

Taxon: Pachypodium densiflorum Baker

Family: Apocynaceae

Common Name(s): Madagascar palm

Synonym(s): Pachypodium brevicalyx (H.Perrier)
Pachypodium densiflorum var.
Pachypodium densiflorum var.
Pachypodium rauhii Halda

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 22 Jan 2017

WRA Score: 1.0

Designation: L

Rating: Low Risk

Keywords: Succulent, Shrub, Spiny, Toxic, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
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
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
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	y
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
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	?
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
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

Qsn #	Question	Answer Option	Answer
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
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
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*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
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic		
402	Allelopathic		
403	Parasitic	y=1, n=0	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	y
405	Toxic to animals	y=1, n=0	y
406	Host for recognized pests and pathogens		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	y
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
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		
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)	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
411	Climbing or smothering growth habit	y=1, n=0	n
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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
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
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
603	Hybridizes naturally		
604	Self-compatible or apomictic		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	y
605	Requires specialist pollinators	y=-1, n=0	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	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	2
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
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
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
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
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed		
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n

Qsn #	Question	Answer Option	Answer
801	Prolific seed production (>1000/m2)		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	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		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		
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). <i>Pachypodium</i> (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 20 Jan 2017]	"Native: Africa Western Indian Ocean: Madagascar"

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 20 Jan 2017]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"P. densiflorum is known from 200 to 1750 m above sea level." ... "ECOLOGY. On steep gneiss and quartz rocks. Alt. 750-2000 m. Accompanied by <i>Pachypodium brevicaulis</i> , <i>Aloe ibitiensis</i> , <i>Cynanchum perrieri</i> , <i>Ischonolepis tuberosa</i> , <i>Kalanchoe tomentosa</i> , <i>Cynorkis incarnata</i> , <i>Euphorbia quartziticola</i> , <i>E. millii</i> , <i>E. didiereoides</i> and <i>Xerophyta</i> sp." [Elevation range exceeds 1000 m]

204	Native or naturalized in regions with tropical or subtropical climates	y
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Qsn #	Question	Answer
	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 20 Jan 2017]	"Native: Africa Western Indian Ocean: Madagascar"

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 22 Jan 2017]	"Cultivated: . also cult."
	Stein, G. 2012. Pachypodiums- The caudiciform collectors plant- Introduction to the species and cultivational suggestions. http://davesgarden.com/guides/articles/view/539 . [Accessed 22 Jan 2017]	[Cultivated in California] "Pachypodium densiflorum- this is probably the last species to be discussed that has a chance of being grown as an outdoor plant in southern California. Mine has been in the garden for over 3 years and though it did get badly damaged last year during the freeze, all Pachypodiums were equally fried last winter. It recovered quickly (better than Pachypodium rutenbergianum did) and is branching a lot now (in response to the freeze damage). This species is a Madagascan one, as all the below species are, and not all that easy to tell from Pachypodium rosulatum. It has soft, slight fuzzy, ovoid paddle-shaped pale green leaves with white midribs. Spines are paired, short, stout and tend to fall off on the older stems. This is one of the most attractive ornamental plants having a very large, smooth, shiny caudiciform trunk that tends to gently but rapidly taper into several short, thinner but still stout branches- all upright. Flowers are in late summer to fall on long stalks far above the plant. They are relatively large, deep yellow to gold with a characteristic white conical shape at the center of each flower."

