

Key Words: High Risk, Naturalized, Shrub, Edible Fruit, Spreads vegetatively, Bird-dispersed

Family: *Cactaceae*

Taxon: *Nopalea cochenillifera*

Synonym: *Cactus cochenillifer* L. (basonym)
Opuntia cochenillifera (L.) Mill.

Common Name: Cochineal cactus
Cochineal nopal cactus
Cochenillier
Nopal chamacuero

Questionnaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** H(HPWRA)
Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score** 7

101	Is the species highly domesticated?	y=-3, n=0	
102	Has the species become naturalized where grown?	y=1, n=-1	
103	Does the species have weedy races?	y=1, n=-1	
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	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	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	
402	Allelopathic	y=1, n=0	
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
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	y
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	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	
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)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 7

Supporting Data:

101	2004. Parfitt, B.D./Gibson, A.C.. Cactaceae. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. Vol. 4. Flora of North America Association, New York and Oxford	[Is the species highly domesticated? Possibly Yes] "This species may have been selected for spinelessness in Mexico, much like <i>Opuntia ficus-indica</i> , to ease the culturing and collection of cochineal scale insects for red dye."
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Species suited to tropical or subtropical climate(s) 2-High] "Original habitat unknown, widely cultivated and escaped in tropical America."
201	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Species suited to tropical or subtropical climate(s) 2-High] "This cactus is native to Mexico. Wild distribution is found in tropical central America, Mexico and Jamaica."
202	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Quality of climate match data 2-High]
203	1962. Standley, P.C./Williams, L.O.. Flora of Guatemala - Vol. 24 - Part VII - Numbers 2. Fieldiana. 24: 1-281.	[Broad climate suitability (environmental versatility)? Possibly] "Probably not native in Guatemala, but much planted at low and middle elevations; thoroughly naturalized in many places at middle elevations, up to 1,500 meters or even higher..." [Elevation range may exceed 1000 m]
203	2011. Hortocopia Inc.. <i>Opuntia cochenillifera</i> . http://www.hortocopia.com/hortpix/html/opucoc000.htm	[Broad climate suitability (environmental versatility)? No] "Hardiness range: 9A - 11"
203	2012. Dave's Gardern. PlantFiles: Prickly Pear, Cochineal Nopal Cactus - <i>Nopalea cochenillifera</i> . http://davesgarden.com/guides/pf/go/60167/	[Broad climate suitability (environmental versatility)? No] "Hardiness: 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	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Original habitat unknown, widely cultivated and escaped in tropical America."
205	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Does the species have a history of repeated introductions outside its natural range? Yes] "Slopes; low altitudes. S Guangdong, Guangxi, Hainan [native to Mexico; widely introduced and escaped in tropical regions]."
205	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Does the species have a history of repeated introductions outside its natural range? Yes] "This cactus is frequently cultivated in tropical and subtropical America, also in the Mediterranean, Canary Island, tropical Africa, India and Southeast Asia."
301	1994. Liogier, H.A.. Descriptive Flora of Puerto Rico and Adjacent Islands. Spermatophyta, Volume III. Cyrtillaceae to Myrtaceae. La Editorial, UPR, San Juan, Puerto Rico	[Naturalized beyond native range? Possibly Yes] "Locally persistent and spontaneous after planting in the dry southern districts, PR; probably native of Central America."
301	2001. Rebman, J.P./Pinkava, D.J.. <i>Opuntia</i> cacti of North America - An Overview. Florida Entomologist. 84(4): 474-483.	[Naturalized beyond native range? Yes] "Just one species (<i>N. cochenillifera</i> (L.) Salm-Dyck) is found in the United States and has naturalized from cultivation in central Florida."
301	2005. Wagner, W.L./Herbst, D.R./Lorence, D.H.. Flora of the Hawaiian Islands website. Smithsonian Inst., Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm	[Naturalized beyond native range? Yes] "Native range unknown, although most likely southern Mexico or northern Central America, cultivated since ancient times as a host for cochineal insects that provide cochineal dye, now widely grown as an ornamental in warm parts of the world. In the Hawaiian Islands, naturalized on Kaua'i, O'ahu, Maui."
302	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Garden/amenity/disturbance weed? No] No evidence
303	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Agricultural/forestry/horticultural weed? No] No evidence

