

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>Colocasia heterochroma</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	y	1
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	?	
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	8	Yes
C	10	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%20Ign d.tif). 2. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. <i>Annales Botanici Fennici</i> 40: 283-286. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei (Araceae) - a new angiospermic record for Bangladesh. <i>Bangladesh Journal of Botany</i> 32(2): 129-131. 4. Toha, AMM, Rahman, MA, Boyce, PC, and Wilcock, CC (2004) Notes on the Araceae 1: some new records for Bangladesh. <i>Journal of Economic and Taxonomic Botany</i> 28(2): 347-354.	1. Global hardiness zones 9-11. 2. SW Yunnan, China: Yingjiang. 3. Bangladesh. 4. Bangladesh - Hill Tracts districts (Bandarban and Rangamati)
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. <i>Annales Botanici Fennici</i> 40: 283-286. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei (Araceae) - a new angiospermic record for Bangladesh. <i>Bangladesh Journal of Botany</i> 32(2): 129-131. 4. Toha, AMM, Rahman, MA, Boyce, PC, and Wilcock, CC (2004) Notes on the Araceae 1: some new records for Bangladesh. <i>Journal of Economic and Taxonomic Botany</i> 28(2): 347-354.	1. One to two climatic regions. 2. SW Yunnan, China: Yingjiang. 3. Bangladesh 4. Bangladesh - Hill Tracts districts (Bandarban and Rangamati)

2.04	1. Climate Source (http://www.climatesource.com/cn/fact_sheets/chinapt_xl.jpg). 2. Atlapedia Online (http://www.atlapedia.com/online/countries/banglad.htm).	1. For Yunnan Province, the average annual precipitation is 23.6 in/yr -- 196.9 in/yr. 2. For Bangladesh: "the average annual precipitation varies between 1,270 mm and 1,520 mm (50 to 60 inches) depending on the region."
2.05	Jearrard's Herbal (http://www.johnjearrard.co.uk/araceae/colocasia/colocasiaheterochromadarkshadows.html).	Cultivated in the United Kingdom.
3.01		no evidence
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05	Weber, E (2003) <i>Invasive Plant Species of the World</i> . CAB International, Oxon, United Kingdom.	<i>Colocasia esculenta</i> is listed as being a weed in several countries.
4.01	Heng, L and Guanghua, Z (1993) <i>Araceae</i> in Wu, ZY and Raven, PH (editors), <i>Flora of China</i> , Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis.	no description of these traits
4.02		
4.03	Heng, L and Guanghua, Z (1993) <i>Araceae</i> in Wu, ZY and Raven, PH (editors), <i>Flora of China</i> , Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis.	no description of parasitism
4.04		
4.05	Heng, L and Guanghua, Z (1993) <i>Araceae</i> in Wu, ZY and Raven, PH (editors), <i>Flora of China</i> , Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis.	no evidence
4.06		
4.07	Heng, L and Guanghua, Z (1993) <i>Araceae</i> in Wu, ZY and Raven, PH (editors), <i>Flora of China</i> , Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis.	no evidence
4.08		
4.09	1. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. <i>Annales Botanici Fennici</i> 40: 283-286. 2. Heng, L and Guanghua, Z (1993) <i>Araceae</i> in Wu, ZY and Raven,	1. "In dense forest". 2. "Dense forests". 3. "Shady hill slope".

	PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei (Araceae) - a new angiospermic record for Bangladesh. Bangladesh Journal of Botany 32(2): 129-131.	
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 and inceptisols in these regions.
4.11	1. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. <i>Annales Botanici Fennici</i> 40: 283-286. 2. Heng, L and Guanghua, Z (1993) Araceae in Wu, ZY and Raven, PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei (Araceae) - a new angiospermic record for Bangladesh. Bangladesh Journal of Botany 32(2): 129-131.	1. Stolon 5-10 cm long, 3 mm diam., non-branching. 2. "Perennial herbs with cormous tuber...stolons...erect of creeping...internodes ...bearing ovoid bulbils". 3. "Cormous herb...stolons very slender".
4.12	1. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. <i>Annales Botanici Fennici</i> 40: 283-286. 2. Heng, L and Guanghua, Z (1993) Araceae in Wu, ZY and Raven, PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei (Araceae) - a new angiospermic record for Bangladesh. Bangladesh Journal of Botany 32(2): 129-131.	1. Stolon 5-10 cm long, 3 mm diam., non-branching. 2. "Perennial herbs with cormous tuber...stolons...erect of creeping...internodes ...bearing ovoid bulbils". 3. "Cormous herb...stolons very slender".
5.01		terrestrial
5.02		Araceae
5.03		Araceae
5.04	1. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. <i>Annales Botanici Fennici</i> 40: 283-286. 2. Heng, L and Guanghua, Z (1993) Araceae in Wu, ZY and Raven, PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei	1. Stolon 5-10 cm long, 3 mm diam., non-branching. 2. "Perennial herbs with cormous tuber...stolons...erect of creeping...internodes ...bearing ovoid bulbils". 3. "Cormous herb...stolons very slender".

	(Araceae) - a new angiospermic record for Bangladesh. Bangladesh Journal of Botany 32(2): 129-131.	
6.01		no evidence
6.02		
6.03		
6.04		
6.05		
6.06	1. Cao, L.-M and Long, C.-L (2003) <i>Colocasia bicolor</i> (Araceae), a new species from Yunnan, China. Annales Botanici Fennici 40: 283-286. 2. Heng, L and Guanghua, Z (1993) Araceae in Wu, ZY and Raven, PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 3. Ara, H, Uddin, SN, and Hassan, MA (2003) <i>Colocasia heterochroma</i> H. Li et Z.X. Wei (Araceae) - a new angiospermic record for Bangladesh. Bangladesh Journal of Botany 32(2): 129-131. 4. Plant Delights Nursery (http://www.plantdelights.com/Catalog/Current/Detail/06124.html).	1. Stolon 5-10 cm long, 3 mm diam., non-branching. 2. "Perennial herbs with cormous tuber...stolons...erect of creeping...internodes ...bearing ovoid bulbils". 3. "Cormous herb...stolons very slender". 4. "Spreads very slowly via short underground rhizomes".
6.07		
7.01		
7.02	Jearrard's Herbal (http://www.johnjearrard.co.uk/araceae/colocasia/casiaheterochromadarkshadows.html).	Cultivated in the United Kingdom.
7.03		no evidence
7.04	1. Heng, L and Guanghua, Z (1993) Araceae in Wu, ZY and Raven, PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	1. "Fruit a berry" [genus description]. 2. "Berry: greenish to whitish or red(?), obconoid or oblong...many seeded. Seed: ovoid to ellipsoid, testa thickish...endosperm copious" [genus description]. [no evidence of adaptations to wind dispersal]
7.05		
7.06	1. Heng, L and Guanghua, Z (1993) Araceae in Wu, ZY and Raven, PH (editors), Flora of China, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	1. "Fruit a berry" [genus description]. 2. "Berry: greenish to whitish or red(?), obconoid or oblong...many seeded. Seed: ovoid to ellipsoid, testa thickish...endosperm copious" [genus description]. [no evidence of adaptations to wind dispersal]

7.07	<p>1. Heng, L and Guanghua, Z (1993) <i>Araceae</i> in Wu, ZY and Raven, PH (editors), <i>Flora of China</i>, Vol. 23. Science Press, Beijing, & Missouri Botanical Garden Press, St. Louis. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) <i>The Genera of Araceae</i>. Royal Botanic Gardens Kew, London.</p>	<p>1. "Fruit a berry" [genus description]. 2. "Berry: greenish to whitish or red(?), obconoid or oblong...many seeded. Seed: ovoid to ellipsoid, testa thickish...endosperm copious" [genus description]. [no evidence of adaptations to wind dispersal]</p>
7.08		
8.01		
8.02		
8.03		
8.04		
8.05		