

Taxon: <i>Harrisia eriophora</i> (Pfeiff.) Britton	Family: Cactaceae
Common Name(s): fragrant apple cactus fragrant prickly apple jijira pitahaya woolly prickly apple	Synonym(s): <i>Cereus eriophorus</i> Pfeiff.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 9 Oct 2017
WRA Score: 7.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Tropical Cactus, Spiny, Edible Fruit, Spreads Vegetatively, Bird-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	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed		
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	y
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		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
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	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	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)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Taylor, N.P., González Torres, L.R. & Barrios, D. 2013. <i>Harrisia eriophora</i> . The IUCN Red List of Threatened Species 2013: e.T151853A568818. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T151853A568818.en . [Accessed 6 Oct 2017]	[Not domesticated] " <i>Harrisia eriophora</i> is endemic to Cuba (Hunt et al. 2006), where it is widespread. It occurs from sea level to 100 m in elevation (N. Taylor and A. Franck pers. comm. 2011). Its extent of occurrence is 110,000 km ² . The number of locations is likely to be in the hundreds. Each of the subpopulations likely has 5 to 15 individuals. It is also cultivated for its edible fruit"

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 5 Oct 2017]	"Native: Northern America Southeastern U.S.A.: United States - Florida Southern America Caribbean: Cuba"

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 5 Oct 2017]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Dave's Garden. 2017. Fragrant Prickly Apple - <i>Harrisia eriophora</i> . https://davesgarden.com/guides/pf/go/106703/ . [Accessed 6 Oct 2017]	"Hardiness: 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)"

Qsn #	Question	Answer
	Taylor, N.P., González Torres, L.R. & Barrios, D. 2013. <i>Harrisia eriophora</i> . The IUCN Red List of Threatened Species 2013: e.T151853A568818. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T151853A568818.en . [Accessed 6 Oct 2017]	"Upper elevation limit (metres): 100"
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Distribution. West-central and western Cuba (Fig. 3); scrub forest and scrubland; 5–50 m." [Occurs at low elevations only. Does not exhibit environmental versatility in native range]

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Britton, N.L. & Rose, J.N. 1920. The Cactaceae: Descriptions and Illustrations of Plants of the Cactus Family, Volume II. The Carnegie Institution of Washington, Washington, D.C.	"Distribution: Central and western Cuba and Isle of Pines."
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 5 Oct 2017]	"Native: Northern America Southeastern U.S.A.: United States - Florida Southern America Caribbean: Cuba"

205	Does the species have a history of repeated introductions outside its natural range?	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 9 Oct 2017]	"Cultivated: . also cult." [No evidence of repeated & widespread introduction outside native range, unlike related species in the genus]

301	Naturalized beyond native range	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. 2017. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/ . [Accessed 9 Oct 2017]	<i>Harrisia bonplandii</i> and <i>Harrisia martini</i> naturalized on Kauai (Poipu). No evidence for <i>H. eriophora</i> to date
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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	No evidence

303	Agricultural/forestry/horticultural weed	

Qsn #	Question	Answer
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Cited as an agricultural weed in Acuna, G.J. (1974). Plantas Indeseables en Los Cultivos Cubanos. Academia de Ciencias, Insitituto de Investigaciones de Cuba, Havana. Unable to access and corroborate reference

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
	Biosecurity Queensland. 2017. <i>Harrisia</i> cactus. Moonlight cactus. <i>Harrisia martinii</i> , <i>Harrisia tortuosa</i> and <i>Harrisia pomanensis</i> . State of Queensland, Department of Agriculture and Fisheries. https://www.daf.qld.gov.au . [Accessed 9 Oct 2017]	" <i>Harrisia</i> cactus (<i>Harrisia martinii</i> , <i>Harrisia tortuosa</i> and <i>Harrisia pomanensis</i>) are restricted invasive plants under the Biosecurity Act 2014. It must not be given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control."
	Julien, M., McFadyen, R. & Cullen, J. (eds.). (2012). Biological Control of Weeds in Australia. CSIRO Publishing, Melbourne	" <i>Harrisia martini</i> " ... " <i>Harrisia</i> cactus was introduced into Australia as an ornamental about 1900 (Mcfadyen 1986), and rapidly became a problem in the brigalow scrub country of north and central Qld inland from Bowen and Rockhampton. In suitable conditions, it outcompetes native groundcover plants to form dense impenetrable thickets with up to 110 000 plants ha-1 and 80-90% groundcover (Mcfadyen 1986). By 1935 it was a serious weed in grazing country and the first official attempts to control it, using arsenic pentoxide as a herbicide, started in 1951 (Mann 1967). The above-ground stems were killed relatively easily, but regrowth from root tubers was rapid and effective so that control required repeated treatments. Arsenic pentoxide was poisonous to staff, cattle and other vegetation, and the costs far exceeded the economic value of the land."

