

Family: *Areaceae*

Taxon: *Licuala spinosa*

Synonym: *Corypha pilearia* Lour.

Licuala horrida Blume

Licuala pilearia (Lour.) Blume

Licuala ramosa Blume

Common Name: spiny licuala

mangrove fan palm

Questionnaire :	current 20090513	Assessor:	Assessor	Designation:	H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Assessor	WRA Score	8
101	Is the species highly domesticated?		y=-3, n=0		n
102	Has the species become naturalized where grown?		y=1, n=-1		
103	Does the species have weedy races?		y=1, n=-1		
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		n=0, y = 1*multiplier (see Appendix 2)		n
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)		n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)		n
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)		n
401	Produces spines, thorns or burrs		y=1, n=0		y
402	Allelopathic		y=1, n=0		
403	Parasitic		y=1, n=0		n
404	Unpalatable to grazing animals		y=1, n=-1		
405	Toxic to animals		y=1, n=0		n
406	Host for recognized pests and pathogens		y=1, n=0		
407	Causes allergies or is otherwise toxic to humans		y=1, n=0		n
408	Creates a fire hazard in natural ecosystems		y=1, n=0		n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0		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	
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	
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	
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 8

Supporting Data:

101	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Is the species highly domesticated? No evidence] "Cultivated world-wide in the tropics, sub tropics and temperate regions." ... "Often cultivated in parks, worldwide."
102	2013. WRA Specialist. Personal Communication.	NA
103	2013. WRA Specialist. Personal Communication.	NA
201	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Species suited to tropical or subtropical climate(s) 2-High] "DISTRIBUTION. Widely distributed from the Philippines and Vietnam in the north to Sumatra in the south, and from the Andaman and Nicobar Islands in the west to Borneo and Java in the east."
202	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Quality of climate match data 2-High]
203	2003. Riffle, R.L./Craft, P.. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	[Broad climate suitability (environmental versatility)? No] "This species is hardier to cold than most others and is adaptable to zones 10 and 11."
204	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Widely distributed from the Philippines and Vietnam in the north to Sumatra in the south, and from the Andaman and Nicobar Islands in the west to Borneo and Java in the east."
205	2001. Ellison, D./Ellison, A.. Cultivated Palms of the World. UNSW Press, Sydney.	[Does the species have a history of repeated introductions outside its natural range? Yes] "...this species is common in cultivation."
205	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Does the species have a history of repeated introductions outside its natural range? Yes] "Cultivated world-wide in the tropics, sub tropics and temperate regions." ... "Often cultivated in parks, worldwide."
301	2012. Lau, A./Frohlich, D.. New plant records from O'ahu for 2009. Bishop Museum Occasional Papers. 113: 7-26.	[Naturalized beyond native range? Yes] "Licuala spinosa Wurmb New naturalized record. This species, native to Indonesia, is a clump forming fan palm to 10 feet tall with fronds more or less circular in outline. It looks similar to the more common Licuala grandis but differs in having its fronds divided nearly to the base. This species was first collected in Hawai'i from Foster Botanical Garden in 1949. It was noted here very sparingly naturalized sprouting from a hedged row of adventive and naturalized <i>Tabebuia heterophylla</i> saplings, as well as other naturalized species and garden escapes near Foster Botanical Garden (Henderson 2009; Hodel 2009). Material examined. O'AHU: Vineyard Blvd, across from Foster Garden. Growing in mixed <i>Tabebuia</i> hedge in lowland urban setting. Juvenile about 2 ft tall, no flowers or fruit, 8 Aug 2008, OED 2008080801."
302	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Garden/amenity/disturbance weed? No, but disturbance adapted] "A very common palm distributed in light open habitats. It is found associated with mangroves where it forms tussocks. It thrives in disturbed habitats such as ditches along roads and dykes separating rice paddies. Finally, it occurs behind the coastline in Peninsular Thailand in forests dominated by <i>Melaleuca cajuputi</i> forest."
302	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Garden/amenity/disturbance weed? No evidence]
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No evidence]
304	2008. Meyer, J-Y./Lavergne, C./Hodel, D. R.. Time Bombs in Gardens: Invasive Ornamental Palms in Tropical Islands, with Emphasis on French Polynesia (Pacific Ocean) and the Mascarenes (Indian Ocean). Palms. 52: 71-83.	[Environmental weed? No] No evidence
304	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Environmental weed? No] No evidence
305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? No evidence]

