Taxon: Millettia grandis (E. Mey.) Skeels **Family:** Fabaceae

Common Name(s): umzimbeet **Synonym(s):** Millettia caffra Meisn.
Virgilia grandis E. Mey.

Assessor: Chuck Chimera **Status:** In Progress **End Date:** 7 Jun 2019

WRA Score: **-2.0** **Designation:** L **Rating:** Low Risk

Keywords: Small Tree, Unarmed, Toxic Seeds, Nitrogen Fixing, Explosively Dehiscent

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	n
301	Naturalized beyond native range	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)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	y
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
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	n
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)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 5 Jun 2019]	[Cultivated, but not domesticated] "To meet expected demands and relieve the pressure on natural populations of Millettia grandis, starting planting programmes is recommended. These seem to have good prospects because the trees can be easily propagated by seed and grow fairly fast, so that harvesting of poles for construction and wood for the carving industry can be expected within a reasonable period. Millettia grandis also has prospects as an ornamental tree for gardens and streets and for windbreaks in agroforestry systems. "

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). 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**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 5 Jun 2019]	"Millettia grandis occurs from southern Mozambique to eastern South Africa. It has been planted occasionally outside this region, e.g. in Mauritius."
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 12 Jun 2019]	"Native Africa SOUTHERN AFRICA: South Africa [KwaZulu-Natal]"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Jun 2019]	

203	**Broad climate suitability (environmental versatility)**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"It occurs in coastal and associated vegetation up to about Richard's Bay in KwaZulu-Natal Province. M. grandis is very rarely found more than 20 km from the coast or at altitudes greater than 600 m (Sim 1907; Coates Palgrave 2002), even though it is successfully cultivated and grown as far inland as the South African highveld and in cities in Zimbabwe that are subject to very different climatic conditions."
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed]	"Millettia grandis occurs in coastal forest and open lowland forest up to 600 m altitude. It can be found as a pioneer along forest margins."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 5 Jun 2019]	"Millettia grandis occurs from southern Mozambique to eastern South Africa. It has been planted occasionally outside this region, e.g. in Mauritius."

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	"Millettia grandis also has prospects as an ornamental tree for gardens and streets and for windbreaks in agroforestry systems." [Cultivated within its native range]
	WRA Specialist. (2019). Personal Communication	Several websites in South Africa promote and/or sell this plant. No evidence of widespread introduction outside it's native range.

301	Naturalized beyond native range	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. (2019). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 6 Jun 2019]	No evidence to date

Qsn #	Question	Answer
302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	**Environmental weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	**Congeneric weed**	**y**
	Source(s)	**Notes**
	Brisbane City Council. 2017. Weed Identification Tool - pongamia - Millettia pinnata. http://weeds.brisbane.qld.gov.au/weeds/pongamia. [Accessed 6 Jun 2019]	"A weed of riparian vegetation, forest margins, urban bushland, roadsides, disturbed sites and waste areas."
	Setzer, K. 2013. Beware the invasive pongam tree. Sun Sentinel, December 16. http://articles.sun-sentinel.com/. [Accessed 6 Jun 2019]	"Here's why the pongam is too good to be true: In addition to crowding out our natives, it is highly invasive. It produces hundreds of seed pods and sends up root suckers quicker than a mushroom grows after a rainstorm. In addition to the root suckers, dozens of seedlings spread out from its base. The surface roots also travel, sending up more suckers in surprising places far from the parent tree. The tree is also a bit messy. It is temporarily deciduous, defoliating for about a month in spring. Then it flowers and flowers - and drops the flowers by the thousands everywhere. Most parts of this tree are in some way toxic; the flowers are known to stun or kill fish. You could compost the leaves and flowers, which are quite oily."
	Kueffer, C. & Mauremootoo, J. 2004. Case studies on the status of invasive woody plant species in the Western Indian Ocean 3. Mauritius (islands of Mauritius and Rodrigues). Working Paper FBS/4-3E. FAO, Rome, Italy	"Pongamia pinnata is naturalized in estuaries." ... "On the islands of Rodrigues and Mauritius, the natural habitats of the coastal zone have been destroyed almost completely. Casuarina equisetifolia has been widely planted. Two invasive woody plant species have been identified in the coastal zone: Mimusops coriacea and Pongamia pinnata" ... "Not many invasive species affect mangroves. The only abundant invasive woody plant species is Pongamia pinnata (J. Mauremootoo and J.-C. Sevathian, personal observations; Rouillard and Guého 1999)."

Qsn #	Question	Answer
	Low, T. & Booth, C. 2008. The Weedy Truth About Biofuels The Invasive Species Council, