

Taxon: <i>Ruellia simplex</i> C. Wright	Family: Acanthaceae
Common Name(s): Britton's wild petunia Mexican blue bells Mexican petunia Spanish ladies	Synonym(s): <i>Ruellia brittoniana</i> Leonard <i>Ruellia coerulea</i> Morong <i>Ruellia malacosperma</i> Greenm. <i>Ruellia spectabilis</i> Britton <i>Ruellia tweedieana</i> Griseb.

Assessor: Chuck Chimera	Status: In Progress	End Date: 8 May 2019
WRA Score: 20.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Ornamental Herb, Environmental Weed, Dense Cover, Spreads Vegetatively, Explosive Dehiscence

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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
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
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
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
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
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

Qsn #	Question	Answer Option	Answer
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)	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
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)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
402	Allelopathic		
403	Parasitic	y=1, n=0	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	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
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
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
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
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	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
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
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
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)	y=1, n=-1	y
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal		
704	Propagules adapted to wind dispersal		
705	Propagules water dispersed	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y

Qsn #	Question	Answer Option	Answer
708	Propagules survive passage through the gut	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)		
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		
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
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	[Assessment of wild type. Fruitless plants would limit ability for plants to spread from cultivation] "Mexican petunia (<i>Ruellia simplex</i> Wright) is a non-native plant that was introduced to Florida sometime in the 1940s and since then has naturalized in most of the state and in other southern states. Since 2007, we have developed at the University of Florida/Institute for Food and Agricultural Science in Gainesville the first <i>Ruellia</i> L. breeding program aiming to develop fruitless plants with different flower colors and growth habits that will not be invasive by seed dispersal. A combination of polyploidization and hybridization methods was used. In 2011, a total of 15 plants were selected and grown in southeastern, north-central, and northwestern Florida (Fort Pierce, Citra, and Quincy) using a randomized block design with three blocks and three plants per plot at each site. Plants were evaluated monthly for landscape performance, flowering, and fruiting. Two hybrids (R10-102 and R10-108) had outstanding potential as new fruitless cultivars for the plant industry having improved landscape performance and flowering."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	NA

Qsn #	Question	Answer
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. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 6 May 2019]	"Native Northern America NORTHERN MEXICO: Mexico [San Luis Potosí, Tamaulipas] SOUTHERN MEXICO: Mexico [Chiapas, Hidalgo, Puebla, Veracruz de Ignacio de la Llave] Southern America CARIBBEAN: Cuba, Dominican Republic, Trinidad and Tobago, United States [Puerto Rico] BRAZIL: Brazil (s.e.) WESTERN SOUTH AMERICA: Bolivia (w.) SOUTHERN SOUTH AMERICA: Argentina, [Córdoba, Chaco, Corrientes, Entre Ríos, Formosa, Jujuy, Misiones, Salta, Santa Fe, Santiago del Estero, Tucumán] Paraguay, Uruguay"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 6 May 2019]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Dave's Garden. (2019). <i>Ruellia</i> , Mexican petunia, Mexican bluebell 'Mayan Purple' <i>Ruellia simplex</i> . https://davesgarden.com/guides/pf/go/234551/ . [Accessed 8 May 2019]	"Hardiness: USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15 °F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	" <i>Ruellia simplex</i> has the ability to grow in a wide range of environmental conditions, from wetlands to almost xeric (Hupp et al., 2009)."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes

Qsn #	Question	Answer
	<p>USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 6 May 2019]</p>	<p>"Native Northern America NORTHERN MEXICO: Mexico [San Luis Potosí, Tamaulipas] SOUTHERN MEXICO: Mexico [Chiapas, Hidalgo, Puebla, Veracruz de Ignacio de la Llave] Southern America CARIBBEAN: Cuba, Dominican Republic, Trinidad and Tobago, United States [Puerto Rico] BRAZIL: Brazil (s.e.) WESTERN SOUTH AMERICA: Bolivia (w.) SOUTHERN SOUTH AMERICA: Argentina, [Córdoba, Chaco, Corrientes, Entre Ríos, Formosa, Jujuy, Misiones, Salta, Santa Fe, Santiago del Estero, Tucumán] Paraguay, Uruguay</p> <p>Naturalized Northern America SOUTHEASTERN U.S.A.: United States [Florida, Georgia, Louisiana, South Carolina] SOUTH-CENTRAL U.S.A.: United States [Texas]"</p>