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 22 Jan 2017]	No evidence to date

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

Qsn #	Question	Answer
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). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Undershrub 10-50 cm high; trunk cactus-like, 10-20 x 4-40 cm; bark pale grey-green, smooth, glossy, 3-5 mm thick; wood greenish. Branches 5-10 cm in diameter; branchlets 0-20 x 1-3 cm, covered with paired straight spines 5-13 mm long, 1.5-3 mm in diameter at the base, basal part conical, laterally compressed, 0.3-0.4 of the spine length."
402	Allelopathic	
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[Unknown. Grows with other vegetation] "P. densiflorum is associated with <i>Aloe accutissima</i> , <i>Bulbostylis schoenoides</i> , <i>Dipcadi heterocuspe</i> , <i>Euphorbia milii</i> , <i>Ischnolepis tuberosa</i> , <i>Pellaea goudotii</i> , <i>Pentaschistis perrieri</i> , <i>Senecio crassissimus</i> , <i>Tetradenia fruticosa</i> and <i>Xerophyta dasylirioides</i> . According to Koechlin et al. (1974), <i>Coleochloa setifera</i> , <i>Euphorbia onoclada</i> , <i>Senecio decaryi</i> are growing in association."
403	Parasitic	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Undershrub 10-50 cm high; trunk cactus-like, 10-20 x 4-40 cm; bark pale grey-green, smooth, glossy, 3-5 mm thick; wood greenish." [Apocynaceae. No evidence]
404	Unpalatable to grazing animals	

Qsn #	Question	Answer
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown, but spines, and potential toxicity, might deter browsing

405	Toxic to animals	y
	Source(s)	Notes
	Bester, S. P. 2007. <i>Pachypodium</i> Lindl. PlantZAfrica. SANBI. https://www.plantzafrica.com/plantnop/pachypodium.htm . [Accessed 22 Jan 2017]	" <i>Pachypodium</i> falls in a group of the Apocynaceae notorious for poisonous properties and for yielding potent poisons that have been used most effectively in arrow poison since ancient times. The active principles in these poisons are usually glucosides with a digitalis-like action that stimulates the heart, and their effect is well known to hunters who often control and administer them with great skill. "
	Stein, G. 2012. <i>Pachypodiums</i> - The caudiciform collectors plant- Introduction to the species and cultivational suggestions. http://davesgarden.com/guides/articles/view/539 . [Accessed 22 Jan 2017]	" <i>Pachypodiums</i> are members of the family Apocynaceae which also includes <i>Adeniums</i> , <i>Oleanders</i> , <i>Plumeria</i> and <i>Periwinkles</i> . <i>Pachypodium</i> means 'thick foot', referring to the large, swollen caudiciform stems all members of this genus have. They not only have succulent stems but most are heavily armed with thick, stiff spines on the caudex and branches. They are also protected by their toxic sap (true of all Apocynaceae, though <i>Pachypodiums</i> have clear sap, not the white latex seen running from <i>Plumeria</i> injuries)."

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
	LLIFLE - Encyclopedia of living forms. 2017. <i>Pachypodium densiflorum</i> . http://www.llifle.com/ . [Accessed 22 Jan 2017]	" <i>Pachypodium</i> falls in a group of the Apocynaceae notorious for poisonous properties and for yielding potent poisons that have been used most effectively in arrow poison since ancient times. The active principles in these poisons are usually glucosides with a digitalis-like action that stimulates the heart, and their effect is well known to hunters who often control and administer them with great skill."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"HABIT. Tuberous plant with thick branches and with few ramifications. Height up to 50 cm, width up to 1 m." ... "ECOLOGY. On steep gneiss and quartz rocks. Alt. 750-2000 m." [No evidence. Unlikely given succulent habit & habitat]
	Bester, S. P. 2007. <i>Pachypodium</i> Lindl. PlantZAfrica. SANBI. https://www.plantzafrica.com/plantnop/pachypodium.htm . [Accessed 22 Jan 2017]	" <i>Pachypodium densiflorum</i> var. <i>densiflorum</i> is said to grow in association with sedges, which provide humus in the habitat on rocky sheets as the dead matter absorbs water. The <i>pachypodiums</i> become dry during the dry season but become spongy and then solid within a few days when they take up water. They can survive extreme temperatures. "

Qsn #	Question	Answer
409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	LLIFLE - Encyclopedia of living forms. 2017. <i>Pachypodium densiflorum</i> . http://www.llifle.com/ . [Accessed 22 Jan 2017]	"Exposition: It like full sun to light shade."
	Stein, G. 2012. <i>Pachypodiums- The caudiciform collectors plant- Introduction to the species and cultivational suggestions</i> . http://davesgarden.com/guides/articles/view/539 . [Accessed 22 Jan 2017]	"Most are full sun plants in the wild."

