Taxon: Pachypodium namaquanum (Wyley ex Harv.) Welw.

Family: Apocynaceae

Common Name(s): elephant's trunk

Synonym(s): Adenium namaquanum Wyley ex ..

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 24 Jan 2017

WRA Score: -4.0

Designation: L

Rating: Low Risk

Keywords: Succulent, Cactus-Like, Spiny, Slow-Growing, 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	y
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	y
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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	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	y
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)	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	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/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
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**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	No evidence of domestication

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 24 Jan 2017]	"Native: Africa Southern Africa: Namibia; South Africa - Cape Province"

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 24 Jan 2017]	

203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"P. namaquanum occurs between 300 and 900 m in arid regions both north and south of the Orange R. on rocky slopes, often with their roots wedged tightly between large boulders or in rock crevices (Phillips 1940). Apparently the plants are strongly phototropic, they grow in areas where the sun is always to their north and most characteristically they curve their apex northwards. This species particularly fascinates gardeners, but although the seed germinates fairly readily, it generally does not thrive away from its natural desertlike conditions (Coates Palgrave 1983)."

Qsn #	Question	Answer
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Pachypodium namaquanum is found in dry rocky deserts at altitudes from 300-900 m above sea level in the Gariep Centre (a centre of floristic endemism), which has the greatest variety of succulents on earth. The climate is harsh and the weather can be quite unpredictable. Rainfall varies from as little as 50 to 150 mm, and occurs mainly in winter. Extreme aridity is experienced in rain shadows of some mountains where as little as 0-15 mm falls annually. Additional precipitation is supplied by thick layers of fog that occasionally move inland from the coast. The maximum temperature in summer may reach 48 °C with a mean of approximately 25 °C."

204	Native or naturalized in regions with tropical or subtropical climates	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 24 Jan 2017]	"Native: Africa Southern Africa: Namibia; South Africa - Cape Province"

205	Does the species have a history of repeated introductions outside its natural range?	?
	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 24 Jan 2017]	"Cultivated: . also cult."
	Dave's Garden. 2017. Club Foot, Elephant's Trunk, Half-Man's, Halfmen - Pachypodium namaquanum. http://davesgarden.com/guides/pf/go/53186/. [Accessed 24 Jan 2017]	"Regional This plant has been said to grow in the following regions: Phoenix, Arizona Simi Valley, California Spring Valley, California Vista, California"

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. 2017. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 24 Jan 2017]	No evidence to date

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**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Cactus-like plant, 1.5-5 m high; trunk subcylindrical, unbranched or once or sometimes twice branched, 10-30 cm in diameter at the base, tapering to 8-10 cm in diameter at the apex; bark grey-green to dark brown, smooth or with remains of leaf scars; upper part of trunk and branches covered with straight or curved spines in groups of three, two of which subequal, 1.5-7.5 cm long, 1-3 mm in diameter at the base, in between them the third small one 0.5-4 cm long, 0.5-2 mm in diameter, fused at their base and forming a conical or subcorneal and laterally compressed excrescence, 4-5 x 4-3 x 3-2 mm, leaf scar between the two spines near the base, rarely the small spine absent, erect at the apex of trunk or branches, later recurved and shed, leaving the basal excrescences." ... "P. namaquanum is distinguished from the other species by its mostly unbranched trunk covered with long spines."

Qsn #	Question	Answer
402	**Allelopathic**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

403	**Parasitic**	**n**
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Cactus-like plant, 1.5-5 m high; trunk subcylindrical, unbranched or once or sometimes twice branched" [Apocynaceae. No evidence]

404	**Unpalatable to grazing animals**	
	Source(s)	**Notes**
	Midgley, J. J., Cowling, R. M., Hendricks, H., Desmet, P. G., Esler, K., & Rundel, P. (1997). Population ecology of tree succulents (Aloe and Pachypodium) in the arid western Cape: decline of keystone species. Biodiversity and Conservation, 6(6), 869-876	[Possibly Yes] "Watt and Breyer-Brandwag (1932) report that the stems and pith of P. namaquanum is acrid, as in many Apocynaceae, and this may deter herbivores. This may explain relatively low levels of mortality of this species."

405	**Toxic to animals**	**y**
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"It is known that P. namaquanum also contains poisonous alkaloids as its sap is also used for arrow poisons. The sap can also cause blindness when in contact with the eyes. It is said that when the spines that arise from the stem are stroked, the plant produces a series of clicking sounds that supposedly mimics the clicks of the Nama language (a population of people found in northwest Namaqualand)."