401	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of <i>Licuala</i> (Arecaceae: Coryphoideae). <i>Telopea</i> . 10(1): 207-223.	[Produces spines, thorns or burrs? Yes] "It is found in a range of habitats from ditches to forest understorey. It forms a dense crown and the petioles are armed with long spines."
402	2008. Hashim, M.N./Abd Razak, O./Zuhaidi, A./Rosdi, K./Ab Rasip, A.G.. The potential of palas (<i>Licuala spinosa</i>) palm as an understorey crop in rubber (<i>Hevea brasiliensis</i>) plantation in Malaysia. Forest Research Institute, Kuala Lumpur, Malaysia	[Allelopathic? No evidence] "Palas (<i>Licuala spinosa</i> .) is a small understorey palm commonly found in the disturbed forests in Malaysia. In northern states of Peninsular Malaysia, young leaves/shoots of a certain <i>Licuala</i> species (<i>L. spinosa</i>) are commonly collected and used as wrapping material for "ketupat", a Malaysian delicacy made of sticky rice during the festive months of Syawal and Zulhijjah of the Muslim calendar. Traditionally, the leaves are obtained from the wild Palas palms found in the forests. The collection of young Palas leaves is tedious and required a long period as the palm plants are scattered throughout the forest areas. Moreover, the Palas shoot gatherers have to confront dangerous animals of the forests, especially snakes and biting insects. There is also a fierce competition between the gatherers, as the resource is diminishing. As the access to forest areas become limited due to long distance of villages from natural forest coupled with restricted regulations from the authority, the supply of palas shoots becoming scarce and unreliable. Furthermore, Forest Enactment and Act requires gatherers to obtain valid forest permit for the forest produce collection. To overcome this situation, domestication of this palm species has been initiated by some farmers in Kedah and Perlis. In this paper, we present a case study of a resourceful planter in Kuala Nerang, Kedah who has successful in establishing (intercropping) palas palms under a mature rubber plantation. The prospect of improving and expanding this new crop under the agroforestry system is also discussed."
403	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Parasitic? No] "A medium-sized, coarse palm, forming dense, compact (to widespreading) clumps with several 7-8 cm thick stems to 4-5(6) m."
404	2002. Russon, A.E.. Return of the Native: Cognition and Site-Specific Expertise in Orangutan Rehabilitation. <i>International Journal of Primatology</i> . 23(3): 461-478.	[Unpalatable to grazing animals? Palatable to orangutans] "Table I. Changes in palm food consumption from 5/95 to 7/00" [Orangutans consumed Fr (fruit), Fl (flower), M (meristem), P (parenchyma), and Fl-St (flower stem) of <i>Licuala spinosa</i>]
404	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of <i>Licuala</i> (Arecaceae: Coryphoideae). <i>Telopea</i> . 10(1): 207-223.	[Unpalatable to grazing animals? Unknown, but spines could deter browsing] "It is found in a range of habitats from ditches to forest understorey. It forms a dense crown and the petioles are armed with long spines."
405	2002. Russon, A.E.. Return of the Native: Cognition and Site-Specific Expertise in Orangutan Rehabilitation. <i>International Journal of Primatology</i> . 23(3): 461-478.	[Toxic to animals? No evidence] "Table I. Changes in palm food consumption from 5/95 to 7/00" [Orangutans consumed Fr (fruit), Fl (flower), M (meristem), P (parenchyma), and Fl-St (flower stem) of <i>Licuala spinosa</i>]
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No evidence]
406	2012. Caasi-Lit, M.T./Lit Jr, I.L./Larona, A.R.. Expansion of local geographic and host ranges of <i>Nipaecoccus nipae</i> (Maskell)(Pseudococcidae, Hemiptera) in the Philippines with new records of predators and attending ants. <i>Philippine Journal of Crop Scienc</i>	[Host for recognized pests and pathogens?] "Table 2. Updated host list of the buff coconut mealybug, <i>Nipaecoccus nipae</i> (Maskell), in the Philippines. New host records are written in boldface letters." [Includes <i>Licuala spinosa</i>]
407	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Causes allergies or is otherwise toxic to humans? No evidence] " <i>Licuala</i> leaves are collected as food wrappers in Malaysia and Indonesia, and a royalty fee used to be paid for this to the Malaysian Forestry Department. The young leaves of <i>Licuala spinosa</i> are collected to make ketupat (square parcels of woven strips of palm leaf in which rice is boiled and served) for local use. Leaves are sold on local markets for the latter."
407	2013. Palmpedia. <i>Licuala spinosa</i> . http://www.palmpedia.net/wiki/Licuala_spinosa [Accessed 08 Nov 2013]	[Causes allergies or is otherwise toxic to humans? No evidence] "Uses: Ornamentals, and decorations, roofing, food-wrappers, walking sticks, binding, making hats, and eaten as vegetables."
408	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of <i>Licuala</i> (Arecaceae: Coryphoideae). <i>Telopea</i> . 10(1): 207-223.	[Creates a fire hazard in natural ecosystems? No evidence, and unlikely given habitat] "Occurs in open, swampy ground and river banks in coastal areas. In Peninsular Malaysia it is found in swampy depressions in open sandy country, especially along the east coast."
409	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of <i>Licuala</i> (Arecaceae: Coryphoideae). <i>Telopea</i> . 10(1): 207-223.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Observations throughout Thailand have shown that <i>Licuala spinosa</i> is a versatile species that thrives well under both light open and forest conditions, as long as there is a constant water supply."

