

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>Kalanchoe pinnata (air plant)</i>			
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	y	0
3.03	Weed of agriculture	y	0
3.04	Environmental weed	y	0
3.05	Congeneric weed	y	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	y	1
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans		
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	y	1
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	y	1
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		
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative fragmentation	y	1
6.07	Minimum generative time (years)		
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		
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)		
8.01	Prolific seed production	y	1
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	n	-1
8.05	Effective natural enemies present in Florida, or east of the continental divide		
Total Score			16

Outcome	Reject*
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*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	9	yes
C	15	yes
total	30	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		cultivated, but no evidence of selection for reduced weediness
1.02		
1.03		
2.01	Whistler (2000) Tropical Ornamentals: a Guide. Timber Press, Portland.	"widely cultivated in the tropic and subtropics"
2.02		
2.03		
2.04		
2.05	Whistler (2000) Tropical Ornamentals: a Guide. Timber Press, Portland.	"widely cultivated in the tropic and subtropics"
3.01	1. New Zealand Plant Conservation Network (2005) New Zealand Adventive Vascular Plant List. 2. Kairo, Ali, Cheesman, Haysom, and Murphy (2003) Invasive Species Threats in the Caribbean Region. Report to the Nature Conservancy. 3. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. 4. Weber (2003) Invasive Plant Species of the World. CABI Publishing.	Naturalized in New Zealand (1), the Caribbean (2), Hawaii (3); weedy in Australia and the Galapagos (4).
3.02	McMullen (1999) Flowering Plants of the Galapagos. Cornell University Press, Ithaca.	<i>Kalanchoe pinnata</i> considered one of the worst invasive species in the Galapagos - invades open, disturbed areas such as roadsides and fields.
3.03	Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons.	considered a common weed of agriculture in Hawaii and Puerto Rico
3.04	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	considered an environmental weed in Australia and the Galapagos
3.05	Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons.	<i>Kalanchoe verticillata</i> considered a common weed of agriculture in Hawaii, and is present as a weed in Australia.
4.01	Wickens (1987) Flora of Tropical East Africa: Crassulaceae. A.A. Balkema/Rotterdam/Boston.	no description of these traits
4.02		no evidence
4.03	Wickens (1987) Flora of Tropical East Africa:	no description of this

	Crassulaceae. A.A. Balkema/Rotterdam/Boston.	
4.04		
4.05	Smith (2004) <i>Kalanchoe</i> species poisoning in pets. Veterinary Medicine 99: 933-936.	" <i>Kalanchoe</i> species contain cardiac glycosides and are toxic to animals. In South Africa and Australia, where these plants are found in the wild, cattle and sheep poisonings are common."
4.06		
4.07		
4.08		no evidence
4.09	1. Wickens (1987) Flora of Tropical East Africa: Crassulaceae. A.A. Balkema/Rotterdam/Boston. 2. Hortocopia 4.0	1. Habitat: riverine, among rocks, also in shade of trees 2. partial shade or partial sun to full sun
4.1	Hortocopia 4.0	Suitable soil is well-drained/loamy or sandy.
4.11	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.	growth habit: subshrub, forb/herb
4.12	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"often forms dense stands"; up to 2 m high
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.	Crassulaceae
5.03	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.	herbaceous Crassulaceae
5.04	Hortocopia 4.0	"This plant's roots are fibrous."
6.01		
6.02	Hortocopia 4.0	"Propagation is from cuttings and seeds."
6.03		
6.04		
6.05	T.D. Macfarlane, L. Watson and N.G. Marchant (Editors) (2000 onwards). Western Australian Genera and Families of Flowering Plants. Western Australian Herbarium. Version: August 2002. (http://florabase.calm.wa.gov.au/).	floral nectaries present, entomophilous [genus <i>Kalanchoe</i>]
6.06	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"The plant is suckering from the base and spreads vegetatively by forming young plantlets on the leaf margins...The plant spreads rapidly due to vegetative growth."
6.07		
7.01		

7.02	Whistler (2000) Tropical Ornamentals: a Guide. Timber Press, Portland.	"widely cultivated in the tropic and subtropics"
7.03		no evidence
7.04	Whistler (2000) Tropical Ornamentals: a Guide. Timber Press, Portland.	fruit is a follicle
7.05		no evidence
7.06		
7.07		no evidence of any means of attachment
7.08		
8.01	Eggl (2003) Illustrated Handbook of Succulent Plants. Crassulaceae. Springer-Verlag, Berlin.	numerous, minute seeds
8.02		
8.03	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	"Effective chemical control is done by applying 2,4-D together with a surfactant."
8.04	1. Queensland Government, Natural Resources and Mines, Pest Series. Mother of millions: Bryophyllum species. (http://www.nrm.qld.gov.au/factsheets/pdf/pest/pp33.pdf) 2. PIER, Institute of Pacific Islands Forestry (http://www.hear.org/pier/species/bryophyllum_pinnatum.htm).	1. Fire is an effective control mechanism and "lessens the problem for years". [does not tolerate fire] 2. "Apparently cannot withstand trampling by animals, it thrives in pastures only on rock piles and on fence lines."
8.05		