

<b>Taxon:</b> <i>Peniocereus hirschtianus</i>	<b>Family:</b> Cactaceae
<b>Common Name(s):</b> Peniocereus	<b>Synonym(s):</b> <i>Cereus guatemalensis</i> (Britton & Rose) <i>Cereus hirschtianus</i> K.Schum. <i>Nyctocereus guatemalensis</i> Britton & Rose

<b>Assessor:</b> Assessor	<b>Status:</b> Assessor Approved	<b>End Date:</b> 3 Sep 2014
<b>WRA Score:</b> 4.0	<b>Designation:</b> EVALUATE	<b>Rating:</b> Evaluate

**Keywords:** Spiny Cactus, Possibly Naturalizing, Rarely Cultivated, Fleshy-fruited, Zoochorous

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		
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
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
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
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)		
411	Climbing or smothering growth habit	y=1, n=0	y
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		
607	Minimum generative time (years)		
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	n
705	Propagules water dispersed	y=1, n=-1	n
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/m <sup>2</sup> )		
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
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	[No evidence] "This species is found in Costa Rica, El Salvador, Guatemala and Nicaragua (Hunt et al. 2006). Schulze-Rojas (2004) also report the species from Honduras."
102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA
103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2014. 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
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	"Range Description: This species is found in Costa Rica, El Salvador, Guatemala and Nicaragua (Hunt et al. 2006). Schulze-Rojas (2004) also report the species from Honduras."
202	Quality of climate match data	High
	Source(s)	Notes
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	"In Guatemala, the species inhabits thorn scrub vegetation (Arias and Véliz-Pérez 2006). In Costa Rica it is primarily found near the coast in deciduous dry lowland forest (B. Hammel pers. comm. 2009)."
	Desert Tropicals. 2014. <i>Peniocereus hirschtianus</i> . <a href="http://www.desert-tropicals.com/Plants/Cactaceae/Peniocereus_hirschtianus.html">http://www.desert-tropicals.com/Plants/Cactaceae/Peniocereus_hirschtianus.html</a> . [Accessed 3 Sep 2014]	"USDA: 9-11"

Qsn #	Question	Answer
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus</i> - <i>Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	[Observed at higher elevations than collections, but range still less than 1000 m in tropical latitudes] "On Feb 15, 2010, fatlizard from north central Nicaragua (Zone 11) wrote: This plant grows wild in north central Nicaragua. I have seen it in various locations from approx 500 m to 800 m elevation, usually in fun sun or part shade. Examples in full sun seem to have a less attractive, heat stressed appearance."
	Tropicos.org. 2014. Tropicos [Online Database]. Missouri Botanical Garden. <a href="http://www.tropicos.org/">http://www.tropicos.org/</a> . [Accessed 3 Sep 2014]	Collected only from low elevation tropical latitudes: Elevation Range" 0-430 m Latitudinal Range: 10°48'00"N - 15°46'30"N

204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	"Native: Costa Rica; El Salvador; Guatemala; Nicaragua"

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Lau, A. & Frohlich, D. 2013. New plant records for the Hawaiian Islands 2011–2012. Bishop Museum Occasional Papers 114: 5–16	"This species is not known from cultivation worldwide, and it is rarely seen in its native range in Central America (N Taylor, 2012, Singapore Botanic Gardens, pers. comm.)."

301	<b>Naturalized beyond native range</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Lau, A. & Frohlich, D. 2013. New plant records for the Hawaiian Islands 2011–2012. Bishop Museum Occasional Papers 114: 5–16	[Possibly Naturalizing on Oahu, Hawaiian Islands] "It was spreading along the crater walls in Koko Crater Botanical Garden, but it was unclear whether it had been planted in this area." ... "Material examined. O'AHU: Koko Crater Botanical Garden, 21.284°N, 157.682°W. Scattered distribution in open rocky areas, dry lowland exposed rocky ridge. Sprawling cactus, stems arching or lying on ground. Stems flat green, ribs strongly compressed, spines usually grey. Flowers open in morning, sweetly fragrant, petals white on inner surface, filaments white, anthers and stigma cream-colored, 22 Mar 2012, OED 2012032205."

302	<b>Garden/amenity/disturbance weed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	WRA Specialist. 2014. Personal Communication	No evidence, but also not widely cultivated outside native range

303	<b>Agricultural/forestry/horticultural weed</b>	<b>n</b>
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	WRA Specialist. 2014. Personal Communication	No evidence, but also not widely cultivated outside native range

304	Environmental weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	WRA Specialist. 2014. Personal Communication	No evidence, but also not widely cultivated outside native range

305	Congeneric weed	
	<b>Source(s)</b>	<b>Notes</b>
	Invasive Species South Africa. 2014. Cactus Working Group established. <a href="http://www.invasives.org.za/item/408-cactus-working-group-established.html">http://www.invasives.org.za/item/408-cactus-working-group-established.html</a> . [Accessed 3 Sep 2014]	[Serpent cactus ( <i>Peniocereus serpentinus</i> ) listed among potentially invasive cactus species. No detail on impacts given] "Several cactus species have been identified as serious invaders in parts of South Africa, especially the Northern and Eastern Cape. Some cactus species have invaded large tracts of land to the detriment of indigenous plants. They are also a threat to livestock due to the spines which cause injury to animals. Of particular concern are the following cactus species:" ... "Serpent cactus ( <i>Peniocereus serpentinus</i> )"
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	<i>Peniocereus serpentinus</i> = <i>Nyctocereus serpentinus</i> reported as naturalized

401	Produces spines, thorns or burrs	y
	<b>Source(s)</b>	<b>Notes</b>
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus - Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	"Danger: Plant has spines or sharp edges; use extreme caution when handling"
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	" <i>Nyctocereus guatemalensis</i> " ... ""Stems half-erect, arching, creeping, or even prostrate, 3 to 6 cm. in diameter: ribs 8 to 12, very low; radial spines about 10; centrals 3 to 6, usually much longer than the radials, the longer ones 3 to 4 cm. long;" [ <i>Nyctocereus guatemalensis</i> = <i>Peniocereus hirschtianus</i> ]

402	Allelopathic	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2014. Personal Communication	Unknown

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and Genera of Vascular Plants: Volume II. Flowering Plants. Dicotyledons: Magnoliid, Hamamelid and Caryophyllid Families. Springer-Verlag, Berlin, Heidelberg, New York	[Genus Description] "Prostrate or scandent shrubs; roots thickened, turnip-like or Dahlia-like; stems slender, ribbed, sparingly branched; epidermis sometimes papillose-downy; spines conspicuous, or appressed and short." [Cactaceae]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	[Unknown. Spines may deter browsing] "Stems half-erect, arching, creeping, or even prostrate, 3 to 6 cm. in diameter: ribs 8 to 12, very low; radial spines about 10; centrals 3 to 6, usually much longer than the radials, the longer ones 3 to 4 cm. long;"

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

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

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

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Lau, A. & Frohlich, D. 2013. New plant records for the Hawaiian Islands 2011–2012. Bishop Museum Occasional Papers 114: 5–16	[Dry, introduced grasses, rather than succulent cacti, are the likely cause of any increased fire risk in these areas] "Scattered distribution in open rocky areas, dry lowland exposed rocky ridge. Sprawling cactus, stems arching or lying on ground. Stems flat green, ribs strongly compressed, spines usually grey."
	Standley, P.C. & Williams, L.O. 1962. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 2. Chicago Natural History Museum	[May occur in dry, fire prone habitats, but as a cactus, unlikely to increase the fire risk in these areas, especially in an introduced range, where flammable grasses are much more likely to contribute to the fuel load] "Nyctocereus guatemalensis" ... "Dry, brushy plains, 200-300 meters; endemic"

Qsn #	Question	Answer
409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Desert Tropicals. 2014. <i>Peniocereus hirschtianus</i> . <a href="http://www.desert-tropicals.com/Plants/Cactaceae/Peniocereus_hirschtianus.html">http://www.desert-tropicals.com/Plants/Cactaceae/Peniocereus_hirschtianus.html</a> . [Accessed 3 Sep 2014]	"Sun Exposure: Bright shade to partial sun"
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus - Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	"Sun Exposure: Sun to Partial Shade Light Shade" ... "On Feb 15, 2010, fatlizard from north central Nicaragua (Zone 11) wrote: This plant grows wild in north central Nicaragua. I have seen it in various locations from approx 500 m to 800 m elevation, usually in fun sun or part shade. Examples in full sun seem to have a less attractive, heat stressed appearance."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus - Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)"

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus - Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	"On Feb 15, 2010, fatlizard from north central Nicaragua (Zone 11) wrote: ... The wild plants vary from clumping to trailing to climbing, so selection will be necessary to use them for ornamental purposes."
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	"Stems half-erect, arching, creeping, or even prostrate, 3 to 6 cm. in diameter: ribs 8 to 12, very low; radial spines about 10; centrals 3 to 6, usually much longer than the radials, the longer ones 3 to 4 cm. long;"

412	Forms dense thickets	
	Source(s)	Notes
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	[Unknown] "P. hirschtianus occurs in high densities in thorn scrub vegetation in Guatemala (Arias and Véliz-Pérez 2006). In Costa Rica it is very scarce; B. Hammel (pers. comm. 2009) reports that he has been unable to find plants that he had seen in previous occasions."

