Taxon: Terminalia catappa L. **Family:** Combretaceae

Common Name(s): country almond
Indian almond
Malabar almond
tropical almond

Synonym(s): Phytolacca javanica Osbeck

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 10 Mar 2023

WRA Score: 8.0 **Designation:** H(Hawai'i) **Rating:** High Risk

Keywords: Coastal Tree, Environmental Weed, Dense Stands, Self-Incompatible, Water-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	n
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	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	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	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y
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

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
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	3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
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**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence. Variety selection rather than breeding] "Major variation exists in T. catappa for a range of economically important nut characteristics, as a result of selection for desirable traits, e.g. for large fruits/kernels and ease of cracking, and propagation by village people in various parts of its range. In Vanuatu the variability of T. catappa is high: variations occur mainly in fruit size, colour and shape (Siwatibau S, Bani C, Kaloptap J, 1998. SPRIG Rapid Rural Appraisal Survey of selected tree species in Vanuatu. Report by Island Consulting to CSIRO Division of Forestry/SPRIG Project), whereas in the Solomon Islands fruits seem to be overall larger and less variable in size (Walter and Sam, 1993, 1994). Evans (1991) reported very little variation within the species in most parts of the Solomons, except for the Santa Cruz Islands (Temotu Province) where selection has produced some large-fruited forms. Two fruit types have been reported from the Mussau Islands, Bismarck Archipelago, Papua New Guinea (Lepofsky, 1992). One type has a soft endocarp which can be easily broken with the teeth, while the other has a hard endocarp which must be hit with a stone or cut with a knife to obtain the nut: it is uncertain whether the soft-shelled trees breed true to type. The island of Iwa, in the Marshall Bennett Group, is also renowned for its soft-shelled nuts (Bourke, 1996). Benthall (1946) has reported the presence of several forms in India that differ in leaf shape and fruit characteristics. One type has an edible, sweet flesh and this is cultivated in gardens. Variation in biometric characters of tree, leaf and nut traits of 10-year-old open-pollinated trees in Periyakulum, Tamil Nadu, was studied by Kumar et al. (1991). Variation has also been reported in kernel taste and size from the Caribbean and southern USA, and Morton (1985) has suggested that superior types may be vegetatively propagated and more widely cultivated. T. catappa should be highly amenable to breeding programmes, given the high level of variation in nut characteristics and the young age, about 3-4 years, at which plants flower and fruit, and accessibility of flowers for controlled pollination, although the latter are small and crowded."

102	Has the species become naturalized where grown?	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	NA

Qsn #	Question	Answer
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**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa has a very wide natural distribution in near-coastal areas of the Indian Ocean, through tropical Asia and into the Pacific. The rind of the fruit, comprising light, pithy/corky tissue, enables the fruits to float and be dispersed long distances by sea currents (Kadambi, 1954; Nakanishi, 1989; Troup and Joshi, 1984)."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The species has been spread widely by humans and the native range is uncertain. It has long been naturalised in a broad belt extending from the Indian subcontinent through southeast Asia, Northern Australia, New Guinea to the Pacific Islands. The tree is found throughout the South Pacific region, including the Solomon Islands, Vanuatu, and Fiji. It is present on nearly all the high archipelagos of Polynesia and Micronesia. More recently, the tree has also been introduced to parts of Africa and the Americas."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa has a very wide natural distribution in near-coastal areas of the Indian Ocean, through tropical Asia and into the Pacific."

203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa is well-adapted to maritime subtropical and tropical climates. Rainfall, generally in the range 1000 to 3500 mm, may be distributed rather uniformly or with a summer maximum. T. catappa is invariably found near the coast, at less than 300-400 m altitude, although it may occasionally occur up to 800 m (Sosef et al., 1995). Sites with little seasonal variation in temperature are preferred. In the Philippines, it is adapted to a temperature range of 22° to 32°C (Uriarte, 1994). The entire range is frost-free. T. catappa is moderately drought-resistant and can endure a dry season of up to 5-6 months. When the roots reach the water-table, T. catappa requires less rainfall and can thus survive longer drought. Climatic amplitude (estimates) - Altitude range: 0 - 800 m - Mean annual rainfall: 1000 - 3500 mm - Rainfall regime: summer; bimodal; uniform - Dry season duration: 0 - 6 months - Mean annual temperature: 20 - 26ºC - Mean maximum temperature of hottest month: 32 - 35ºC - Mean minimum temperature of coldest month: 15 - 17ºC - Absolute minimum temperature: 7 - 21ºC"

