

Taxon: <i>Zephyranthes citrina</i> Baker	Family: Amaryllidaceae
Common Name(s): citron zephyrlily yellow rain lily	Synonym(s): <i>Zephyranthes eggersiana</i> Urb. <i>Zephyranthes sulphurea</i> Noter

Assessor: No Assessor	Status: Assessor Approved	End Date: 31 May 2018
WRA Score: 12.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Bulbs, Toxic, Geophyte, 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	n
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		
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	y=1, n=-1	y
405	Toxic to animals	y=1, n=0	y
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	y
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		

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	y
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	y
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	y=1, n=-1	n
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)	y=1, n=-1	n
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		
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
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	[No evidence. Cultivated, but not domesticated] " <i>Zephyranthes citrina</i> has been reported from a variety of countries, ranging from Guyana ("... Demerara ...") up to the southeastern United States. However, since it is widely cultivated and it is apparently often naturalized, it is now difficult to state with any degree of certainty what is the real distribution of the species."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2018. 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. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 29 May 2018]	Native Northern America SOUTHERN MEXICO: Mexico [Campeche, Chiapas, Quintana Roo, Tabasco, Yucatan] Southern America CARIBBEAN: Antigua and Barbuda, Barbados, Dominica, Guadeloupe, Hispaniola, St. Lucia, Trinidad and Tobago CENTRAL AMERICA: Honduras

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 29 May 2018]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Dave's Garden. 2018. Rain Lily, Rainlily - <i>Zephyranthes citrina</i> . https://davesgarden.com/guides/pf/go/1244/ . [Accessed 31 May 2018]	"Hardiness: USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) 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)"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 29 May 2018]	Native Northern America SOUTHERN MEXICO: Mexico [Campeche, Chiapas, Quintana Roo, Tabasco, Yucatan] Southern America CARIBBEAN: Antigua and Barbuda, Barbados, Dominica, Guadeloupe, Hispaniola, St. Lucia, Trinidad and Tobago CENTRAL AMERICA: Honduras Cultivated (also cult. in neotropics) Naturalized Southern America CARIBBEAN: Bahamas, Cuba

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Yellow rain lily is commonly cultivated in Hawai'i and is sparingly naturalized along roadsides, at least on Kauai."
	Carnevali, G., Duno, R., Tapia, J. L., & Ramirez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . The Journal of the Torrey Botanical Society, 137(1), 39-48	" <i>Zephyranthes citrina</i> has been reported from a variety of countries, ranging from Guyana ("... Demerara ...") up to the southeastern United States. However, since it is widely cultivated and it is apparently often naturalized, it is now difficult to state with any degree of certainty what is the real distribution of the species."

