

<b>Taxon:</b> Hoodia pilifera	<b>Family:</b> Apocynaceae
<b>Common Name(s):</b> hoodia	<b>Synonym(s):</b> Hoodia annulata (N. E. Br.) Plowes Hoodia coleorum Plowes Hoodia grandis (N. E. Br.) Plowes Stapelia pilifera L. f. Trichocaulon annulatum N. E. Br. Trichocaulon grande N. E. Br. Trichocaulon pillansii N. E. Br.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 6 May 2015
<b>WRA Score:</b> -2.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Succulent, Spiny, Medicinal, Fly-Pollinated, 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	?
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	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	y
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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		
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	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	n
601	Evidence of substantial reproductive failure in native habitat		
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	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
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		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
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)	y=-1, n=1	y

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Albers, F. & Meve, U. (eds.). 2002. Illustrated Handbook of Succulent Plants: Asclepiadaceae. Springer Science & Business Media, Berlin - Heidelberg - New York	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2015. 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, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 5 May 2015]	"Native: AFRICA Southern Africa: South Africa - Eastern Cape, Western Cape"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed ]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	"Habitat: Grows in arid areas of at around 300-900 m of altitude."
	Dave's Garden. 2015. Hoodia - Hoodia pilifera. <a href="http://davesgarden.com/guides/pf/go/61167/">http://davesgarden.com/guides/pf/go/61167/</a> . [Accessed 5 May 2015]	"Hardiness: USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"

Qsn #	Question	Answer
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	"Most of these species grow in areas of Africa where winters are dry, periods of rainfall are short & the plants adapt by becoming dormant & losing roots. Here in Hawaii winters are the most rainy season, rain occurs frequently throughout the year & periods of prolonged wet soil conditions are encountered. Last summer here was also very wet & wet soil conditions persisted for months. When these plants are dormant they become highly susceptible to bacterial & fungal rot, mites and mite transmitted diseases."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 5 May 2015]	"Native: AFRICA Southern Africa: South Africa - Eastern Cape, Western Cape"

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	Dave's Garden. 2015. Hoodia - Hoodia pilifera. <a href="http://davesgarden.com/guides/pf/go/61167/">http://davesgarden.com/guides/pf/go/61167/</a> . [Accessed 5 May 2015]	"This plant has been said to grow in the following regions: Phoenix, Arizona; Riverside, California"
	WRA Specialist. 2015. Personal Communication	Not widely available through on-line sales. Limited cultivation information
	Exotic Plants. 2015. Hoodia pilifera. Stapeliads - Asclepiads seeds. <a href="http://www.exotic-plants.de/seeds/asclepiads/Hoodia-pilifera.php">http://www.exotic-plants.de/seeds/asclepiads/Hoodia-pilifera.php</a> . [Accessed 5 May 2015]	Seeds available for purchase

301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2015. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm">http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm</a> . [Accessed ]	No evidence

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

401	Produces spines, thorns or burrs	y
	Source(s)	Notes
	Archer, R. H., & Victor, J. E. 2003. Plate 479. <i>Hoodia Pilifera</i> subsp. <i>Pillansii</i> Apocynaceae: Asclepiadoideae. Curtis's Botanical Magazine, 20(4): 219-224	"Spiny succulent shrub to 300 (≈600) mm tall and up 500 mm diam., branching from base. Stems 350-500 mm thick, with 25-35 rows of vertical series of tubercles, each tipped with a greyish (purplish when young) stiff spine 5-6 mm long, glabrous, glaucous-green."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Archer, R. H., & Victor, J. E. 2003. Plate 479. <i>Hoodia Pilifera</i> subsp. <i>Pillansii</i> Apocynaceae: Asclepiadoideae. Curtis's Botanical Magazine, 20(4): 219-224	"Spiny succulent shrub to 300 (≈600) mm tall and up 500 mm diam., branching from base." [No evidence. Apocynaceae]

404	Unpalatable to grazing animals	
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Tibe, O., Modise, D. M., & Mogotsi, K. K. (2008). Potential for domestication and commercialization of Hoodia and Opuntia species in Botswana. <i>African Journal of Biotechnology</i> , 7(9): 1199-1203	[Possibly unpalatable] "There is no evidence that the Hoodia species has ever been used as livestock forage and fodder. Its spiny appearance may act as a deterrent to being eaten by animals."
	Archer, R. H., & Victor, J. E. 2003. Plate 479. Hoodia Pilifera subsp. Pillansii Apocynaceae: Asclepiadoideae. <i>Curtis's Botanical Magazine</i> , 20(4): 219-224	[Spines may deter browsing, but habitat may be damaged by overgrazing] "The species is sensitive to alternating drought and wet conditions often experienced in the area and is indirectly vulnerable to overgrazing by goats and sheep."

