

Australia/New Zealand Weed Risk Assessment adapted for United States.

Data used for analysis published in: Gordon, D.R. and C.A. Gantz. 2008. Potential impacts on the horticultural industry of screening new plants for invasiveness. Conservation Letters 1: 227-235. Available at: <http://www3.interscience.wiley.com/cgi-bin/fulltext/121448369/PDFSTART>

<i>Pinellia peltata</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 U.S. climates (USDA hardiness 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)	n	0
2.04	Native or naturalized in regions with an average of 11-60 inches of annual precipitation	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	n	-2
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	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic		
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		
4.09	Is a shade tolerant plant at some stage of its life cycle		
4.1	Grows on one or more of the following soil types: alfisols, entisols, or mollisols	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	y	1
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	?	
6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic		
6.05	Requires specialist pollinators		
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		
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)	?	
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		
8.05	Effective natural enemies present in U.S.		
Total Score			3

Outcome	Accept*
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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	11	Yes
B	7	Yes
C	11	Yes
total	29	yes

Data collected 2008

Question number	Reference	Source data
1.01		used horticulturally, but no evidence of significant modification
1.02		
1.03		
2.01	1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20gnd.tif). 2. Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm . 3. Yi, T.-S, Li, H, and Li, D.-Z (2005) Chromosome variation in the genus <i>Pinellia</i> (Araceae) in China and Japan. Botanical Journal of the Linnean Society 147: 449-455.	1. Global hardiness zones 8-9. 2. Fujian and Zhejiang. 3. "occupies a very small area of Fujian and Zhejiang provinces in China"
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydro-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm . 3. Yi, T.-S, Li, H, and Li, D.-Z (2005) Chromosome variation in the genus <i>Pinellia</i> (Araceae) in China and Japan. Botanical Journal of the Linnean Society 147: 449-455.	1. One climatic region. 2. Fujian and Zhejiang. 3. "occupies a very small area of Fujian and Zhejiang provinces in China"
2.04	Climate Source (http://www.climatesource.com/cn/fact_sheets/chin)	For the regions listed, average annual precipitation ranges from 55.1

	appt_xl.jpg).	inches/year to 196.9 inches/year.
2.05	1. Jearrard's Herbal (http://www.johnjearrard.co.uk/araceae/misca/pinelliapeltata.html). 2. Aroid Pictures (http://www.aroidpictures.fr/LYON/pinpeltata.html).	1. Cultivated in the United Kingdom. 2. Cultivated in France.
3.01		
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05	Holm, L, JV Pancho, JP Herberger, and DL Plucknett (1979) A Geographical Atlas of World Weeds. John Wiley and Sons, New York.	<i>Pinellia ternata</i> is a principal weed in Japan.
4.01	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	no description of these traits
4.02		
4.03	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	no description of parasitism
4.04		
4.05	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	no evidence
4.06		
4.07	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	no evidence
4.08		
4.09		

4.1	USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (http://soils.usda.gov/use/worldsoils/mapindex/order.html).	Primarily ultisols in this region.
4.11	P'ei, C (1935) Notes on <i>Pinellia</i> of China. Contributions from the Biological Laboratory of the Science Society of China Botanical Series 10(1): 1-3.	"Herb, 30 cm. tall, stem fleshy".
4.12	P'ei, C (1935) Notes on <i>Pinellia</i> of China. Contributions from the Biological Laboratory of the Science Society of China Botanical Series 10(1): 1-3.	"Herb, 30 cm. tall, stem fleshy".
5.01		terrestrial
5.02		Araceae
5.03		Araceae
5.04	1. Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm . 2. P'ei, C (1935) Notes on <i>Pinellia</i> of China. Contributions from the Biological Laboratory of the Science Society of China Botanical Series 10(1): 1-3.	1. Tuber subglobose [species description]; perennial herbs with cormlike tuber [genus description]. 2. Sub-globose tuber.
6.01		no evidence
6.02	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	"Bulbils distributed at tuber, at petiole or on leaf blade base" [genus description]
6.03		
6.04		
6.05		
6.06	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	"Bulbils distributed at tuber, at petiole or on leaf blade base" [genus description].

6.07		
7.01		
7.02	1. Jearrard's Herbal (http://www.johnjearrard.co.uk/araceae/misca/pinelliapeltata.html). 2. Aroid Pictures (http://www.aroidpictures.fr/LYON/pinpeltata.html).	1. Cultivated in the United Kingdom. 2. Cultivated in France.
7.03		no evidence
7.04	1. Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm . 2. Ohwi, J (1965) Flora of Japan. Smithsonian Institution, Washington, D.C.	1. Berries ovoid, acute at apex, seed globose [species description]. 2. "Berry enclosing a single seed with copious endosperm" [genus description]. [no evidence of adaptations to wind dispersal]
7.05		
7.06	1. Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm . 2. Ohwi, J (1965) Flora of Japan. Smithsonian Institution, Washington, D.C.	1. Berries ovoid, acute at apex, seed globose [species description]. 2. "Berry enclosing a single seed with copious endosperm" [genus description].
7.07	Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm .	Berries ovoid, acute at apex, seed globose. [no evidence of adaptations to external dispersal]
7.08	1. Heng, L and Guanghua, Z (1979) <i>Pinellia</i> . In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 23. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). Accessed online at http://hua.huh.harvard.edu/china/mss/volume23/Araceae-K_coauthoring.htm . 2. Ohwi, J (1965) Flora of Japan. Smithsonian Institution, Washington, D.C.	1. Berries ovoid, acute at apex, seed globose [species description]. 2. "Berry enclosing a single seed with copious endosperm" [genus description].
8.01		
8.02		
8.03		
8.04		
8.05		