301	Naturalized beyond native range	y
	Source(s)	Notes

Qsn #	Question	Answer
	<p>Staples, G.W., Imada, C.T., & Herbst, D.R. 2002. New Hawaiian plant records for 2000. Bishop Museum Occasional Papers 68: 3-18</p>	<p>"First reported in the state from Kaua'i in 1995 (Lorence et al., 1995), this is the first naturalized record of the yellow rain lily from O'ahu and Maui. Collector's notes for the O'ahu voucher indicate that the plants appeared about one week after a rainstorm and the population extended in patches for about one mile along the roadside. Flowers were observed in the same area in mid-July 2000, but when we returned to make a voucher a few days later the flowers had disappeared. The collector's notes for the Maui specimen indicate that the population appeared to be sparingly naturalized along the roadside and that capsules with seeds were present, as well as flowers. Collectors are encouraged to watch for the ephemeral blooms of rain lilies on all islands and to try and collect vouchers to better document their existence and abundance throughout the state. It would also be useful to know if these plants are spreading through seed or by vegetative means only. Material examined. O'AHU: growing on roadside between Waialua and Schofield Barracks along the winding section of road [e.g., Hwy. 830, Kaukonahua Rd.], elev. 300–400 ft, 14 Sep 1992, C. Corn s.n. (BISH 665946). MAUI: East Maui, Pā'ia, on west side of Baldwin Ave., just mauka of Pā'ia School, in grassy roadside verge, 20° 54' N, 156° 21' W, 28 Aug 2000, F. Starr & K. Martz 000828-1."</p>
	<p>Oppenheimer, H. (2011). New Hawaiian plant records for 2009. Bishop Museum Occasional Papers 110: 5-10</p>	<p>"Only <i>Zephyranthes citrina</i> Baker has been documented outside of cultivation in the Hawaiian islands (Lorence et al. 1995: 40; Staples et al. 2002: 12). However, <i>Z. grandiflora</i> (large pink rain lily) was listed as potentially invasive (Staples et al. 2000: 23). Native to Mexico and Guatemala, it is naturalized in the West Indies, South America, and China (Staples & Herbst 2005: 694). This species is somewhat ephemeral, but plants have been observed scattered in this general area of Lāna'i for more than a decade. It differs from <i>Z. citrina</i> with its large pink flowers, taller stature, and longer leaves. Material examined. Lāna'i: Kanepu'u, 525 m. sparingly naturalized and local herbs from underground bulbs, 29 May 2008, Oppenheimer & Perlman H50817."</p>
	<p>Lorence, D.H., Flynn, T.W. & Wagner, W.L. 1995. Contributions to the flora of Hawai'i. III. New additions, range extensions, and rediscoveries of flowering plants. Bishop Museum Occasional Papers 41: 19-58</p>	<p>"The zephyr or yellow rain lily is frequently cultivated in Hawaiian gardens. These collections represent a new naturalized record of the genus in the Hawaiian Islands, although plants are often adventive in lawns (G. Staples & D. Herbst, in preparation). The zephyr lily may be more widely naturalized than suspected but has been overlooked due to its rather short flowering period, after which it dies back to underground bulbs. <i>Hippeastrum puniceum</i> (Lam.) Voss is the only other bulb-forming, geophytic Liliaceae with an inferior ovary naturalized in the Hawaiian Islands. <i>Zephyranthes citrina</i> can be distinguished from the former species by these characters: smaller bulbs 2.5–3 cm in diam.; narrower linear leaves 2–3 mm wide; 1-flowered inflorescences; smaller flowers with a bright yellow perianth 4–5 cm long. Material examined. KAUAI: Koloa District, Maluhia Road across from Ann Knudsen Park, 4 Sep 1985, T. Flynn 1197 (BISH, PTBG); along Hwy 53 between Koloa and Lawai, ca. 1 mile from Lawai, roadside, 126–134 m (420–440 ft), 16 Sep 1990, M. Kiehn MK-900916–1/1 (PTBG)."</p>
	<p>USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 29 May 2018]</p>	<p>Naturalized Southern America CARIBBEAN: Bahamas, Cuba</p>

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"It is often seen growing in lawns and the median strip between street and sidewalk."
	Dave's Garden. 2018. Rain Lily, Rainlily - <i>Zephyranthes citrina</i> . https://davesgarden.com/guides/pf/go/1244/ . [Accessed 31 May 2018]	"On Sep 15, 2011, saltcedar from Austin, TX (Zone 8b) wrote: Bit of a weed but a pretty weed! Not for the anal retentive gardener as it plants itself where it likes!"
WRA Specialist. 2018. Personal Communication	May cause problems where naturalized, but evidence of detrimental impacts or active control of this species were not found at this time	

