

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>Tulipa karabachensis</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	n	0
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	?	
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>1</b>

<b>Outcome</b>	<b>Accept*</b>
----------------	----------------

\*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	9	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 ( <a href="http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20gnd.tif">http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20gnd.tif</a> ). 2. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 3. Rare Plants ( <a href="http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related">http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related</a> ).	1. Global plant hardiness zones 4-8. 2. "grows in Azerbaydzhan, the Nagorno-Karabakhskaya autonomous region, Gadrut district, between the Kagnyjurd pasture lands and mount Ziarat." 3. "Endemic to the Karabakh range in what is now Armenia and Azerbaijan"
2.02		
2.03	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. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 3. Rare Plants ( <a href="http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related">http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related</a> ).	1. Only two climatic regions. 2. "grows in Azerbaydzhan, the Nagorno-Karabakhskaya autonomous region, Gadrut district, between the Kagnyjurd pasture lands and mount Ziarat." 3. "Endemic to the Karabakh range in what is now Armenia and Azerbaijan"
2.04	1. Atlapedia Online ( <a href="http://www.atlapedia.com/online/countries/armenia.htm">http://www.atlapedia.com/online/countries/armenia.htm</a> ). 2. Atlapedia Online ( <a href="http://www.atlapedia.com/online/countries/azerbaij.htm">http://www.atlapedia.com/online/countries/azerbaij.htm</a> ).	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.

2.05	1. The Alpine Garden ( <a href="http://www.thealpinegarden.com/tukarab.htm">http://www.thealpinegarden.com/tukarab.htm</a> ). 2. Rare Plants ( <a href="http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related">http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related</a> ).	1. Cultivation information provided on UK website. 2. Sold in the UK; "A little gem barely in cultivation but very deserving of attention."
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.	One congener is present as a weed in one country (Pakistan?) [not enough evidence to be considered a weed].
4.01	Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam.	no description of these traits
4.02		
4.03	Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam.	no description of parasitism
4.04		
4.05	Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam.	no evidence
4.06		
4.07	Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam.	no evidence
4.08		
4.09	1. The Alpine Garden ( <a href="http://www.thealpinegarden.com/tukarab.htm">http://www.thealpinegarden.com/tukarab.htm</a> ). 2. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 3. Walters, SM et al (1984) The European Garden Flora. Volume I. Pteridophyta, Gymnospermae, Angiospermae-Monocotyledons (Part I). P. 179. Cambridge University Press, Cambridge (Cambridgeshire) and New York.	1. "Grows in full sun" 2. "Grows...along the edge of the forest". 3. "Most species require a sunny position where the bulbs can be baked during the summer." [genus description].
4.1	USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil	In the Nagorno-Karabakhskaya autonomous region of Azerbaijan,

	Resources ( <a href="http://soils.usda.gov/use/worldsoils/mapindex/order.html">http://soils.usda.gov/use/worldsoils/mapindex/order.html</a> ).	alfisols, entisols, and mollisols occur; in Armenia, aridisols and entisols occur, along with the "rocky land" soil order type; in Azerbaijan, aridisols, alfisols, entisols, and mollisols occur, along with a small amount of inceptisols and some of the "rocky land" soil order type.
4.11	1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 2. Fedorov, AA (1999) Flora of Russia: The European Part and Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 3. The Alpine Garden ( <a href="http://www.thealpinegarden.com/tukarab.htm">http://www.thealpinegarden.com/tukarab.htm</a> ). 4. Rare Plants ( <a href="http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related">http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related</a> ).	1. "Stem 40 cm above ground level, leaved part of the stem 12-15 cm". 2. "Stem solitary" [genus description]. 3. "Height 20 cm". 4. "A stem of 25-30 cm (at most, often less)".
4.12	1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 2. Fedorov, AA (1999) Flora of Russia: The European Part and Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 3. The Alpine Garden ( <a href="http://www.thealpinegarden.com/tukarab.htm">http://www.thealpinegarden.com/tukarab.htm</a> ). 4. Rare Plants ( <a href="http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related">http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related</a> ).	1. "Stem 40 cm above ground level, leaved part of the stem 12-15 cm". 2. "Stem solitary" [genus description]. 3. "Height 20 cm". 4. "A stem of 25-30 cm (at most, often less)".
5.01		terrestrial
5.02		Liliaceae
5.03		Liliaceae
5.04	1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 2. Fedorov, AA (1999) Flora of Russia: The European Part and Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 3. ZipcodeZoo.com ( <a href="http://zipcodezoo.com/Plants/T/Tulipa_karabachensis.asp">http://zipcodezoo.com/Plants/T/Tulipa_karabachensis.asp</a> ). 4. Walters, SM <i>et al</i> (1984) The European Garden Flora. Volume I. Pteridophyta,	1. "Bulb...up to 2.5 cm in diameter, nearly globose". 2. "Bulb conical, with two to five concentric storage scales at the bottom, covering scales coriaceous or arachnid-tomentose" [genus description]. 3. "Bulbose; bulbs often stoloniferous, tunicate, papery to coriaceous" [genus description]. 4. "Bulbous perennials" [genus description]. 5. "Perennial

