

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>Aquilegia caucasica</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	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	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		
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		
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	
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			-1

Outcome	Accept
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section	# questions answered	satisfy minimum?
A	11	Yes
B	6	Yes
C	9	Yes
total	26	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. 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?3758).	1. Global hardiness zones 5-8. 2. Native to Western Asia (Northern Iran and Turkey) and the Caucasus (Armenia, Azerbaijan, Georgia, Russian Federation) [occurs within the same latitudes, ~30-45°N, as much of the United States]
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-	1. Two climatic regions. 2. Native to Western Asia (Northern Iran and

	2007.pdf). 2. 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?3758).	Turkey) and the Caucasus (Armenia, Azerbaijan, Georgia, Russian Federation) [3 biomes]
2.04	1. Microsoft Encarta World Precipitation and Average Rainfall (http://uk.encarta.msn.com/encnet/RefPages/RefMedia.aspx?refid=461530746&artrefid=761554737&pn=3&sec=-1). 2. Atlapedia Online (http://www.atlapedia.com/online/countries/).	1. For Iran, average annual precipitation ranges from less than 10 inches/year to 20 inches/year; For Turkey, average annual precipitation ranges from less than 10 inches/year to 40 inches/year. 2. For Armenia, average annual precipitation varies from 300 to 635 mm (12 to 25 inches); For Azerbaijan: average annual precipitation is between 200 to 300 mm (8 to 12 inches) in the lowlands and 300 to 900 mm (12 to 35.5 inches) in the highlands, although precipitation is distributed unevenly throughout the year; For Georgia: along the coast average annual precipitation varies from 1,200 to 2,800 mm (47 to 110 inches) to 600 to 800 mm (24 to 31.5 inches) in the mountainous regions; For the Russian Federation: rainfall is highest in the westerly mountain regions which has an average annual precipitation of up to 2,000 mm (79 inches) while on the East European Plain it averages between 600 and 700 mm (24 to 27.5 inches) and up to 1,000 (39 inches) in the southern areas of the Far East.
2.05	1. Danish Iris and Lily Society (http://www.fsagx.ac.be/pc/cv/index_seminum/is05104.txt). 2. Arrowhead Alpines (http://www.arrowhead-alpines.com/an-ar.htm).	1. Seeds distributed in Europe. 2. Sold in the U.S.
3.01		no evidence
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05	New Zealand Plant Conservation Network (2005) New Zealand Adventive Vascular Plant List.	One congener is "fully naturalised" in New Zealand [not enough evidence to be considered a weed].
4.01	Munz, PA (1946) <i>Aquilegia</i> the cultivated and wild columbines. <i>Gentes herbarium</i> 7: 59.	no description of these traits
4.02		
4.03	Munz, PA (1946) <i>Aquilegia</i> the cultivated and wild columbines. <i>Gentes herbarium</i> 7: 59. 19:7-131.	no description of parasitism
4.04		
4.05	Munz, PA (1946) <i>Aquilegia</i> the cultivated and wild	no evidence

	columbines. Gentes herbarium 7: 59.	
4.06		
4.07	Munz, PA (1946) Aquilegia the cultivated and wild columbines. Gentes herbarium 7: 59.	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).	All three soil orders are found in these regions.
4.11	Munz, PA (1946) Aquilegia the cultivated and wild columbines. Gentes herbarium 7: 59.	"Perennial herbs usually with several erect stems from a thick caudex".
4.12		
5.01	Munz, PA (1946) Aquilegia the cultivated and wild columbines. Gentes herbarium 7: 59.	Terrestrial
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?3758).	Ranunculaceae
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?3758).	Ranunculaceae
5.04		
6.01		no evidence
6.02	1. Kew Gardens Seed Information Database (http://data.kew.org/sid/SidServlet?ID=5211&Num=d3W). 2. Danish Iris and Lily Society (http://www.fsagx.ac.be/pc/cv/index_seminum/is05104.txt).	1. 82% germination. 2. Seeds distributed in Europe.
6.03		
6.04		
6.05		
6.06		
6.07		
7.01		
7.02	1. Danish Iris and Lily Society (http://www.fsagx.ac.be/pc/cv/index_seminum/is05104.txt). 2. Arrowhead Alpines (http://www.arrowhead-alpines.com/an-ar.htm).	1. Seeds distributed in Europe. 2. Sold in the U.S.
7.03		no evidence
7.04	Munz, PA (1946) Aquilegia the cultivated and wild columbines. Gentes herbarium 7: 59.	"Seeds black, minutely punctate, about 2 mm. long". [no adaptations to wind dispersal]
7.05		
7.06		
7.07	Munz, PA (1946) Aquilegia the cultivated and wild columbines. Gentes herbarium 7: 59.	"Seeds black, minutely punctate, about 2 mm. long". [no adaptations to external dispersal]
7.08		
8.01		

8.02		
8.03		
8.04		
8.05		