304	2009. Global Invasive Species Database. <i>Opuntia cochenillifera</i> . http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Environmental weed? No] "Interaction with other invasive species: Mice were several times seen climbing on <i>Opuntia</i> plants, where one was seen to graze the anthers from several flowers (Duffey 1964). Threat to endangered species: Endemic vascular flora of Ascension Island are threatened by an unidentified <i>Opuntia</i> sp. Specifically, <i>Opuntia</i> occurs at at least two locations where endemic species occur. These endemics are the 'Near Threatened (NT)' <i>Asplenium ascensionis</i> - (in IUCN Red List of Threatened Species) and the 'Critically Endangered (CR)' <i>Pteris adscensionis</i> - (in IUCN Red List of Threatened Species), both of which require active conservation measures to ensure their survival (Gray Pelembe & Stroud 2005)." [No evidence that the species is <i>Nopalea (Opuntia) cochenillifera</i>]
305	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Congeneric weed? No] No evidence of <i>Nopalea</i> , but several <i>Opuntia</i> species are invasive weeds of agriculture or the natural environment.
401	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Produces spines, thorns or burrs? Mostly] "Stout shrubs to 4 m. tall, the older trunks broadly cylindrical, to 2 dm. thick, the young stem joints elliptic-oblong, to 5 dm. long, green, the areoles without spines or nearly so."
402	2012. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Parasitic? No] "Stout shrubs to 4 m. tall, the older trunks broadly cylindrical, to 2 dm. thick, the young stem joints elliptic-oblong, to 5 dm. long, green, the areoles without spines or nearly so." [Cactaceae]
404	1990. Ferreira dos Santos, M.V. et al.. Comparative study of cultivars of the fodder cacti <i>Opuntia ficus indica</i> Mill (Gigante and Redonda) and <i>Nopalea cochenillifera</i> Salm Dyck (Miúda) for milk production. Revista da Sociedade Brasileira de Zootecnia. 19(6)	[Unpalatable to grazing animals? No] "In a Latin square design experiment 12 Holstein cows between days 49 to 181 of lactation with mean daily milk yields of 11.8 kg were given during 3 periods of 28 days diets with <i>Opuntia ficus indica</i> cultivars Gigante and Redonda and <i>Nopalea (Opuntia) cochenillifera</i> cultivar Miúda supplemented with silage and concentrate. Mean crude protein in the cultivars was 4.83, 4.21 and 2.55 and crude fibre 9.53, 8.62 and 5.14%, respectively. Intake of crude protein and fibre was lower and intake of DM greater with cultivar Miúda than with the other cultivars. Digestibility of DM in vitro was 77.37% for Miúda compared with 74.11 and 75.12% for Redonda and Gigante. Mean milk production and milk fat were not significantly different among treatments."