409	2003. Riffle, R.L./Craft, P.. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "It is a true water lover and, while it needs partial shade when young, can readily adapt to full sun when older."
409	2013. Dave's Garden. PlantFiles: Spiny Licuala, Mangrove Fan Palm - Licuala spinosa. http://davesgarden.com/guides/pf/go/57888/ [Accessed 08 Nov 2013]	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Sun Exposure: Sun to Partial Shade Light Shade Partial to Full Shade Full Shade"
410	2013. Betrock's Palm World. Licuala spinosa. www.palmworld.net/Guide2.asp?PALMID=50 [Accessed 08 Nov 2013]	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] "SOIL REQUIREMENTS: Widely adaptable"
411	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Climbing or smothering growth habit? No] "Caespitose palm, with up to 4 m tall stems forming large clumps."
412	2003. Riffle, R.L./Craft, P.. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	[Forms dense thickets? Possibly Yes] "This is a densely clustering species. Mature trunks grow to 15 feet high and are covered with fibers and leaf bases in their upper parts but are almost smooth and light covered on the lower portions. A clump can measure at least 15 feet wide and 20 feet tall."
501	1990. National Research Council. Saline Agriculture: Salt-Tolerant Plants for Developing Countries. National Academies Press, Washington, DC	[Aquatic? No] "Licuala spinosa is a palm found in tidal forests immediately behind the mangroves from the Malay Peninsula to the Andaman Islands."
501	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Aquatic? No] "A very common palm distributed in light-open habitats. It is found associated with mangroves where it forms tussocks."
502	1998. Keng, H. (ed.). The Concise Flora of Singapore: Monocotyledons, Volume 2. Singapore University Press, Singapore	[Grass? No] "Bushy palm, in clumps, 2-5 m tall"
503	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Nitrogen fixing woody plant? No] Arecaceae
504	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "A medium-sized, coarse palm, forming dense, compact (to widespreading) clumps with several 7-8 cm thick stems to 4-5(6) m. Leaves are hand-shaped and have a radius of 45-60 cm; leaflets about 7-8 cm wide, with squared-off ends. The leaf stalks are quite heavily armed with short spines."
601	2002. Barfod, A.S./Guan, S.L.. The Genus Licuala (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Evidence of substantial reproductive failure in native habitat? No] "This widespread, common species is unlikely to be under serious threat."
601	2010. LaFrankie, J.V.. Trees of Tropical Asia. Black Tree Publications, Baroro. Philippines	[Evidence of substantial reproductive failure in native habitat? No] "Licuala spinosa is the most widespread species and also one of the tallest."
602	2001. Ellison, D./Ellison, A.. Cultivated Palms of the World. UNSW Press, Sydney.	[Produces viable seed? Yes] "Mature fruit is read and seed should germinated in 4 to 6 months."
603	2001. Ellison, D./Ellison, A.. Cultivated Palms of the World. UNSW Press, Sydney.	[Hybridizes naturally? Unknown] No hybrids reported in genus
604	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of Licuala (Arecaceae: Coryphoideae). Telopea. 10(1): 207-223.	[Self-compatible or apomictic? Yes] "Rachillae bagged with nets impenetrable to insects (6 rachillae with a total of 187 flowers) showed a fruiting success of 3.4%, comparable with that of unbagged inflorescences from adjacent palms growing in shady conditions (5.5%; 2 rachillae with a total of 145 flowers). Licuala spinosa is thus potentially self-compatible." ... "The detailed study of receptivity further shows that self-pollination is possible during an overlap between the male and female phases before the insects reappear at sunset (phase III)."
605	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of Licuala (Arecaceae: Coryphoideae). Telopea. 10(1): 207-223.	[Requires specialist pollinators? No] "Licuala spinosa. A range of insects belonging to eight different orders visited the flowers." ... "Cicadoidea, Formicidae, Lepidoptera and Thysanoptera were also recorded but their presence was erratic. Potentially important pollinators should consequently be looked for among insects of the orders Coleoptera, Diptera and Hymenoptera."
606	2003. Barfod, A.S./Burholt, T./Borchsenius, F.. Contrasting pollination modes in three species of Licuala (Arecaceae: Coryphoideae). Telopea. 10(1): 207-223.	[Reproduction by vegetative fragmentation? Yes] "Licuala spinosa Wurmb (subgenus Licuala) is an understory palm often with a large production of suckers."