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to India, China, and Indonesia; in Hawai'i over 26,000 trees planted by state foresters for reforestation on Kaua'i, O'ahu, Maui, and Hawai'i between 1928 and 1951, now naturalized at least on Kaua'i, Maui, and Hawai'i."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa has a very wide natural distribution in near-coastal areas of the Indian Ocean, through tropical Asia and into the Pacific."
	Oppenheimer, H. (2008). New Hawaiian plant records for 2007. Bishop Museum Occasional Papers 100: 22-38	[Lanai] "Terminalia catappa L. New island record Tropical almond is a common littoral tree and has been previously documented from Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i (Wagner et al. 1999a: 547–8; Oppenheimer 2003: 9). On Läna'i trees are scattered along the windward, eastern shore amongst Prosopis and Thespesia, but is less abundant. Seedlings are sometimes observed near cultivated plants at Mänele Bay. Material examined. LÄNA'I: Keömuku Rd between Halepalaoa Landing and Kahe'a, near sea level, 21 Mar 2007, Oppenheimer, Perlman & Tangalin H30717."
	Oppenheimer, H. L. (2003). New plant records from Maui and Hawai'i Counties. Bishop Museum Occasional Papers. 73: 3-30	[Molokai] "Terminalia catappa L. New island record Tropical almond is a common littoral tree on the east end of Moloka'i. It had already been known to be naturalized on Kaua'i, O'ahu, Maui, and Hawai'i (Wagner et al. 1990: 548); C.W. Smith had also reported its occurrence on Moloka'i (1985: 215). Material examined: MOLOKA'I: Kawela, near sea level, 18 Nov 2001, Oppenheimer H110145."

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"T. catappa has been widely introduced as a cultivated plant in and is now naturalized and nearly pantropical in its distribution. If planted near the sea, nuts are readily spread by ocean currents to germinate elsewhere. False kamani was apparently brought to Hawai'i by Dr. William Hillebrand between 1851 and 1871; the original tree still stands at Foster Botanical Garden, Honolulu, which was once Hillebrand's home."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa is widely distributed in the Philippines, Papua New Guinea and Polynesia, and has been widely planted throughout the Tropics, including West and East Africa (Streets, 1962; Morton, 1985), Brazil (Paschoal and Galetti, 1995), Central and South America and the Caribbean (Heinsleigh and Holaway, 1988; Sosef et al., 1995). It is naturalised in Florida, USA, and Puerto Rico (Morton, 1985). In Hawaii, the species was introduced very early,"
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The species has been spread widely by humans and the native range is uncertain. It has long been naturalised in a broad belt extending from the Indian subcontinent through southeast Asia, Northern Australia, New Guinea to the Pacific Islands. The tree is found throughout the South Pacific region, including the Solomon Islands, Vanuatu, and Fiji. It is present on nearly all the high archipelagos of Polynesia and Micronesia. More recently, the tree has also been introduced to parts of Africa and the Americas."

301	**Naturalized beyond native range**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"It is naturalised in Florida, USA, and Puerto Rico (Morton, 1985)." ... "T. catappa naturalizes readily in suitable littoral habitats, and may be regarded as a potential weed threat to native plant communities."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The species has been spread widely by humans and the native range is uncertain. It has long been naturalised in a broad belt extending from the Indian subcontinent through southeast Asia, Northern Australia, New Guinea to the Pacific Islands. The tree is found throughout the South Pacific region, including the Solomon Islands, Vanuatu, and Fiji. It is present on nearly all the high archipelagos of Polynesia and Micronesia. More recently, the tree has also been introduced to parts of Africa and the Americas."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Kauai, Oahu, Maui and Hawaii] "Native to India, China, and Indonesia; in Hawai'i over 26,000 trees planted by state foresters for reforestation on Kaua'i, O'ahu, Maui, and Hawai'i between 1928 and 1951, now naturalized at least on Kaua'i, Maui, and Hawai'i."
	Oppenheimer, H. (2008). New Hawaiian plant records for 2007. Bishop Museum Occasional Papers 100: 22-38	[Lanai] "Terminalia catappa L. New island record Tropical almond is a common littoral tree and has been previously documented from Kaua'i, O'ahu, Moloka'i, Maui, and Hawai'i (Wagner et al. 1999a: 547–8; Oppenheimer 2003: 9). On Läna'i trees are scattered along the windward, eastern shore amongst Prosopis and Thespesia, but is less abundant. Seedlings are sometimes observed near cultivated plants at Mänele Bay. Material examined. LÄNA'I: Keömuku Rd between Halepalaoa Landing and Kahe'a, near sea level, 21 Mar 2007, Oppenheimer, Perlman & Tangalin H30717."
	Oppenheimer, H. L. (2003). New plant records from Maui and Hawai'i Counties. Bishop Museum Occasional Papers. 73: 3-30	[Molokai] "Terminalia catappa L. New island record Tropical almond is a common littoral tree on the east end of Moloka'i. It had already been known to be naturalized on Kaua'i, O'ahu, Maui, and Hawai'i (Wagner et al. 1990: 548); C.W. Smith had also reported its occurrence on Moloka'i (1985: 215). Material examined: MOLOKA'I: Kawela, near sea level, 18 Nov 2001, Oppenheimer H110145."

