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

Amorphophallus lambii			
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)	1	
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	N	0
2.05	Does the species have a history of repeated introductions outside its natural range?	?	
3.01	Naturalized beyond native range	N	-1
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		
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		
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	Y	1
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	?	
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			2

Outcome	Accept*

*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	10	Yes
B	7	Yes
C	11	Yes
total	28	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%20lgnd.tif). 2. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	1. Global plant hardiness zones 12-13 (but mostly 13). 2. Distribution: Sabah, East Malaysia; Central Kalimantan, Indonesia [entirely tropical]
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. Hetterscheid, W and S Ittenbach (1996)	1. One climatic region. 2. Distribution: Sabah, East Malaysia; Central Kalimantan, Indonesia

	Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	[fewer than 3 biomes]
2.04	1. Atlapedia Online (http://www.atlapedia.com/online/countries/malaysia.htm). 2. Microsoft Encarta World Precipitation and Average Rainfall (http://uk.encarta.msn.com/encnet/RefPages/RefMedia.aspx?refid=461530746&artrefid=761554737&pn=3&sec=-1).	1. For East Malaysia: "Average annual precipitation for East Malaysia it is 4,420 mm (150 inches)" 2. For Indonesia, average annual precipitation is over 80 inches/year.
2.05	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. B and T World Seeds (http://www.b-and-t-world-seeds.com/carth.asp?species=Amorphophallus%20lambii&sref=502411).	1. Cultivated [but unclear how much it is cultivated and where, and whether it is in horticulture trade]. 2. Listed on B and T World Seeds website, but not currently available.
3.01		no evidence
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.	A. campanulatus considered present as a weed of agriculture in Fiji [not enough evidence to be considered a weed].
4.01	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	no description of these traits
4.02		
4.03	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	no description of parasitism
4.04		
4.05	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	no evidence
4.06		
4.07	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	no evidence
4.08		
4.09	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. Bown, D (2000) Aroids: Plants of the Arum Family. Timber Press, Portland, Oregon.	1. Grows in shaded conditions. 2. "The plant likes…shady conditions in rain forest".
4.1	1. USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (http://soils.usda.gov/use/worldsoils/mapindex/order.html). 2. Hetterscheid, W and S Ittenbach (1996)	1. Very small areas with alfisols and entisols, but primarily ultisols. 2. Grows on rich, alluvial soils; Amorphophallus spp. require a rich

	Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 3. Bown, D (2000) Aroids: Plants of the Arum Family. Timber Press, Portland, Oregon.	soil. 3. "The plant likes rich soil"
4.11	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	Terrestrial, herbaceous plant.
4.12		
5.01	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	Terrestrial, herbaceous plant.
5.02	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?433472).	Araceae
5.03	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?433472).	Herbaceous; Araceae.
5.04	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	1. Has tuber to 22 cm in diameter. 2. "Tuber usually depressed-globose, sometimes irregularly +/- elongate-cylindric, napiform or carrot-shaped, rarely rhizomatous or stoloniferous"; "geophytes" [genus description].
6.01		no evidence
6.02	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	"Fresh seed of Amorphophallus usually germinates quickly (between one and three weeks)".
6.03		
6.04		
6.05		
6.06	Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131.	Has tuber to 22 cm in diameter.
6.07		
7.01		
7.02	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. B and T World Seeds (http://www.b-and-t-world-seeds.com/carth.asp?species=Amorphophallus%20lambii&sref=502411).	1. Cultivated [but unclear how much it is cultivated and where, and whether it is in horticulture trade]. 2. Listed on B and T World Seeds website, but not currently available.
7.03		no evidence
7.04	1. Hetterscheid, W and S Ittenbach (1996) Everything	1. Fruits are berries. 2. "Berry:

	you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	sometimes very large, 1- to few-seeded, orange to red, rarely blue or white…Seed: ellipsoid, testa smooth, thin…endosperm absent" [genus description]. [no adaptations to wind dispersal].
7.05		
7.06	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	1. "Equally little is known about the distributors of Amorphophallus seed, although no one doubts that birds are the main group."; "The berries [of A. lambii] are eaten by Bulbuls (Pycnonotus zeylanicus) as soon as they become ripe and turn red." 2. "Berry: sometimes very large, 1- to few-seeded, orange to red, rarely blue or white…Seed: ellipsoid, testa smooth, thin…endosperm absent" [genus description].
7.07	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	1. Fruits are berries. 2. "Berry: sometimes very large, 1- to few-seeded, orange to red, rarely blue or white…Seed: ellipsoid, testa smooth, thin…endosperm absent" [genus description]. [no adaptations to external dispersal].
7.08	1. Hetterscheid, W and S Ittenbach (1996) Everything you always wanted to know about Amorphophallus, but were afraid to stick your nose into!!!!! Aroideana 19:7-131. 2. Mayo, SJ, Bogner, J, and Boyce, PC (1997) The Genera of Araceae. Royal Botanic Gardens Kew, London.	1. Fruits are berries. 2. "Berry: sometimes very large, 1- to few-seeded, orange to red, rarely blue or white…Seed: ellipsoid, testa smooth, thin…endosperm absent" [genus description]. [no adaptations to external dispersal].
8.01		
8.02		
8.03		
8.04		
8.05		