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	No evidence to date

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 to date

305	Congeneric weed	y
	Source(s)	Notes
	Zhenghao Xu & Le Chang. 2017. Identification and Control of Common Weeds: Volume 3. Zhejiang University Press, Hangzhou and Springer Nature Singapore	" <i>Zephyranthes candida</i> ... Habitat Cultivated areas or other places as a weed escaping from cultivation. ... Ecology <i>Zephyranthes candida</i> prefers moist, fertile soil situations and often occurs in roadsides or grasslands naturalized from cultivation. Harmfulness The species can be easily escaped to be a weed."
Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Zephyranthes candida</i> ... References: United States of America-N-101, New Zealand-UW-280, Japan-N-287, Australia-N-945, South Korea-N-773, Japan-N-794, Australia-W-853, Australia- W-869, New Zealand-U-919, Australia-N- 354, Australia-N-1049, China-I-1055, South Korea-N-761, China-N-1215, Italy- U-251, Japan-N-1278, Europe-W-1325, French Polynesia-N-1514, North Korea-N- 1600, India-N-1632, South Korea-N-1578, Eastern Caribbean-N-1742, China-I-1769, China-N-1796, Italy-U-1887, New Zealand-N-2048, Anguilla-W-1977, Australia-W-1977, China-W-1977, Democratic Republic of Korea-W-1977, Italy-W-1977, Japan-W-1977, South Korea-N-2113, North Korea--."	

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	[No evidence] "Plant with a subglobose bulb of 15–30 x 20–35 mm diameter, bulb neck up to 20 mm long, tunics dark brown. Leaves 2–5, concurrent with the flowers, glabrous, linear, green, erect to decumbent, 10–30 cm long, (2–)2.5–5 mm wide, apex acute."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Plant with a subglobose bulb of 15–30 x 20–35 mm diameter, bulb neck up to 20 mm long, tunics dark brown." [No evidence. Amaryllidaceae]

404	Unpalatable to grazing animals	y
	Source(s)	Notes
	Knox, G. W. 2009. Rainlily, <i>Zephyranthes</i> and <i>Habranthus</i> spp.: Low Maintenance Flowering Bulbs for Florida Gardens. ENH1151. UF/IFAS Extension Service, University of Florida, Quincy, FL. http://edis.ifas.ufl.edu . [Accessed 31 May 2018]	"Although rainlily bulbs are considered to have low toxicity, homeowners should be aware of the poisonous potential of rainlily, particularly if small children and/or pets are present. However, these poisonous components make rainlily resistant to damage from deer, rodents and insects. Snails and slugs are the only pests reported to feed on rainlily leaves."

405	Toxic to animals	y
	Source(s)	Notes
	Knox, G. W. 2009. Rainlily, <i>Zephyranthes</i> and <i>Habranthus</i> spp.: Low Maintenance Flowering Bulbs for Florida Gardens. ENH1151. UF/IFAS Extension Service, University of Florida, Quincy, FL. http://edis.ifas.ufl.edu . [Accessed 31 May 2018]	"Although rainlily bulbs are considered to have low toxicity, homeowners should be aware of the poisonous potential of rainlily, particularly if small children and/or pets are present. However, these poisonous components make rainlily resistant to damage from deer, rodents and insects. Snails and slugs are the only pests reported to feed on rainlily leaves."
	Dave's Garden. 2018. Rain Lily, Rainlily - <i>Zephyranthes citrina</i> . https://davesgarden.com/guides/pf/go/1244/ . [Accessed 31 May 2018]	"Danger: Parts of plant are poisonous if ingested"
	Nellis, D.W. 1997. Poisonous plants and animals of Florida and the Caribbean. Pineapple Press Inc., Sarasota, FL	"Toxic properties Members of this genus contain the toxic alkaloid lycorine, an emetic with an LD50 of 41 mg/kg in dogs. Haemanthidine, widespread in this family, is also present along with nerinine and tazettin. The bulb contains a higher concentration of alkaloids than the foliage."

406	Host for recognized pests and pathogens	n
	Source(s)	Notes

Qsn #	Question	Answer
	Knox, G. W. 2009. Rainlily, <i>Zephyranthes</i> and <i>Habranthus</i> spp.: Low Maintenance Flowering Bulbs for Florida Gardens. ENH1151. UF/IFAS Extension Service, University of Florida, Quincy, FL. http://edis.ifas.ufl.edu . [Accessed 31 May 2018]	"Few pests affect rainlily.... Snails and slugs are the only pests reported to feed on rainlily leaves. ... The disease red blotch (<i>Stagonospora curtisii</i>) occurs occasionally in rainlily during cool, damp weather. As the name of this disease implies, it appears as a streak or blotch of dark red on leaves. This disease does not significantly harm rainlily, but primarily affects the plant's appearance, and leaves forming at times other than during cool, damp weather will not show red-blotch symptoms. Rainlily is not as susceptible to this disease as is amaryllis (<i>Hippeastrum</i> spp.)."
	Brent and Becky's. 2018. <i>Zephyranthes citrina</i> - Rain Lily. https://www.brentandbeckysbulbs.com/Zephyranthes/citrina/Rain-Lily . [Accessed 31 May 2018]	"Pests: Pest Proof, Pest Resistant"

