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.

Murraya paniculata (orange jasmine)			
Question number	**Question**	**Answer**	**Score**
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
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)		
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	y	0
3.02	Garden/amenity/disturbance weed	n	0
3.03	Weed of agriculture	n	0
3.04	Environmental weed	y	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	?	
4.1	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)	y	1
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		
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		
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative fragmentation		
6.07	Minimum generative time (years)	4	-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)		
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05	Effective natural enemies present in Florida, or east of the continental divide		
Total Score			7

Outcome	**Reject***

*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	6	yes
B	10	yes
C	15	yes
total	31	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		widely cultivated, but no evidence of selection for reduced weediness
1.02		
1.03		
2.01		
2.02		
2.03		
2.04		
2.05	Whistler (2000) Tropical Ornamentals: a Guide. Timber Press, Portland.	"widely and commonly cultivated in the tropics"
3.01	1. Kairo, Ali, Cheesman, Haysom, and Murphy (2003) Invasive Species Threats in the Caribbean Region. Report to the Nature Conservancy. 2. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. Supplement 3.1. University of Hawai'i Press/Bishop Museum Press, Honolulu. 3. Francis (2003) USDA Forest Service, International Institute of Tropical Forestry (http://www.fs.fed.us/global/iitf/pdf/shrubs/Murraya%20exotica.pdf).	naturalized in Bermuda (1), Oahu (2), and Puerto Rico (3)
3.02		no evidence
3.03		no evidence
3.04	1. Thorp, J.R., Wilson, M (1998 onwards) Weeds Australia (http://www.weeds.org.au/cgi-bin/weedident.cgi?tpl=plant.tpl&ibra=all&card=E33). 2. Calyx Horticultural Services, Queensland gardening information (http://www.calyx.com.au/murraya.html).	1. *M. paniculata* "is invasive and naturalising in South-east and Central Queensland and has the potential to become a serious weed in North Queensland". 2. "A drawback of *Murraya* [*paniculata*] is that it is considered an environmental weed in many districts." "*Murraya paniculata*...is a native of Australia, but the plants commonly in cultivation probably originated in Asia". [so the invasive form is not native to Australia, and is the form in the horticultural trade]

3.05		none found
4.01	Dassanayake (1985) A Revised Handbook to the Flora of Ceylon. Amerind Publishing Co., New Delhi.	unarmed
4.02		no evidence
4.03	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	no description of this
4.04		
4.05		no evidence of this in horticultural references or toxicity references
4.06	Woods, Lacey, Brockway, and Johnstone (2005) Hosts of Mediterranean fruit fly *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae) from Broome and the Broome Peninsula, Western Australia. Australian Journal of Entomology 44: 437-441.	"The eight hosts most important to medfly survival and abundance in Broome" include *Murraya paniculata*.
4.07		no evidence of this in horticultural references or toxicity references
4.08		no evidence
4.09	1. Horticopia 4.0 2. Francis (2003) USDA Forest Service, International Institute of Tropical Forestry (http://www.fs.fed.us/global/iitf/pdf/shrubs/Murraya%20exotica.pdf).	1. exposure: partial shade or partial sun to full sun; full sun or light shade. 2. "Orange jasmine is moderately intolerant of shade. Although growing well under partial shade, it produces few flowers or fruits. Escaped plants in Puerto Rico are most often seen at the edges and in the understory of dry and moist secondary forests."
4.1	Jones (1993) Flora of Malaysia, Illustrated. Oxford University Press, Kuala Lumpur.	"In Malaysia, it grows wild on limestone outcrops"
4.11	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	shrub or small tree
4.12		no evidence
5.01		terrestrial
5.02	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	Rutaceae
5.03	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	Rutaceae
5.04	Francis (2003) USDA Forest Service, International Institute of Tropical Forestry (http://www.fs.fed.us/global/iitf/pdf/shrubs/Murraya%20exotica.pdf).	"seedlings quickly develop deep root systems"
6.01		
6.02	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	propagation by seed
6.03		
6.04		
6.05	Vitali and Machado (1994) Visitors to flowers of	"flowers of *M. exotica* [=*M. paniculata*]

	Murraya exotica L. (Rutaceae). [=*M. paniculata*] Semina 15: 153-169.	were visited by a wide variety of insects"
6.06		
6.07	1. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 2. Horticopia 4.0	1. moderate growth rate 2. slow growth rate
7.01		
7.02	Whistler (2000) Tropical Ornamentals: a Guide. Timber Press, Portland.	"widely and commonly cultivated in the tropics"
7.03		no evidence
7.04	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.	fruits are berries
7.05		no evidence
7.06	1. PIER, Institute of Pacific Islands Forestry (http://www.hear.org/pier/species/murraya_paniculata.htm) 2. Langeland and Stocker (2001) Control of non-native plants in natural areas of Florida. University of Florida, IFAS Extension, SP 242 (http://edis.ifas.ufl.edu/pdffiles/WG/WG20900.pdf).	1. possibly bird dispersed 2. "small orange fruit are bird-dispersed"
7.07		no evidence of any means of attachment
7.08		fleshy fruited
8.01		
8.02		
8.03	1. Francis (2003) USDA Forest Service, International Institute of Tropical Forestry (http://www.fs.fed.us/global/iitf/pdf/shrubs/Murraya%20exotica.pdf). 2. Langeland and Stocker (2001) Control of non-native plants in natural areas of Florida. University of Florida, IFAS Extension, SP 242 (http://edis.ifas.ufl.edu/pdffiles/WG/WG20900.pdf).	1. "Orange jasmine can be killed (with moderate success) with herbicides recommended for broad-leaf weeds". 2. "Treatment: Hand pull seedlings; basal bark treatment with 10% Garlon 4...All methods listed have been found effective under certain circumstances."
8.04	Francis (2003) USDA Forest Service, International Institute of Tropical Forestry (http://www.fs.fed.us/global/iitf/pdf/shrubs/Murraya%20exotica.pdf).	"Plants coppice vigorously after disturbance."
8.05		