501	Aquatic	n
	Source(s)	Notes

Qsn #	Question	Answer
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	"Habitat and Ecology: In Guatemala, the species inhabits thorn scrub vegetation (Arias and Véliz Pérez 2006). In Costa Rica it is primarily found near the coast in deciduous dry lowland forest (B. Hammel pers. comm. 2009). Systems: Terrestrial"

502	Grass	n
	Source(s)	Notes
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and Genera of Vascular Plants: Volume II. Flowering Plants. Dicotyledons: Magnoliid, Hamamelid and Caryophyllid Families. Springer-Verlag, Berlin, Heidelberg, New York	Cactaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and Genera of Vascular Plants: Volume II. Flowering Plants. Dicotyledons: Magnoliid, Hamamelid and Caryophyllid Families. Springer-Verlag, Berlin, Heidelberg, New York	Cactaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	"Stems half-erect, arching, creeping, or even prostrate, 3 to 6 cm. in diameter: ribs 8 to 12, very low; radial spines about 10; centrals 3 to 6, usually much longer than the radials, the longer ones 3 to 4 cm. long; flowers very fragrant, 4 to 5 cm. long; ovary somewhat tuberculate, each tubercle crowned by an areole bearing a cluster of pinkish or brownish spines; outer sepals brownish; petals lanceolate, acute, nearly white; stamens much shorter than the petals, attached all along the surface of the wide throat; style stout, 3 cm. long; fruit small (about 2 cm. long), spiny; seeds black, shining, 3 mm. in diameter."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	" <i>Peniocereus hirschtianus</i> is listed as Least Concern based on the extent of the range and its apparent abundance in Guatemala. It occurs mainly in lowland dry habitats, which are not highly threatened."

602	Produces viable seed	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	"fruit small (about 2 cm. long), spiny; seeds black, shining, 3 mm. in diameter."
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	"Propagation Methods: From woody stem cuttings Allow cut surface to callous over before planting From seed; direct sow after last frost"

603	Hybridizes naturally	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2014. Personal Communication	Unknown

604	Self-compatible or apomictic	
	<b>Source(s)</b>	<b>Notes</b>
	Raguso, R. A., Henzel, C., Buchmann, S. L., & Nabhan, G. P. (2003). Trumpet flowers of the Sonoran Desert: floral biology of <i>Peniocereus cacti</i> and sacred <i>Datura</i> . <i>International Journal of Plant Sciences</i> , 164(6): 877-892	[Other <i>Peniocereus</i> are self-incompatible] "The floral biology of night-blooming <i>Peniocereus cacti</i> and <i>Datura</i> plants was studied in North America's Sonoran Desert. In populations of two rare cactus species ( <i>Peniocereus greggii</i> and <i>Peniocereus striatus</i> ), individual plants bloom synchronously on less than five nights per year and are self-incompatible."

605	Requires specialist pollinators	n
	<b>Source(s)</b>	<b>Notes</b>
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	"flowers very fragrant, 4 to 5 cm. long; ovary somewhat tuberculate, each tubercle crowned by an areole bearing a cluster of pinkish or brownish spines; outer sepals brownish; petals lanceolate, acute, nearly white; stamens much shorter than the petals, attached all along the surface of the wide throat; style stout, 3 cm. long;"
	Raguso, R. A., Henzel, C., Buchmann, S. L., & Nabhan, G. P. (2003). Trumpet flowers of the Sonoran Desert: floral biology of <i>Peniocereus cacti</i> and sacred <i>Datura</i> . <i>International Journal of Plant Sciences</i> , 164(6): 877-892	[No, assuming floral morphology & pollinator requirements are similar] "Flowers of all species studied are visited by hawk moths at dusk and by honeybees and native bees the following morning. Hawk moths have the appropriate behavior and body dimensions to pollinate <i>Peniocereus</i> effectively, but visits are rare. Nonnative honeybees also visit <i>P. greggii</i> and may contribute incrementally to fruit set."