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	Notes
	Knox, G. W. 2009. Rainlily, <i>Zephyranthes</i> and <i>Habranthus</i> spp.: Low Maintenance Flowering Bulbs for Florida Gardens. ENH1151. UF/IFAS Extension Service, University of Florida, Quincy, FL. http://edis.ifas.ufl.edu . [Accessed 31 May 2018]	"Although rainlily bulbs are considered to have low toxicity, homeowners should be aware of the poisonous potential of rainlily, particularly if small children and/or pets are present. However, these poisonous components make rainlily resistant to damage from deer, rodents and insects. Snails and slugs are the only pests reported to feed on rainlily leaves."
	Nellis, D.W. 1997. Poisonous plants and animals of Florida and the Caribbean. Pineapple Press Inc., Sarasota, FL	"Toxic properties Members of this genus contain the toxic alkaloid lycorine, an emetic with an LD50 of 41 mg/kg in dogs. Haemanthidine, widespread in this family, is also present along with nerinine and tazettin. The bulb contains a higher concentration of alkaloids than the foliage."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Also with medicinal uses] " <i>Zephyranthes citrina</i> ... Leaves on rheumatic joints. Bulbs made into a paste and used on skin diseases."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Plant with a subglobose bulb of 15–30 3 20–35 mm diameter, bulb neck up to 20 mm long, tunics dark brown." [No evidence of fire risk]
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[No evidence. Plant bulbs underground will not contribute to fire risk] "Inconspicuous for most of the year, the plant goes unnoticed until the few days in late summer or fall when mass flowering takes place, an event particularly noteworthy in dry leeward areas."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	The Southern Bulb Co. 2018. Golden Yellow Rain Lily. http://www.southernbulbs.com/golden-yellow-rain-lily/ . [Accessed 31 May 2018]	"Light: Full Sun to Part Shade"

Qsn #	Question	Answer
	Knox, G. W. 2009. Rainlily, Zephyranthes and Habranthus spp.: Low Maintenance Flowering Bulbs for Florida Gardens. ENH1151. UF/IFAS Extension Service, University of Florida, Quincy, FL. http://edis.ifas.ufl.edu . [Accessed 31 May 2018]	"Most rainlily species will flourish under full sun to part shade."
	Dave's Garden. 2018. Rain Lily, Rainlily - Zephyranthes citrina. https://davesgarden.com/guides/pf/go/1244/ . [Accessed 31 May 2018]	"Sun Exposure: Full Sun" ... "On Dec 30, 2007, htop from San Antonio, TX (Zone 8b) wrote: ... I have found that it does best in full sun; however, I have planted them in an area that receives morning sun and afternoon shade."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Dave's Garden. 2018. Rain Lily, Rainlily - Zephyranthes citrina. https://davesgarden.com/guides/pf/go/1244/ . [Accessed 31 May 2018]	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)" ... "On Aug 22, 2001, Terry from Murfreesboro, TN (Zone 7a) wrote: ... It is more cold-hardy than some of the other Zephyranthes species and tolerates a wide range of soil conditions, from boggy to drought."
	The Southern Bulb Co. 2018. Golden Yellow Rain Lily. http://www.southernbulbs.com/golden-yellow-rain-lily/ . [Accessed 31 May 2018]	"Soil: Any"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of Zephyranthes (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . The Journal of the Torrey Botanical Society, 137(1), 39-48	"Plant with a subglobose bulb of 15–30 x 20–35 mm diameter, bulb neck up to 20 mm long, tunics dark brown."

