

<b>Taxon:</b> Willughbeia edulis	<b>Family:</b> Apocynaceae
<b>Common Name(s):</b> edible willugbeia	<b>Synonym(s):</b> Ambelania edulis (Roxb.) J.Presl Ancylocladus cochinchinensis Pierre Ancylocladus curtisianus Pierre Ancylocladus edulis (Roxb.) Kuntze Pacouria roxburghii Kostel. Willughbeia cochinchinensis (Pierre) Willughbeia curtisiana (Pierre) Willughbeia dulcis Ridl. Willughbeia martabanica Wallich

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 11 Jan 2016
<b>WRA Score:</b> 1.0	<b>Designation:</b> EVALUATE	<b>Rating:</b> Evaluate

**Keywords:** Tropical, Liana, Unarmed, Edible Fruit, Zoochorous

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	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
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	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	y
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m <sup>2</sup> )		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	No evidence
102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA
103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. 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
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	"Distribution - Nicobar Islands, India, Bangladesh, Burma, Thailand, Vietnam, Cambodia, Laos, Malay Peninsula."
202	Quality of climate match data	High
	Source(s)	Notes
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 8 Jan 2016]	"Preferred Climate Zone : Tropical, Sub-Tropical / Monsoonal" ... "Habitat : It grows in lowland forests and freshwater swamp forests."
	Maxwell, J. F. (2009). Vascular flora of the Emerald Pool area, Krabi province, southern Thailand. <i>Maejo International Journal of Science and Technology</i> , 3(1), 1-25	[ <i>Willughbeia edulis</i> occurs from 25-75 m altitude] "Abstract: The Emerald Pool is situated in remnant lowland (25-75 m), seasonal, fresh water, swamp forest on limestone bedrock. Primary, evergreen seasonal, hardwood forest, often with bamboo and frequently degraded, surrounds the swamp forest and extends to 175 m elevation. The bedrock above the swamp forest is sandstone with occasional limestone outcrops and hills. A total of 111 vascular plant families with 420 species were found."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	"Distribution - Nicobar Islands, India, Bangladesh, Burma, Thailand, Vietnam, Cambodia, Laos, Malay Peninsula."
205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	No evidence of widespread cultivation outside native range
301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm">http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm</a> . [Accessed 11 Jan 2016]	No evidence to date
302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
304	Environmental weed	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm">http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm</a> . [Accessed ]	No evidence
305	Congeneric weed	n

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

401	Produces spines, thorns or burrs	n
	<b>Source(s)</b>	<b>Notes</b>
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	[No evidence] "Woody climber. Branches glabrous, lenticillate. Leaves: petiole 0.6-1.9 cm long; blade elliptic or oblong, apex acuminate to rounded, base cuneate to rounded; 1.3-5 x as long as wide, 3.2-25 x 1.2-11.5 cm; papery or subcoriaceous; glabrous; 9-28 pairs of lateral nerves at 50-80°, usually reaching margin, tertiary venation reticulate or with one intercalated vein."

402	Allelopathic	n
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2016. Personal Communication	Unknown

403	Parasitic	n
	<b>Source(s)</b>	<b>Notes</b>
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	"Woody climber" [Apocynaceae. No evidence]

404	Unpalatable to grazing animals	n
	<b>Source(s)</b>	<b>Notes</b>
	Hanelt, P. (ed.). 2001. <i>Mansfeld's Encyclopedia of Agricultural and Horticultural Crops</i> , Volume 4. Springer-Verlag, Berlin, Heidelberg, New York	"The fruits are eaten." [Fruits eaten by animals & humans. Palatability of foliage to animals unknown]

