

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>Ranunculus muricatus (spinyfruit buttercup)</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	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	y	1
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)	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	n	-1
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	?	
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed	n	-1
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)	y?	1
7.08	Propagules dispersed by other animals (internally)	n	-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	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	9	yes
C	16	yes
total	31	yes

Data collected 2006-2007

Question number	Reference	Source data
1.01		no evidence of cultivation
1.02		
1.03		
2.01		
2.02		
2.03		
2.04		
2.05	1. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. 2. New Zealand Plant Conservation Network (2005) New Zealand Adventive Vascular Plant List. 3. Stace (1997) New Flora of the British Isles, second edition. Cambridge University Press, Cambridge.	Native to Eurasia (1); introduced in Hawaii (1), New Zealand (2), and England (3).
3.01	1. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. 2. New Zealand Plant Conservation Network (2005) New Zealand Adventive Vascular Plant List.	1. "Native to Eurasia; in Hawaii naturalized in fields and pastures" 2. Fully naturalized in New Zealand.
3.02		no evidence
3.03	1. Holm (1979) A Geographical Atlas of World Weeds. John Wiley and Sons. 2. Stace (1997) New Flora of the British Isles, second edition. Cambridge University Press, Cambridge.	1. Considered a common weed of agriculture in Australia, Japan, and Portugal. 2. "Introduced; naturalized as weed of cultivated ground in SW England"
3.04		no evidence
3.05	Weber (2003) Invasive Plant Species of the World. CABI Publishing.	<i>R. repens</i> considered invasive in Australia.
4.01	Benson (1948) A treatise on the North American <i>Ranunculi</i> . The American Midland Naturalist 40: 1-261.	no description of these traits
4.02	Bansal (1997) Allelopathic effect of buttercups on wheat varieties. Allelopathy Journal 4: 139-142.	"Laboratory studies showed that... <i>R. muricatus</i> ...had an allelopathic effect on the germination of wheat, which was mediated by an increased phenolic content, less mobilization of starch, and a suppression of DNA, RNA and protein concentrations."
4.03	Benson (1948) A treatise on the North American	no description of this

	<i>Ranunculi</i> . The American Midland Naturalist 40: 1-261.	
4.04		
4.05	Flora of North America, vol. 3 (http://www.efloras.org/florataxon.aspx?flora_id=1&axon_id=127971).	"Most <i>Ranunculus</i> species are poisonous to stock; when abundant, they may be troublesome to ranchers."
4.06		
4.07	Bruneton (1999) Toxic Plants: Dangerous to Humans and Animals. Lavoisier Publishing, Paris.	"All authors agree that buttercups...have irritant properties...Ingestion can induce severe stomatitis with swelling, burns, and ulcerations."
4.08		no evidence
4.09		
4.1	Wilson and King (2003) Arable Plants: a Field Guide. English Nature and WILDGuides (http://fieldguide.co.uk/?PP=species_account&SPID=7&SHC=20&PSD=1&PHPSESSID=830bae722add1a9ea6cbb2fea9c0f05c).	soil type: sandy loams
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	Benson (1948) A treatise on the North American <i>Ranunculi</i> . The American Midland Naturalist 40: 1-261.	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.	Ranunculaceae
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 Ranunculaceae
5.04	Benson (1948) A treatise on the North American <i>Ranunculi</i> . The American Midland Naturalist 40: 1-261.	"roots about 0.7 mm in diameter"
6.01		
6.02	Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	at least some of the time an annual plant
6.03		
6.04		
6.05	Hafliger et al. (1988) Dicot Weeds 1. Dicotyledonous Weeds of 13 Families. CIBA-GEIGY Ltd., Basel, Switzerland.	genus <i>Ranunculus</i> pollinated by insects
6.06	1. Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu. 2. Hafliger	1. "not rooting at the nodes" 2. rhizome absent

	et al. (1988) Dicot Weeds 1. Dicotyledonous Weeds of 13 Families. CIBA-GEIGY Ltd., Basel, Switzerland.	
6.07	1. Benson (1948) A treatise on the North American <i>Ranunculi</i> . The American Midland Naturalist 40: 1-261. 2. Stace (1997) New Flora of the British Isles, second edition. Cambridge University Press, Cambridge.	1. annual or perhaps perennial [so capable of reproducing in a year or less] 2. annual
7.01		
7.02		no evidence
7.03		
7.04	Benson (1948) A treatise on the North American <i>Ranunculi</i> . The American Midland Naturalist 40: 1-261.	fruits are achenes, 5.5 mm long [no evidence of adaptations for wind dispersal]
7.05		no evidence
7.06		externally dispersed
7.07	Benson (1948) A treatise on the North American <i>Ranunculi</i> . The American Midland Naturalist 40: 1-261.	achenes "covered with stout, curved spines"
7.08		externally dispersed
8.01	Wagner, Herbst, and Sohmer (1999) Manual of the flowering plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press, Honolulu.	"Achenes 10-20 in a globose head"
8.02	Wilson and King (2003) Arable Plants: a Field Guide. English Nature and WILDGuides (http://fieldguide.co.uk/?PP=species_account&SPID=7&SHC=20&PSD=1&PHPSESSID=830bae722add1a9ea6cbb2fea9c0f05c).	"Seed is relatively short-lived."
8.03	Kawana, Kojima, and Sumiyoshi (1998) Control of <i>Ranunculus muricatus</i> L. and <i>R. sardous</i> Crantz. with herbicides. Report of the Kyushu Branch of the Crop Science Society of Japan 64: 34-36.	Several herbicide formulations gave almost complete control of <i>R. muricatus</i> in pot trials.
8.04		
8.05		