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	<p>Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i>, Acanthaceae). <i>HortScience</i>, 47(9), 1245-1251</p>	<p>"<i>R. simplex</i> has naturalized in disturbed uplands and wetlands of seven southern U.S. states (Florida, Georgia, South Carolina, Alabama, Mississippi, Louisiana, and Texas) plus the Virgin Islands, Puerto Rico, and Hawaii (Kartesz, 2012; U.S. Department of Agriculture, Natural Resources Conservation Service, 2012)."</p>

301	Naturalized beyond native range	y
	Source(s)	Notes
	<p>Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i>, Acanthaceae). <i>HortScience</i>, 47(9), 1245-1251</p>	<p>"Mexican petunia (<i>Ruellia simplex</i> Wright) is a non-native plant that was introduced to Florida sometime in the 1940s and since then has naturalized in most of the state and in other southern states."</p>
	<p>USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 6 May 2019]</p>	<p>"Naturalized Northern America SOUTHEASTERN U.S.A.: United States [Florida, Georgia, Louisiana, South Carolina] SOUTH-CENTRAL U.S.A.: United States [Texas]"</p>
	<p>Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i>. http://keyserver.lucidcentral.org. [Accessed 8 May 2019]</p>	<p>"This species has become widely naturalised in the warmer parts of eastern Australia. It is widespread in the coastal districts of Queensland and is also becoming naturalised in the coastal districts of northern New South Wales. Also naturalised overseas in south-eastern USA (i.e. Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina and Florida), Hawaii, Central America (i.e. Belize) and the Caribbean (i.e. Puerto Rico and the Virgin Islands)."</p>

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	An environmental weed. See 3.04

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	An environmental weed. See 3.04

304	Environmental weed	y
	Source(s)	Notes
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	"In 2001, it was promoted to a FLEPPC Category I Invasive as displacement of native plant communities by Mexican-petunia was recurrently observed (FLEPPC 2011). In addition to its FLEPPC ranking, the UF/IFAS Assessment does not recommend its use for North, Central, and South Florida due to its invasiveness and rapid spread in these regions (IFAS Invasive Plant Working Group 2013). It has been shown that Mexican petunia has a competitive advantage over the native Carolina wild-petunia (<i>Ruellia caroliniensis</i>) for resource utilization and efficiency (Wilson et al. 2004)."
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed]	"Mexican petunia (<i>Ruellia simplex</i>) is regarded as an environmental weed in Queensland and is of particular concern in the south-eastern parts of this state, where it was recently ranked among the 200 most invasive plant species. For example, it is listed as a significant non declared pest plant in Maroochy Shire, an undesirable plant in Caboolture Shire, and a weed of natural bushland and waterways in Gold Coast City. In the last 20 years, Mexican petunia (<i>Ruellia simplex</i>) has gone from being relatively uncommon to being one of the most common and widespread species in Brisbane's waterways. It often forms dense monocultures in wetter sites, particularly along creekbeds and on creekbanks. Such infestations prevent the natural growth and regeneration of native riparian plants (e.g. <i>Backhousia myrtifolia</i> , <i>Glochidion ferdinandi</i> , <i>Waterhousea floribunda</i> , <i>Carex</i> spp. and <i>Callistemon</i> spp.), and unlike some other riparian weeds it will grow in shady creeks. Mexican petunia (<i>Ruellia simplex</i>) has also become invasive in south-eastern USA, where it has spread rapidly and displaced native flora. It is proving especially problematic in wet areas and can out-compete closely related native species in such environments (e.g. <i>Ruellia caroliniensis</i>). Because of this, it has been listed as a Category 1 invasive pest plant by the Florida Exotic Pest Plant Council."

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	A number of <i>Ruellia</i> species are naturalized and invasive worldwide

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	[No evidence] "an evergreen perennial, herbaceous plant growing up to 1 m high. "

402	Allelopathic	
	Source(s)	Notes
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	[Unknown if allelopathy plays a role in the proliferation of this species] "Upon germination and establishment in these floodplains, Mexican-petunia increases in abundance and ultimately dominates the aboveground cover, creating monotypic invasions (Figures 2a and 2b). Continued propagule introduction into floodplains contributes to the capacity for Mexican-petunia to alter ecosystem processes and successfully compete with native species for available resources (Gordon 1998; Mack et al. 2000)."

403	Parasitic	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 8 May 2019]	"Family: Acanthaceae" [No evidence in family]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown

405	Toxic to animals	n
	Source(s)	Notes
	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Missouri Botanical Garden. (2019). <i>Ruellia simplex</i> . http://www.missouribotanicalgarden.org . [Accessed 8 May 2019]	"No serious insect or disease problems."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	[Not listed among impacts. Invades wet areas] "Mexican petunia (<i>Ruellia simplex</i>) has also become invasive in south-eastern USA, where it has spread rapidly and displaced native flora. It is proving especially problematic in wet areas and can out-compete closely related native species in such environments (e.g. <i>Ruellia caroliniensis</i>). Because of this, it has been listed as a Category 1 invasive pest plant by the Florida Exotic Pest Plant Council."
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	No evidence. Not listed among impacts

Qsn #	Question	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Langeland, K.A. & Burks, K.C. (eds.). 2008. Identification and Biology of Nonnative Plants in Florida's Natural Areas. UF/IFAS Distribution, Gainesville, FL	"Grows well in sun and shade; very heat tolerant; moderately salt tolerant (Arnold 2000), and drought tolerant (Gilman 1999a)."
	Reinhardt Adams, C. A., Wiese, C., Lee, L. C., Smith, A. M., Freyre, R. and Wilson, S. B. (2014). Managing Mexican Petunia (<i>Ruellia simplex</i> C. Wright) in the Home Landscape. ENH1237. UF/IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 8 May 2019]	"Mexican petunia tolerates shade, sun, wet, dry, and poor soil conditions."
	Dave's Garden. (2019). <i>Ruellia</i> , Mexican petunia, Mexican bluebell 'Mayan Purple' <i>Ruellia simplex</i> . https://davesgarden.com/guides/pf/go/234551/ . [Accessed 8 May 2019]	"Sun Exposure: Full Sun Sun to Partial Shade"
	Missouri Botanical Garden. (2019). <i>Ruellia simplex</i> . http://www.missouribotanicalgarden.org . [Accessed 8 May 2019]	"Sun: Full sun to part shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. 2012. Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"Prefers sun and moist soils, but is drought tolerant and can grow in most kinds of soil."
	Langeland, K.A. & Burks, K.C. (eds.). 2008. Identification and Biology of Nonnative Plants in Florida's Natural Areas. UF/IFAS Distribution, Gainesville, FL	"Tolerates a wide variety of soil types including heavy clay (Arnold 2000), acidic, sandy, loamy, and occasionally wet soils (Gilman 1999a)."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"Distinguishing Features an evergreen perennial, herbaceous plant growing up to 1 m high. it produces several stems from a single rootstock and the older stems may be slightly woody; the younger stems are mostly hairless, green and four angled (quadrangular). its simple leaves are carried in opposite pairs on the stem; each leaf has a short stem (petiole) 1-2 cm and the leaves are long and narrow (up to 20 cm long), hairless and usually dark green or slightly purplish tinted; the leaf tip is pointed and the leaf margins are even. its tubular flowers are lavender or purplish in colour, but white forms are known. its club-shaped fruits (up to 25 mm long) are at first green or purplish green; when ripe, they turn brown and then explosively release the seeds."

412	Forms dense thickets	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. 2012. Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"Mexican petunia can form dense mats that shade out other plants."
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	"Upon germination and establishment in these floodplains, Mexican-petunia increases in abundance and ultimately dominates the aboveground cover, creating monotypic invasions (Figures 2a and 2b). Continued propagule introduction into floodplains contributes to the capacity for Mexican-petunia to alter ecosystem processes and successfully compete with native species for available resources (Gordon 1998; Mack et al. 2000)."

