**Australia/New Zealand Weed Risk Assessment adapted for Florida.**

**Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. Invasive Plant Science and Management 1: 178-195.**

| *Tulipa gesneriana* | | | |
|---|---|---|---|
| **Question number** | **Question** | **Answer** | **Score** |
| 1.01 | Is the species highly domesticated? | y | -3 |
| 1.02 | Has the species become naturalised where grown? | y | 1 |
| 1.03 | Does the species have weedy races? | | |
| 2.01 | Species suited to Florida's USDA climate 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) | | |
| 2.04 | Native or naturalized in habitats with periodic inundation | | |
| 2.05 | Does the species have a history of repeated introductions outside its natural range? | y | |
| 3.01 | Naturalized beyond native range | y | 0 |
| 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 | n | 0 |
| 4.03 | Parasitic | n | 0 |
| 4.04 | Unpalatable to grazing animals | | |
| 4.05 | Toxic to animals | y | 1 |
| 4.06 | Host for recognised pests and pathogens | ? | |
| 4.07 | Causes allergies or is otherwise toxic to humans | y | 1 |
| 4.08 | Creates a fire hazard in natural ecosystems | n | 0 |
| 4.09 | Is a shade tolerant plant at some stage of its life cycle | n | 0 |
| 4.1 | Grows on infertile soils (oligotrophic, limerock, or excessively draining soils) | y | 1 |
| 4.11 | Climbing or smothering growth habit | n | 0 |
| 4.12 | Forms dense thickets | n | 0 |
| 5.01 | Aquatic | n | 0 |

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|---|---|---|---|
| 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 | | |
| 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 | y | 1 |
| 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 | n | -1 |
| 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 Florida, or east of the continental divide | | |
| Total Score | | | 3 |

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| **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 | 7 | yes |
| B | 10 | yes |
| C | 11 | yes |
| total | 28 | yes |

Data collected 2006-2007

| Question number | Reference | Source data |
|---|---|---|
| 1.01 | van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | "This vegetatively propagated crop is currently the most important bulbous geophyte in the world. Modern cultivars (predominantly *Tulipa gesneriana*) are grown for bulb production, cut flowers, flowering potted plants, and landscaping…Continued breeding and improvement of *T. gesneriana* focus on disease resistance, improved floral longevity, and new flower shapes/colors." Cultivated in Europe for hundreds of years. |
| 1.02 | 1. Huxley (1992) The New Royal Horticultural Society Dictionary of Gardening. The MacMillan Press, London. 2. Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | 1. native to Eastern Europe and Asia Minor 2. naturalized in SW Europe |
| 1.03 | | |
| 2.01 | | |
| 2.02 | | |
| 2.03 | | |
| 2.04 | | |
| 2.05 | van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | "This vegetatively propagated crop is currently the most important bulbous geophyte in the world. Modern cultivars (predominantly *Tulipa gesneriana*) are grown for bulb production, cut flowers, flowering potted plants, and landscaping." Cultivated in Europe for hundreds of years. |
| 3.01 | 1. Huxley (1992) The New Royal Horticultural Society | 1. native to Eastern Europe and |