302	**Garden/amenity/disturbance weed**	
	Source(s)	**Notes**
	CABI. (2023). CABI Compendium Invasive Species. https://www.cabidigitallibrary.org/product/qi. [Accessed 10 Mar 2023]	"The fruits of T. catappa contain tannic acid that stains cars and other commodities. Trees produce a significant amount of litter, leaves and fruits, which require constant removal from parks and gardens (Brown and Cooprider, 2013). The tree is difficult to manage because of multiple trunks, requiring regular pruning because of its fast growth. Exposed surface root system can also be hazardous to humans, sidewalks and buildings (Gilman and Watson, 1994)."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Possible landscaping nuisance] "For ornamental purposes, the falling leaves and rotting fruits can be a nuisance; and the trees tend also to grow rather large (Coode, 1978; Heinsleigh and Holaway, 1988)."

Qsn #	Question	Answer
	CaribbeanInvasives.org. (2023). Terminalia catappa L. https://caribbeaninvasives.org/index.php/2021/08/20/terminalia-catappa-l/. [Accessed 9 Mar 2023]	[Potential disturbance weed] "This plant likes to invade urban open space, coastal forest, forest edges/gaps, and disturbed areas. Terminalia catappa L. is a host for the invasive fruit fly'Bactrocera invadens'. It can establish dense stands and is detrimental to native flora and fauna."
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Potential landscaping or maintenance problem] "It cultivated as a shade or street tree, it needs plenty of room for the broad, spreading crown, and the extensive, shallow surface roots can damage sidewalks, driveways, and lawns."

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa naturalizes readily in suitable littoral habitats, and may be regarded as a potential weed threat to native plant communities."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Cited as an agricultural weed, but no impacts verified

304	Environmental weed	y
	Source(s)	**Notes**
	Enloe, S. F., Langeland, K., Ferrell, J., Sellers, B. and MacDonald, G. (2018). Integrated Management of Non-Native Plants in Natural Areas of Florida. SP 242. Revised. University of Florida, IFAS, Gainesville, FL	"Comments: The Indian almond is deciduous and invades coastal habitats, hammocks, and disturbed sites"
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa naturalizes readily in suitable littoral habitats, and may be regarded as a potential weed threat to native plant communities."
	CABI. (2023). CABI Compendium Invasive Species. https://www.cabidigitallibrary.org/product/qi. [Accessed 10 Mar 2023]	"T. cattapa is a fast-growing species that produces many new seedlings with the potential of invading large areas along the littoral and outcompeting and displacing native vegetation (Gilman and Watson, 1994; ISSG, 2017). T. cattapa has a deep-rooting system that may alter the dynamics of coastal areas by inhibiting the natural movement of sand dunes and changing soil chemistry. Sand dunes provide habitat for highly specialized plants and animals, which are affected by the presence of this alien species (Smith, 2010; ISSG, 2017)."
	Smith, C.W. (1985). Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"Terminalia catappa L. (False kamani) This evergreen tree rarely reaches heights over 15 m. It shades out all other species. The seeds are dispersed by man and probably by water. Adaptation to fire is unknown, It has not been evaluated for biological control and is considered a desirable shade tree by many people. The plant is confined to mesic and wet coastal habitats on all major islands."

Qsn #	Question	Answer
	Marciniak, B., Machado, L. P., de Campos, L. L. F., Hirota, M., & Dechoum, M. S. (2022). Direct and indirect effects of an invasive non-native tree on coastal plant communities. Plant Ecology, 223(8), 935-949	"The results of our study show that the presence of Terminalia catappa changes the composition of plant communities, facilitates the development of shade-tolerant species, and promotes woody encroachment in coastal scrub vegetation. Therefore, the coastal scrub frontal dune assessed in our study tends to be converted from a herb-shrub heliophyte cover to vegetation dominated by trees and vines that develop better in shady or diffused light habitats. Additionally, T. catappa leads to the loss of positive and negative associations between native species and to biodiversity loss, with short- and long-term consequences to ecosystem functioning (Thébault and Fontaine 2010; van Moorsel et al. 2021). The establishment of T. catappa is expected to be favored by climate change, as seed germination rates are likely to benefit from higher temperatures (Tietze et al. 2019). Besides, D. ecastaphyllum, which facilitates T. catappa establishment in coastal scrub, is also expected to expand its distribution as temperatures increase (Souza 2010). As environmental processes are dynamic and these species will be favored by climate change, regulations to restrict the use of T. catappa are necessary to prevent negative consequences on native plant communities and associated Nature's contributions to people."