501	Aquatic	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	[Terrestrial, but invasive near aquatic habitats] "A weed of waterways, riparian vegetation, dams, ponds, wetlands and drainage ditches in sub tropical and tropical regions."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 6 May 2019]	Family: Acanthaceae Subfamily: Acanthoideae Tribe: Ruellieae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 6 May 2019]	Family: Acanthaceae Subfamily: Acanthoideae Tribe: Ruellieae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"This species seeds profusely and also reproduces vegetatively via creeping underground stems (i.e. rhizomes) and stem segments."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes

Qsn #	Question	Answer
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	[No evidence] "Native to Mexico and South America (i.e. south-eastern Brazil, Bolivia, Argentina, Paraguay and Uruguay)." ... "This species has become widely naturalised in the warmer parts of eastern Australia. It is widespread in the coastal districts of Queensland and is also becoming naturalised in the coastal districts of northern New South Wales. Also naturalised overseas in south-eastern USA (i.e. Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina and Florida), Hawaii, Central America (i.e. Belize) and the Caribbean (i.e. Puerto Rico and the Virgin Islands)."

602	Produces viable seed	y
	Source(s)	Notes
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	"It produces on average 20.6 seeds per capsule with 98% to 100% germination rate under ideal conditions of 30 °C day and 20 °C night (Wilson and Mecca, 2003)."

603	Hybridizes naturally	
	Source(s)	Notes
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	[Unknown. Artificial hybridization used to breed sterile cultivars] "Mexican petunia (<i>Ruellia simplex</i> Wright) is a non-native plant that was introduced to Florida sometime in the 1940s and since then has naturalized in most of the state and in other southern states. Since 2007, we have developed at the University of Florida/Institute for Food and Agricultural Science in Gainesville the first <i>Ruellia</i> L. breeding program aiming to develop fruitless plants with different flower colors and growth habits that will not be invasive by seed dispersal. A combination of polyploidization and hybridization methods was used. In 2011, a total of 15 plants were selected and grown in southeastern, north-central, and northwestern Florida (Fort Pierce, Citra, and Quincy) using a randomized block design with three blocks and three plants per plot at each site. Plants were evaluated monthly for landscape performance, flowering, and fruiting. Two hybrids (R10-102 and R10-108) had outstanding potential as new fruitless cultivars for the plant industry having improved landscape performance and flowering."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Freyre, R., Wilson, S. B., & Knox, G. W. (2013). Breeding <i>Ruellia</i> and Trialing for Sterility at the University of Florida. <i>Acta Horticulturae</i> 1055, 431-435	"Numerous pollinators were observed in the field so it is assumed that fruit formation was mostly due to open pollination. In the potted trials R10-105-Q54 had excellent quality and flowering (4.5 and 2.8) and 'Chi Chi' was not significantly different (4.1 and 3.9). In this trial no pollinators were observed so fruiting was due to selfing."
	Missouri Botanical Garden. (2019). <i>Ruellia simplex</i> . http://www.missouribotanicalgarden.org . [Accessed 8 May 2019]	"Plants may spread invasively by self-seeding and rhizomes."

Qsn #	Question	Answer
	Long, R. W. (1966). Artificial interspecific hybridization in <i>Ruellia</i> (Acanthaceae). <i>American Journal of Botany</i> , 53(9), 917-927	In this study on artificial interspecific hybridization in <i>Ruellia</i> , fertility of parent species was determined before plants were crossed. All <i>Ruellia</i> spp. examined (including <i>Ruellia squarrosa</i>) were highly self-compatible.