401	Produces spines, thorns or burrs	y
	Source(s)	Notes
	Britton, N.L. & Rose, J.N. 1920. The Cactaceae: Descriptions and Illustrations of Plants of the Cactus Family, Volume II. The Carnegie Institution of Washington, Washington, D.C.	"Night-flowering cacti with slender, branched stems, the branches fluted or angled, each areole with several acicular spines"

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown. No evidence found

403	Parasitic	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Britton, N.L. & Rose, J.N. 1920. The Cactaceae: Descriptions and Illustrations of Plants of the Cactus Family, Volume II. The Carnegie Institution of Washington, Washington, D.C.	"Plant 3.5 dm. high or less, the young joints bright green, the main stem 4 cm. in diameter or more, the branches nearly as thick, erect or ascending, 8 or 9-ribbed, the ribs prominent, the depressions between them rather deep; areoles 2 to 4 cm. apart; spines 6 to 9, the longer ones 2.5 to 4 cm. long, light brown with nearly black tips" [Cactaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	[Unknown for <i>H. eriophora</i> . Spines may deter browsing] "One of the principal dry season foods of the Chacoan peccary may be the stems of <i>Harrisia</i> (Mayer & Brandt 1982). Exotic rhesus macaques have been observed feeding on stems of <i>H. portoricensis</i> (Brecken 2000). Introduced iguanas are reported to eat the flowers of <i>H. aboriginum</i> (Bradley et al. 2004) and gopher tortoises have been reported eating stem bases of <i>H. aboriginum</i> (Woodmansee et al. 2007). Introduced feral hogs were responsible for the death of at least one plant of <i>H. fragrans</i> (Bradley & Hines 2007)."

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 in genus

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"The internal flesh of the fruits of <i>Harrisia</i> are edible and used locally by humans (Fawcett & Rendle 1926; Morton 1962; Barton et al. 1990; Schmeda-Hirschmann 1994; Andrade 2002; Arenas and Scarpa 2007; Fig. 18), although they should be avoided if already visited by other animals because of the possibility of disease transmission (Martinez 2010)."
	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 in genus

408	Creates a fire hazard in natural ecosystems	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Shrubs or small trees, with well-developed erect trunk to 1 m." ... "West-central and western Cuba (Fig. 3); scrub forest and scrubland; 5–50 m." [May add to fuel load, but no evidence of increased fire risk with this or other species in genus]

409	Is a shade tolerant plant at some stage of its life cycle	Y
	Source(s)	Notes
	Dave's Garden. 2017. Fragrant Prickly Apple - <i>Harrisia eriophora</i> . https://davesgarden.com/guides/pf/go/106703/ . [Accessed 9 Oct 2017]	"Sun Exposure: Full Sun Sun to Partial Shade Light Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Dave's Garden. 2017. Fragrant Prickly Apple - <i>Harrisia eriophora</i> . https://davesgarden.com/guides/pf/go/106703/ . [Accessed 9 Oct 2017]	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)"
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"West-central and western Cuba ... scrub forest and scrubland; 5–50 m."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Britton, N.L. & Rose, J.N. 1920. <i>The Cactaceae: Descriptions and Illustrations of Plants of the Cactus Family, Volume II. The Carnegie Institution of Washington, Washington, D.C.</i>	"Plant 3.5 dm. high or less, the young joints bright green, the main stem 4 cm. in diameter or more, the branches nearly as thick, erect or ascending, 8 or 9-ribbed, the ribs prominent, the depressions between them rather deep; areoles 2 to 4 cm. apart; spines 6 to 9, the longer ones 2.5 to 4 cm. long, light brown with nearly black tips"

412	Forms dense thickets	
	Source(s)	Notes
	Julien, M., McFadyen, R. & Cullen, J. (eds.). (2012). <i>Biological Control of Weeds in Australia</i> . CSIRO Publishing, Melbourne	[Related taxon forms dense thickets] " <i>Harrisia martini</i> " ... " <i>Harrisia</i> cactus was introduced into Australia as an ornamental about 1900 (Mcfadyen 1986), and rapidly became a problem in the brigalow scrub country of north and central Qld inland from Bowen and Rockhampton. In suitable conditions, it outcompetes native groundcover plants to form dense impenetrable thickets with up to 110 000 plants ha-1 and 80 90% groundcover (Mcfadyen 1986). By 1935 it was a serious weed in grazing country and the first official attempts to control it, using arsenic pentoxide as a herbicide, started in 1951 (Mann 1967). The above-ground stems were killed relatively easily, but regrowth from root tubers was rapid and effective so that control required repeated treatments. Arsenic pentoxide was poisonous to staff, cattle and other vegetation, and the costs far exceeded the economic value of the land."

Qsn #	Question	Answer
	Taylor, N.P., González Torres, L.R. & Barrios, D. 2013. <i>Harrisia eriophora</i> . The IUCN Red List of Threatened Species 2013: e.T151853A568818. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T151853A568818.en . [Accessed 9 Oct 2017]	[Unknown if these populations form dense thickets] " <i>Harrisia eriophora</i> is endemic to Cuba (Hunt et al. 2006), where it is widespread. It occurs from sea level to 100 m in elevation (N. Taylor and A. Franck pers. comm. 2011). Its extent of occurrence is 110,000 km ² . The number of locations is likely to be in the hundreds. Each of the subpopulations likely has 5 to 15 individuals."

501	Aquatic	n
	Source(s)	Notes
	Taylor, N.P., González Torres, L.R. & Barrios, D. 2013. <i>Harrisia eriophora</i> . The IUCN Red List of Threatened Species 2013: e.T151853A568818. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T151853A568818.en . [Accessed 6 Oct 2017]	[Terrestrial] "This species lives in dry shrublands."

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 5 Oct 2017]	Family: Cactaceae Subfamily: Cactoideae Tribe: Trichocereae

503	Nitrogen fixing woody plant	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 5 Oct 2017]	Family: Cactaceae Subfamily: Cactoideae Tribe: Trichocereae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Britton, N.L. & Rose, J.N. 1920. The Cactaceae: Descriptions and Illustrations of Plants of the Cactus Family, Volume II. The Carnegie Institution of Washington, Washington, D.C.	"Plant 3.5 dm. high or less, the young joints bright green, the main stem 4 cm. in diameter or more, the branches nearly as thick, erect or ascending, 8 or 9-ribbed, the ribs prominent, the depressions between them rather deep; areoles 2 to 4 cm. apart; spines 6 to 9, the longer ones 2.5 to 4 cm. long, light brown with nearly black tips"

Qsn #	Question	Answer
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Taylor, N.P., González Torres, L.R. & Barrios, D. 2013. <i>Harrisia eriophora</i> . The IUCN Red List of Threatened Species 2013: e.T151853A568818. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T151853A568818.en . [Accessed 6 Oct 2017]	" <i>Harrisia eriophora</i> is endemic to Cuba (Hunt et al. 2006), where it is widespread. It occurs from sea level to 100 m in elevation (N. Taylor and A. Franck pers. comm. 2011). Its extent of occurrence is 110,000 km ² . The number of locations is likely to be in the hundreds. Each of the subpopulations likely has 5 to 15 individuals. It is also cultivated for its edible fruit."

602	Produces viable seed	y
	Source(s)	Notes
	Barrios, D., González-Torres, L. R., & García-Beltrán, J. A. (2012). Vivipary in Cuban cacti: a pioneer study in <i>Leptocereus scopulophilus</i> . <i>Bradleya</i> , 30: 147-150	"In this paper we report the occurrence of vivipary in four Cuban cactus species (<i>Leptocereus arboreus</i> , <i>L. scopulophilus</i> , <i>Harrisia eriophora</i> and <i>Selenicereus grandiflorus</i>)." ... "Vivipary is a relatively unusual trait in the angiosperms that involves the germination of seeds inside fruits before they are dispersed from the parent plant (Cota-Sánchez, 2004)."
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Seeds of <i>Harrisia</i> do not appear to experience much dormancy (~8 weeks, Rojas-Sandoval & Meléndez-Ackerman 2009c), as they sometimes germinate in the fruit (vivipary), e.g. in <i>H. eriophora</i> (Barrios et al. 2012)," ... " <i>Harrisia eriophora</i> ... Seeds 1.7–2.1 × 2.6–3.35 mm."