305	Congeneric weed	
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Terminalia argentea ... Weed of: Pastures" [Impacts to pastures unspecified]

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Trees 8-25 m tall; branches conspicuously whorled. Leaves dark green, glossy, in pseudowhorls, crowded toward the ends of the branches, broadly obovate, (10-)20-43 cm long, (6-)12-21 cm wide, brown puberulent, at least when young, apex acuminate to emarginate, petioles 1-2 cm long."

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	de Gouveia Baratelli, T., Gomes, A. C. C., Wessjohann, L. A., Kuster, R. M., & Simas, N. K. (2012). Phytochemical and allelopathic studies of Terminalia catappa L. (Combretaceae). Biochemical Systematics and Ecology, 41, 119-125	[Potentially] "In conclusion, allelopathic bioassays indicate that the dichloromethane and ethyl-acetate fractions of T. catappa's fruits were the most active ones. Their EC50 were established at 336 and 383 ppm, respectively, against lettuce radicles. Only dichloromethane fractions inhibit L. sativa germination. Lettuce roots showed to be more sensitive to allelochemicals than the shoots. The allelopathic activity of T. catappa might be related to the interaction of different groups of substances such as fatty acids (stearic and palmitic acids), 2-pentadecanone, phenolic acids (vanillic, siringic, ferulic and p-coumaric acids) and bsitosterol- 3-O-b-D-glucoside identified and characterized in this work. This study points out, that the allelochemicals are released into the environment through green leaves and accumulated fallen fruits of T. catappa. Allelopathy might play a role in the successful invasion of T. catappa into non-native environments, but further field studies are required to evaluate the significance of the allelochemicals on neighborhood species that co-occur in nature with this species."

403	Parasitic	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Trees 8-25 m tall" [Combretaceae]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Rekhate, D. H., & Honmode, J. (1983). Studies on forage vegetations with reference to selective grazing in sheep. Transactions of Indian Society of Desert Technology and University Centre of Desert Studies, 8(2), 72-75	"Abstract : The preference of sheep for different fodders was determined by 3 methods. Sheep relished velvet bean [Mucuna deeringiana] and oats among fodder crops and grasses, and Leucaena leucocephala and Sesbania grandiflora among shrubs. Leaves of Terminalia catappa were palatable to ewes, Bauhinia variegata to rams and Ficus virens to lambs. Data on CP contents and pharmacological ingredients in these fodders are given."
	Sasu, P., Attoh-Kotoku, V., Akorli, D. E., Adjei-Mensah, B., Tankouano, R. A., & Kwaku, M. (2023). Nutritional evaluation of the leaves of Oxytenanthera abyssinica, Bambusa balcooa, Moringa oleifera, Terminalia catappa, Blighia sapida, and Mangifera indica as non-conventional green roughages for ruminants. Journal of Agriculture and Food Research, 11, 100466	"Taking into account the scarcity of fodder species during the dry months in most developing countries, the leaves of Moringa oleifera, Oxytenanthera abyssinica, Bambusa balcooa, Mangifera indica, Terminalia catappa and Blighia sapida could provide a viable feed option for livestock farmers to keep their animals at a healthy weight."
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"The foliage is suitable for feeding tasar or katkura silkworms. In the Caribbean, the fruit is an important food for birds and many wild mammals, and it is also consumed by various livestock, including pigs."

405	Toxic to animals	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"The foliage is suitable for feeding tasar or katkura silkworms. In the Caribbean, the fruit is an important food for birds and many wild mammals, and it is also consumed by various livestock, including pigs." [No evidence]
	Sasu, P., Attoh-Kotoku, V., Akorli, D. E., Adjei-Mensah, B., Tankouano, R. A., & Kwaku, M. (2023). Nutritional evaluation of the leaves of Oxytenanthera abyssinica, Bambusa balcooa, Moringa oleifera, Terminalia catappa, Blighia sapida, and Mangifera indica as non-conventional green roughages for ruminants. Journal of Agriculture and Food Research, 11, 100466	[No evidence] "Taking into account the scarcity of fodder species during the dry months in most developing countries, the leaves of Moringa oleifera, Oxytenanthera abyssinica, Bambusa balcooa, Mangifera indica, Terminalia catappa and Blighia sapida could provide a viable feed option for livestock farmers to keep their animals at a healthy weight."
	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	y
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa naturalizes readily in suitable littoral habitats, and may be regarded as a potential weed threat to native plant communities. The fruits are hosts of the Caribbean fruit fly (Anastrepha suspensa) in Florida, and of the Mediterranean fruit fly (Ceratitis capitata) in Costa Rica (Morton, 1985)."
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"The fruits are hosts for 21 fruit fly species including Caribbean fruit fly (Anastrepha suspensa) in Florida, and of the Mediterranean fruit fly (Ceratitis capitata) in Costa Rica, as well as a fruit piercing moth (Ophiusa coronata)"