412	Forms dense thickets	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"A few plants can proliferate into a sizable colony within a few years."

501	Aquatic	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Terrestrial] "Zephyranthes citrina is native to Mexico, Central America, northern South America, and the West Indies and is cultivated elsewhere. It is often seen growing in lawns and the median strip between street and sidewalk."

502	Grass	n
	Source(s)	Notes

Qsn #	Question	Answer
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 29 May 2018]	Family: Amaryllidaceae Subfamily: Amaryllidoideae Tribe: Hippeastreae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 29 May 2018]	Family: Amaryllidaceae Subfamily: Amaryllidoideae Tribe: Hippeastreae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Deciduous perennial; bulbs globose, to 1" (diameter), offsets numerous." ... "Inconspicuous for most of the year, the plant goes unnoticed until the few days in late summer or fall when mass flowering takes place, an event particularly noteworthy in dry leeward areas."
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Plant with a subglobose bulb of 15–30 x 20–35 mm diameter, bulb neck up to 20 mm long, tunics dark brown."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	[No evidence] "Distribution and Ecology. <i>Zephyranthes citrina</i> has been reported from a variety of countries, ranging from Guyana ("... Demerara ...") up to the southeastern United States. However, since it is widely cultivated and it is apparently often naturalized, it is now difficult to state with any degree of certainty what is the real distribution of the species."

602	Produces viable seed	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Inconspicuous for most of the year, the plant goes unnoticed until the few days in late summer or fall when mass flowering takes place, an event particularly noteworthy in dry leeward areas. At that time, a carpet of bright yellow blossoms appears, soon followed by capsules that mature and shed their seeds." ... "Propagation is from seed or by offsets, which are produced abundantly"

603	Hybridizes naturally	

Qsn #	Question	Answer
	Source(s)	Notes
	Chowdhury, M. R., & Hubstenberger, J. (2006). Evaluation of cross pollination of <i>Zephyranthes</i> and <i>Habranthus</i> species and hybrids. <i>Journal of the Arkansas Academy of Science</i> , 60(1), 113-118	[Artificial hybrids possible. Unknown if natural hybrids occur with this species] "Abstract.-The genus <i>Zephyranthes</i> and the related genus <i>Habranthus</i> in the family Amaryllidaceae are commonly grown ornamental bulbs having new world homologies. Inter-specific and inter-generic hybridizations are complicated by the fact that some of the species are apomictic, cross incompatible, or have widely variable 2n chromosome numbers. A simple, inexpensive method of pollen storage was tested to evaluate the production of hybrid seed. Intact anthers harvested after pollen release and stored at 4°C were used for pollination. Emasculated flowers were pollinated at noon on the first or second day of anthesis. Hybrid crosses were labeled and seed collected when formed. All available parents were used in hybridizations except when species were known to have apomictic or pseudogamous seed development. Hybridization data were recorded for seedpods having successful seed set as well as those that aborted. Development of 'normal' seedpods filled with seed occurred even though viable embryos were not always formed. F, Z. <i>grandiflora</i> was successful 55% of the time, and Pink Trihybrid, a rather infertile seed parent, was successful at least 19% of the time. These data suggest that repeating many crosses ultimately produced a few hybrids in problematic crosses. In addition to producing seed of potentially interesting new hybrids, this study helped to identify successful seed and pollen parents for future breeding efforts. Hybrid seed was sown to test viability of the progeny."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Pacific Bulb Society. 2017. <i>Zephyranthes</i> . https://www.pacificbulbsociety.org/pbswiki/index.php/Zephyranthes . [Accessed 31 May 2018]	" <i>Zephyranthes citrina</i> is native to the Yucatan peninsula in Mexico.... This form does not offset much, but a large colony of them can be built up quickly because of the abundant apomictic (sexual reproduction without fertilization) seed production."
	Ghosh, S., & Shivanna, K. R. (1984). Structure and Cytochemistry of the Stigma and Pollen—Pistil Interaction in <i>Zephyranthes</i> . <i>Annals of Botany</i> , 53(1), 91-106	" <i>Zephyranthes citrina</i> is self-compatible while <i>Z. Candida</i> is self-incompatible"