405	Toxic to animals	n
	<b>Source(s)</b>	<b>Notes</b>
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence
	Wagstaff, D.J. 2008. <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Useful Tropical Plants Database. (2016). <i>Willughbeia edulis</i> . <a href="http://tropical.theferns.info/viewtropical.php?id=Willughbeia+edulis">http://tropical.theferns.info/viewtropical.php?id=Willughbeia+edulis</a> . [Accessed 8 Jan 2016]	"Edible Uses: Fruit - raw[46, 317, 460]. A pleasant flavour[46]. The yellowish, ovoid fruit is about the size of a lemon[46]. The fruit is about 5cm in diameter[555]. Medicinal The latex is used as a plaster for sores and as a treatment for yaws [555]. The stems are used to treat yaws, dysentery, and liver discomfort [555] The roots are used internally to treat jaundice, heartburn, and diarrhoea[555]."
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Ethnobotanical Uses : Edible Plant Parts ( (Edible Fruits)) Food ( (Fruit & Vegetable: Its fruits are edible.)) Medicinal (Its stem and latex have been used in treating dysentery, liver problems and yaws.) [Others]: It was a source of poor quality rubber before introduction of the rubber tree ( <i>Hevea brasiliensis</i> )."
	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
	Source(s)	Notes
	Useful Tropical Plants Database. (2016). <i>Willughbeia edulis</i> . <a href="http://tropical.theferns.info/viewtropical.php?id=Willughbeia+edulis">http://tropical.theferns.info/viewtropical.php?id=Willughbeia+edulis</a> . [Accessed 8 Jan 2016]	"Habitat: Lowland primary rain forests[334, 555]."
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 8 Jan 2016]	[Unlikely. Occurs in wet habitats] "Habitat : It grows in lowland forests and freshwater swamp forests. It occurs locally in Bukit Timah, Central Catchment Nature Reserve, along Chestnut Track, Seletar Track, in Mandai, Mount Serapong, Nee Soon Swamp Forest, Pulau Ubin (Chek Jawa), Pulau Tekong, and Pulau Ubin."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"It grows in lowland forests and freshwater swamp forests." ... "Light Preference : Full Sun, Semi Shade"

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	<b>Source(s)</b>	<b>Notes</b>
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafauweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafauweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Plant & Rootzone Preference/Tolerance : Moist Soils, Well-Drained Soils, Fertile Loamy Soils"
411	Climbing or smothering growth habit	y
	<b>Source(s)</b>	<b>Notes</b>
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	"Woody climber."
412	Forms dense thickets	n
	<b>Source(s)</b>	<b>Notes</b>
	Savajol, N., Chan, L. Yep, L., Pinto, F., & Eanghourt, K. (2012). Participatory needs assessment on wild foods diversity towards food security and climate change adaptation in Ratanakiri province. NTFPEP, Quezon City, The Philippines	[Climbing, smothering habit] "This climbing plant grows in the dense forests of Cambodia."
501	Aquatic	n
	<b>Source(s)</b>	<b>Notes</b>
	Vanlalnghaka, C. (2015). Seasonal variation in the diet of the frugivorous bat, <i>Rousettus leschenaultia</i> . <i>Science Vision</i> 15(3): 106-114	[Terrestrial climber] "This plant is growing mainly in the evergreen and semi-evergreen forest"
502	Grass	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 8 Jan 2016]	"Family: Apocynaceae Subfamily: Rauvolfioideae Tribe: Willughbeieae"
503	Nitrogen fixing woody plant	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 8 Jan 2016]	Apocynaceae
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	"Woody climber. Branches glabrous, lenticillate. Leaves: petiole 0.6-1.9 cm long; blade elliptic or oblong, apex acuminate to rounded, base cuneate to rounded"

601	Evidence of substantial reproductive failure in native habitat	n
	<b>Source(s)</b>	<b>Notes</b>
	Savajol, N., Chan, L. Yep, L., Pinto, F., & Eanghour, K. (2012). Participatory needs assessment on wild foods diversity towards food security and climate change adaptation in Ratanakiri province. NTFPEP, Quezon City, The Philippines	"Description and habitat: This climbing plant grows in the dense forests of Cambodia. It grows abundantly in the north western and south eastern provinces."
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	[No evidence. Relatively widespread distribution] "Distribution - Nicobar Islands, India, Bangladesh, Burma, Thailand, Vietnam, Cambodia, Laos, Malay Peninsula."

