

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>Beesia calthaefolia</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)	y	1
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?	?	
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		
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	?	
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	?	
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	?	
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.		
<b>Total Score</b>			<b>0</b>

<b>Outcome</b>	<b>Accept</b>
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<b>section</b>	<b># questions answered</b>	<b>satisfy minimum?</b>
A	10	Yes
B	5	Yes
C	8	Yes
total	23	yes

Question number	Reference	Source data
1.01		
1.02		
1.03		
2.01	<p>1. PERAL NAPPFAST Global Plant Hardiness (<a href="http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20Ign.d.tif">http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20Ign.d.tif</a>). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (<a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455</a>). 3. Dhar, U and Samant, SS (1993) Endemic plant diversity in the Indian Himalaya I. <i>Ranunculaceae</i> and <i>Paeoniaceae</i>. <i>Journal of Biogeography</i> 20: 659-668. 4. Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i>. Pp 142-143. In: Wu, Z and Raven, PH (editors). <i>Flora of China</i>. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). 5. Yuan, Q and Yang, Q-E (2006) Tribal relationships of <i>Beesia</i>, <i>Eranthis</i> and seven other genera of <i>Ranunculaceae</i>: evidence from cytological characters. <i>Botanical Journal of the Linnean Society</i> 150: 267-289.</p>	<p>1. Global plant hardiness zones (??)3-9. 2. China: China - Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan. 3. Endemic to Eastern Himalaya. 4. "S Gansu, N Guangxi, Guizhou, W Hubei, W Hunan, S Shanxi, Sichuan, NW Yunnan [N Myanmar]". 5. "Distributed in the eastern Himalaya and western and central China".</p>
2.02		
2.03	<p>1. Köppen-Geiger climate map (<a href="http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf">http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf</a>). 2. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (<a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455</a>). 3. Dhar, U and Samant, SS (1993) Endemic plant diversity in the Indian Himalaya I. <i>Ranunculaceae</i> and <i>Paeoniaceae</i>. <i>Journal of Biogeography</i> 20: 659-668. 4. Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i>. Pp 142-143. In: Wu, Z and Raven, PH (editors). <i>Flora of China</i>. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis). 5. Yuan, Q and Yang, Q-E (2006) Tribal relationships of <i>Beesia</i>, <i>Eranthis</i> and seven other genera of <i>Ranunculaceae</i>: evidence from cytological characters. <i>Botanical Journal of the Linnean Society</i> 150: 267-289.</p>	<p>1. Three climatic regions. 2. China: China - Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan. 3. Endemic to Eastern Himalaya. 4. "S Gansu, N Guangxi, Guizhou, W Hubei, W Hunan, S shanxi, Sichuan, NW Yunnan [N Myanmar]". 5. "Distributed in the eastern Himalaya and western and central China".</p>

2.04	<p>1. Climate Source (<a href="http://www.climatesource.com/cn/fact_sheets/chinapt_xl.jpg">http://www.climatesource.com/cn/fact_sheets/chinapt_xl.jpg</a>). 2. Atlapedia Online (<a href="http://www.atlapedia.com/online/countries/myanmar.htm">http://www.atlapedia.com/online/countries/myanmar.htm</a>).</p>	<p>1. For Gansu Province, the average annual precipitation is less than 2 in/yr -- 31.5 in/yr. For Guangxi Province, the average annual precipitation is 31.5 in/yr -- 196.9 in/yr. For Guizhou Province, the average annual precipitation is 31.5 in/yr -- 66.9 in/yr. For Hubei Province, the average annual precipitation is 31.5 in/yr -- 78.7 in/yr. For Hunan Province, the average annual precipitation is 39.4 in/yr -- 78.7 in/yr. For Shanxi Province, the average annual precipitation is 11.8 in/yr -- 66.9 in/yr. For Sichuan Province, the average annual precipitation is 19.7 in/yr -- 78.7 in/yr. For Yunnan Province, the average annual precipitation is 23.6 in/yr -- 196.9 in/yr. 2. For Myanmar: "The coastal and high mountain precipitation varies between 2,500 to 5,000 mm (98 to 196 inches) annually with the interior receiving 1,000 mm (39 inches) or less." [distribution range is too broad to determine average annual precipitation]</p>
2.05	B & T World Seeds ( <a href="http://www.b-and-t-world-seeds.com/carth.asp?species=Beesia%20calthifolia&amp;sref=449214">http://www.b-and-t-world-seeds.com/carth.asp?species=Beesia%20calthifolia&amp;sref=449214</a> ).	Listed on website, but seeds are not currently for sale.
3.01		no evidence
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05		no evidence
4.01	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	no evidence
4.02		

4.03	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	no evidence
4.04		
4.05	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	no evidence
4.06		
4.07	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	"The rhizomes are used medicinally to treat rheumatic pain, influenza, and swelling" [genus description]. [no evidence of toxicity]
4.08		
4.09		
4.1	USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources ( <a href="http://soils.usda.gov/use/worldsoils/mapindex/order.html">http://soils.usda.gov/use/worldsoils/mapindex/order.html</a> ).	Entisols, inceptisols, and ultisols are the soil orders in the regions of origin in China; Northern Myanmar has ultisols; Eastern Himalaya is composed of ultisols and some entisols [although this is an approximation].
4.11	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	"Scapes more than 14 cm, to 58 cm at fruiting" [species description]; "herbs perennial...scape simple" [genus description].
4.12		
5.01		terrestrial
5.02	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland ( <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455</a> ).	Ranunculaceae
5.03	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland ( <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455">http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?410455</a> ).	Ranunculaceae
5.04	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri	"Rhizome to 10 cm, 3-7 mm in diam".

	Botanical Garden (St. Louis).	
6.01		no evidence
6.02		
6.03		
6.04		
6.05		
6.06	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	"Rhizome to 10 cm, 3-7 mm in diam".
6.07		
7.01		
7.02	B & T World Seeds ( <a href="http://www.b-and-t-world-seeds.com/carth.asp?species=Beesia%20calthifolia&amp;sref=449214">http://www.b-and-t-world-seeds.com/carth.asp?species=Beesia%20calthifolia&amp;sref=449214</a> ).	Listed on website, but seeds are not currently for sale.
7.03		no evidence
7.04	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	"Follicle 1.1-1.7 cm, flat, lanceolate-linear, middle part curved, lower part 3-4 mm wide...seeds several, ca. 2.5 mm, obliquely corrugate" [species description]; "follicle solitary, long, narrow, flat, with transverse veins. Seeds several, ovoid-globose, rugose" [genus description]. [no evidence of adaptations to wind dispersal]
7.05		
7.06		
7.07	Liangqian, L and Tamura, M (2001) <i>Beesia calthifolia</i> . Pp 142-143. In: Wu, Z and Raven, PH (editors). Flora of China. Vol. 6. Science Press (Beijing) and Missouri Botanical Garden (St. Louis).	"Follicle 1.1-1.7 cm, flat, lanceolate-linear, middle part curved, lower part 3-4 mm wide...seeds several, ca. 2.5 mm, obliquely corrugate" [species description]; "follicle solitary, long, narrow, flat, with transverse veins. Seeds several, ovoid-globose, rugose" [genus description]. [no evidence of adaptations to external dispersal]
7.08		
8.01		
8.02		
8.03		
8.04		
8.05		