404	2001. Hanelt, P. (ed.). Mansfeld's encyclopedia of agricultural and horticultural crops: (except ornamentals). Angiospermae - monocotyledones: orchidaceae - pandanaceae, Volume 5. Springer-Verlag, Berlin, Heidelberg, New York	[Unpalatable to grazing animals? No] " <i>O. cochenillifera</i> is also an important hedge plant and the cladodes are used for forage and fodder."
405	2001. Hanelt, P. (ed.). Mansfeld's encyclopedia of agricultural and horticultural crops: (except ornamentals). Angiospermae - monocotyledones: orchidaceae - pandanaceae, Volume 5. Springer-Verlag, Berlin, Heidelberg, New York	[Toxic to animals? No] " <i>O. cochenillifera</i> is also an important hedge plant and the cladodes are used for forage and fodder." [No evidence of toxicity]
406	2005. Zimmermann, H.G./Mayra Pérez Sandi y Cuen/Bello Rivera, A.. The Status of <i>Cactoblastis cactorum</i> (Lepidoptera: Pyralidae) in the Caribbean and the Likelihood of its Spread to Mexico. IAEA, Vienna	[Host for recognized pests and pathogens? Yes] " <i>Nopalea cochenillifera</i> is a very common exotic garden plant throughout the Caribbean and it must be assumed that Caribbean people have carried cladodes of this species to every corner of the region. It is probable that <i>Cactoblastis</i> was dispersed through human intervention by means of infested cladodes or plants. The many interceptions of larvae inside cladodes at Miami is testimony of the ease with which the cactus moth can spread unnoticed as larvae inside cladodes. Many cladodes on <i>N. cochenillifera</i> have been seen to be infested with <i>Cactoblastis</i> ."
406	2009. Global Invasive Species Database. <i>Opuntia cochenillifera</i> . http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Host for recognized pests and pathogens? Yes] "Cochineal (<i>Dactylopius</i> spp.) and <i>Cactoblastis</i> (<i>Cactoblastis</i> spp.) are the two most important biological control agents for prickly pear cacti. The two attack the cactus in a totally different manner. Cochineal species attach to the outside of the plant and sucks the moisture out of the plant. <i>Cactoblastis</i> are black and yellow striped grubs that tunnel into and devour the inside of the plant (North West Weeds 2007). <i>Cactoblastis</i> oviposits by gluing sticks of about 50 to 90 eggs on cactus spines; the gregarious larvae bore into the pads or cladodes, devouring them from the inside (Stiling 2002). Because of its oligophagous feeding habits <i>Cactoblastis</i> has been successful against a whole range of <i>Opuntia</i> species including 11 species of North American origin (Julien and Griffiths 1998, in Stiling 2002)."