602	Produces viable seed	y
	<b>Source(s)</b>	<b>Notes</b>
	Useful Tropical Plants Database. (2016). <i>Willughbeia edulis</i> . <a href="http://tropical.theferns.info/viewtropical.php?id=Willughbeia+edulis">http://tropical.theferns.info/viewtropical.php?id=Willughbeia+edulis</a> . [Accessed 8 Jan 2016]	"Propagation Seed -"
	Savajol, N., Chan, L. Yep, L., Pinto, F., & Eanghour, K. (2012). Participatory needs assessment on wild foods diversity towards food security and climate change adaptation in Ratanakiri province. NTFPEP, Quezon City, The Philippines	"The plant can also be propagated from the seeds."

603	Hybridizes naturally	
	<b>Source(s)</b>	<b>Notes</b>
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	No hybrids documented
	WRA Specialist. 2016. Personal Communication	Unknown



Qsn #	Question	Answer
604	Self-compatible or apomictic	
	Source(s)	Notes
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	[Unknown. Perfect flowers] "Flowers 5-merous, actinomorphic. Sepals connate at the base; lobes free and erect or slightly reflexed; colleters absent. Corolla: lobes in bud overlapping to the left forming a cone or cylinder of erect lobes; tube cylindrical, somewhat inflated around the stamens, or short and inflated; lobes spreading and ovate, elliptic or oblong. Stamen insertion variable, completely included within the tube; free from the pistil head; filament varying in length; anthers ovate to lanceolate, apex acute or obtuse, base rounded. Disk absent."
	WRA Specialist. 2016. Personal Communication	Unknown

605	Requires specialist pollinators	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Its flowers are insect-pollinated."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Propagation Method : Seed" [No evidence]
	Savajol, N., Chan, L. Yep, L., Pinto, F., & Eanghourt, K. (2012). Participatory needs assessment on wild foods diversity towards food security and climate change adaptation in Ratanakiri province. NTFPEP, Quezon City, The Philippines	[No evidence] "Cultivation: The plant is easily propagated by cuttings of the stem. Cuttings are directly put into the ground at the beginning of rainy season. The plant needs to be put under a tree and does not need much care. The plant can also be propagated from the seeds."

607	Minimum generative time (years)	
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	[Unknown] "Plant Growth Rate : Moderate"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Fruits: Its fruits are round or egg-shaped berries, and about 1.2–5.8 cm wide across. Its seeds with are up to 13 mm across." [Unlikely. Fruit & seeds lack means of external attachment]

702	Propagules dispersed intentionally by people	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Hanelt, P. (ed.). 2001. Mansfeld's Encyclopedia of Agricultural and Horticultural Crops, Volume 4. Springer-Verlag, Berlin, Heidelberg, New York	"Occasionally also cultivated."

703	Propagules likely to disperse as a produce contaminant	n
	<b>Source(s)</b>	<b>Notes</b>
	Savajol, N., Chan, L. Yep, L., Pinto, F., & Eanghourt, K. (2012). Participatory needs assessment on wild foods diversity towards food security and climate change adaptation in Ratanakiri province. NTFPEP, Quezon City, The Philippines	"Ligneous liana climbing high in trees. The yellow berries are oval shaped about 10-15 centimeters, inside contained 4 to 5 seeds. The ripped fruits are sold in the market and are well appreciated." [Unlikely. Fruits & seeds relatively large]

704	Propagules adapted to wind dispersal	n
	<b>Source(s)</b>	<b>Notes</b>
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	"Fruit a fleshy berry; spherical, ellipsoid or pear-shaped; few to many seeded; indehiscent. Seed compressed ovoid; without a coma; smooth, with a very thin endosperm and thick homy cotyledons."
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 8 Jan 2016]	"Seed / Spore Dispersal : Biotic (Fauna)"

705	Propagules water dispersed	
	<b>Source(s)</b>	<b>Notes</b>
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Fruits: Its fruits are round or egg-shaped berries, and about 1.2–5.8 cm wide across. Its seeds with are up to 13 mm across." ... "It grows in lowland forests and freshwater swamp forests." [Unknown, but possible if growing near aquatic habitats]