405	Toxic to animals	n
	<b>Source(s)</b>	<b>Notes</b>
	Raimondo, D. 2008. Hoodia pilifera (L.f.) Plowes subsp. pilifera. National Assessment: Red List of South African Plants version 2014.1. <a href="http://redlist.sanbi.org/species.php?species=2705-25">http://redlist.sanbi.org/species.php?species=2705-25</a> . [Accessed 5 May 2015]	[Palatable to humans. Presumably non-toxic to humans or animals] "Low densities are most likely the result of habitat degradation due to overgrazing throughout its range as well as harvesting for food by local people."
	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	
	<b>Source(s)</b>	<b>Notes</b>
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 28 April	"Some breaking news applicable to all of the hoodias: I just got pathology reports back from UH identifying the fungus causing black spot disease here in H. pilifera and H. parviflora as an anthraconose Collectotricum spp. This genus of fungi is of worldwide distribution and has been reported as a disease of hoodia in southern Africa where these plants are endemic. It affects many crops, here including mangos."

Qsn #	Question	Answer
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	[Affected by widespread pests & diseases in the Hawaiian Islands] "When these plants are dormant they become highly susceptible to bacterial and fungal rot, mites and mite transmitted diseases." ... "Approximately 1000 seedlings and cuttings of various Hoodia species ( <i>H. juttae</i> , <i>H. gordonii</i> , <i>H. macrantha</i> , <i>H. parviflora</i> and <i>H. pilifera</i> ) and <i>Hoodiopsis triebneri</i> have been grown in containers outdoors or planted directly in the ground for field trials at our site in Naalehu over the past three years. Virtually all of these have contracted black spot disease, a syndrome that apparently results from infestations with the false spider mite <i>Brevipalpus phoenicis</i> during wet weather conditions. The mite is present throughout Hawaii and has many host species. The permanent black lesions and scarring characteristic of the disease may result from the bite of the mite or a self limiting anthraconose fungus infection transmitted by the mites. This is still under investigation. Black spot disease weakens the plants and severely stunts growth of the affected shoots. If mite infestations are untreated the disease usually kills the plants. All species in this group except <i>Caralluma</i> and some <i>Orbea</i> spp. and <i>Huernia</i> spp. are susceptible to black spot disease. Bacterial soft rot is a devastating disease of this entire group, and also most prevalent during wet weather conditions. It is apparently caused by <i>Erwinia</i> bacteria (taxonomy unsettled) beginning as a root infection and spreading rapidly throughout the vascular system of the plant. Particularly in the swarming phase of growth the bacteria release enzymes that degrade the cell walls and result in the complete liquefaction of the internal tissues and collapse of the plant in 1- 2 days after the infection is first noticed. In <i>Hoodia</i> species the infections usually spread very rapidly and kill the entire plant. In <i>Hoodiopsis</i> infections tend to be walled off in the affected shoots, which may drop off and reroot as new plants."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Raimondo, D. 2008. <i>Hoodia pilifera</i> (L.f.) Plowes subsp. <i>pilifera</i> . National Assessment: Red List of South African Plants version 2014.1. <a href="http://redlist.sanbi.org/species.php?species=2705-25">http://redlist.sanbi.org/species.php?species=2705-25</a> . [Accessed 5 May 2015]	[No evidence. Palatable to people] "This taxon is very rare and difficult to find. Low densities are most likely the result of habitat degradation due to overgrazing throughout its range as well as harvesting for food by local people."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Archer, R. H., & Victor, J. E. 2003. Plate 479. <i>Hoodia Pilifera</i> subsp. <i>Pillansii</i> Apocynaceae: Asclepiadoideae. <i>Curtis's Botanical Magazine</i> , 20(4): 219-224	[No evidence. Unlikely due to succulent habit] "Spiny succulent shrub to 300 (≈600) mm tall and up 500 mm diam., branching from base." ...

