

Taxon: *Torenia fournieri* Linden ex E. Fourn.

Family: Linderniaceae

Common Name(s): bluewings
wishbone flower

Synonym(s):

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 14 Jun 2017

WRA Score: 11.0

Designation: H(HPWRA)

Rating: High Risk

Keywords: Annual, Naturalized, Ornamental, Self-Compatible, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Widely cultivated, but not domesticated] "The origin of <i>Torenia</i> spp. is not known (Fischer 2004), although they are reportedly native to South East Asia, Africa and Madagascar (Yamazaki 1985). Details on the distribution of a few well known species of <i>torenia</i> are given in Table 1. <i>Torenia</i> x <i>hybrida</i> describes those plants derived from controlled crosses between <i>T. fournieri</i> and <i>T. concolor</i> (see Section 2.5). The flowers of <i>T. x hybrida</i> are both male and female sterile (Tanaka 2008)" ... "Apart from its ornamental value, <i>T. fournieri</i> is a useful experimental model plant for cytogeneticists to study fertilization, because of the ease of observing pollination and fertilisation due to the protruding nature of the embryo sac (see Sections 3.2 & 4.2). <i>T. fournieri</i> is also used to study the location and movement of chromosomes and their centromeres in the early stages of embryogenesis in interspecific hybrid plants (Kikuchi et al. 2005)."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 13 Jun 2017]	"Native: Asia-Tropical Indo-China: Cambodia; Laos; Thailand; Vietnam"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed]	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Gilman, E.F. & Howe, T. 1999. <i>Torenia fournieri</i> . Fact Sheet FPS-584. University of Florida IFAS Extension. http://edis.ifas.ufl.edu . [Accessed 14 Jun 2017]	"USDA hardiness zones: all zones"
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Elevation range apparently exceeds 1000 m, demonstrating some environmental versatility] "Usually cultivated in S China but sometimes occurring by roadsides or in fields; below 1200 m."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 13 Jun 2017]	"Native: Asia-Tropical Indo-China: Cambodia; Laos; Thailand; Vietnam"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	" <i>T. x hybrida</i> and <i>T. fournieri</i> have been introduced into most States of Australia, including the tropics and subtropics."
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/ . [Accessed 14 Jun 2017]	" <i>Torenia fournieri</i> J. Linden ex E. Fournier (Confirmed) Common Names: <i>Torenia</i> , Wishbone flower, 'Ōla'a-beauty First Collected: 1933"
	Gilman, E.F. & Howe, T. 1999. <i>Torenia fournieri</i> . Fact Sheet FPS-584. University of Florida IFAS Extension. http://edis.ifas.ufl.edu . [Accessed]	" <i>Torenia</i> is an excellent landscape annual that may also be used as a potted plant." [Cultivated in Florida]

Qsn #	Question	Answer
301	Naturalized beyond native range	y
	Source(s)	Notes
	Reddy, C. S. (2008). Catalogue of invasive alien flora of India. Life Science Journal, 5(2): 84-89	"After successful local establishment, some naturalized species disperse and produce viable offspring in areas distant from the sites of introduction. Such naturalized species are called invasive (Richardson et al, 2000)." ... "Table 1. List of invasive alien plant species in India" [Table includes <i>Torenia fournieri</i>]
	Wu, S., Aleck Yang, T.Y., Teng, Y.C., Chang, C.Y., Yang, K.C. and Hsieh, C.F. 2010. Insights of the latest naturalized flora of Taiwan: change in the past eight years. <i>aiwania</i> , 55(2), 139-159	"Appendix 1. List of naturalized species of Taiwan" [<i>Torenia fournieri</i> included in table. First Record from 1940]
	Conant, P. 2017. HDOA (ret.). Pers. Comm. 08 June	"I have seen it all over Volcano village and it acts like hono hono or that reddish Polygonum sp. " ... "It only comes up in the road, suggesting it comes on tires, or needs a lotta sun."
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Usually cultivated in S China but sometimes occurring by roadsides or in fields; below 1200 m. Fujian, Guangdong, Guangxi, Taiwan, Yunnan, Zhejiang [Cambodia, Laos, Thailand, Vietnam]."