706	Propagules bird dispersed	y
	<b>Source(s)</b>	<b>Notes</b>
	Vanlalnghaka, C. (2015). Seasonal variation in the diet of the frugivorous bat, <i>Rousettus leschenaultia</i> . <i>Science Vision</i> 15(3): 106-114	"Table 1. The dietary habit of <i>R. leschenaulti</i> at the Lengteng Wildlife Sanctuary were identified by analysis of faecal matter, collection of discarded plant parts beneath the day and night roosts, collection of pollens attached to the body of bats, and the field observation on feeding behaviour.)" [ <i>Willughbeia edulis</i> fruit included in the diet of fruit bats]
	Middleton, D. J. (1993). A taxonomic revision of <i>Willughbeia</i> Roxb (Apocynaceae). <i>Blumea</i> , 38(1), 1-24	[Fleshy-fruited. Presumably Yes] "Fruit a fleshy berry" ... "Fruit spherical or oval; 1.7-5.8 cm long, 1.2-5.8 cm wide, yellow or orange. Seeds 6-16 x 4-13 x 3-6 mm."

707	Propagules dispersed by other animals (externally)	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Fruits: Its fruits are round or egg-shaped berries, and about 1.2–5.8 cm wide across. Its seeds with are up to 13 mm across." ... "Seed / Spore Dispersal : Biotic (Fauna)" [Unlikely. Fruit & seeds lack means of external attachment. May be carried & seeds discarded by fruit bats in native range]

708	Propagules survive passage through the gut	Y
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2013. <i>Willughbeia edulis</i> . <a href="https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534">https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1534</a> . [Accessed 11 Jan 2016]	"Seed / Spore Dispersal : Biotic (Fauna)" [Presumably Yes]
	Vanlalnghaka, C. (2015). Seasonal variation in the diet of the frugivorous bat, <i>Rousettus leschenaultia</i> . <i>Science Vision</i> 15(3): 106-114	"Table 1. The dietary habit of <i>R. leschenaulti</i> at the Lengteng Wildlife Sanctuary were identified by analysis of faecal matter, collection of discarded plant parts beneath the day and night roosts, collection of pollens attached to the body of bats, and the field observation on feeding behaviour.)" [Presumably yes. <i>Willughbeia edulis</i> fruit included in the diet of fruit bats]

801	Prolific seed production (>1000/m <sup>2</sup> )	
	Source(s)	Notes
	Savajol, N., Chan, L. Yep, L., Pinto, F., & Eanghourt, K. (2012). Participatory needs assessment on wild foods diversity towards food security and climate change adaptation in Ratanakiri province. NTFPEP, Quezon City, The Philippines	[Unknown] "The yellow berries are oval shaped about 10-15 centimeters, inside contained 4 to 5 seeds."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 11 Jan 2016]	[Unknown] "Storage Behaviour: No data available for species or genus. Of 182 known taxa of family APOCYNACEAE, 95.60% Orthodox(p/?), 1.65% Recalcitrant(?), 2.75% Uncertain"

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

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

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2016. Personal Communication	Unknown

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Thrives in tropical climates
- Climbing growth habit
- Reproduces by seeds
- Seeds dispersed by mammals, possibly birds & intentionally by people
- Limited ecological information reduces accuracy of risk prediction

## Low Risk Traits

- No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
- Unarmed (no spines, thorns or burrs)
- Edible fruit
- Medicinal uses
- Not reported to spread vegetatively
- Fruit relatively large & unlikely to be accidentally dispersed

Second Screening Results: Vines must pass both tests

Herb or low stature shrubby life form

(A) Reported as a weed of cultivated lands? No

Tree/tree-like shrub

(A) Shade tolerant or known to form dense stands?> Unknown. Possibly shade tolerant

(B) Bird-dispersed?> Dispersed by frugivores

(C) Life cycle <4 years? Unknown

Outcome = Evaluate