407	1997. Nerd, A./Dumoutier, M./Mizrahi, Y.. Properties and postharvest behavior of the vegetable cactus <i>Nopalea cochenillifera</i> . <i>Postharvest Biology and Technology</i> . 10: 135-143.	[Causes allergies or is otherwise toxic to humans? No evidence] "The cactus <i>Nopalea cochenillifera</i> (L.) Salm- Dyck is a succulent shrub with green, flattened stem segments called cladodes. The tender young cladodes, nopalitos in Spanish, are consumed as a vegetable in Mexico and Texas (Mick, 1991; Nobel, 1994). In Mexico the cladodes of other cactus species, mostly members of the genus <i>Opuntia</i> , are eaten as well (Pimienta-Barrios, 1993; Nobel, 1994). We chose to focus on <i>N. cochenillifera</i> , because its young cladodes are particularly delicate and unlike those of the <i>Opuntia</i> species, are free of spines."
407	2012. Lim, T.K.. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 1, Fruits. Springer, New York	[Causes allergies or is otherwise toxic to humans? No] "Fruit and cladodes are edible. The fruits are eaten fresh or processed into drinks, fruit salads etc as with <i>Opuntia ficus-indica</i> ."
408	1958. Anonymous. <i>Flora of Panama</i> . Part VII. Fascicle I. <i>Annals of the Missouri Botanical Garden</i> . 45(1): 1-91.	[Creates a fire hazard in natural ecosystems? No] "Massive succulent shrubs;..." [No evidence. Succulent plants unlikely to burn well]
408	2009. Global Invasive Species Database. <i>Opuntia cochenillifera</i> . http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Creates a fire hazard in natural ecosystems? No] No evidence
409	2010. Shaw, J./Ferguson, D.. <i>Opuntiads of the USA - Nopalea cochenillifera</i> (Linnaeus) Salm-Dyck. http://opuntiads.com/html/nopalea-cochenillifera.html	[Is a shade tolerant plant at some stage of its life cycle? Yes] "It is easy to grow, being tolerant of too much water and poor light. However, plants in poor light soon become spindly." [Does not thrive in shade]
409	2012. Dave's Gardern. <i>PlantFiles: Prickly Pear, Cochineal Nopal Cactus - Nopalea cochenillifera</i> . http://davesgarden.com/guides/pf/go/60167/	[Is a shade tolerant plant at some stage of its life cycle? Possibly] "Sun Exposure: Full Sun Sun to Partial Shade"
410	2011. Hortocopia Inc.. <i>Opuntia cochenillifera</i> . http://www.hortocopia.com/hortpix/html/opucoc000.htm	[Tolerates a wide range of soil conditions ? Yes] "Soil pH requirements: Acidic, neutral, slightly alkaline" ... "Soil type: Sandy, clay, loamy"
411	1958. Anonymous. <i>Flora of Panama</i> . Part VII. Fascicle I. <i>Annals of the Missouri Botanical Garden</i> . 45(1): 1-91.	[Climbing or smothering growth habit? No] "Stout shrubs to 4 m. tall, the older trunks broadly cylindrical, to 2 dm. thick, the young stem joints elliptic-oblong, to 5 dm. long, green, the areoles without spines or nearly so."
412	1958. Anonymous. <i>Flora of Panama</i> . Part VII. Fascicle I. <i>Annals of the Missouri Botanical Garden</i> . 45(1): 1-91.	[Forms dense thickets? Yes] "Occasionally encountered in cultivation or thickets in Panama..."
501	2004. Parfitt, B.D./Gibson, A.C.. <i>Cactaceae</i> . In: <i>Flora of North America</i> Editorial Committee, eds. 1993+. <i>Flora of North America North of Mexico</i> . Vol. 4. <i>Flora of North America</i> Association, New York and Oxford	[Aquatic? No] "Shrubs or trees to 4-5 m; trunks 15-20 cm diam."
502	2012. USDA ARS National Genetic Resources Program. <i>Germplasm Resources Information Network - (GRIN)</i> [Online Database]. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Grass? No] <i>Cactaceae</i>
503	2012. USDA ARS National Genetic Resources Program. <i>Germplasm Resources Information Network - (GRIN)</i> [Online Database]. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Nitrogen fixing woody plant? No] <i>Cactaceae</i>
504	1958. Anonymous. <i>Flora of Panama</i> . Part VII. Fascicle I. <i>Annals of the Missouri Botanical Garden</i> . 45(1): 1-91.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Stout shrubs to 4 m. tall, the older trunks broadly cylindrical, to 2 dm. thick, the young stem joints elliptic-oblong, to 5 dm. long, green, the areoles without spines or nearly so."
601	1958. Anonymous. <i>Flora of Panama</i> . Part VII. Fascicle I. <i>Annals of the Missouri Botanical Garden</i> . 45(1): 1-91.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
601	2004. Parfitt, B.D./Gibson, A.C.. <i>Cactaceae</i> . In: <i>Flora of North America</i> Editorial Committee, eds. 1993+. <i>Flora of North America North of Mexico</i> . Vol. 4. <i>Flora of North America</i> Association, New York and Oxford	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	2004. Crescent Bloom. <i>Nopalea cochenillifera</i> . http://www.crescentbloom.com/plants/Specimen/NO/Nopalea%20cochenillifera.htm	[Produces viable seed? Yes]" <i>Nopalea cochenillifera</i> is typically propagated by seed."