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence] "Kernels of ripe fruit are eaten fresh or roasted. The kernels are usually consumed fresh shortly after extraction from the shell as it starts to mould within 1–2 days at ambient temperatures. The kernels can be preserved by smoking and consumed up to a year later. In some areas the kernels are consumed as snack food by children, with the fleshy outer flesh also sometimes being eaten. The sun-dried kernels also yield 38–55% oil of acceptable flavour, edible like almond oil nut but the yellow oil becomes turbid on standing (Howes 1948; Hedrick 1972; Rosengarten 1984; Morton 1985). In the Philippines, a wine is processed by fermenting mature fruits."
	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	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa is well-adapted to maritime subtropical and tropical climates. Rainfall, generally in the range 1000 to 3500 mm, may be distributed rather uniformly or with a summer maximum. T. catappa is invariably found near the coast, at less than 300-400 m altitude, although it may occasionally occur up to 800 m (Sosef et al., 1995)." [No evidence found. Generally does not occur in fire prone ecosystems]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"Shade - Tropical almond tolerates 0–25% shade. Seedlings and saplings tolerate moderate shade levels but require high light levels to grow satisfactorily, and mature trees prefer full sunlight."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa seedlings are shade-tolerant during early growth (the first 1-2 years). Thereafter they should receive full overhead light for optimal growth, although the tree may grow under moderate shade (Kadambi, 1954). A 13-m tall T. catappa tree grown under the dense shade of Quercus and Ficus exhibited release after growing up through the densely shading canopies (Fisher and Hibbs, 1982). The species is considered to be a pioneer tree. The species regenerates abundantly on its preferred littoral sites (Streets, 1962; Morton, 1985). Under favourable conditions T. catappa is moderately fast-growing, with height growth in early years averaging around 2 m per year (Dixon, 1970; Gupta, 1993)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"It is adapted to a wide range of soils with a wide pH range from 4 to 8, including light textured soils, raised sandy and rocky beaches, brackish, saline and alkaline sands over limestone, but requires good drainage when grown on heavier, clayey soils. It abhors waterlogged soils."

Qsn #	Question	Answer
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa naturally occurs on various coastal soils, especially those on raised sandy and rocky beaches (Kadambi, 1954; Exell, 1954; Streets, 1962; Coode, 1978; Morton, 1985; Lemmens et al., 1995). It is adapted to a very wide range of lighter-textured soil types, including brackish/saline and alkaline sands over limestone, but requires good drainage when grown on heavier, clayey soils (Mitchell, 1964; Morton, 1985; Hearne, 1975; Jensen, 1995; Heinsleigh and Holaway, 1988). Soil pH ranges from 6.0 to 7.4, neutral to moderately alkaline and rich in bases (Francis, 1989). T. catappa will grow in almost any soil provided that moisture is sufficient to sustain growth. As it can tolerate salty and dry conditions, it is suitable for reforestation or revegetation of sandy areas or mined land (Reyes et al., 1991). Soil descriptors - Soil texture: light - Soil drainage: free - Soil reaction: acid; neutral; alkaline - Special soil tolerances: saline - Soil types: sandy soils; saline soils; alkaline soils; alluvial soils; calcareous soils; limestone soils"
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Fores Service, Washington, D.C.	"The tree grows in sandy, clay, or poor soils, although it reaches its best growth in sandy soils."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Trees 8-25 m tall"

412	Forms dense thickets	y
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"False kamani (*Terminalia catappa) is often codominant in coastal situations."
	CaribbeanInvasives.org. (2023). Terminalia catappa L. https://caribbeaninvasives.org/index.php/2021/08/20/terminalia-catappa-l/. [Accessed 7 Mar 2023]	"his plant likes to invade urban open space, coastal forest, forest edges/gaps, and disturbed areas. Terminalia catappa L. is a host for the invasive fruit fly 'Bactrocera invadens'. It can establish dense stands and is detrimental to native flora and fauna."
	Medeiros, A.C., Loope, L.L. & Chimera, C.G. (1998). Flowering Plants and Gymnosperms of Haleakala National Park. Technical Report 120. Pacific Cooperative Studies Unit, Honolulu, HI	"Lower Kipahulu Valley. Tall tree forming thick groves both below and above the road from sea level to 560 ft elevation."
	Krushelnycky, P. D., Chimera, C. G. and VanderWerf, E. A. (2019). Natural resource condition assessment: Haleakalā National Park. Natural Resource Report NPS/HALE/NRR—2019/1977. National Park Service, Fort Collins, Colorado	"Table 4.2.1-2. Notable non-native vegetation controlled below 1000 ft in coastal 'Ohe'o, Ka'āpahu and Nu'u (Source: NPS 2017b)." [Includes Terminalia catappa which "Forms dense stands that exclude most other native and non-native plants"]

Qsn #	Question	Answer
501	**Aquatic**	**n**
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Terrestrial] "It naturally occurs on various coastal soils but is also found inland in dry or open forest near streams and in clearings at elevations of less than 300–400 m and also in semi-arid conditions."