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). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	" <i>P. densiflorum</i> grows on outcrops of gneiss, granite and quartzite in fissures or clefts. It is adapted to very acid soil with pH between 3.5 and 4.5. <i>P. densiflorum</i> is found in the Evergreen Sclerophyllous (Uapaca) Woodland or Savanna zone." ... "CULTIVATION. Substrate loose peat with quartz sand, pH 3.5. Temperature from spring to autumn: nocturnal 15°C and diurnal 25°C or more."
	LLIFLE - Encyclopedia of living forms. 2017. <i>Pachypodium densiflorum</i> . http://www.llifle.com/ . [Accessed 22 Jan 2017]	"Soil: Needs a draining cactus potting mix"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Undershrub 10-50 cm high; trunk cactus-like, 10-20 x 4-40 cm; bark pale grey-green, smooth, glossy, 3-5 mm thick; wood greenish."

412	Forms dense thickets	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[No evidence] "ECOLOGY. On steep gneiss and quartz rocks. Alt. 750-2000 m. Accompanied by <i>Pachypodium brevicaulis</i> , <i>Aloe ibitiensis</i> , <i>Cynanchum perrieri</i> , <i>Ischonolepis tuberosa</i> , <i>Kalanchoe tomentosa</i> , <i>Cynorkis incarnata</i> , <i>Euphorbia quartziticola</i> , <i>E. milii</i> , <i>E. didiereoides</i> and <i>Xerophyta</i> sp."

501	Aquatic	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[Terrestrial] " <i>P. densiflorum</i> grows on outcrops of gneiss, granite and quartzite in fissures or clefts. It is adapted to very acid soil with pH between 3.5 and 4.5. <i>P. densiflorum</i> is found in the Evergreen Sclerophyllous (Uapaca) Woodland or Savanna zone."

Qsn #	Question	Answer
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 20 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 20 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). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"Undershrub 10-50 cm high; trunk cactus-like, 10-20 x 4-40 cm; bark pale grey-green, smooth, glossy, 3-5 mm thick; wood greenish."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Wiersema, J.H. & León, B. 1999. <i>World Economic Plants: A Standard Reference</i> . CRC Press, Boca Raton, FL	" <i>Pachypodium densiflorum</i> Baker ECON: CITES-II" [Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled.]

602	Produces viable seed	y
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"REPRODUCTION. By seeds."

603	Hybridizes naturally	
	Source(s)	Notes
	Eggle, U. 2002. <i>Illustrated handbook of succulent plants: Dicotyledons</i> . Springer-Verlag, Berlin - Heidelberg - New York	[Unknown] "Occasional wild hybrids have been reported, and garden hybrids have been created, but none so far between Madagascan and African species."

604	Self-compatible or apomictic	
	Source(s)	Notes

Qsn #	Question	Answer
	Lipow, S. R., & Wyatt, R. (1999). Floral morphology and late-acting self-incompatibility in <i>Apocynum cannabinum</i> (Apocynaceae). <i>Plant Systematics and Evolution</i> , 219(1-2): 99-109	[Unknown for <i>P. densiflorum</i>] "... five species of <i>Pachypodium</i> (Anderson 1983) are self compatible."