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**	**y**
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"It is known that P. namaquanum also contains poisonous alkaloids as its sap is also used for arrow poisons. The sap can also cause blindness when in contact with the eyes. It is said that when the spines that arise from the stem are stroked, the plant produces a series of clicking sounds that supposedly mimics the clicks of the Nama language (a population of people found in northwest Namaqualand)."

408	**Creates a fire hazard in natural ecosystems**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"As with most plants in the arid Richtersveld and surrounds, survival is of extreme importance. The swollen stem bases act as moisture reservoirs to help the plant cope with extreme drought periods. It does not have succulent leaves to store water, and in fact the leaves shrivel up and fall off in the hot summer months. The tufts of velvety leaves appear again during the brief winter gro"wing period, and act as solar panels that manufacture the energy needed for growth and reproduction. [No evidence. Unlikely given succulent habit & habitat]

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Aspect: Full Sun"
	Dave's Garden. 2017. Club Foot, Elephant's Trunk, Half-Man's, Halfmen - Pachypodium namaquanum. http://davesgarden.com/guides/pf/go/53186/. [Accessed 24 Jan 2017]	"Sun Exposure: Full Sun"
	LLIFLE - Encyclopedia of living forms. 2017. Pachypodium namaquanum. http://www.llifle.com/. [Accessed 24 Jan 2017]	"Sun Exposure: Light shade to full sun."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"In continental Africa P. namaquanum grows mainly on granite, quartzite and sand." ... "Pachypodium namaquanum grows on sand or on outcrops of granite, quartzite an schists"
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Soil type: Clay, Metal-rich"

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Cactus-like plant, 1.5-5 m high; trunk subcylindrical, unbranched or once or sometimes twice branched"

Qsn #	Question	Answer
412	**Forms dense thickets**	**n**
	Source(s)	**Notes**
	LLIFLE - Encyclopedia of living forms. 2017. Pachypodium namaquanum. http://www.llifle.com/. [Accessed 24 Jan 2017]	"They are fairly large, with an average density of between 625 and 1,100 individuals per hectare. Similar densities, with a range of ages, are also found on Pella Mt." [No evidence of dense stands]
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[No evidence] "DISTRIBUTION. Namibia and South-Africa (West Northern Cape Province). ECOLOGY. Nama Karoo and Succulent Karoo on sand, schist, granitic or quartzitic rocks. Alt. 300-900 m."

501	**Aquatic**	**n**
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[Terrestrial] "ECOLOGY. Nama Karoo and Succulent Karoo on sand, schist, granitic or quartzitic rocks. Alt. 300-900 m."

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 24 Jan 2017]	Family: Apocynaceae Subfamily: Apocynoideae Tribe: Malouetieae

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 24 Jan 2017]	Family: Apocynaceae Subfamily: Apocynoideae Tribe: Malouetieae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Cactus-like plant, 1.5-5 m high; trunk subcylindrical, unbranched or once or sometimes twice branched, 10-30 cm in diameter at the base, tapering to 8-10 cm in diameter at the apex"

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Pachypodium namaquanum is listed as a Lower Risk (LR) and Near Threatened (NT) species according to the Southern African Plant Red Data List (Golding 2002). This means that after the species had been evaluated, it failed to meet the criteria for Critically Endangered (CE), Endangered (E), or Vulnerable (V). This succulent does not qualify for Conservation Dependent (species which are the focus of continuing conservation programmes), but maybe is closer to qualifying for Vulnerable, i.e. plants that are at risk of becoming endangered. However, notwithstanding its local status, this particular plant is listed on CITES as an Appendix 1 and 2 species, which means that its trade is prohibited and the import or export of such plants is subject to the obtainment of certain certificates and permits. For further information on the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES), log on to www.cites.org. Threats to P. namaquanum and associated flora include mining for diamonds and other minerals, overgrazing by sheep and goats in mountainous areas, alien plant invaders (e.g. Prosopis spp.), and illegal removal of succulents by collectors and traders (Van Wyk & Smith 2001)."
	Midgley, J. J., Cowling, R. M., Hendricks, H., Desmet, P. G., Esler, K., & Rundel, P. (1997). Population ecology of tree succulents (Aloe and Pachypodium) in the arid western Cape: decline of keystone species. Biodiversity and Conservation, 6(6), 869-876	"The situation for P. namaquanum is not as critical because although recruitment levels are low, so too are mortality levels."