502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 7 Mar 2023]	Family: Combretaceae Subfamily: Combretoideae Tribe: Combreteae Subtribe: Terminaliinae

503	**Nitrogen fixing woody plant**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Combretaceae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Trees 8-25 m tall; branches conspicuously whorled."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "General T. catappa has a very wide natural distribution in near-coastal areas of the Indian Ocean, through tropical Asia and into the Pacific. The rind of the fruit, comprising light, pithy/corky tissue, enables the fruits to float and be dispersed long distances by sea currents (Kadambi, 1954; Nakanishi, 1989; Troup and Joshi, 1984). The extent to which its range has been extended through movement by humans is difficult to determine. T. catappa extends from the Seychelles, through India, the Andamans and adjacent islands, throughout South-East Asia (Myanmar, Thailand, the Malay Peninsula, Vietnam, the Philippines, Indonesia) to Papua New Guinea and northern Australia (Exell, 1954; Fenton et al., 1977; Heinsleigh and Holaway, 1988; Francis, 1989; Pedley, 1990; Sosef et al., 1995). The species is found throughout the South Pacific, including Solomon Islands, Vanuatu and Fiji (Whitmore, 1966; Smith, 1985; Wheatley, 1992; Smith, 1985), and is present on nearly all the high archipelagos of Polynesia and Micronesia, but it may be an aboriginal introduction in the eastern parts of its range (Whistler, 1992b)."

602	Produces viable seed	y
	Source(s)	**Notes**
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"Propagation is usually by seeds gathered from beneath mature trees. Seeds are soaked in cold water for 24 h before planting and germination occurs in about 20 days."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Seeds are reported to stay viable for a long period (Degener, 1946), but are normally sown fresh, within a few weeks of collection; little is known of seed storage behaviour, although it is claimed that they may be stored for one year if kept dry. Seeds can be sown without pre-treatment: germination commences in 3-8 weeks (Maximo and Lanting, 1982; Mbuya et al., 1994; Prins and Maghembe, 1994; Reyes et al., 1991)."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The plant is easily propagated from freshly collected seeds. Seeds stored at ambient conditions for longer than 8 weeks lose their viability."
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"The species is readily propagated from seed. Mass vegetative propagation by rooted cuttings is also feasible."

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Saju, P. U. (2000). Reproductive biology of Terminalia species of tropical moist deciduous forests of Kerala. MSc Thesis. Kerala Agricultural University,	"The results of the study on self pollination of Terminalias are presented in Table 7. In Terminalia tomentosa and T. belerica, no fruit set was observed in flowers where self pollination was executed. In T. catappa, 21 per cent initial fruit set was observed but all the fruits were fallen with in few weeks before reaching maturity. The self pollination study in T. paniculata showed that it achieved an initial fruit set of 37 per cent and about 12 per cent of them reached the mature stage. But no germination was obtained from seeds produced by self pollination." ... "The results on the self fertilization studies suggest that self fertilization is not effective in these species. The failure of all the species in producing viable fruits clearly indicate that Terminalias are not favouring self fertilization."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"Flowering can occur up to three times a year, more often twice a year. In peninsular Malaysia flowering occurs from January to February and July to August. The tree never flowers when defoliated. The ratio of male to hermaphroditic florets on a spike is 16:1. The flowers have an effective system of self-incompatibility. Various insects (Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera) pollinate the flowers."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Flowers in 1 to several spikes at the tips of the branches, each spike 10-25 cm long, perfect flowers only at base of spike; perfect flowers with calyx tube distinctly narrowed above ovary, calyx teeth 1-1.5 mm long; staminate flowers apparently on slender pedicels 1.5-2.5 mm long, but actually the receptacle with an aborted ovary."
	Roubik, D.W. (1995). Pollination of cultivated plants in the tropics. FAO Services Bulletin 118. FAO, Rome, Italy	"Pollinators = fly, bee?"
	Kubitzki, K., Bayer, C. & Stevens, P.F. (2007). The Families and Genera of Vascular Plan&s: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Generic description] "Secondly, small whitish or pale fragrant flowers are the commonest situation throughout the family, and are pollinated by a wide range of insects, including beetles, flies, bees and butterflies. They usually have very well-developed nectaries inside the hypanthium, and are frequently grouped into larger clusters. In India, Srivastava (1993) found that four species of Terminalia were self-incompatible, and were visited by these orders of insects for both pollen and nectar."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"Propagation is usually by seeds gathered from beneath mature trees. Seeds are soaked in cold water for 24 h before planting and germination occurs in about 20 days. Natural root grafts do occur. Early seedling growth is slow and a preplant fertilizer application is recommended on poor soils. The slow growth necessitates weeding for a few months after planting. The seedling or sapling can be coppiced though it does not produce prolific sprouts." [No evidence]