602	2004. Parfitt, B.D./Gibson , A.C.. Cactaceae. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. Vol. 4. Flora of North America Association, New York and Oxford	[Produces viable seed? Yes] "Fruits ellipsoid, 25-40 x 20-25 mm; areoles well distributed. Seeds tan to gray, 3-5 x 1.5-3 mm, slightly pubescent." [Possibly not Hawaiian Islands if pollinators are unavailable, but may spread vegetatively]
603	2012. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]
604	2001. Rebman, J.P./Pinkava, D.J.. Opuntia cacti of North America - An Overview. Florida Entomologist. 84(4): 474-483.	[Self-compatible or apomictic? Possibly] "Flowers in the Cactaceae are usually perfect, containing both functional pistils and stamens. Such flowers can either outcross with other individuals or be self-fertile and pollinate themselves (del Carmen Mandujano et al. 1996; McFarland et al. 1989; Osborn et al. 1988; Ross 1981)."
605	2001. Rebman, J.P./Pinkava, D.J.. Opuntia cacti of North America - An Overview. Florida Entomologist. 84(4): 474-483.	[Requires specialist pollinators? Yes] "Two other genera of the Opuntioideae, Nopalea and Consolea , are found only in Florida in the United States. Nopalea (Fig. 4) has a flower modified for hummingbird pollination. The flower is somewhat tubular in shape with red to orange tepals that are almost completely closed, but with protruding stamens and stigmas. The Nopalea flower also has a nectar chamber covered by an extension of the style near its base."
605	2004. Parfitt, B.D./Gibson , A.C.. Cactaceae. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. Vol. 4. Flora of North America Association, New York and Oxford	[Requires specialist pollinators? Yes] "Plants of Nopalea are pollinated by hummingbirds, and their winter flowering coincides with hummingbird migration."
606	2009. Global Invasive Species Database. Opuntia cochenillifera. http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Reproduction by vegetative fragmentation? Yes] "...easily propagated and the tiniest bit of leaf will take root almost anywhere "
607	2009. Global Invasive Species Database. Opuntia cochenillifera. http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Minimum generative time (years)? 1] "...easily propagated and the tiniest bit of leaf will take root almost anywhere " [Generation time is the time from germination to production of viable seed, or the time taken for a vegetatively reproduced plant to produce a clone that is capable of independent growth.]
701	2008. Yoshioka, J.M.. Botanical survey of the War in the Pacific National Historical Park Guam, Mariana Islands. Pacific Cooperative Studies Unit Technical Report 161. University of Hawaii, Department of Botany, Honolulu, HI.	[Propagules likely to be dispersed unintentionally? Yes] "Because of the regular use of the park by visitors and residents, there are several incipient and/or adventive plant species not found in other WAPA units. These species probably arrived at the unit by car, on people, or on animals as unintentional introductions. Interesting and unexpected discoveries included Dentella repens and Bacopa monnieri growing in a wet depression adjacent to the parking lot, and Nopalea cochenillifera, a thornless cactus that had apparently rooted from a discarded cutting."
701	2009. Global Invasive Species Database. Opuntia cochenillifera. http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Potentially] "...easily propagated and the tiniest bit of leaf will take root almost anywhere " [Could spread as green or garden waste]
702	2001. Hanelt, P. (ed.). Mansfeld's encyclopedia of agricultural and horticultural crops: (except ornamentals). Angiospermae - monocotyledones: orchidaceae - pandanaceae, Volume 5. Springer-Verlag, Berlin, Heidelberg, New York	[Propagules dispersed intentionally by people? Yes] "The plants have been distributed mainly as ornamental plants but also because they have been used as host plant for the cochineal insects (Dactylopius coccus) used for the commercial production of red dye."
703	2001. Hanelt, P. (ed.). Mansfeld's encyclopedia of agricultural and horticultural crops: (except ornamentals). Angiospermae - monocotyledones: orchidaceae - pandanaceae, Volume 5. Springer-Verlag, Berlin, Heidelberg, New York	[Propagules likely to disperse as a produce contaminant? Unknown] "The plants have been distributed mainly as ornamental plants but also because they have been used as host plant for the cochineal insects (Dactylopius coccus) used for the commercial production of red dye." [If grown commercially, could potentially contaminate other crops]
704	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Propagules adapted to wind dispersal? No] "Berry oblongoid-turbinate, about 5 cm. long, deep red when ripe."
705	2000. Staples, G.W./Herbst, D.R/Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Propagules water dispersed? Unlikely] "Dispersal syndrome codes: = B = bird; V = vegetatively propagating" [Vegetative fragments could potentially float, but is probably an unlikely scenario]
706	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Propagules bird dispersed? Presumably Yes]"Fruit a fleshy berry with numerous seeds." ... "Berry oblongoid-turbinate, about 5 cm. long, deep red when ripe."