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Regarded as a weed in a number of publications] <i>Torenia fournieri</i> Linden ex <i>E. Fourn.</i> Scrophulariaceae Total N° of Refs: 32 Global Risk Score: 4.32 Rating: Low Habit: perennial Herb Preferred Climate/s: Mediterranean, Subtropical, Tropical Origin: Aust, E Asia, Europe, SE Asia Major Pathway/s: Contaminant, Herbal, Ornamental Dispersed by: Humans, Escapee References: Guyana-CW-32, Australia-CN- 468, United States of America-N-101, United States of America-W-179, Japan-N- 794, Belize-N-850, India-N-976, India-I- 1047, Australia-N-1049, India-N-1148, China-N-1215, Japan-N-1278, India-I- 1279, India-I-1280, south and southeast Asia-A-1320, China-N-1344, India-I-1345, Taiwan-N-1403, south and southeast Asia- A-1408, India-N-1628, India-N-1631, Global-CD-1611, Taiwan-W-1748, China- N-1758, India-N-1789, India-I-1875, India- I-2022, Australia-W-1977, Democratic Republic of the Congo-W-1977, India-W- 1977, Japan-W-1977, Taiwan-W-1977."
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Naturalized and potentially weedy] "The CRC for Weed Management, in its online Introduced Flora of Australia and its Weed Status, lists <i>T. fournieri</i> as being a weed of agriculture (see http://weeds.cbit.uq.edu.au/). On the other hand, other authorities do not list any <i>Torenia</i> spp. as being weeds in Australia (Groves et al. 2003; Weeds Australia 2006). As <i>T. x hybrida</i> was only introduced relatively recently (about 5 years ago) to Australian horticulture, and has no means of sexual reproduction and limited asexual reproduction, it would not be expected to have developed weed status. In addition to <i>T. fournieri</i> and <i>T. x hybrida</i> , the species <i>T. baillonii</i> is also permitted as an import (nursery stock) to Australia (AQIS 2008)."

303	Agricultural/forestry/horticultural weed	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	y
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"A number of <i>Torenia</i> spp. are classified as "naturalised" or "weeds" in various parts of the world including <i>T. asiatica</i> L. (US), <i>T. bicolor</i> Dalz. (global), <i>T. concolor</i> Lindl. (global), <i>T. flava</i> Bth. (Java), <i>T. fournieri</i> Linden ex Fourn. [Guyana, Surinam French Guiana and the US, (Florida)], <i>T. polygonoides</i> Benth. (Thailand), <i>T. spicata</i> Engl. (global), <i>T. thouarsii</i> (Cham. & Schltdl.) Kuntze. (global; Guyana, Surinam French Guiana) and <i>T. violacea</i> (Azaola ex Blanco) Pennell (Java, Global, Indonesia, The Tropics and China) (Randall 2002). <i>Torenia asiatica</i> and <i>Torenia glabra</i> are classified as potentially invasive in Hawaii (Staples et al. 2000). <i>Torenia. x hybrida</i> does not possess any characteristics typical of weeds since it does not produce any viable seed, cannot spread by vegetative means under natural conditions and does not produce any persistent vegetative structures."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Torenia concolor</i> ... Weed of: Bananas, Orchards and Plantations" ... " <i>Torenia polygonoides</i> ... Weed of: Orchards & Plantations" [A number of <i>Torenia</i> species are also listed as naturalized and/or invasive]