607	Minimum generative time (years)	3

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"T. catappa should be highly amenable to breeding programmes, given the high level of variation in nut characteristics and the young age, about 3-4 years, at which plants flower and fruit, and accessibility of flowers for controlled pollination, although the latter are small and crowded."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Fruit green, sometimes tinged red, ellipsoid, somewhat compressed, 2-6 cm long, 2-3 cm wide, narrowly winged along lateral margins, mesocarp firm to leathery, fibrous." [No evidence. Fruit and seed large and lack means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"T. catappa has been widely introduced as a cultivated plant in and is now naturalized and nearly pantropical in its distribution. If planted near the sea, nuts are readily spread by ocean currents to germinate elsewhere. False kamani was apparently brought to Hawai'i by Dr. William Hillebrand between 1851 and 1871; the original tree still stands at Foster Botanical Garden, Honolulu, which was once Hillebrand's home."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"The species has been spread widely by humans and the native range is uncertain. It has long been naturalised in a broad belt extending from the Indian subcontinent through southeast Asia, Northern Australia, New Guinea to the Pacific Islands. The tree is found throughout the South Pacific region, including the Solomon Islands, Vanuatu, and Fiji. It is present on nearly all the high archipelagos of Polynesia and Micronesia. More recently, the tree has also been introduced to parts of Africa and the Americas."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Fruit green, sometimes tinged red, ellipsoid, somewhat compressed, 2-6 cm long, 2-3 cm wide, narrowly winged along lateral margins, mesocarp firm to leathery, fibrous." [No evidence. Propagules large and unlikely to ever be dispersed accidentally as a produce contaminant]

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"The rind of the fruit, comprising light, pithy/corky tissue, enables the fruits to float and be dispersed long distances by sea currents"

Qsn #	Question	Answer
705	**Propagules water dispersed**	**y**
	Source(s)	**Notes**
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"The rind of the fruit is a light, pithy, or corky tissue that enables the fruit to float and be dispersed by sea currents."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"The rind of the fruit, comprising light, pithy/corky tissue, enables the fruits to float and be dispersed long distances by sea currents (Kadambi, 1954; Nakanishi, 1989; Troup and Joshi, 1984). The extent to which its range has been extended through movement by humans is difficult to determine."

706	**Propagules bird dispersed**	
	Source(s)	**Notes**
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"The fruit are eaten, and the seeds distributed by fruit bats and birds. The seeds float and can be carried considerable distances on the oceans and still remain viable." [Unclear if Hawaii's introduced avifauna would be capable of dispersing seeds]
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	[Possibly carried by birds. Unlikely to be internally dispersed by birds present in the Hawaiian Islands] "Trees are also found away from coasts due to fruits being carried inland and dropped by frugivorous birds and bats, and as a result of deliberate planting by humans."

707	**Propagules dispersed by other animals (externally)**	**y**
	Source(s)	**Notes**
	Marciniak, B., Machado, L. P., de Campos, L. L. F., Hirota, M., & Dechoum, M. S. (2022). Direct and indirect effects of an invasive non-native tree on coastal plant communities. Plant Ecology, 223(8), 935-949	"Fruits of T. catappa are often consumed by bats, an animal group with high seed dispersal capacity (Regolin et al. 2020). Consequently, bats may be contributing to the arrival of zoochoric species in areas invaded by T. catappa. Birds may also contribute to the seed dispersal of zoochoric plant species in areas invaded by T. catappa. Therefore, because the seed rain of woody species is higher where taller T. catappa trees are present, the process of woody encroachment may be accelerated in these areas (Ratajczak et al. 2012; Prather et al. 2017)."
	Birkinshaw, C. R. (1995). The importance of black lemur, Eulemur macaco (Lemuridae, Primates), for seed dispersal in Lokobe Forest, Madagascar. PhD Dissertation. University College London, London, UK	"The black lemurs always drop the seeds of tw o species, Mangifera indica and Terminalia catappa." ... "For two species, Mangifera indica and Terminalia catappa, black lemurs very rarely acted as synchores. Normally, they waste the seeds of these species by dropping them below their parent once they have gnawed away the flesh. However, rarely they carried the fruits in their hand or mouth, out of the parent tree. This behaviour occurred either when the group moved off before an individual had finished feeding or when one animal wanted to stop another from stealing its fruit."
	Elangovan, V., Marimuthu, G., & Kunz, T. H. (1999). Temporal patterns of individual and group foraging behaviour in the short-nosed fruit bat, Cynopterus sphinx, in south India. Journal of Tropical Ecology, 15(5), 681-687	"While transporting whole fruit of T. catappa, which weighed 84.8% of the bat's body mass, individual bats sometimes dropped fruits at an average distance of 21.9 ± 11.8 m (n = 77) from fruit trees, before reaching a feeding roost."