605	Requires specialist pollinators	n
	Source(s)	Notes
	UF / IFAS Center for Aquatic and Invasive Plants. (2018). https://plants.ifas.ufl.edu/plant-directory/ruellia-simplex/ . [Accessed 8 May 2019]	"Flowers are trumpet shaped (1-1/2 to 3 inches in diameter), solitary or borne in clusters at the tips of the stems, and are attractive to butterflies, bees and other pollinators."
	Freyre, R., Wilson, S. B., & Knox, G. W. (2013). Breeding <i>Ruellia</i> and Trialing for Sterility at the University of Florida. <i>Acta Horticulturae</i> 1055, 431-435	"Numerous pollinators were observed in the field so it is assumed that fruit formation was mostly due to open pollination."
	Hawkeswood, T. J., & Sommung, B. (2016). Pollination of <i>Ruellia simplex</i> C. Wright (Acanthaceae) by the Giant Tropical Bee, <i>Apis dorsata</i> (Fabr., 1793) (Hymenoptera: Apidae) in Bangkok, Thailand. <i>Calodema</i> , 438: 1-5	"Observations on the South East Asian Giant Tropical Bee, <i>Apis dorsata</i> (Fabr., 1793)(Apidae: Hymenoptera) pollinating flowers of the introduced plant <i>Ruellia simplex</i> C. Wright (Acanthaceae) in the Queen Sirikit Botanical Park No. 9 (Rama Park 9) in Bangkok, Thailand during October 2016 are provided. This appears to be (a) the first record of <i>A. dorsata</i> pollinating <i>Ruellia simplex</i> in Thailand, and (b) the first record of <i>A. dorsata</i> feeding from <i>R. simplex</i> flowers. Some literature pertaining to the biology of <i>A. dorsata</i> in Thailand is briefly reviewed."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. 2012. <i>Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species</i> . Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"It spreads through root and stem fragments and by seed."
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"This species seeds profusely and also reproduces vegetatively via creeping underground stems (i.e. rhizomes) and stem segments."
	Dave's Garden. (2019). <i>Ruellia</i> , Mexican petunia, Mexican bluebell 'Mayan Purple' <i>Ruellia simplex</i> . https://davesgarden.com/guides/pf/go/234551/ . [Accessed 8 May 2019]	[Even sterile cultivars may spread vegetatively] "On Mar 29, 2016, coriaceous from ROSLINDALE, MA wrote:" ... "If garden waste is disposed of properly, this cultivar is not likely to pose a threat to natural areas. (Trimnings can easily root if not destroyed.)"

Qsn #	Question	Answer
607	Minimum generative time (years)	1
	Source(s)	Notes
	Missouri Botanical Garden. (2019). <i>Ruellia simplex</i> . http://www.missouribotanicalgarden.org . [Accessed 8 May 2019]	"Suggested Use: Annual, Rain Garden" ... " <i>Ruellia simplex</i> , commonly called Mexican petunia or Texas petunia, is a vigorous, shrubby, woody-based, rhizomatous perennial that is grown as an annual north of USDA Zone 8." ... "Flowering is very respectable but less frequent when plants are grown as annuals in northern gardens, but will typically bloom from May to September. Flowers are followed by bean-like pods (to 1" long) which explosively dehisce mature seed in all directions."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"Its seeds are spread short distances when they are explosively released from the mature fruit. They may also be spread in water, externally on animals and in dumped garden waste. Colonies spread laterally via their creeping underground stems (i.e. rhizomes) and stem segments may be dispersed by water during floods and in dumped garden waste."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	"Mexican-petunia (<i>Ruellia simplex</i>), known for its prolific purple flowering in a range of conditions, is a commonly planted herbaceous perennial used in many landscape settings."
	Kaufman, S.R. & Kaufman, W. 2012. <i>Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species</i> . Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"Often planted for its tubular, five-petaled, purple-blue flowers."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"Its seeds are spread short distances when they are explosively released from the mature fruit. They may also be spread in water, externally on animals and in dumped garden waste. Colonies spread laterally via their creeping underground stems (i.e. rhizomes) and stem segments may be dispersed by water during floods and in dumped garden waste." [If cultivated as an ornamental, seeds could potentially contaminate other potted planted, or ornamental soil media]

704	Propagules adapted to wind dispersal	
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Qsn #	Question	Answer
	Source(s)	Notes
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	"Explosive dehiscence of the seed capsule results in seed dispersal distances from the parent plant of 2.5 to 3 m (Witzum and Schulgasser, 1995)." [Wind may aid in movement of dehisced seeds]
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"Its seeds are spread short distances when they are explosively released from the mature fruit."

