouted after treatments of 5% and 10% Tordon 101 herbicide concentration]

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	y
	Source(s)	**Notes**
	Lurie, M. H., Barton, K. E., & Daehler, C. C. (2017). Pre-damage biomass allocation and not invasiveness predicts tolerance to damage in seedlings of woody species in Hawaii. Ecology, 98(12), 3011-3021	"However, Alstonia macrophylla, Thevetia peruviana, Solanum melongena, and Macadamia integrifolia nearly tolerated the Defoliated treatments (Fig. 2)." [Alstonia macrophylla exhibits high seedling tolerance to herbivory, likely due to pre-allocation of resources to cotyledons and roots. However, this trait alone does not fully explain its invasiveness. Its success in Hawaii probably stems from a combination of tolerance, high fecundity, efficient dispersal, and anthropogenic support (e.g., ornamental planting).]
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Silvicultural characteristics descriptors - Tolerates drought; fire; wind; weeds - Ability to regenerate rapidly; self-prune; coppice"

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

Qsn #	Question	Answer
	Source(s)	**Notes**
	WRA Specialist. (2025). Personal Communication	Unknown

Summary of Risk Traits:

Alstonia macrophylla (commonly called devil tree or hard alstonia) is a tall evergreen tree native to Sri Lanka, India, and Southeast Asia. It can reach heights over 30 meters, with large leathery leaves arranged in whorls and clusters of small, fragrant white flowers. Introduced to Hawai'i as a fast-growing ornamental and shade tree, it is now naturalized on several islands. The species produces lightweight wood and milky latex, historically used in traditional medicine and for carving. Its rapid growth and tolerance for a variety of soils have made it a popular landscaping choice in the tropics.

In Hawai'i, A. macrophylla can invade disturbed areas, forest edges, and roadsides, where it may outcompete native vegetation by forming dense stands. It produces abundant wind-dispersed seeds that facilitate its spread. While not currently listed as a severe invasive threat statewide, it has shown invasive tendencies in other Pacific islands, warranting caution in planting near natural areas. Management focuses on preventing its establishment in sensitive habitats and removing young plants before seed set. Residents are encouraged to consider native or non-invasive alternatives for shade and ornamental use to help protect Hawai'i's unique ecosystems.

High Risk / Undesirable Traits
Thrives and can spread in regions with tropical climates
Naturalized on O'ahu, Maui and Hawai'i (Hawaiian Islands)
A disturbance adapted weed with the potential to impact natural areas
Potentially toxic to animals and people
Shade tolerant
Tolerates many soil types (not limited by substrate)
Reproduces by seeds
Reaches maturity in 2 ½ years
Seeds dispersed by wind, and through intentional cultivation
Capable of prolific seed production
Tolerates and resprouts after cutting and fire

Low Risk Traits
Unarmed (no spines, thorns, or burrs)
Seeds lose viability after 9 months
Herbicides may provide effective control