607	2008. Renuka, C.. KFRI Palmetum (Final report of the project KFRI 444/04-Strengthening and enriching the Palmetum). Kerala Forest Research Institute, Kerala	[Minimum generative time (years)? Unknown] "They are relatively fast growing."
607	2013. Betrock's Palm World. <i>Licuala spinosa</i> . www.palmworld.net/Guide2.asp?PALMID=50 [Accessed 08 Nov 2013]	[Minimum generative time (years)? Unknown] "Despite the ferocious armament along the leaf stems and its slow rate of growth, spiny licuala is prized for its attractively-segmented, circular leaves."
701	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No evidence] "Fruits are round, 10-12 mm diameter, bright orange to reddish, and very showy." [Small, fleshy fruits presumably adapted for frugivory]
702	2008. Kobayashi, K./Criley, R./Kaufman, A./Tsugawa, S./Ricordi, A./Clifford, P.. Barrier Plants. L-20. College of Tropical Agriculture and Human Resources (CTAHR, Honolulu, HI http://www.ctahr.hawaii.edu/freepubs)	[Propagules dispersed intentionally by people? Yes] " <i>Licuala spinosa</i> , Arecaceae. A densely clumping palm reaching 10 feet high with circular-shaped leaves that are segmented. It does best in wet soils in either full sun or partial shade. Protect from strong winds to prevent leaf damage. Spines are along trunks and leaf rachis. It is used as a hedge, screen, or barrier planting."
703	2002. Barfod, A.S./Guan, S.L.. The Genus <i>Licuala</i> (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Propagules likely to disperse as a produce contaminant? No Evidence] "The one-seeded fruits ripen from green to red. They are globose and less than 1 cm in diam." [Genus description] "Fruit globose, about 8 mm in diam.," [Species description. Adapted for animal dispersal and unlikely to become a produce contaminant]
704	2002. Barfod, A.S./Guan, S.L.. The Genus <i>Licuala</i> (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Propagules adapted to wind dispersal? No] "Fruit globose, about 8 mm in diam.,"
705	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Propagules water dispersed? Possibly. Distribution suggests yes] "Occurs in open, swampy ground and river banks in coastal areas. In Peninsular Malaysia it is found in swampy depressions in open sandy country, especially along the east coast."
706	1998. Baker, H.G./Baker, I./Hodges, S.A.. Sugar Composition of Nectars and Fruits Consumed by Birds and Bats in the Tropics and Subtropics. Biotropica. 30(4): 559-586.	[Propagules bird dispersed? Yes] "Appendix 2. Sugar composition of nectars and fruits from tropical and subtropical regions worldwide." ... [Table indicates that <i>Licuala spinosa</i> are consumed by passerine birds in the Old World [Po]
706	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Propagules bird dispersed? Presumably Yes] "Fruits are round, 10-12 mm diameter, bright orange to reddish, and very showy." [Small, fleshy fruits presumably adapted for frugivory]
706	2013. Learn 2 Grow. <i>Licuala spinosa</i> . http://www.learn2grow.com/plants/licuala-spinosa/ [Accessed 08 Nov 2013]	[Propagules bird dispersed? Yes] "Attracts - Birds"