	Gymnospermae, Angiospermae-Monocotyledons (Part I). P. 179. Cambridge University Press, Cambridge (Cambridgeshire) and New York. 5. Komarov, VL (1935) Flora of the U.S.S.R. Volume IV. Liliiflorae and Microspermae. P. 320. Izdatel'stvo Akademii Nauk SSSR, Leningrad and Israel Program for Scientific Translations, Jerusalem (1968).	bulbose plants" [genus description].
6.01		no evidence
6.02		
6.03		
6.04		
6.05		
6.06	1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 2. Fedorov, AA (1999) Flora of Russia: The European Part and Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 3. ZipcodeZoo.com ( <a href="http://zipcodezoo.com/Plants/T/Tulipa_karabachensis.asp">http://zipcodezoo.com/Plants/T/Tulipa_karabachensis.asp</a> ). 4. Walters, SM <i>et al</i> (1984) The European Garden Flora. Volume I. Pteridophyta, Gymnospermae, Angiospermae-Monocotyledons (Part I). P. 179. Cambridge University Press, Cambridge (Cambridgeshire) and New York. 5. Komarov, VL (1935) Flora of the U.S.S.R. Volume IV. Liliiflorae and Microspermae. P. 320. Izdatel'stvo Akademii Nauk SSSR, Leningrad and Israel Program for Scientific Translations, Jerusalem (1968).	1. "Bulb...up to 2.5 cm in diameter, nearly globose". 2. "Bulb conical, with two to five concentric storage scales at the bottom, covering scales coriaceous or arachnid-tomentose" [genus description]. 3. "Bulbose; bulbs often stoloniferous, tunicate, papery to coriaceous" [genus description]. 4. "Bulbous perennials" [genus description]. 5. "Perennial bulbose plants" [genus description].
6.07		
7.01		
7.02	1. The Alpine Garden ( <a href="http://www.thealpinegarden.com/tukarab.htm">http://www.thealpinegarden.com/tukarab.htm</a> ). 2. Rare Plants ( <a href="http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related">http://rareplants.co.uk/product.asp?s=9nqbv570426&amp;P_ID=2413&amp;strPageHistory=related</a> ).	1. Cultivation information provided on UK website. 2. Sold in the UK; "A little gem barely in cultivation but very deserving of attention."
7.03		no evidence
7.04	1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 2. Fedorov, AA (1999) Flora of Russia: The European Part and	1. "Papillae slightly overlapping the ovary". 2. "Seeds numerous, flattened, reddish-brown" [genus description]. 3. "Fruit a spherical or

	Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 3. Walters, SM et al (1984) The European Garden Flora. Volume I. Pteridophyta, Gymnospermae, Angiospermae-Monocotyledons (Part I). P. 179. Cambridge University Press, Cambridge (Cambridgeshire) and New York. 4. Komarov, VL (1935) Flora of the U.S.S.R. Volume IV. Liliiflorae and Microspermae. P. 320. Izdatel'stvo Akademii Nauk SSSR, Leningrad and Israel Program for Scientific Translations, Jerusalem (1968).	ellipsoid capsule containing numerous, flat seeds." [genus description]. 4. "Seeds flat" [genus description].
7.05		
7.06		
7.07	1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. A.A. Balkema, Rotterdam. 2. Fedorov, AA (1999) Flora of Russia: The European Part and Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 3. Walters, SM et al (1984) The European Garden Flora. Volume I. Pteridophyta, Gymnospermae, Angiospermae-Monocotyledons (Part I). P. 179. Cambridge University Press, Cambridge (Cambridgeshire) and New York. 4. Komarov, VL (1935) Flora of the U.S.S.R. Volume IV. Liliiflorae and Microspermae. P. 320. Izdatel'stvo Akademii Nauk SSSR, Leningrad and Israel Program for Scientific Translations, Jerusalem (1968).	1. "Papillae slightly overlapping the ovary". 2. "Seeds numerous, flattened, reddish-brown" [genus description]. 3. "Fruit a spherical or ellipsoid capsule containing numerous, flat seeds." [genus description]. 4. "Seeds flat" [genus description]. [no evidence of adaptations to external dispersal]
7.08		
8.01	1. Fedorov, AA (1999) Flora of Russia: The European Part and Bordering Regions. Volume IV. A.A. Balkema, Rotterdam and Brookfield, Vermont. 2. ZipcodeZoo.com ( <a href="http://zipcodezoo.com/Plants/T/Tulipa_karabachensis.asp">http://zipcodezoo.com/Plants/T/Tulipa_karabachensis.asp</a> ).	1. "Seeds numerous" [genus description]. 2. "Seeds many, in 2 rows per locule, flat." [genus description]
8.02		
8.03		
8.04		
8.05		