606	Reproduction by vegetative fragmentation	
	<b>Source(s)</b>	<b>Notes</b>
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	[Unknown] "Propagation Methods: From woody stem cuttings Allow cut surface to callous over before planting From seed; direct sow after last frost"

Qsn #	Question	Answer
607	Minimum generative time (years)	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1962. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 2. Chicago Natural History Museum	[Unknown. Spines on fruit may allow them to adhere to dispersal vectors] "fruit 2 cm. long, spiny; seeds black, lustrous, 3 mm. in diameter."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Hammel, B. 2013. <i>Peniocereus hirschtianus</i> . The IUCN Red List of Threatened Species. Version 2014.2. <a href="http://www.iucnredlist.org">www.iucnredlist.org</a>	"Use and Trade: This is a fairly popular species in cultivation. "
	Lau, A. & Frohlich, D. 2013. New plant records for the Hawaiian Islands 2011–2012. Bishop Museum Occasional Papers 114: 5–16	[Not widely cultivated in the Hawaiian Islands] "This species is not known from cultivation worldwide, and it is rarely seen in its native range in Central America (N Taylor, 2012, Singapore Botanic Gardens, pers. comm.)."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unlikely. Not commonly cultivated, and no evidence that this plant is grown with agricultural or horticultural produce

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	"fruit small (about 2 cm. long), spiny; seeds black, shining, 3 mm. in diameter."

705	Propagules water dispersed	n
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1962. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 2. Chicago Natural History Museum	[Unlikely given fruit morphology & habitat] " <i>Nyctocereus guatemalensis</i> ... "Dry, brushy plains, 200-300 meters" ... "fruit 2 cm. long, spiny; seeds black, lustrous, 3 mm. in diameter."

706	Propagules bird dispersed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	[Presumably Yes. Fleshy-fruited] "fruit small (about 2 cm. long), spiny; seeds black, shining, 3 mm. in diameter."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1962. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 2. Chicago Natural History Museum	[Unknown. Spiny fruits could possibly adhere to animal fur/hair] "fruit 2 cm. long, spiny; seeds black, lustrous, 3 mm. in diameter."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	[Presumably Yes. Fleshy-fruited & adapted for frugivory] "fruit small (about 2 cm. long), spiny; seeds black, shining, 3 mm. in diameter."

801	Prolific seed production (>1000/m <sup>2</sup> )	
	Source(s)	Notes
	Britton, N.L. & Brown, A. 1913. An Illustrated Flora of the Northern United States, Canada and the British Possessions. Vol. III. Gentianaceae to Compositae. Charles Scribner's Sons, New York, NY	[Unknown] "fruit small (about 2 cm. long), spiny; seeds black, shining, 3 mm. in diameter."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Dave's Garden. 2014. PlantFiles: <i>Peniocereus</i> - <i>Peniocereus hirschtianus</i> . <a href="http://davesgarden.com/guides/pf/go/139538/">http://davesgarden.com/guides/pf/go/139538/</a> . [Accessed 3 Sep 2014]	"Properly cleaned, seed can be successfully stored"
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed ]	Unknown

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

Qsn #	Question	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Lau, A. & Frohlich, D. 2013. New plant records for the Hawaiian Islands 2011–2012. Bishop Museum Occasional Papers 114: 5–16	[Unknown. No obvious pests or pathogens noted attacking plants] "Material examined. O'AHU: Koko Crater Botanical Garden, 21.284°N, 157.682°W. Scattered distribution in open rocky areas, dry lowland exposed rocky ridge. Sprawling cactus, stems arching or lying on ground. Stems flat green, ribs strongly compressed, spines usually grey. Flowers open in morning, sweetly fragrant, petals white on inner surface, filaments white, anthers and stigma creamcolored, 22 Mar 2012, OED 2012032205."
	WRA Specialist. 2014. Personal Communication	Unknown

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Thrives in tropical climates
- Possibly naturalizing on Oahu, Hawaiian Islands (confirmation needed)
- Other *Peniocereus* species have become naturalized
- Spiny
- Seeds dispersed by birds & intentionally by people
- Limited ecological information makes accurate risk prediction difficult

## Low Risk Traits

- No reports of invasiveness or naturalization (with the possible exception of Oahu), but no evidence of widespread introduction outside native range
- Restricted to lower elevation, dry tropical climates
- Non-toxic
- Ornamental value

## Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Unknown. May possess some shade tolerance. Unknown if able to form dense stands

(B) Bird-dispersed?> Dispersed by birds

(C) Life cycle <4 years? Unknown

Outcome = Evaluate