605	Requires specialist pollinators	n
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Flowers erect, actinomorphic, perianth funnellform, bright yellow, 2–4.5 cm long. Floral tube 0.7–1.5 cm long, accounting for less than 1/3 of total perianth length, cylindrical, somewhat broader toward the apex, yellow-green. Tepals erect, more rarely somewhat spreading, bright yellow, lobules subequal, elliptic to lanceolate, acute, 2–3 3 1–1.5 cm, external tepals slightly broader, with 15 nerves, internal tepals with 13 nerves; stamens erect, filaments filiform, 1.2–2 cm long; anthers suberect, dorsifixed, yellow, 5–7 mm long; ovary ovate to globose, 4–6 mm long, 4–5 mm in diameter; style 2–2.5 cm long, as long or slightly longer than the anthers, stigma capitate."

Qsn #	Question	Answer
	Brent and Becky's. 2018. <i>Zephyranthes citrina</i> - Rain Lily. https://www.brentandbeckysbulbs.com/Zephyranthes/citrina/Rain-Lily . [Accessed 31 May 2018]	"the plant is one that attracts numerous pollinators"

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Deciduous perennial; bulbs globose, to 1" (diameter), offsets numerous." ... "Propagation is from seed or by offsets, which are produced abundantly; these may be obtained from a neighbor or purchased in a garden shop. A few plants can proliferate into a sizable colony within a few years."

607	Minimum generative time (years)	1
	Source(s)	Notes
	Dave's Garden. 2018. Rain Lily, Rainlily - <i>Zephyranthes citrina</i> . https://davesgarden.com/guides/pf/go/1244/ . [Accessed 31 May 2018]	"On Jul 7, 2006, ceejaytown from The Woodlands, TX (Zone 9a) wrote: ... It reseeds nicely, and may bloom from seed the first year." ... "On Mar 3, 2003, mbandaka wrote: ... It is easy from seed if seed is sown immediately after maturing. Will often bloom the next year after sowing if given lots of TLC. No fragrance, very self fertile."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Kubitzki, K. (ed.). 1998. <i>The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Liliaceae (except Orchidaceae)</i> . Springer-Verlag, Berlin, Heidelberg, New York	"Dispersal systems in Amaryllidaceae have been poorly documented, with the exception of the Amaryllideae and Galantheae."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"It is often seen growing in lawns and the median strip between street and sidewalk." [Seeds are small & may be moved by adhering to soil on footwear, clothing or vehicles in heavily trafficked areas]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Yellow rain lily is commonly cultivated in Hawai'i and is sparingly naturalized along roadsides, at least on Kauai."
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	" <i>Zephyranthes citrina</i> has been reported from a variety of countries, ranging from Guyana ("... Demerara ...") up to the southeastern United States. However, since it is widely cultivated and it is apparently often naturalized, it is now difficult to state with any degree of certainty what is the real distribution of the species."

Qsn #	Question	Answer
703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	No evidence found. It may be possible that seeds could contaminate soil in potted plants growing in their vicinity, but this is speculative

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Fruit globose, slightly trilobulate, 6–12 mm diameter; seeds, thin, flattened, dull black, semicircular to elliptic, 3–5 mm diameter." [Flattened shape & small size may facilitate dispersal by wind]
	Kubitzki, K. (ed.). 1998. <i>The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Liliaceae (except Orchidaceae)</i> . Springer-Verlag, Berlin, Heidelberg, New York	"The flattened, winged type of seed characteristic of <i>Cyrtanthus</i> , <i>Eustephieae</i> , <i>Hippeastreae</i> , <i>Stenomesseae</i> , and <i>Ungernia</i> is adapted for wind dispersal." [Zephyranthes citrina = Tribe: Hippeastreae]

