

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>Brugmansia x candida (angel's trumpet)</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	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	y	1
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans	y	1
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)	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		
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	n	-1
6.05	Requires specialist pollinators	y	-1

6.06	Reproduction by vegetative fragmentation	y	1
6.07	Minimum generative time (years)	2	0
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		
8.02	Evidence that a persistent propagule bank is formed (>1 yr)		
8.03	Well controlled by herbicides		
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			2

Outcome	Evaluate*
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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	14	yes
total	29	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		
2.02		
2.03		
2.04		
2.05	Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books.	" <i>B. x candida</i> was one of the first <i>Brugmansia</i> to be taken to

		Africa and Europe and is now widely cultivated in those places."
3.01	1. Villaseñor and Espinosa-Garcia (2004) The alien flowering plants of Mexico. Diversity and Distributions 10: 113-123. 2. McMullen (1999) Flowering Plants of the Galapagos. Cornell University Press, Ithaca. 3. New Zealand Plant Conservation Network (2005) New Zealand Adventive Vascular Plant List.	1. present in 13 Mexican states (considered naturalized) 2. naturalized in the Galapagos 3. fully naturalized in New Zealand
3.02		no evidence
3.03		no evidence
3.04	1. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. 2. McMullen (1999) Flowering Plants of the Galapagos. Comstock Publishing Associates, Ithaca.	1. "in Hawai'i frequently cultivated and sparingly established" 2. escaped from cultivation in the Galapagos [no mention of its being a problem]
3.05		no evidence
4.01	Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	no description of these traits
4.02		no evidence
4.03	Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	no description of this
4.04		
4.05	Bruneton (1999) Toxic Plants: Dangerous to Humans and Animals. Lavoisier Publishing, Paris.	"it is possible for contaminated fodder and grain to induce toxicosis"
4.06		
4.07	Greene and Patterson (1996) Ingestion of angel's trumpet: an increasingly common source of toxicity. Southern Medical Journal 89: 365-369.	"Ingestion of the flowers, seeds, or leaves of this plant...can cause serious illness or death."
4.08		no evidence
4.09	1. Hortocopia 4.0 2. Huxley (1992) The New Royal Horticultural Society Dictionary of Gardening. The MacMillan Press, London. 3. Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492).	1. exposure: partial shade or partial sun to full sun 2. sun or part shade BUT 3. full sun (only)
4.1	Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492).	"organically rich, medium wet, well-drained soils...During the growing season, plants are heavy feeders that need regular fertilization to stimulate new growth and flowers."
4.11	USDA, NRCS. 2005. <i>The PLANTS Database</i> , 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.	tree, shrub
4.12		no evidence
5.01		terrestrial
5.02	USDA, NRCS. 2005. <i>The PLANTS Database</i> , Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton	Solanaceae

	Rouge, LA 70874-4490 USA.	
5.03	USDA, NRCS. 2005. <i>The PLANTS Database</i> , 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.	Solanaceae
5.04		
6.01		
6.02	1. Hortocopia 4.0 2. Huxley (1992) <i>The New Royal Horticultural Society Dictionary of Gardening</i> . The MacMillan Press, London.	1. "Seedlings may appear throughout the garden from this plant." 2. propagate from seed
6.03		
6.04	Wagner, Herbst, and Sohmer (1999) <i>Manual of the flowering plants of Hawai'i</i> . University of Hawai'i Press/Bishop Museum Press, Honolulu.	self-incompatible
6.05	1. Grant and Grant (1983) Behavior of hawkmoths on flowers of <i>Datura meteloides</i> . <i>Botanical Gazette</i> 144: 280-284. 2. Mildred E. Mathias <i>Botanical Garden Newsletter</i> , Spring 2001, vol. 4(2). <i>The Plants That Love Hawkmoths</i> (http://www.botgard.ucla.edu/html/MEMBGNewsletter/Volume4number2/Theplantsthatlovehawkmoths.html).	1. " <i>Datura arborea</i> [synonym] in section <i>Brugmansia</i> appears to be a hawkmoth flower." 2. "Sphingophilous flowers [flowers adapted to pollination by hawkmoths, family Sphingidae] are largely unused by other classes of pollinators." [Large, trumpet-shaped flower morphology suggests specialist pollinators]
6.06	Wagner, Herbst, and Sohmer (1999) <i>Manual of the flowering plants of Hawai'i</i> . University of Hawai'i Press/Bishop Museum Press, Honolulu.	"often spreading clonally...it may persist as suckering clumps"
6.07	Missouri Botanical Garden, Kemper Center for Home Gardening (http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=A492)	"In the first year, plants will typically grow to 3' tall with minimal flowering. In the second year, plants will grow taller with more profuse flowering." [unknown when vegetative reproduction begins]
7.01		
7.02	Wagner, Herbst, and Sohmer (1999) <i>Manual of the flowering plants of Hawai'i</i> . University of Hawai'i Press/Bishop Museum Press, Honolulu.	"widely cultivated as an ornamental"
7.03		no evidence
7.04	Preissel and Preissel (2002) <i>Brugmansia and Datura: Angel's Trumpets and Thorn Apples</i> . Firefly Books.	Fruit a large capsule; fruit/seeds do not appear adapted to wind dispersal. "...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds".
7.05	Preissel and Preissel (2002) <i>Brugmansia and Datura: Angel's Trumpets and Thorn Apples</i> . Firefly Books.	"...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds" [and no evidence of water dispersal]
7.06	Preissel and Preissel (2002) <i>Brugmansia and Datura: Angel's Trumpets and Thorn Apples</i> . Firefly Books.	"...they [the fruits] weather while still on the tree until the

		destruction of the outer skin releases the seeds"
7.07	Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books.	no description of any means of attachment
7.08	Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books.	"...they [the fruits] weather while still on the tree until the destruction of the outer skin releases the seeds"
8.01	Iqbal, Wijesekera, and Hapukotuwa (2001) Fruits in <i>Brugmansia x candida</i> . Ceylon Journal of Science 28: 19-20.	over 50 seeds per pod
8.02		
8.03		
8.04	Preissel and Preissel (2002) <i>Brugmansia</i> and <i>Datura</i> : Angel's Trumpets and Thorn Apples. Firefly Books.	"...cutting off the <i>Brugmansia</i> bushes aboveground is not the way to get rid of them, as numerous new bushes grow from the roots. What was intended to be a removal campaign actually results in spreading the stock further."
8.05		