

Australia/New Zealand Weed Risk Assessment adapted for Florida.

Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. *Invasive Plant Science and Management* 1: 178-195.

<i>Litchi chinensis (lychee)</i>			
Question number	Question	Answer	Score
1.01	Is the species highly domesticated?	y	-3
1.02	Has the species become naturalised where grown?	n	-1
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high)	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	n	0
2.04	Native or naturalized in habitats with periodic inundation	?	
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	n	-2
3.02	Garden/amenity/disturbance weed	n	0
3.03	Weed of agriculture	n	0
3.04	Environmental weed	n	0
3.05	Congeneric weed	n	0
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	n	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	n	0
4.08	Creates a fire hazard in natural ecosystems	n	0
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
4.1	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)	n	0
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	n	0
5.01	Aquatic	n	0

5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat		
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative fragmentation	n	-1
6.07	Minimum generative time (years)	5	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant	n	-1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	n	-1
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	y	1
8.01	Prolific seed production		
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	n	-1
8.03	Well controlled by herbicides		
8.04	Tolerates, or benefits from, mutilation or cultivation		
8.05	Effective natural enemies present in Florida, or east of the continental divide		
Total Score			-7

Outcome Accept*

*Used secondary screen from: Daehler, C. C., J.L. Denslow, S. Ansari, and H. Kuo. 2004. A risk assessment system for screening out harmful invasive pest plants from Hawaii's and other Pacific islands. *Conserv. Biol.* 18: 360-368.

section	# questions answered	satisfy minimum?
A	8	yes
B	11	yes
C	17	yes
total	36	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01	1. Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia. 2. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 3. Huxley (1992) The New Royal Horticultural Society Dictionary of Gardening. Stockton Press, New York.	1. "Lychee has a long history in southern China and has undergone intensive selection. It was cultivated by people of Malayan descent possibly as early as 1500 BC". 2. "Lychees do not reproduce faithfully from seed, and the choicest have abortive, not viable seed." [although selection has likely been for more fruits, potentially making the species more weedy, trees with high proportions of shrivelled, non-viable seeds are also prized] 3. "Litchi has been so long improved in cultivation that wild forms, aside from naturalized escapes, are thought to be unknown"
1.02		
1.03		
2.01	Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia.	"It is adapted to the tropics and warm subtropics"
2.02		
2.03	1. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 2. Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia.	1. "The lychee is native to low elevations of the provinces of Kwangtung and Fukien in southern China" [small corner of China; not naturalized elsewhere] 2. has an "exacting climatic requirement"
2.04	1. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 2. Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdffiles/MG/MG05100.pdf).	1. "The lychee can stand occasionally brief flooding better than citrus" but "it cannot stand water-logging". 2. "Lychee may withstand short periods of flooding."
2.05	Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdffiles/MG/MG05100.pdf).	"Lychee are grown commercially in many subtropical areas such as Australia, Brazil, southeast China, India, Indonesia, Israel,

		Madagascar, Malaysia, Mauritius, Mexico, Myanmar, Pakistan, South Africa, Taiwan, Thailand, Vietnam, and the U.S."
3.01		no evidence
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05		no evidence
4.01	Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	no description of these traits
4.02	Fujii, Shibuya, Nakatani, Itani, Hiradate, and Parvez (2004) Assessment method for allelopathic effect from leaf litter leachates. <i>Weed Biology and Management</i> 4: 19-23.	Leaf litter leachate of "...litchi (<i>Litchi chinensis</i> Sonnerat) showed either no inhibitory or slightly promotive activity" on lettuce seedlings.
4.03	Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	no description of this
4.04		
4.05		no evidence
4.06	Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	Several insect pests infest lychees, including mites, stinkbugs, and fruit flies.
4.07		fruits readily eaten; no other evidence of toxicity
4.08		no evidence
4.09	1. Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdf/files/MG/MG05100.pdf). 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	1. "In general, lychee trees should be planted in full sun for best growth and fruit production." 2. full sun
4.1	1. Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdf/files/MG/MG05100.pdf). 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 3. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	1. "Sandy soils with low organic-matter content are suitable if sufficient fertilizers are supplied." 2. "deep, fertile, moist, sandy soil" 3. "The lychee grows well on a wide range of soils. In China it is cultivated in sandy or clayey loam, "river mud", moist sandy clay, and even heavy clay."
4.11	Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	large tree
4.12		no evidence
5.01		terrestrial
5.02	USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	Sapindaceae
5.03		no evidence, and Sapindaceae
5.04	Subhadrabandhu and Stern (2005) Taxonomy, botany and plant development. Pp. 25-34 in	does not produce bulbs, corms, or tubers