705	Propagules water dispersed	y
	Source(s)	Notes
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	"In natural areas, Mexican-petunia propagules often travel through stormwater runoff deposited in floodplain forests. Upon germination and establishment in these floodplains, Mexican-petunia increases in abundance and ultimately dominates the aboveground cover, creating monotypic invasions"
	Kaufman, S.R. & Kaufman, W. 2012. <i>Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species</i> . Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"Principally found on disturbed sites such as along drainage ditches, but also found along lakeshores and in wooded areas." [Occurs in proximity to water and riparian areas, suggesting water likely moves seeds]
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	" <i>Ruellia simplex</i> has the ability to grow in a wide range of environmental conditions, from wetlands to almost xeric (Hupp et al., 2009)." ... "Furthermore, <i>Ruellia</i> seeds turn mucilaginous and adhesive on contact with water and in this way can be dispersed by animals (Ezcurra, 1993). Consequently, <i>R. simplex</i> has naturalized in disturbed uplands and wetlands of seven southern U.S. states"

706	Propagules bird dispersed	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"This species seeds profusely and also reproduces vegetatively via creeping underground stems (i.e. rhizomes) and stem segments. Its seeds are spread short distances when they are explosively released from the mature fruit. They may also be spread in water, externally on animals and in dumped garden waste. Colonies spread laterally via their creeping underground stems (i.e. rhizomes) and stem segments may be dispersed by water during floods and in dumped garden waste."

707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	Freyre, R., Moseley, A., Wilson, S. B., & Knox, G. W. (2012). Breeding and evaluating for landscape performance and fruitlessness in Mexican petunia (<i>Ruellia</i> , Acanthaceae). <i>HortScience</i> , 47(9), 1245-1251	"Explosive dehiscence of the seed capsule results in seed dispersal distances from the parent plant of 2.5 to 3 m (Witzum and Schulgasser, 1995). Furthermore, <i>Ruellia</i> seeds turn mucilaginous and adhesive on contact with water and in this way can be dispersed by animals (Ezcurra, 1993)."

Qsn #	Question	Answer
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"This species seeds profusely and also reproduces vegetatively via creeping underground stems (i.e. rhizomes) and stem segments. Its seeds are spread short distances when they are explosively released from the mature fruit. They may also be spread in water, externally on animals and in dumped garden waste. Colonies spread laterally via their creeping underground stems (i.e. rhizomes) and stem segments may be dispersed by water during floods and in dumped garden waste."

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"This species seeds profusely and also reproduces vegetatively via creeping underground stems (i.e. rhizomes) and stem segments. Its seeds are spread short distances when they are explosively released from the mature fruit. They may also be spread in water, externally on animals and in dumped garden waste. Colonies spread laterally via their creeping underground stems (i.e. rhizomes) and stem segments may be dispersed by water during floods and in dumped garden waste."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Langeland, K.A. & Burks, K.C. (eds.). 2008. Identification and Biology of Nonnative Plants in Florida's Natural Areas. UF/IFAS Distribution, Gainesville, FL	"Each capsule contains approximately 20 seeds (Wilson and Wilson 2001)."
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	"seedbank studies conducted on Mexican-petunia invasions at Paynes Prairie Preserve State Park (Gainesville, FL) (Mazzota et al. 2012) and the Lake Jesup Conservation Area (Sanford, FL) (Smith et al., unpublished data) show that the majority of species present in the seedbank are natives."
	Queensland Government. (2019). Weeds of Australia. <i>Ruellia simplex</i> . http://keyserver.lucidcentral.org . [Accessed 8 May 2019]	"This species seeds profusely and also reproduces vegetatively via creeping underground stems (i.e. rhizomes) and stem segments." [Seed densities unspecified]

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22	"seedbank studies conducted on Mexican-petunia invasions at Paynes Prairie Preserve State Park (Gainesville, FL) (Mazzota et al. 2012) and the Lake Jesup Conservation Area (Sanford, FL) (Smith et al., unpublished data) show that the majority of species present in the seedbank are natives."