409	Is a shade tolerant plant at some stage of its life cycle	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Dave's Garden. 2015. Hoodia - Hoodia pilifera. <a href="http://davesgarden.com/guides/pf/go/61167/">http://davesgarden.com/guides/pf/go/61167/</a> . [Accessed 5 May 2015]	"Sun Exposure: Full Sun Sun to Partial Shade"
	Hall, H. 1953. Hoodias. The Cactus and Succulent Journal of Great Britain 15(3): 68-69	[Generic description] "Unlike most of their Stapelia relatives which lurk beneath scrub or rocks, they usually stand out in the open to all the sun and wind and, in places, may be the only living plant for miles."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	<b>Source(s)</b>	<b>Notes</b>
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	"Since roots are quite shallow, a gritty, very free-draining compost with extra perlite or pumiceis suitable, and clay pots help the plants to dry out between watering."
	Dave's Garden. 2015. Hoodia - Hoodia pilifera. <a href="http://davesgarden.com/guides/pf/go/61167/">http://davesgarden.com/guides/pf/go/61167/</a> . [Accessed 5 May 2015]	"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	n
	<b>Source(s)</b>	<b>Notes</b>
	Archer, R. H., & Victor, J. E. 2003. Plate 479. Hoodia Pilifera subsp. Pillansii Apocynaceae: Asclepiadoideae. Curtis's Botanical Magazine, 20(4): 219-224	"Spiny succulent shrub to 300 (≈600) mm tall and up 500 mm diam., branching from base. Stems 350≈500 mm thick, with 25≈35 rows of vertical series of tubercles, each tipped with a greyish (purplish when young) stiff spine 5≈6 mm long, glabrous, glaucous-green."

412	Forms dense thickets	n
	<b>Source(s)</b>	<b>Notes</b>
	Archer, R. H., & Victor, J. E. 2003. Plate 479. Hoodia Pilifera subsp. Pillansii Apocynaceae: Asclepiadoideae. Curtis's Botanical Magazine, 20(4): 219-224	"No population is thought to contain more than 250 individuals, and it therefore qualifies as severely fragmented."

501	Aquatic	n
	<b>Source(s)</b>	<b>Notes</b>
	Raimondo, D. 2008. Hoodia pilifera (L.f.) Plowes subsp. pilifera. National Assessment: Red List of South African Plants version 2014.1. <a href="http://redlist.sanbi.org/species.php?species=2705-25">http://redlist.sanbi.org/species.php?species=2705-25</a> . [Accessed 5 May 2015]	"Major system Terrestrial"

502	Grass	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 5 May 2015]	"Family: Apocynaceae subfamily: Asclepiadoideae tribe: Ceropegieae subtribe: Stapeliinae. Also placed in: Asclepiadaceae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 5 May 2015]	"Family: Apocynaceae subfamily: Asclepiadoideae tribe: Ceropegieae subtribe: Stapeliinae. Also placed in: Asclepiadaceae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Archer, R. H., & Victor, J. E. 2003. Plate 479. <i>Hoodia pilifera</i> subsp. <i>Pillansii</i> Apocynaceae: Asclepiadoideae. Curtis's Botanical Magazine, 20(4): 219-224	[No evidence]"Spiny succulent shrub to 300 (±600) mm tall and up to 500 mm diam., branching from base. Stems 350±-500 mm thick, with 25±-35 rows of vertical series of tubercles, each tipped with a greyish (purplish when young) stiff spine 5±6 mm long, glabrous, glaucous-green."

601	Evidence of substantial reproductive failure in native habitat	
	Source(s)	Notes
	Raimondo, D. 2008. <i>Hoodia pilifera</i> (L.f.) Plowes subsp. <i>pilifera</i> . National Assessment: Red List of South African Plants version 2014.1. <a href="http://redlist.sanbi.org/species.php?species=2705-25">http://redlist.sanbi.org/species.php?species=2705-25</a> . [Accessed ]	[Possibly Yes. Reproductive failure due to habitat destruction & overharvesting. but not necessarily due to natural constraints] "This taxon is very rare and difficult to find. Low densities are most likely the result of habitat degradation due to overgrazing throughout its range as well as harvesting for food by local people."