602	Produces viable seed	y
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Pachypodium namaquanum grows easily from seed as long as the seeds are fresh and without signs of parasitism."
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"This species particularly fascinates gardeners, but although the seed germinates fairly readily, it generally does not thrive away from its natural desertlike conditions (Coates Palgrave 1983)."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	Unknown. No evidence

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Lipow, S. R., & Wyatt, R. (1999). Floral morphology and late-acting self-incompatibility in Apocynum cannabinum (Apocynaceae). Plant Systematics and Evolution, 219(1-2): 99-109	"... five species of Pachypodium (Anderson 1983) are self-compatible."

Qsn #	Question	Answer
	Midgley, J. J., Cowling, R. M., Hendricks, H., Desmet, P. G., Esler, K., & Rundel, P. (1997). Population ecology of tree succulents (Aloe and Pachypodium) in the arid western Cape: decline of keystone species. Biodiversity and Conservation, 6(6), 869-876	"P. namaquanum, on the other hand, appears to be self-fertile (Relief, 1988)." [Possibly Yes]

605	Requires specialist pollinators	y
	Source(s)	**Notes**
	Rau, E. 2016. President, Sustainable Bioresources, LLC. Personal Communication. 29 December	"P. nomaquanum (blooms here but no pollination; grows outdoors in containers with rapid drainage but susceptible to rot with too much water)"
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Pachypodium namaquanum belongs to the Apocynaceae family, a group of plants with milky or watery sap and generally simple, opposite leaves. It is pollinated by ants and bees which are able to enter the tubular flowers with ease. Sugarbirds have been observed pollinating cultivated plants in the Karoo Desert National Botanical garden in Worcester, South Africa. Whether the same is true in wild populations is uncertain."
	Midgley, J. J., Cowling, R. M., Hendricks, H., Desmet, P. G., Esler, K., & Rundel, P. (1997). Population ecology of tree succulents (Aloe and Pachypodium) in the arid western Cape: decline of keystone species. Biodiversity and Conservation, 6(6), 869-876	"The structure of flowers of both Aloe spp. and P. namaquanum suggests sunbird-pollination. G. Williamson (personal observation) has observed malachite sunbirds pollinating P. namaquanum. These three species are thus amongst the only birdpollinated species in the area."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	[No evidence of natural vegetative spread] "Pachypodium namaquanum can also be grown from cuttings, although success is not guaranteed. Cuttings also take an extremely long time to show active growth. They should be taken in the period just before the growing season starts. The apex (tip of the shoot or leaf) of the stem which contains actively dividing cells is used and the wound is treated with a fungicide or flowers of sulphur and then left to dry for at least two weeks. Cuttings are inserted vertically into a well-drained, sandy medium. The same medium used for germinating seeds can be used for cuttings. Cuttings are kept in a hot, well-lit and ventilated area, and watered sparingly in the winter months; once a week should be more than enough."

607	Minimum generative time (years)	>3
	Source(s)	**Notes**
	LLIFLE - Encyclopedia of living forms. 2017. Pachypodium namaquanum. http://www.llifle.com/. [Accessed 24 Jan 2017]	"Pachypodium namaquanum generally blooms at 6 year old or older, 30 cm tall."
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Plants are extremely slow growing, around 0.5-1.5 cm per year, and can attain an age of one hundred years or more."

Qsn #	Question	Answer
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of Pachypodium spp. are provided with awns suggesting that dispersal is by wind. However, according to Keraudren (1963) wind dispersal may not be very effective because the awns of the seeds separate easily or even as soon as the fruit follicles open, and the seeds will fall on the ground near the mother plant." [No evidence]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Pachypodium namaquanum must rate as the most sought-after and popular of all large succulents from the arid Northern Cape and southern Namibia, otherwise known as the Gariep Region (Orange River region)."

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	LLIFLE - Encyclopedia of living forms. 2017. Pachypodium namaquanum. http://www.llifle.com/. [Accessed]	"The Pachypodium namaquanum generally blooms at 6 year old or older, 30 cm tall." ... "Fruit: Twin pencil-thin tapering seedpods (follicles) in a V-shape (joined at the base) up to 50 mm long. Short, soft and grey hairs densely cover the fruit. These are pale brown and split down one side to release the wind-dispersed plumed seeds. Seeds: About 4 mm long and attached to a tuft of whitish hairs that act as parachutes. Seeds normally ripen from September to December." [Unlikely. No evidence]

704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"The fruits are horn-like, with twin pencil-thin tapering capsules of up to 50 mm long that are joined at the base. Short, soft and grey hairs densely cover the fruit. Fruits are pale brown and split to release the wind-dispersed seeds which are about 4 mm long and are attached to a tuft of whitish hairs that act as parachutes. Seeds normally ripen from September to December."
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of Pachypodium spp. are provided with awns suggesting that dispersal is by wind. However, according to Keraudren (1963) wind dispersal may not be very effective because the awns of the seeds separate easily or even as soon as the fruit follicles open, and the seeds will fall on the ground near the mother plant."