708	**Propagules survive passage through the gut**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"Trees are also found away from coasts due to fruits being carried inland and dropped by frugivorous birds and bats, and as a result of deliberate planting by humans." [Unknown. Unlikely to be internally disperses by any birds present in the Hawaiian Islands. Unknown if feral pigs would consume fruit or internally disperse seeds]

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Fruit green, sometimes tinged red, ellipsoid, somewhat compressed, 2-6 cm long, 2-3 cm wide, narrowly winged along lateral margins, mesocarp firm to leathery, fibrous." [Relatively large seeded. No evidence found that densities in excess of 1000/m2 are produced.]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Seeds are reported to stay viable for a long period (Degener, 1946), but are normally sown fresh, within a few weeks of collection; little is known of seed storage behaviour, although it is claimed that they may be stored for one year if kept dry. Seeds can be sown without pre-treatment: germination commences in 3-8 weeks (Maximo and Lanting, 1982; Mbuya et al., 1994; Prins and Maghembe, 1994; Reyes et al., 1991)."
	Vozzo, J.A. (2002). Tropical Tree Seed Manual. USDA Fores Service, Washington, D.C.	"The period of seed viability is unknown."
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	[Somewhat contradicts Forestry Compendium] "The seed storage behavior is unknown, but seeds appear to lose viability fairly rapidly under storage. Until effective medium-term seed storage procedures are developed it is recommended that seeds be sown within 4–6 weeks of collection."

803	Well controlled by herbicides	y
	Source(s)	**Notes**
	CABI. (2023). CABI Compendium Invasive Species. https://www.cabidigitallibrary.org/product/qi. [Accessed 10 Mar 2023]	"In Florida (USA) areas invaded by T. catappa are treated with basal applications of herbicides such as triclopyr (Hadden et al., 2005). In Santa Catarina, Brazil, cutting the tree and applying 4% triclopyr to the stump was the most effective treatment for T. catappa (Dechoum and Ziller, 2013)."
	Enloe, S. F., Langeland, K., Ferrell, J., Sellers, B. and MacDonald, G. (2018). Integrated Management of Non-Native Plants in Natural Areas of Florida. SP 242. Revised. University of Florida, IFAS, Gainesville, FL	"Terminalia catappa ... Treatment: Cut stump: 50% Garlon 3A. Basal bark: 10% Garlon 4"

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Ability to coppice"
	Thomson, L. A., & Evans, B. (2006). Terminalia catappa (tropical almond). Species Profiles for Pacific Island Agroforestry, 2(2), 1-20.	"Coppice - Seedlings and saplings coppice strongly, although the extent of regrowth after severe pruning or damage is unknown in mature trees. The main leader may be cut out of the top, sometimes more than once, to create a very wide-spreading shade or specimen tree. Excessive pruning by wind or man may cause weakening or death of mature trees."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Chinese rose beetles often attack the young leaves, in some cases reducing them to skeletons."

Summary of Risk Traits:

A tree widely cultivated and distributed throughout the Pacific and naturalized on all main Hawaiian Islands. Although planted as a shade tree in some locations, its large stature and exposed surface roots may create problems with lawns, sidewalks, and buildings. It spreads primarily by its water-dispersed seeds, and through intentional cultivation. In some situations, the tree can form dense stands that may exclude other vegetation and modify ecosystem processes.

High Risk / Undesirable Traits
• Thrives and spreads in regions with tropical climates
• Naturalized on Kauai, Oahu, Molokai, Lanai. Maui and Hawaii (Hawaiian Islands) and widely distributed in the tropical Pacific
• Large surface roots and leaf litter may create problems in landscaping and around sidewalks, driveways, and lawns.
• An environmental weed in some locations, excluding other vegetation and modifying ecosystem processes.
• Other Terminalia species may be weedy or invasive.
• Potentially allelopathic.
• Host of plant pests and pathogens.
• Seedlings are shade tolerant and capable of establishing under other vegetation.
• Tolerates many soil types.
• Can form dense stands that excludes other vegetation.
• Reproduces by seeds.
• Capable of reaching maturity in 3 years.
• Large seeds dispersed by water, carried externally by fruit bats, birds and possibly other frugivores, and intentionally cultivated.
• Able to coppice and resprout after cutting.

Low Risk Traits
• In spite of invasiveness, and issues with roots and litter in cultivated settings, valued as an ornamental and landscaping tree.
• Unarmed (no spines, thorns, or burrs)
• Fruit and foliage palatable to browsing animals.
• Non-toxic
• Kernels of ripe fruit edible and valued as a food source in some places.
• Self-Incompatible.
• Not reported to spread vegetatively.
• Relatively large seeds unlikely to be dispersed long distances when cultivated away from water, or in the absence of animals capable of carrying or ingesting fruit.
• Herbicides may provide effective control.