602	Produces viable seed	y
	Source(s)	Notes
	Cactus Art Nursery. 2015. <i>Hoodia pilifera</i> . <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_pilifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_pilifera.htm</a> . [Accessed 5 May 2015]	"Propagation is done mainly from seed. Cuttings are not really an option, as the severed ends very rarely form a callus from where roots will eventually form. Seeds are produced in March and April of each year (Europe). The seed horns must be semi-dry and starting to split down the middle before seed can be collected. "

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	Sustainable Bioresources, LLC. 2015. Certified Nursery Product List. <a href="http://hdoa.hawaii.gov/pi/files/2013/01/0482-Sustainable-Bioresources-LLC-15-03-05.pdf">http://hdoa.hawaii.gov/pi/files/2013/01/0482-Sustainable-Bioresources-LLC-15-03-05.pdf</a> . [Accessed 5 May 2015]	[Possibly Yes. Artificial hybrids in cultivation] " <i>Hoodia pilifera</i> subsp. <i>pilifera</i> X <i>Hoodia</i> spp."

604	Self-compatible or apomictic	
	Source(s)	Notes
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	"Observations suggest that these Hoodias are self-sterile and that pollination by the same or related species is required."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Cactus Art Nursery. 2015. <i>Hoodia pilifera</i> . <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_pilifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_pilifera.htm</a> . [Accessed 5 May 2015]	"Flowers: Saucer-shaped/campanulate, inside dark purple to almost black or pinkish brown, outside reddish green, with a smell of decaying flesh to attract flies and blowflies (the main pollinators). The flowers are solitary or in small inflorescences with up to 3 flowers. Pedicel 0.5-1.5 mm long."
	Grubben, G.J.H. (ed.). 2004. Plant Resources of Tropical Africa. Volume 2. Vegetables. PROTA, Wageningen, Netherlands	"Most <i>Hoodia</i> flowers have a foetid, excrement-like odour; they produce nectar and pollination is mostly effected by flies."
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	"The large flowered species of <i>Hoodia</i> with malodorous blooms - "carrion flowers" ( <i>H. gordonii</i> , <i>H. macrantha</i> , <i>H. parviflora</i> , <i>H. juttiae</i> and some <i>H. pilifera</i> ssp.) and <i>Hoodiopsis</i> are pollinated by flies. We have confirmed that a wide variety of fly species present throughout Hawaii are capable of pollinating the plants resulting in production of viable seeds.
	Archer, R. H., & Victor, J. E. 2003. Plate 479. <i>Hoodia Pilifera</i> subsp. <i>Pillansii</i> Apocynaceae: Asclepiadoideae. Curtis's Botanical Magazine, 20(4): 219-224	[Foetid odor. Fly-pollinated] "Flowers 1-3 together, developing successively in upper parts of stem, with foetid odour. Pedicel 1-1.5 mm long, about 1.5 mm thick, glabrous."

Qsn #	Question	Answer
606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	"Propagation is done mainly from seed. Cuttings are not really an option, as the severed ends very rarely form a callus from where roots will eventually form."
	Hall, H. 1953. Hoodias. The Cactus and Succulent Journal of Great Britain 15(3): 68-69	[Generic description] "It seems an impossible task to propagate them by cuttings, and I have never seen root formation upon branches broken off by animals, etc., and which may have been lying on the soil for a year or more. One would imagine that a plant with 30-40 branches from the base would have a few supplementary roots from some of them, but the root system appears to be confined to the original central stem."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	"Blooming season: Flowers are normally borne in August or September. Hoodia takes duration of 5 years to be completely mature, till its flowers appear."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	[Unlikely, but possibly if hairs on seeds aid in adherence to clothing, or mud on shoes or equipment] "Seeds: The seeds are light brown in colour, are flat and have a pappus of fluffy, silky hair attached to their one end. This pappus acts as a parachute when the seed pod splits open. The seeds are blown some distance from the parent plant where they will establish themselves."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Exotic Plants. 2015. Hoodia pilifera. Stapeliads - Asclepiads seeds. <a href="http://www.exotic-plants.de/seeds/asclepiads/Hoodia-pilifera.php">http://www.exotic-plants.de/seeds/asclepiads/Hoodia-pilifera.php</a> . [Accessed 5 May 2015]	[Seeds available commercially] "5 seeds 3.51 US\$"

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	Possibly, but no evidence. Seeds could potentially be blown into other crops, or containers with other plants & be dispersed unintentionally

704	Propagules adapted to wind dispersal	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	"Seeds: The seeds are light brown in colour, are flat and have a pappus of fluffy, silky hair attached to their one end. This pappus acts as a parachute when the seed pod splits open. The seeds are blown some distance from the parent plant where they will establish themselves."