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence] "Herbs, 15–50 cm tall. Stems erect, quadrangular, simple or branched above middle, subglabrous. Petiole 1–2 cm; leaf blade oblong-ovate to ovate, 3–5 × 1.5–2.5 cm, subglabrous, margin coarsely serrate. Racemes often terminal; bracts linear, 2–5 mm. Pedicel 1–2 cm. Calyx ellipsoid, 1.3–1.9 × ca. 0.8 cm, green or purple-red at apex and margin, 5-winged; wings decurrent, ca. 2 mm wide, becoming ca. 3 mm wide in fruit; lips subtriangular, 1.5–1.7 cm, sometimes apically lobed. Corolla 2.5–4 cm, exceeding calyx by 1–2.3 cm; tube pale violet, upper side yellow; lower lip lobes purple-blue, middle lobe with a yellow patch near base, oblong to suborbicular, ca. 10 × 8 mm, subequal; upper lip pale blue, erect, broadly obovate, 1–1.2 × 1.2–1.5 cm, emarginate. Stamens unappendaged. Capsule narrowly ellipsoid ca. 12 × 0.5 mm. Seeds yellow."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown. No evidence found
403	Parasitic	n
	Source(s)	Notes
	Keng, H. 1990. The Concise Flora of Singapore: Gymnosperms and dicotyledons. Singapore University Press, Singapore	"Erect herb, 30-40 cm high, leaves opposite, ovate, 2-5.5 cm long" [No evidence]
404	Unpalatable to grazing animals	
	Source(s)	Notes
	Better Homes & Gardens. 2017. Wishbone Flower. <i>Torenia fournieri</i> . http://www.bhg.com/gardening/plant-dictionary/annual/wishbone-flower/ . [Accessed 14 Jun 2017]	"Deer Resistant" [Potentially unpalatable]
405	Toxic to animals	n
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"Throughout the world <i>Torenia</i> spp. are widely grown ornamental plants and are not known to be poisonous to people or other organisms. A comprehensive search of the scientific literature ⁶ and an examination of a number of toxic plant databases ⁷ (Cornell University Poisonous Plant Information Database; Canadian Poisonous Plants Information System; FDA Poisonous Plant Database; Toxic Plant Database, Veterinary Library, University of Illinois, USA; Toxic Plant Database, University of Purdue, USA) revealed no evidence that <i>torenia</i> has any toxic or allergenic potential to people or is toxic to other organisms."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence
406	Host for recognized pests and pathogens	n
	Source(s)	Notes
	Cohen, S. & Benner, J. 2010. The Nonstop Garden: A Step-by-Step Guide to Smart Plant Choices and Four-Season Designs. Timber Press, Portland, OR	"It performs best in full shade in hot, humid climates. Otherwise, it does not have any serious foes."
	Gilman, E.F. & Howe, T. 1999. <i>Torenia fournieri</i> . Fact Sheet FPS-584. University of Florida IFAS Extension. http://edis.ifas.ufl.edu . [Accessed 14 Jun 2017]	"Pest resistance: long-term health usually not affected by pests" ... "Pests and Diseases: <i>Torenia</i> had moderate to severe whitefly infestations in central Florida evaluation trials." [Whiteflies are a common pest]
407	Causes allergies or is otherwise toxic to humans	n

Qsn #	Question	Answer
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"Throughout the world <i>Torenia</i> spp. are widely grown ornamental plants and are not known to be poisonous to people or other organisms. A comprehensive search of the scientific literature ⁶ and an examination of a number of toxic plant databases ⁷ (Cornell University Poisonous Plant Information Database; Canadian Poisonous Plants Information System; FDA Poisonous Plant Database; Toxic Plant Database, Veterinary Library, University of Illinois, USA; Toxic Plant Database, University of Purdue, USA) revealed no evidence that <i>torenia</i> has any toxic or allergenic potential to people or is toxic to other organisms."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Cohen, S. & Benner, J. 2010. The Nonstop Garden: A Step-by-Step Guide to Smart Plant Choices and Four-Season Designs. Timber Press, Portland, OR	[Unlikely given habit and habitat] "This true annual gets its common name from the two tiny anthers that form in each flower and resemble a wishbone." ... "Wishbone flower tends to like it on the cooler side. It performs best in full shade in hot, humid climates."
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	No evidence

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Hessayon, D. G. 1996. The New Bedding Plant Expert. Expert Books, New York	"Any well-drained garden soil will do-thrives In sun or partial shade."
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	" <i>T. fournieri</i> is recommended for growing in part shade and in moist, well-drained soil (Gilman & Howe 1999)"
	Cohen, S. & Benner, J. 2010. The Nonstop Garden: A Step-by-Step Guide to Smart Plant Choices and Four-Season Designs. Timber Press, Portland, OR	" <i>Torenia fournieri</i> ... Partial to full shade" ... "It performs best in full shade in hot, humid climates."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Hessayon, D. G. 1996. The New Bedding Plant Expert. Expert Books, New York	"Any well-drained garden soil will do"
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	" <i>T. fournieri</i> is recommended for growing in part shade and in moist, well-drained soil (Gilman & Howe 1999);"

Qsn #	Question	Answer
411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Herbs, 15–50 cm tall. Stems erect, quadrangular, simple or branched above middle, subglabrous. Petiole 1–2 cm; leaf blade oblong-ovate to ovate, 3–5 × 1.5–2.5 cm, subglabrous, margin coarsely serrate."
412	Forms dense thickets	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Densities unspecified] "Usually cultivated in S China but sometimes occurring by roadsides or in fields; below 1200 m. Fujian"
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	No evidence
501	Aquatic	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Terrestrial herb] "Herbs, 15–50 cm tall." ... "Usually cultivated in S China but sometimes occurring by roadsides or in fields; below 1200 m."
502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 13 Jun 2017]	Family: Linderniaceae Altfamily: Veronicaceae
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Keng, H. 1990. The Concise Flora of Singapore: Gymnosperms and dicotyledons. Singapore University Press, Singapore	"Erect herb, 30-40 cm high, leaves opposite, ovate, 2-5.5 cm lona" [Linderniaceae]
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Herbs, 15–50 cm tall. Stems erect, quadrangular, simple or branched above middle, subglabrous."
601	Evidence of substantial reproductive failure in native habitat	n

Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence] "Usually cultivated in S China but sometimes occurring by roadsides or in fields; below 1200 m. Fujian, Guangdong, Guangxi, Taiwan, Yunnan, Zhejiang [Cambodia, Laos, Thailand, Vietnam]."
602	Produces viable seed	y
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	" <i>T. fournieri</i> is propagated mainly by seed and grown as an annual either outdoors or as a houseplant; seeds remain uncovered as light apparently aids germination (Cornell University 2006). In central Australia, the recommended seed sowing time is from August to December (DPIFM Darwin 2004)."
603	Hybridizes naturally	
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Unknown. Artificial hybridization possible] " <i>Torenia x hybrida</i> describes those plants derived from controlled crosses between <i>T. fournieri</i> and <i>T. concolor</i> (see Section 2.5). The flowers of <i>T. x hybrida</i> are both male and female sterile (Tanaka 2008)"
604	Self-compatible or apomictic	y
	Source(s)	Notes
	Gilman, E.F. & Howe, T. 1999. <i>Torenia fournieri</i> . Fact Sheet FPS-584. University of Florida IFAS Extension. http://edis.ifas.ufl.edu . [Accessed 14 Jun 2017]	"Invasive potential: may self-seed each year"
	Newcombe, F. (1922). Significance of the Behavior of Sensitive Stigmas. <i>American Journal of Botany</i> , 9(3), 99-120	"On the other hand, I found <i>Torenia fournieri</i> , <i>Mimulus cardinalis</i> , and <i>Utricularia vulgaris</i> readily self-fertile, and one case of self-fertilization in <i>Catalpa bignonioides</i> ."
605	Requires specialist pollinators	n
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"The genera of Scrophulariaceae are mainly insect pollinated. <i>Torenia</i> spp. (excluding <i>T. x hybrida</i>) are apparently insect pollinated and produce numerous seeds. One of the parents of <i>T. x hybrida</i> (<i>T. fournieri</i>) is mainly bee pollinated (Yamazaki 1985; Fischer 2004). In Thailand, pollen from <i>T. fournieri</i> is a food source for several species of stingless bees (Jongjitvimol & Wattanachaiyingcharoen 2006). In North America, hummingbirds are reportedly attracted to the flowers of <i>T. fournieri</i> (Cornell University 2006) and may therefore act as potential pollinators."
606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes

Qsn #	Question	Answer
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Vegetative reproduction under artificial conditions only] " <i>T. fournieri</i> can also be grown from cuttings under controlled conditions (such as bottom heat, aerated medium, misting and plant growth regulator application) that optimise rooting and growth (Ecke Ranch 2007)."

607	Minimum generative time (years)	1
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Annual] " <i>T. fournieri</i> is propagated mainly by seed and grown as an annual either outdoors or as a houseplant; seeds remain uncovered as light apparently aids germination (Cornell University 2006)."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Conant, P. 2017. HDOA (ret.). Pers. Comm. 08 June	"It only comes up in the road, suggesting it comes on tires, or needs a lotta sun."
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Occurrence along roadsides suggests possibly movement by attachment to vehicles, but may indicate preference for open, disturbed habitat] "Usually cultivated in S China but sometimes occurring by roadsides or in fields; below 1200 m"
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Possibly Yes. Seeds lack means of external attachment, but small size may aid in attachment in soil] "A special case of poricidy occurs in <i>T. fournieri</i> where the fruiting body opens adjacent to the septum on each side producing longitudinal pores. This is followed by the septa separating from the placenta emptying the capsule while the septum splits (Kadereit 2008). At the time of poricidal dehiscence of the capsule the calyx splits longitudinally. In <i>Torenia</i> spp. (excluding <i>T. x hybrida</i>), seeds are numerous, minute and wind dispersed (Yamazaki 1985; Fischer 2004)."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"A related species, <i>T. fournieri</i> Lindl. ex Fourn., also called Ola'a beauty or nanioola'a, is also cultivated in Hawai'i for lei and differs from <i>T. asiatica</i> in its erect stems, ellipsoid calyx 7-11 mm long with strigose wings, and pale blue or white corolla."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Torenia fournieri</i> ... Major Pathway/s: Contaminant, Herbal, Ornamental Dispersed by: Humans, Escapee"
	Gilman, E.F. & Howe, T. 1999. <i>Torenia fournieri</i> . Fact Sheet FPS-584. University of Florida IFAS Extension. http://edis.ifas.ufl.edu . [Accessed 14 Jun 2017]	[Ornamental] "Wishbone Flower is a perennial grown as an annual with flowers of blue, white, or pink with yellow markings (Fig. 1). The plants grow 12 to 15 inches tall and are spaced eight to nine inches apart. <i>Torenia</i> is an excellent landscape annual that may also be used as a potted plant. The leaves turn reddish green during unseasonably cold weather."