603	Hybridizes naturally	
	Source(s)	Notes
	Franck, A. R. (2012). Systematics of <i>Harrisia</i> (Cactaceae). PhD Dissertation. University of South Florida, Tampa, FL	[Unknown for <i>H. eriophora</i> . Hybrid documented in genus] " <i>Harrisia xjusbertii</i> is a putative horticultural hybrid between an <i>Echinopsis</i> and a <i>Harrisia</i> (Berger 1905) with distinctively short (to 5 mm long), thick (~1–2 mm wide), conical blackish spines." ... "Since hybridization is common in cacti, reliance on plastid sequences for phylogenies is discouraged. Other variable nuclear regions should also be sought."

604	Self-compatible or apomictic	
	Source(s)	Notes
	Rojas-Sandoval, J., & Meléndez-Ackerman, E. (2009). Pollination biology of <i>Harrisia portoricensis</i> (Cactaceae), an endangered Caribbean species. <i>American Journal of Botany</i> , 96(12): 2270-2278	[Unknown for <i>H. eriophora</i>] "Controlled pollinations demonstrated that <i>H. portoricensis</i> has a partially self-compatible breeding system that it is not autogamous and thus requires an external mechanism for the movement of pollen to set fruit."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Franck, A. R. (2012). Systematics of <i>Harrisia</i> (Cactaceae). PhD Dissertation. University of South Florida, Tampa, FL	"Flowers 16–23 cm long. Pericarpel green. Hypanthium green, scales green to green with red tips, ovate. Midhypanthium scales 2.8–3.2 × 7.7–10 mm. Sepals greenish pink."

Qsn #	Question	Answer
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	" <i>Harrisia eriophora</i> is probably visited by hawkmoths, although Fleming et al. (2009) indicate it is bat pollinated."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Vegetative reproduction is frequent when stems break and detach from the parent plant. The stems can proceed to produce roots along tissue nearest to the ground and produce a new plant. The ribs of the stem may contract during water stress." [Generic trait]

607	Minimum generative time (years)	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Vegetative reproduction is frequent when stems break and detach from the parent plant." [Possible that fragments could attach externally, but unlikely to happen with people, as opposed to animals]

702	Propagules dispersed intentionally by people	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 9 Oct 2017]	"Cultivated: . also cult." [Grown as an ornamental]
	Taylor, N.P., González Torres, L.R. & Barrios, D. 2013. <i>Harrisia eriophora</i> . The IUCN Red List of Threatened Species 2013: e.T151853A568818. http://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T151853A568818.en . [Accessed 9 Oct 2017]	"It is also cultivated for its edible fruit."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Biosecurity Queensland. 2017. <i>Harrisia</i> cactus. Moonlight cactus. <i>Harrisia martinii</i> , <i>Harrisia tortuosa</i> and <i>Harrisia pomanensis</i> . State of Queensland, Department of Agriculture and Fisheries. https://www.daf.qld.gov.au . [Accessed 9 Oct 2017]	"Fruit and seed are readily eaten by birds, mammals and to a lesser extent by feral pigs." [No evidence in related invasive taxa]

704	Propagules adapted to wind dispersal	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Seed dispersal of <i>Harrisia</i> has likely been assisted by birds (ornithochorous) and/or bats (chiropterochorous) ... Immature fruit green, tuberculate. Mature fruit yellow, smooth. Seeds 1.7–2.1 × 2.6–3.35 mm."

705	Propagules water dispersed	
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Seed dispersal by" water may also be possible (Bregman 1988)." [Possibly in growing in riparian areas]

706	Propagules bird dispersed	y
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Seed dispersal of <i>Harrisia</i> has likely been assisted by birds (ornithochorous) and/or bats (chiropterochorous) as many populations are limited to isolated islands (i.e., West Indies). Species of the bat subtribe <i>Stenodermatina</i> (Chiroptera) are frugivores with distributions in South America, Central America, and the Caribbean (Dávalos 2007) and may potentially consume <i>Harrisia</i> fruits." ... "Immature fruit green, tuberculate. Mature fruit yellow, smooth. Seeds 1.7–2.1 × 2.6–3.35 mm."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Vegetative reproduction is frequent when stems break and detach from the parent plant." [Spiny stem fragments could potentially adhere to animals that break off pieces as they move past or around plants]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	[Presumably yes] "Seed dispersal of <i>Harrisia</i> has likely been assisted by birds (ornithochorous) and/or bats (chiropterochorous) as many populations are limited to isolated islands (i.e., West Indies). Species of the bat subtribe <i>Stenodermatina</i> (Chiroptera) are frugivores with distributions in South America, Central America, and the Caribbean (Dávalos 2007) and may potentially consume <i>Harrisia</i> fruits." ... "Immature fruit green, tuberculate. Mature fruit yellow, smooth. Seeds 1.7–2.1 × 2.6–3.35 mm."