705	Propagules water dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	[Unlikely. Although some secondary dispersal by water may be possible, this is a wind-dispersed species of arid habitats] "Grows in arid areas of at around 300 900 m of altitude." ... "The seeds are blown some distance from the parent plant where they will establish themselves."

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	[No evidence & not fleshy-fruited] "Seeds: The seeds are light brown in colour, are flat and have a pappus of fluffy, silky hair attached to their one end. This pappus acts as a parachute when the seed pod splits open. The seeds are blown some distance from the parent plant where they will establish themselves."

707	Propagules dispersed by other animals (externally)	n
	<b>Source(s)</b>	<b>Notes</b>
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_plifera.htm</a> . [Accessed 5 May 2015]	[Unknown. Adapted for wind dispersal, but hairs could possibly allow seeds to adhere to fur or mud] "The seeds are light brown in colour, are flat and have a pappus of fluffy, silky hair attached to their one end. This pappus acts as a parachute when the seed pod splits open."

708	Propagules survive passage through the gut	n
	<b>Source(s)</b>	<b>Notes</b>
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. (2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"Answer 'no' where the taxon is unlikely to be eaten by animals or if seeds are not viable following passage through the gut." [Seeds possess adaptations for wind dispersal]

Qsn #	Question	Answer
801	<b>Prolific seed production (&gt;1000/m2)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Cactus Art Nursery. 2015. Hoodia pilifera. <a href="http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_pilifera.htm">http://www.cactus-art.biz/schede/HOODIA/Hoodia_pilifera/Hoodia_pilifera/Hoodia_pilifera.htm</a> . [Accessed 5 May 2015]	[Unknown] "Fruit: The seed capsules resemble the horns of a goat and contain numerous seeds. Seeds: The seeds are light brown in colour, are flat and have a pappus of fluffy, silky hair attached to their one end. This pappus acts as a parachute when the seed pod splits open. The seeds are blown some distance from the parent plant where they will establish themselves."
802	<b>Evidence that a persistent propagule bank is formed (&gt;1 yr)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	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 5 May 2015]	Unknown. Seeds of other Hoodia species have orthodox storage
803	<b>Well controlled by herbicides</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2015. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species
804	<b>Tolerates, or benefits from, mutilation, cultivation, or fire</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Raimondo, D. 2008. Hoodia pilifera (L.f.) Plowes subsp. pilifera. National Assessment: Red List of South African Plants version 2014.1. <a href="http://redlist.sanbi.org/species.php?species=2705-25">http://redlist.sanbi.org/species.php?species=2705-25</a> . [Accessed 5 May 2015]	[Unknown. Plants presumably do not tolerate or recover well from damage to or removal of plant parts] "Harvested extensively for its medicinal value. Rare due to habitat degradation, overgrazing and harvesting (Bruyns 2005)."
805	<b>Effective natural enemies present locally (e.g. introduced biocontrol agents)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Rau, E. 2015. President, Sustainable Bioresources, LLC. Personal Communication. 14 April	[Affected by widespread pests & diseases] "Approximately 1000 seedlings and cuttings of various Hoodia species ( <i>H. juttae</i> , <i>H. gordonii</i> , <i>H. macrantha</i> , <i>H. parviflora</i> and <i>H. pilifera</i> ) and <i>Hoodiopsis triebneri</i> have been grown in containers outdoors or planted directly in the ground for field trials at our site in Naalehu over the past three years. Virtually all of these have contracted black spot disease, a syndrome that apparently results from infestations with the false spider mite <i>Brevipalpus phoenicis</i> during wet weather conditions. The mite is present throughout Hawaii and has many host species. The permanent black lesions and scarring characteristic of the disease may result from the bite of the mite or a self limiting anthraconose fungus infection transmitted by the mites."

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Able to grow in regions with tropical climates
- Spiny
- Reproduces by wind-dispersed seeds
- May be able to produce interspecific & intergeneric hybrids
- Limited ecological information may reduce accuracy of risk prediction

## Low Risk Traits

- No reports of invasiveness or naturalization, but introduction outside native range appear to be limited
- Valuable medicinal plant
- Susceptibility to bacterial and fungal rot, mites and mite transmitted diseases may limit ability to escape & spread in the Hawaiian Islands
- Possibly self-incompatible
- Not reported to spread vegetatively