703	Propagules likely to disperse as a produce contaminant	

Qsn #	Question	Answer
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Contaminant"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Small seeds may contaminate other plants or soil grown in proximity] "A related species, <i>T. fournieri</i> Lindl. ex Fourn., also called Ola'a beauty or nanioola'a, is also cultivated in Hawai'i for lei and differs from <i>T. asiatica</i> in its erect stems, ellipsoid calyx 7-11 mm long with strigose wings, and pale blue or white corolla."

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"A special case of poricidy occurs in <i>T. fournieri</i> where the fruiting body opens adjacent to the septum on each side producing longitudinal pores. This is followed by the septa separating from the placenta emptying the capsule while the septum splits (Kadereit 2008). At the time of poricidal dehiscence of the capsule the calyx splits longitudinally. In <i>Torenia</i> spp. (excluding <i>T. x hybrida</i>), seeds are numerous, minute and wind dispersed (Yamazaki 1985; Fischer 2004)."

705	Propagules water dispersed	
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[Wind-dispersed, but small size may aid in secondary dispersal by water] "A special case of poricidy occurs in <i>T. fournieri</i> where the fruiting body opens adjacent to the septum on each side producing longitudinal pores. This is followed by the septa separating from the placenta emptying the capsule while the septum splits (Kadereit 2008). At the time of poricidal dehiscence of the capsule the calyx splits longitudinally. In <i>Torenia</i> spp. (excluding <i>T. x hybrida</i>), seeds are numerous, minute and wind dispersed (Yamazaki 1985; Fischer 2004)."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"In <i>Torenia</i> spp. (excluding <i>T. x hybrida</i>), seeds are numerous, minute and wind dispersed"

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	[No means of external attachment. Small size could aid in attachment to animals] "In <i>Torenia</i> spp. (excluding <i>T. x hybrida</i>), seeds are numerous, minute and wind dispersed"

708	Propagules survive passage through the gut	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. Plant Protection Quarterly, 25(2): 56-74	[No evidence] "Answer 'no' where the taxon is unlikely to be eaten by animals or if seeds are not viable following passage through the gut."

801	Prolific seed production (>1000/m ²)	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Capsules septical. Seeds numerous." [Generic description]
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"Following fertilization, the ovary develops into a fruit classified as a capsule, containing tiny seeds (0.5mm long and 0.3mm wide)." [Seeds small, but densities unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	"Seeds of <i>T. fournieri</i> germinate at temperatures of 21-24°C and take 7-17 days to emerge (Cornell University 2006). There is no information to suggest that <i>torenia</i> seeds exhibit dormancy."
	Royal Botanic Gardens Kew. (2017) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed 14 Jun 2017]	"Storage Behaviour: Orthodox Storage Conditions: Seeds not damaged from exposure to liquid nitrogen (Stanwood & Bass, 1981); seeds maintained for 2-5 years in commercial storage conditions (Priestley, 1986)"

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown. Despite weediness, no information on herbicide efficacy or chemical control of this species found

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	Office of the Gene Technology Regulator. 2008. The Biology of <i>Torenia</i> spp. (<i>torenia</i>). Version 2. Department of Health and Ageing, Australian Government	" <i>T. fournieri</i> is propagated mainly by seed and grown as an annual either outdoors or as a houseplant" [No evidence]

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Able to grow in multiple hardiness zones, and elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely cultivated and naturalized in many locations, possibly including Hawaii Island (not vouchered in flora)
- Regarded as weedy in a number of locations
- Other species have become invasive
- Deer resistant (possibly unpalatable)
- Shade tolerant
- Tolerates many soil types
- Reported to be self-compatible
- Annual (able to reach maturity in one growing season)
- Seeds dispersed by wind & intentionally by people
- Prolific seed production (densities unknown)

Low Risk Traits

- Despite naturalization and reports of weediness, detrimental impacts not specified
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Ornamental (lei flower)
- Not reported to spread vegetatively