Qsn #	Question	Answer
	<p>Hupp, K.V.S. (2007). Investigating the determinants of local scale distribution of <i>Ruellia tweediana</i> (synonym <i>R. brittoniana</i>) in natural areas. M.S. Thesis. University of Florida, Gainesville, FL</p>	<p>[13-15 month viability] "The expansion of the experiment to include the seed survival in the adjoining zones resulted in unanticipated outcomes. It was expected that there would be statistical differences in viability between the Upland and <i>Ruellia</i> treatments because of the absence of <i>R. tweediana</i> plants and the decreased level of moisture in the Upland zone. Instead, the percent viability was not different between zones during the first 12 months and seed survival was actually greater in the Upland zone after 15 months of burial. This suggests that under the conditions of this study, seed survival is unlikely to be the factor limiting <i>R. tweediana</i> in the Upland zone." [<i>Ruellia tweediana</i> Griseb. Synonym of <i>Ruellia simplex</i> C. Wright]</p>
	<p>Reinhardt Adams, C., Wiese, C., & Lee, L. C. (2015). Native recolonization following control of invasive <i>Ruellia simplex</i> in a cypress floodplain forest. <i>Applied Vegetation Science</i>, 18(4), 694-704</p>	<p>[Seeds may persist for 13-15 months] "The low germination of <i>R. simplex</i> from the seed bank suggests that its presence in the seed bank is not providing a barrier to restoration. <i>Ruellia simplex</i> germination from seed bank samples was surprisingly low, given that preliminary studies have suggested that <i>R. simplex</i>'s abundant seed production, lack of primary dormancy and seed longevity were a potential source of rapid <i>R. simplex</i> invasion (Wilson & Mecca 2003). <i>Ruellia simplex</i> seed reportedly has high viability upon initial dehiscence from the parent plant, and high germination rates regardless of soil type or flooding conditions when viable (Wilson & Mecca 2003). While it is possible low germination of <i>R. simplex</i> in the greenhouse was due to not replicating field conditions sufficiently to support germination, viability in the field was reduced fairly rapidly after the first 13–15 mo (Hupp 2007), which may explain the low <i>R. simplex</i> germination rates we observed in the greenhouse."</p>

803	Well controlled by herbicides	y
	Source(s)	Notes
	<p>Smith, A. M., Reinhardt Adams, C. and Wilson, S. B. (2014). Mexican-petunia (<i>Ruellia simplex</i>) Invasions: Management Challenges and Research Opportunities. <i>Wildland Weeds</i> 16(1): 20-22</p>	<p>"Initial control of Mexican petunia is relatively straightforward. Experiments for developing control methods for Mexican-petunia tested four readily available herbicides and found that glyphosate effectively reduced Mexican-petunia cover (R. Stocker, personal communication; Wiese et al. 2013). Adams et al. (2013) further examined the effect and number of glyphosate applications on Mexican-petunia when sprays were initiated in the fall or spring. Sixty to seventy percent reductions in cover of Mexican-petunia resulted, regardless of the number of applications and application season, thus concluding that a single glyphosate application in the fall or spring is sufficient to control Mexican-petunia (Adams et al. 2013)."</p>

Qsn #	Question	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. 2012. Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"It dies back to the ground if temperatures fall below 20°F (-6. 7°C) but can resprout." ... "Plants can be hand pulled or dug out, but it is difficult to remove all roots, and seeds may persist in the soil."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown, although five other species of <i>Ruellia</i> have naturalized in the Hawaiian Islands, suggesting natural controls of this genus may be limited

Summary of Risk Traits:

High Risk / Undesirable Traits

Broad climate suitability

Thrives in tropical climates

Naturalized in Australia and the southeastern US, but no evidence in the Hawaiian Islands to date

An environmental weed (competes with native vegetation)

Other *Ruellia* species are invasive

Shade-tolerant

Tolerates many soil types

Forms monotypic stands that exclude other vegetation

Reproduces by seeds and vegetatively by rhizome and stem fragments

Self-compatible

A perennial, but able to reach maturity in one growing season

Seeds dispersed by explosive dehiscence, by water, and by adhering to animals and possibly people and equipment

Vegetative fragments dispersed by water and by garden waste

Seeds may persist in the soil for 13-15 months

Able to resprout after cutting

Low Risk Traits

Unarmed (no spines, thorns or burrs)

Non-toxic

Sterile cultivars may reduce invasiveness

Herbicides may provide effective control