

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>Richardia brasiliensis (Brazilian pusley)</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	n	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	n	0
4.06	Host for recognised pests and pathogens		
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)	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	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	?	
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
7.02	Propagules dispersed intentionally by people	n	-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	y	-1
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	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	10	yes
C	13	yes
total	29	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		no evidence of cultivation
1.02		
1.03		
2.01	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	"Greatest climatic preference...is warm temperate areas"
2.02		
2.03		
2.04		
2.05	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	Has been introduced into the United States, Mexico, Jamaica, eastern and southern Africa, Mauritius, Ceylon, Java, and Hawaii.
3.01	1. Flora of Zimbabwe (http://www.zimbabweflora.co.zw/speciesdata/species.php?species_id=156700). 2. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	1. <i>R. scabra</i> and <i>R. brasiliensis</i> both "now naturalised weeds in many tropical and subtropical regions of the world". 2. widely naturalized; "in Hawaii naturalized in dry to mesic, disturbed sites"
3.02	Flora of Zimbabwe (http://www.zimbabweflora.co.zw/speciesdata/species.php?species_id=156690).	"Weed of disturbed places."
3.03	Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons.	<i>R. brasiliensis</i> is a principal weed of agriculture in Brazil, Rhodesia (Zimbabwe), and Swaziland, and it is a common weed in Argentina, Hawaii, Indonesia, and South Africa.
3.04		no evidence
3.05	1. Mishra (1999) Florida pusley (<i>Richardia scabra</i> L.): a problem weed of upland rice - its growth behaviour, economic use and control. Indian Journal of Weed Science 31: 271-273. 2. Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons.	1. <i>R. scabra</i> is a weed of rice in India. 2. <i>R. scabra</i> is a common weed of agriculture in El Salvador and the U.S.
4.01	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	no description of these traits
4.02		no evidence

4.03	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	no description of this
4.04		
4.05		no evidence
4.06		
4.07		no evidence
4.08		no evidence
4.09	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	occurs "in exposed localities"
4.1	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	Occurs in "the sandy waterways and coastlines of Uruguay and Brazil. The species is especially common along sandy verges of roads, railways, and streams in exposed localities at lower elevations."
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: forb/herb
4.12		no evidence, and is an herb
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.	Rubiaceae
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 Rubiaceae
5.04	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	"from a long, often thick taproot or from slender fibrous roots" [referring to subgenus <i>Richardia</i> , to which <i>R. brasiliensis</i> belongs]
6.01		
6.02	Lorenzi (1991) Plantas Daninhas do Brasil. Instituto Plantarum.	"reproduction by seeds"
6.03		
6.04		
6.05	The Pollination Home Page, plant/pollinator database (http://pollinator.com/plant_pol/richardia_scabra.htm).	Probably not - <i>R. scabra</i> , which has very similar flowers, pollinated by bees and butterflies.
6.06	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	"rarely rooting from the lower nodes"
6.07	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	"Annuals often becoming perennial" [so capable of reproducing in a year or less]
7.01		
7.02	1. Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). Brittonia 26: 271-301.	No evidence of intentional introduction; at least some of the introductions into the U.S. were as ballast (1).

7.03		no evidence
7.04	Hall, Vandiver, and Sellers (2006) Brazil Pusley, <i>Richardia brasiliensis</i> (Moq.). University of Florida, IFAS Extension, SP 37 (http://edis.ifas.ufl.edu/pdf/files/FW/FW03300.pdf).	"Each flower usually produces 3 nutlets up to 3 mm long and 2 mm wide." [no evidence of adaptations for wind dispersal]
7.05		no evidence
7.06		
7.07	Lewis and Oliver (1974) Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> 26: 271-301.	no evidence of any means of attachment
7.08		
8.01		
8.02		
8.03	Futch and Singh (2000) Field evaluation of chemical weed control in Florida citrus. <i>Proceedings of the Florida State Horticultural Society</i> 113: 68-74.	"Over the 2-year period both Florida and Brazil pusley (<i>Richardia scabra</i> and <i>Richardia brasiliensis</i>) became the dominant weed species in most plots. Bromacil provided 90% and 87% weed control during the first and second years, respectively."
8.04		
8.05		