605	Requires specialist pollinators	y
	Source(s)	Notes
	Eggl, U. 2002. <i>Illustrated handbook of succulent plants: Dicotyledons</i> . Springer-Verlag, Berlin - Heidelberg - New York	"Pollination is as for <i>Adenium</i> ..." "... <i>Adenium</i> .. Pollination requires a long, slender proboscis to enter the lower chamber between one of the five slits in the androecial cone. Incoming pollen lands on the stigmatic area; as the proboscis is withdrawn it is gummed by contact with the knob of the style and picks up fresh pollen from the anthers above. In cultivation a cat's whisker or horse's tail hair can be used to cross-pollinate two plants."
	Van der Walt, K. (2015). <i>Population biology and ecology of the critically endangered succulent adenium swazicum</i> . PhD Dissertation. University of the Witwatersrand, Johannesburg	"There are very few records of pollinators for <i>Pachypodium</i> or <i>Adenium</i> , with hawkmoths suggested for long narrow-tubed flowers and small green flies for <i>Pachypodium densiflorum</i> (Rowley 1999),"

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"REPRODUCTION. By seeds." [No evidence]

607	Minimum generative time (years)	2
	Source(s)	Notes
	LLIFLE - Encyclopedia of living forms. 2017. <i>Pachypodium densiflorum</i> . http://www.llifle.com/ . [Accessed 22 Jan 2017]	"Blooming season: Flowers appear in springtime. This specie can flower at a very young age even if it usually takes 2 years."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of <i>Pachypodium</i> 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

Qsn #	Question	Answer
	LLIFLE - Encyclopedia of living forms. 2017. <i>Pachypodium densiflorum</i> . http://www.llifle.com/ . [Accessed 22 Jan 2017]	"Cultivation and Propagation: It is one of the most attractive species in the entire genus that can be grown both indoors, as well as outdoors in warm climates. It's a moderate grower and an impressive caudex can be steadily developed. In the winters it is deciduous, except in very tropical areas."
	Rau, E. 2016. President, Sustainable Bioresources, LLC. Personal Communication. 29 December	" <i>P. densiflorum</i> (very hardy here outdoors in containers, cinder soil with dolomite)"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of <i>Pachypodium</i> 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." [Unlikely. No evidence]

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[Yes, but may be ineffective over long distances] "The seeds of <i>Pachypodium</i> 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
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	[Unlikely. Tufted seeds may be buoyant, but occurs in dry habitat] "On steep gneiss and quartz rocks.." ... "The seeds of <i>Pachypodium</i> 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."

706	Propagules bird dispersed	
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of <i>Pachypodium</i> 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 No. Primarily adapted for wind dispersal]

Qsn #	Question	Answer
707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of <i>Pachypodium</i> 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. <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."
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"The seeds of <i>Pachypodium</i> 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]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Rapanarivo, S.H.J.V. (1999). <i>Pachypodium</i> (Apocynaceae): Taxonomy, Ecology & Cultivation. CRC Press, Boca Raton, FL	"REPRODUCTION. By seeds." [Unknown, but probably no. No description of prolific seeding]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Bester, S. P. 2007. <i>Pachypodium</i> Lindl. <i>PlantZAfrica</i> . SANBI. https://www.plantzafrica.com/plantnop/pachypodium.htm . [Accessed 22 Jan 2017]	"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 rapid germination. All seed not germinated after 6 weeks can be regarded as nonviable."

Qsn #	Question	Answer
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	y
	Source(s)	Notes
	LLIFLE - Encyclopedia of living forms. 2017. <i>Pachypodium densiflorum</i> . http://www.llifle.com/ . [Accessed 22 Jan 2017]	[Presumably Yes] "Maintenance: This <i>Pachypodium</i> will not require any pruning to look like a very interesting and unusual bonsai, but after several years it can outgrow its indoor location, requiring a 'pruning'. It has amazing 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

- Grows in tropical climates
- Spiny
- Toxic
- Reproduces by seeds
- Reaches maturity in 2 years
- Seeds likely dispersed by wind and people
- Able to regenerate after cutting

Low Risk Traits

- No reports of invasiveness or naturalization, but limited evidence of widespread introduction outside native range
- Landscaping and ornamental value
- Specialized pollinator requirements (likely limits seed set outside native range)
- Not reported to spread vegetatively

Second Screening Results for Herbs or Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivated lands? No
Outcome = Accept (Low Risk)