707	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Propagules dispersed by other animals (externally)? No] "Fruits are round, 10-12 mm diameter, bright orange to reddish, and very showy." [No evidence, and both fruits and seeds lack means of external attachment]
708	2006. Fredriksson, G.M./Wich, S.A.. Frugivory in sun bears (<i>Helarctos malayanus</i>) is linked to El Niño-related fluctuations in fruiting phenology, East Kalimantan, Indonesia. Biological Journal of the Linnean Society. 89(3): 489-508.	[Propagules survive passage through the gut? Yes] "Appendix 2. Overall list of plant species occurring in the diet of the sun bear (faecal analyses and observations) in Sungai Wain between October 1997 to July 2002" [Sunbears observed to consumed fr, fruit; flo, flower; lb, leafbase/pith. of <i>Licuala spinosa</i>]
708	2006. Giesen, W./Wulffraat, S./Zieren, M./Scholten, L.. Mangrove Guidebook for Southeast Asia. Food and Agriculture Organization of the United Nations, Bangkok, Thailand	[Propagules survive passage through the gut? Presumably Yes] "Fruits are round, 10-12 mm diameter, bright orange to reddish, and very showy." [Small, fleshy fruits presumably adapted for frugivory]
708	2013. Albert, A./Hambuckers, A./Culot, L./Savini, T./Huynen, M.C.. Frugivory and Seed Dispersal by Northern Pigtailed Macaques (<i>Macaca leonina</i>), in Thailand. International Journal of Primatology. 34(1): 170-193.	[Propagules survive passage through the gut? Depredated by macaques] "For three species (<i>Licuala spinosa</i> , <i>Polyalthia evecta</i> , <i>Psychotria ophioxylodes</i>), predation was due to the consumption of immature fruits (8 % of feeding observations; N=1855). Only four of the predated species were considered important species in the diet"
801	2002. Barfod, A.S./Guan, S.L.. The Genus <i>Licuala</i> (Arecaceae, Coryphoideae) in Thailand. Kew Bulletin. 57(4): 827-852.	[Prolific seed production (>1000/m2)? Unknown, but possibly no due to single-seeded fruit] "The one-seeded fruits ripen from green to red. They are globose and less than 1 cm in diam." [Genus description] "Fruit globose, about 8 mm in diam.,"

802	2001. Ellison, D./Ellison, A.. Cultivated Palms of the World. UNSW Press, Sydney.	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] "Mature fruit is read and seed should germinated in 4 to 6 months."
803	2013. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	2013. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown]
805	2013. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

Summary of Risk Traits

High Risk / Undesirable Traits

- Naturalized on Oahu, Hawaiian Islands
- Thrives in tropical climates
- Petioles are armed with long spines
- Shade tolerant
- Tolerates many soil types
- May form dense clumps that could exclude other vegetation
- Self-compatible
- Can produce suckers
- Fleshy-fruited with bird-dispersed seeds

Low Risk Traits

- Non-toxic
- Landscaping and ornamental value
- Used as a barrier plant
- Leaves used for wrapping vegetables in native range
- Slow-growing