

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>Geranium ruprechtii</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		

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	1
7.03	Propagules likely to disperse as a produce contaminant	n	-1
7.04	Propagules adapted to wind dispersal	?	
7.05	Propagules water dispersed		
7.06	Propagules bird dispersed		
7.07	Propagules dispersed by other animals (externally)	?	
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	6	Yes
C	7	Yes
total	24	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?424712). 3. ZipcodeZoo.com (http://zipcodezoo.com/Plants/G/Geranium_ruprechtii.asp). 4. Czerepanov, SK (1995) Vascular Plants of Russia and Adjacent States (the former USSR). Cambridge University Press, Cambridge and New York. 5. Aedo, C, Garmendia, FM, and Pando, F (1998) World Checklist of <i>Geranium</i> L. (<i>Geraniaceae</i>). Anales Jardin Botanico de Madrid 56(2): 211-252. 6. Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974).	1. Global plant hardiness zones 4-8. 2. Caucasus: Armenia; Azerbaijan; Russian Federation - Ciscaucasia, Dagestan. 3. "Temperature: Cold Hardiness: 4a, 4b, 5a, 5b, 6a, 6b, 7a, 7b, 8a, 8b" [genus description]. 4. Caucasus. 5. "Regions - Caucasus."; "Botanical countries - NCS [North Caucasus] TCS [Transcaucasus]". 6. "Caucasus: Cisc., Dag., E. Transc. (in high mountain belt of Greater Caucasus Range, from Teberda to Kuba district), S. Transc. (Lake Sevan and Nor-Bayazet)".
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. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory,	1. Only two climatic regions. 2. Caucasus: Armenia; Azerbaijan; Russian Federation - Ciscaucasia, Dagestan. 3. "Temperature: Cold Hardiness: 4a, 4b, 5a, 5b, 6a, 6b, 7a, 7b, 8a, 8b" [genus description].

	<p>Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?424712). 3. ZipcodeZoo.com (http://zipcodezoo.com/Plants/G/Geranium_ruprechtii.asp). 4. Czerepanov, SK (1995) Vascular Plants of Russia and Adjacent States (the former USSR). Cambridge University Press, Cambridge and New York. 5. Aedo, C, Garmendia, FM, and Pando, F (1998) World Checklist of <i>Geranium</i> L. (<i>Geraniaceae</i>). Anales Jardin Botanico de Madrid 56(2): 211-252. 6. Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974).</p>	<p>4. Caucasus. 5. "Regions - Caucasus."; "Botanical countries - NCS [North Caucasus] TCS [Transcaucasus]". 6. "Caucasus: Cisc., Dag., E. Transc. (in high mountain belt of Greater Caucasus Range, from Teberda to Kuba district), S. Transc. (Lake Sevan and Nor-Bayazet)".</p>
2.04	<p>1. Atlapedia Online (http://www.atlapedia.com/online/countries/armenia.htm). 2. Atlapedia Online (http://www.atlapedia.com/online/countries/azerbaij.htm). 3. Atlapedia Online (http://www.atlapedia.com/online/countries/russia.htm).</p>	<p>1. For Armenia: average annual precipitation varies from 300 to 635 mm (12 to 25 inches). 2. 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. 3. 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.</p>
2.05	<p>B & T World Seeds (http://www.b-and-t-world-seeds.com/carth.asp?species=Geranium%20ruprechtii&sref=71512).</p>	<p>Seeds sold internationally.</p>
3.01		<p>no evidence</p>
3.02		<p>no evidence</p>
3.03		<p>no evidence</p>
3.04		<p>no evidence</p>
3.05	<p>Holm, L, JV Pancho, JP Herberger, and DL Plucknett</p>	<p>Three congeners are principal</p>

	(1979) A Geographical Atlas of World Weeds. John Wiley and Sons, New York.	weeds in 3 countries; 7 are common weeds in 11 countries; 6 species are present as weeds in 8 countries.
4.01	Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974).	no description of these traits
4.02		
4.03	Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974).	no description of parasitism
4.04		
4.05	Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974).	no evidence
4.06		
4.07	Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974).	no evidence
4.08		
4.09	ZipcodeZoo.com (http://zipcodezoo.com/Plants/G/Geranium_ruprechtii.asp).	"Sun Exposure: Full Sun" [genus description].
4.1	USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (http://soils.usda.gov/use/worldsoils/mapindex/order.html).	Alfisols, entisols, and mollisols occur in Armenia and Azerbaijan.
4.11	1. Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974). 2. Forty, J (1980) A survey of hardy Geraniums in cultivation and their availability in commerce. The Plantsman 2:	1. "Very similar to <i>G. pratense</i> L."; "Perennial; rootstock short, covered with dark brown stipules of basal leaves; stems few (20), 30-80 cm high, branching above" [description of <i>G. pratense</i>]. 2. "Making leafy clumps about 60 cm in height (2 ft)" [description of <i>Geranium pratense</i> ,

	67-78.	which is described as being similar to <i>G. ruprechtii</i> in Flora of the U.S.S.R.]
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 (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?424712).	Geraniaceae
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?424712).	Geraniaceae
5.04		
6.01		no evidence
6.02	B & T World Seeds (http://www.b-and-t-world-seeds.com/carth.asp?species=Geranium%20ruprechtii&sref=71512).	" <i>Geranium ruprechtii</i> seeds will usually germinate in 30-90 days".
6.03		
6.04		
6.05		
6.06		
6.07		
7.01		
7.02	B & T World Seeds (http://www.b-and-t-world-seeds.com/carth.asp?species=Geranium%20ruprechtii&sref=71512).	Seeds sold internationally.
7.03		no evidence
7.04	1. Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974). 2. Tokarski, M (1972) Morphological and taxonomical analysis of fruits and seeds of the European and Caucasian species of the genus <i>Geranium</i> L. Monographiae Botanicae 36.	1. "Very similar to <i>G. pratense</i> L."; "Fruit ca. 3 cm long, beak glandular...seeds small, maculate" [description of <i>G. pratense</i>]. 2. Fruit has a long appendage at the apex [A persistent style or awn? Drawing is of <i>Geranium pratense</i> fruit, which is described as similar to <i>G. ruprechtii</i> in Flora of the U.S.S.R.]. [no evidence of adaptations to wind dispersal]
7.05		

7.06		
7.07	<p>1. Shishkin, BK and Bobrov, EG (1949) Flora of the U.S.S.R. Volume XIV. Geraniales, Sapindales, Rhamnales. Pp. 3-4, 27. Izdatel'stvo Akademii Nauk SSSR, Moskva-Leningrad and Israel Program for Scientific Translations, Jerusalem (1974). 2. Tokarski, M (1972) Morphological and taxonomical analysis of fruits and seeds of the European and Caucasian species of the genus <i>Geranium</i> L. Monographiae Botanicae 36.</p>	<p>1. "Very similar to <i>G. pratense</i> L."; "Fruit ca. 3 cm long, beak glandular...seeds small, maculate" [description of <i>G. pratense</i>]. 2. Fruit has a long appendage at the apex [A persistent style or awn? Drawing is of <i>Geranium pratense</i> fruit, which is described as similar to <i>G. ruprechtii</i> in Flora of the U.S.S.R.]. [no evidence of adaptations to external dispersal]</p>
7.08		
8.01		
8.02		
8.03		
8.04		
8.05		