705	**Propagules water dispersed**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"After fertilisation, the fruits take two to three months to ripen after which the seeds are dispersed. The seeds are about 4 mm long and are attached to silky hairs which act as parachutes. In the presence of winds, particularly updrafts, the seeds can be blown over vast distances. The parachute seed strategy is also employed by other members of the family, and is an effective way of ensuring healthy, reproductive populations." [Unlikely. Tufted seeds may by buoyant, but occurs in dry habitat]

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	[No evidence] "Fruit: Twin pencil-thin tapering seedpods (follicles) in a V-shape (joined at the base) up to 50 mm long. Short, soft and grey hairs densely cover the fruit. These are pale brown and split down one side to release the wind-dispersed plumed seeds. Seeds: About 4 mm long and attached to a tuft of whitish hairs that act as parachutes. Seeds normally ripen from September to December."

707	Propagules dispersed by other animals (externally)	
	Source(s)	**Notes**
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of Pachypodium spp. are provided with awns suggesting that dispersal is by wind. However, according to Keraudren (1963) wind dispersal may not be very effective because the awns of the seeds separate easily or even as soon as the fruit follicles open, and the seeds will fall on the ground near the mother plant. In addition, it is possible that insects, birds and also small rodents may disperse the seeds." [Possibly. Hairs may adhere to fur or feathers, or rodents may cache and disperse seeds]

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	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. Plant Protection Quarterly, 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."
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Fruits are pale brown and split to release the wind-dispersed seeds which are about 4 mm long and are attached to a tuft of whitish hairs that act as parachutes."
	Rapanarivo, S.H.J.V. (1999). Pachypodium (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of Pachypodium spp. are provided with awns suggesting that dispersal is by wind. However, according to Keraudren (1963) wind dispersal may not be very effective because the awns of the seeds separate easily or even as soon as the fruit follicles open, and the seeds will fall on the ground near the mother plant. In addition, it is possible that insects, birds and also small rodents may disperse the seeds." [Probably No. Seed dispersal, if any, by animals likely to occur externally]

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	n
	Source(s)	**Notes**
	Dean, W. R. J., & Milton, S. (Eds.). (1999). The Karoo: ecological patterns and processes. Cambridge University Press, Cambridge, UK	"For example, seeds of the long-lived stem-succulent, Pachypodium namaquanum (Apocynaceae) in the Richtersveld, exhibit 95% germination within two days of sowing (Retief, 1978), although in the field this species produces very few seeds because of severe parasitism (Retief, 1988)."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	n
	Source(s)	**Notes**
	Voigt, W. & Pekeur, O. 2007. Pachypodium namaquanum. PlantZAfrica. SANBI. http://pza.sanbi.org/pachypodium-namaquanum. [Accessed 24 Jan 2017]	"Pachypodium namaquanum grows easily from seed as long as the seeds are fresh and without signs of parasitism."
	Bester, S. P. 2007. Pachypodium Lindl. PlantZAfrica. SANBI. https://www.plantzafrica.com/plantnop/pachypodium.htm. [Accessed 24 Jan 2017]	[Generic description] "Seeds soon lose their viability. Harvest fresh seed from the taped up pods and sow in a ± 5 mm deep, sterile, sandy medium (4 parts fine and 4 parts coarse river sand; 1 part sieved, well-rotten compost; 1 part perlite; 1 part vermiculite) in summer. Keep moist and at a temperature of 27-35°C to ensure rapic germination. All seed not germinated after 6 weeks can be regarded as nonviable."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. Other species described as having regenerative properties.

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Spiny
• Toxic
• Reproduces by seeds
• Possibly self-compatible
• Seeds dispersed by wind and people

Low Risk Traits
• No reports of invasiveness or naturalization
• Landscaping and ornamental value
• Specialized pollinator requirements (likely limits seed set outside native range)
• Reaches maturity in 6+ years [slow growing]
• Not reported to spread vegetatively
• Limited seed production [due to seed predation]
• Short seed viability