	Menzel and Waite (eds) Litchi and Longan: Botany, Production and Uses. CABI Publishing.	
6.01		
6.02	Mitra and Ray (2005) Propagation. Pp. 35-48 in Menzel and Waite (eds) Litchi and Longan: Botany, Production and Uses. CABI Publishing.	"Fresh litchi seeds germinate within 4-10 days when provided with adequate soil water and aeration". Can grow litchi from seed, but seedlings are not used for raising new plantations.
6.03	McConchie, Vithanage, and Batten (1994) Intergeneric hybridisation between litchi (<i>Litchi chinensis</i> Sonn.) and longan (<i>Dimocarpus longan</i> Lour.). Annals of Botany 74: 111-118.	Litchi will artificially hybridize with longan. [but unknown whether hybrids occur naturally]
6.04	1. Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdffiles/MG/MG05100.pdf). 2. Viruel and Hormaza (2004) Development, characterization and variability analysis of microsatellites in lychee (<i>Litchi chinensis</i> Sonn., Sapindaceae). Theoretical and Applied Genetics 108: 896-902.	1. "Isolated or single lychee trees will usually set acceptable amounts of fruit." 2. "although lychee appears to be self-compatible, outcrossing is important in this species"
6.05	Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	Lychees are pollinated by honeybees and other insects.
6.06	1. Mitra and Ray (2005) Propagation. Pp. 35-48 in Menzel and Waite (eds) Litchi and Longan: Botany, Production and Uses. CABI Publishing. 2. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami.	All methods of asexual reproduction described (air-layering, grafting, or with cuttings) are artificial (1, 2).
6.07	1. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 2. Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdffiles/MG/MG05100.pdf).	1. "seedling trees will not bear until they are 5 to 12, or even 25, years old" 2. "seedling trees may take 10 or more years to bear fruit"
7.01		
7.02	Crane, Balerdi, and Maguire (2005) Lychee growing in the Florida home landscape. University of Florida, IFAS Extension, HS6 (http://edis.ifas.ufl.edu/pdffiles/MG/MG05100.pdf).	"Lychee are grown commercially in many subtropical areas such as Australia, Brazil, southeast China, India, Indonesia, Israel, Madagascar, Malaysia, Mauritius, Mexico, Myanmar, Pakistan, South Africa, Taiwan, Thailand, Vietnam, and the U.S."
7.03		no evidence (and large seed)
7.04	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	fruit a large drupe
7.05		no evidence
7.06	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	fruit a red, ovate drupe to 1.5 inches long; leathery skin contains white, gelatinous mesocarp surrounding large brown seed [no evidence regarding dispersal, but fruit is fleshy and medium-sized]

7.07	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	fruit a large drupe - no evidence of any means of attachment
7.08	1. Nature Conservation Council of NSW (2002) Flying Foxes Policy (http://www.nccnsw.org.au/index.php?option=com_docman&task=doc_download&gid=32). 2. Korine, Izhaki, and Arad (1999) Is the Egyptian fruit-bat <i>Rousettus aegyptiacus</i> a pest in Israel? An analysis of the bat's diet and implications for its conservation. Biological Conservation 88: 301-306.	Grey-headed flying foxes in Australia (1) and Egyptian fruit bats in Israel (2) are known to eat lychee fruits.
8.01		
8.02	1. Morton (1987) Fruits of Warm Climates. Julia F. Morton, Miami. 2. Verheij and Coronel, eds. (1992) Plant Resources of South-East Asia. No. 2. Edible Fruits and Nuts. Prosea, Bogor, Indonesia.	1. "lychee seeds remain viable only 4 to 5 days" [not clear whether in soil or dry storage, but very short] 2. "short life of its seed"
8.03		
8.04		
8.05		