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| | Dictionary of Gardening. The MacMillan Press, London. 2. Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | Asia Minor 2. naturalized in SW Europe |
| 3.02 | | no evidence |
| 3.03 | | no evidence |
| 3.04 | | no evidence |
| 3.05 | | no evidence |
| 4.01 | Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | no description of these traits |
| 4.02 | | no evidence |
| 4.03 | Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | no description of this |
| 4.04 | | |
| 4.05 | 1. Canadian Poisonous Plants Information System (http://www.cbif.gc.ca/pls/pp/ppack.info?p_psn=166&p_type=all&p_sci=sci&p_x=pp). 2. Wolf, P, HJ Blanke, P Wohlsein, J Kamphues, and M Stober (2003) Animal nutrition for veterinarians - actual cases: tulip onions with leaves (*Tulipa gesneriana*) - an unusual and high-risk plant in ruminant feeding. Deutsche Tierarztliche Wochenschrift 110: 302-305. | 1. "Poisoning of humans and dogs has also been reported when tulip bulbs mistaken for onions were ingested." 2. Several cattle died after consuming tulip bulbs. |
| 4.06 | van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | "Tulips can be affected by several diseases e.g. bulb-rot…and viral diseases." |
| 4.07 | Canadian Poisonous Plants Information System (http://www.cbif.gc.ca/pls/pp/ppack.info?p_psn=166&p_type=all&p_sci=sci&p_x=pp). | "Tulips contain an allergen, tuliposide A, which causes dermatitis in sensitive individuals. Poisoning of humans and dogs has also been reported when tulip bulbs mistaken for onions were ingested." |
| 4.08 | | no evidence |
| 4.09 | Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | "It cannot grow in the shade." |
| 4.1 | Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | "The plant prefers light (sandy) and medium (loamy) soils". |
| 4.11 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | growth habit: forb/herb |
| 4.12 | | no evidence |
| 5.01 | | terrestrial |
| 5.02 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National | Liliaceae |

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|---|---|---|
| | Plant Data Center, Baton Rouge, LA 70874-4490 USA. | |
| 5.03 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | herbaceous Liliaceae |
| 5.04 | 1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. AA Balkema, Rotterdam. 2. van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | 1. "The bulb…is a specialized organ for vegetative reproduction serving at the same time as the plant's foodstore." 2. "This vegetatively propagated crop is currently the most important bulbous geophyte in the world." |
| 6.01 | | |
| 6.02 | 1. van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. 2. Plants for a Future (http://www.pfaf.org/database/plants.php?Tulipa+gesneriana). | 1. "Normally tulips are vegetatively propagated. It is only for breeding purposes that tulips are crossed and seeds are harvested. After sowing, seeds require a period of low temperature to induce germination". 2. can be propagated by seed |
| 6.03 | van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | many artificial crosses have been created between *T. gesneriana* and other species [but it is unknown whether hybrids occur naturally] |
| 6.04 | | |
| 6.05 | | |
| 6.06 | 1. Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. AA Balkema, Rotterdam. 2. van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | 1. "The bulb…is a specialized organ for vegetative reproduction serving at the same time as the plant's foodstore…Stolon formation and subsequent dropping of the bulb ensure vegetative reproduction by removing the daughter bulb from the mother plant while maintaining the flow of nutrients between the two." 2. "This vegetatively propagated crop is currently the most important bulbous geophyte in the world." |
| 6.07 | | |
| 7.01 | | |
| 7.02 | van Tuyl, JM and MGM van Creij (2006) Tulip: *Tulipa gesneriana* and *T.* hybrids. Pp. 623-641 in NO Anderson (ed) Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer. | "This vegetatively propagated crop is currently the most important bulbous geophyte in the world. Modern cultivars (predominantly *Tulipa gesneriana*) |

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|---|---|---|
| | | are grown for bulb production, cut flowers, flowering potted plants, and landscaping." Cultivated in Europe for hundreds of years. |
| 7.03 | | no evidence |
| 7.04 | Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. AA Balkema, Rotterdam. | "The fruit of the tulip is a trilocular capsule formed by the syncarpous and superior ovary"; capsule is dehiscent [no evidence of adaptations to wind dispersal] |
| 7.05 | | no evidence |
| 7.06 | | |
| 7.07 | Botschantzeva, ZP (1982) Tulips: Taxonomy, morphology, cytology, phytogeography and physiology. AA Balkema, Rotterdam. | "The fruit of the tulip is a trilocular capsule formed by the syncarpous and superior ovary" [no evidence of any means of attachment] |
| 7.08 | | |
| 8.01 | | |
| 8.02 | | |
| 8.03 | | |
| 8.04 | | |
| 8.05 | | |