706	2000. Staples, G.W./Herbst, D.R/Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Propagules bird dispersed? Yes] "Table 2. Annotated checklist of invasive or potentially invasive cultivated plants in Hawai'i with dispersal syndrome" ... "Opuntia cochenillifera ... Dispersal syndrome codes: = B = bird; V = vegetatively propagating" ... "seeds spread by animals"
707	2000. Staples, G.W./Herbst, D.R/Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Propagules dispersed by other animals (externally)? No] "Dispersal syndrome codes: = B = bird; V = vegetatively propagating" [Fruits, seeds and vegetative parts lack means of external attachment]
708	1994. Liogier, H.A.. Descriptive Flora of Puerto Rico and Adjacent Islands. Spermatophyta, Volume III. Cyrillaceae to Myrtaceae. La Editorial, UPR, San Juan, Puerto Rico	[Propagules survive passage through the gut? Presumably Yes] "fruit red, about 5 mm long; seeds hard, 5 mm long."
801	1958. Anonymous. Flora of Panama. Part VII. Fascicle I. Annals of the Missouri Botanical Garden. 45(1): 1-91.	[Prolific seed production (>1000/m2)? Possibly] "Fruit a fleshy berry with numerous seeds."
802	2012. Dave's Gardern. PlantFiles: Prickly Pear, Cochineal Nopal Cactus - Nopalea cochenillifera. http://davesgarden.com/guides/pf/go/60167/	[Evidence that a persistent propagule bank is formed (>1 yr)? Probably No] "Seed does not store well; sow as soon as possible"
803	2009. Global Invasive Species Database. Opuntia cochenillifera. http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	2010. Shaw, J./Ferguson, D.. Opuntiads of the USA - Nopalea cochenillifera (Linnaeus) Salm-Dyck. http://opuntiads.com/html/nopalea-cochenillifera.html	[Tolerates, or benefits from, mutilation, cultivation, or fire? Possibly] "In frost-free areas N. cochenillifera can easily grow to 10-ft-tall, forming a single trunk tree with pruning. If untended it may form a large jumble of cladodes. In border areas (where the temperature can drop to about 22-26 some winters), N. cochenillifera may be frost pruned to form a short shrub."
805	2005. Zimmermann, H.G./Mayra Pérez Sandi y Cuen/Bello Rivera, A.. The Status of Cactoblastis cactorum (Lepidoptera: Pyralidae) in the Caribbean and the Likelihood of its Spread to Mexico. IAEA, Vienna	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Possibly] "Nopalea cochenillifera is the most common species found in the Caribbean and the only species utilized by some of the local people, mainly as an ornamental. It is a suboptimal host for Cactoblastis despite the fact that up to 20% of the plants investigated were infected. The plant easily recovers from attacks." [May not be very effective]
805	2009. Global Invasive Species Database. Opuntia cochenillifera. http://www.issg.org/database/species/ecology.asp?si=1425&fr=1&sts=sss	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Yes] "Cochineal (Dactylopius spp.) and Cactoblasts (Cactoblastis spp.) are the two most important biological control agents for prickly pear cacti. The two attack the cactus in a totally different manner. Cochineal species attach to the outside of the plant and suck the moisture out of the plant. Cactoblasts are black and yellow striped grubs that tunnel into and devour the inside of the plant (North West Weeds 2007). Cactoblastis oviposits by gluing sticks of about 50 to 90 eggs on cactus spines; the gregarious larvae bore into the pads or cladodes, devouring them from the inside (Stiling 2002). Because of its oligophagous feeding habits Cactoblastis has been successful against a whole range of Opuntia species including 11 species of North American origin (Julien and Griffiths 1998, in Stiling 2002)." [Cactoblastis present in Hawaiian Islands]

Summary of Risk Traits:

High Risk / Undesirable Traits:

- Naturalized in Hawaiian Island, Florida, Puerto Rico and elsewhere
- Sometimes spiny
- Tolerates many soil conditions (and potentially able to exploit many different habitat types)
- Can form thickets
- Spreads vegetatively

Low Risk / Desirable Traits:

- Ornamental value
- Edible fruit and cladodes (stem segments) for both people and animals
- Pollinated by hummingbirds (seed set may be low in areas lacking appropriate birds)
- Despite ability to spread, no negative impacts have been documented