Qsn #	Question	Answer
801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Biosecurity Queensland. 2017. <i>Harrisia</i> cactus. Moonlight cactus. <i>Harrisia martinii</i> , <i>Harrisia tortuosa</i> and <i>Harrisia pomanensis</i> . State of Queensland, Department of Agriculture and Fisheries. https://www.daf.qld.gov.au . [Accessed 9 Oct 2017]	" <i>Harrisia</i> cactus produces large quantities of seed that is highly viable and easily spread by birds and other animals." [Related taxa produce large seed quantities]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Goodman, J., Walters, D., Bradley, K., Maschinski, J., & Salazar, A. (2012). Seeds of endangered <i>Harrisia fragrans</i> form persistent soil seed banks and withstand orthodox storage conditions. <i>Haseltonia</i> , 18: 85-94	[Related species forms persistent seed bank of at least 23 months] "Abstract: Understanding soil seed-bank dynamics of endangered species is crucial for their effective management and conservation. Whether or not seeds of <i>Harrisia fragrans</i> Small, a U.S. endangered cactus endemic to Florida (USA) form persistent soil seed-banks or withstand drying and/or freezing under storage conditions was unknown. We conducted a seed burial experiment with seeds collected from three sites (North, Middle, and South) within the Savannas Preserve State Park, FL, USA. We buried the seeds in plots with three light conditions (sun, partial sun, and shade) at each of the three sites and tested their viability in germination trials after 3.5, 8, 11, 16, 19 and 23 months of burial in soil. Buried seeds remained alive throughout the 23 months of the study period with germination ranging from 64 to 100%, which suggests that this species forms a persistent soil seed-bank. Microhabitat conditions markedly affected seed-bank size and subsequent seed viability. Seeds from the South site exhibited higher and faster germination than seeds from the Middle or North sites. We also evaluated if <i>H. fragrans</i> seeds could withstand dry storage under low relative humidity (RH) and low temperature. In the laboratory 76% of seeds stored under 12% RH and -20°C for 1 and 24 weeks germinated faster than seeds stored under 21-23°C and 50% RH. Thus, the capacity of <i>Harrisia fragrans</i> to form a persistent soil seed bank influences population persistence. Its ability to be stored in orthodox ex-situ conditions offers viable options for its future conservation and regeneration."

803	Well controlled by herbicides	y
	Source(s)	Notes
	Biosecurity Queensland. 2017. <i>Harrisia</i> cactus. Moonlight cactus. <i>Harrisia martinii</i> , <i>Harrisia tortuosa</i> and <i>Harrisia pomanensis</i> . State of Queensland, Department of Agriculture and Fisheries. https://www.daf.qld.gov.au . [Accessed 9 Oct 2017]	"Foliar application of registered herbicides provides effective control, but can be costly over large areas." [A number of herbicides are recommended for control of related, invasive taxa and would probably be effective if used on <i>H. eriophora</i>]

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"Vegetative reproduction is frequent when stems break and detach from the parent plant. The stems can proceed to produce roots along tissue nearest to the ground and produce a new plant. The ribs of the stem may contract during water stress." [Generic trait. Parent plant presumably recovers from frequent stem breakage]

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Franck, A. R. (2016). Monograph of <i>Harrisia</i> (Cactaceae). <i>Phytoneuron</i> , 85: 1-159	"The invasive <i>Cactoblastis cactorum</i> Berg avoids <i>Harrisia</i> (Tate et al. 2009)."
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Thrives in tropical climates
- Cited as an agricultural weed (unconfirmed)
- Other *Harrisia* species are invasive weed
- Spiny
- Shade tolerant
- Reproduces by seeds & vegetatively by stem fragments
- Seeds dispersed by birds, other frugivorous animals & intentionally by people
- Seeds of related species form persistent seed banks
- Members of genus able to resprout after cutting
- Limited ecological information may reduce accuracy of risk prediction

Low Risk Traits

- No confirmed reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
- Palatable fruit
- Non-toxic
- Ornamental
- Herbicides provide effective control of related taxa