705	Propagules water dispersed	
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Fruit globose, slightly trilobulate, 6–12 mm diameter; seeds, thin, flattened, dull black, semicircular to elliptic, 3–5 mm diameter." [Small size may result in movement by water during heavy rains or if growing in riparian habitats]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Kubitzki, K. (ed.). 1998. <i>The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Liliaceae (except Orchidaceae)</i> . Springer-Verlag, Berlin, Heidelberg, New York	"The flattened, winged type of seed characteristic of <i>Cyrtanthus</i> , <i>Eustephieae</i> , <i>Hippeastreae</i> , <i>Stenomesseae</i> , and <i>Ungernia</i> is adapted for wind dispersal."
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	[Not fleshy fruited] "Fruit globose, slightly trilobulate, 6–12 mm diameter; seeds, thin, flattened, dull black, semicircular to elliptic, 3–5 mm diameter."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Kubitzki, K. (ed.). 1998. <i>The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Liliaceae (except Orchidaceae)</i> . Springer-Verlag, Berlin, Heidelberg, New York	"The flattened, winged type of seed characteristic of <i>Cyrtanthus</i> , <i>Eustephieae</i> , <i>Hippeastreae</i> , <i>Stenomesseae</i> , and <i>Ungernia</i> is adapted for wind dispersal."

708	Propagules survive passage through the gut	n
	Source(s)	Notes

Qsn #	Question	Answer
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume III. Flowering plants, Monocotyledons: Liliae (except Orchidaceae). Springer-Verlag, Berlin, Heidelberg, New York	"The flattened, winged type of seed characteristic of Cyrtanthus, Eustephieae, Hippeastreae, Stenomesseseae, and Ungernia is adapted for wind dispersal."
	Knox, G. W. 2009. Rainlily, <i>Zephyranthes</i> and <i>Habranthus</i> spp.: Low Maintenance Flowering Bulbs for Florida Gardens. ENH1151. UF/IFAS Extension Service, University of Florida, Quincy, FL. http://edis.ifas.ufl.edu . [Accessed]	[Not adapted for animal dispersal & unlikely to be consumed] "poisonous components make rainlily resistant to damage from deer, rodents and insects."

801	Prolific seed production (>1000/m ²)	
	Source(s)	Notes
	Carnevali, G., Duno, R., Tapia, J. L., & Ramírez, I. M. (2010). Reassessment of <i>Zephyranthes</i> (Amaryllidaceae) in the Yucatán Peninsula including a new species, <i>Z. orellanae</i> . <i>The Journal of the Torrey Botanical Society</i> , 137(1), 39-48	"Fruit globose, slightly trilobulate, 6–12 mm diameter; seeds, thin, flattened, dull black, semicircular to elliptic, 3–5 mm diameter."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Propagation is from seed or by offsets, which are produced abundantly" [Densities unspecified]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed 31 May 2018]	No data on this species. Other <i>Zephyranthes</i> species have orthodox seeds

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	[Unknown, but presence of bulbs suggests plants will regrow foliage if above-ground vegetation is removed] "Deciduous perennial; bulbs globose" ... "Propagation is from seed or by offsets, which are produced abundantly"

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Brent and Becky's. 2018. <i>Zephyranthes citrina</i> - Rain Lily. https://www.brentandbeckysbulbs.com/Zephyranthes/citrina/Rain-Lily . [Accessed 31 May 2018]	"Pests: Pest Proof, Pest Resistant"

Qsn #	Question	Answer
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Unknown] "It is often seen growing in lawns and the median strip between street and sidewalk." ... "Yellow rain lily is commonly cultivated in Hawai'i and is sparingly naturalized along roadsides, at least on Kaua'i."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Thrives in tropical climates
- Naturalized on Kauai, Oahu, & Maui (Hawaiian Islands) & possibly elsewhere
- May be weedy, but negative impacts have not been reported
- Other *Zephyranthes* species are weeds
- Toxic to animals & people
- Unpalatable to animals
- Tolerates many soil types
- Geophyte (regrows from bulbs)
- Reproduces by seeds & vegetatively by offsets
- May hybridize
- Self-compatible
- Reaches maturity in 1 year
- Seeds dispersed by wind & intentionally by people

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Thrives in full sun (may limit spread into shaded areas)
- Ornamental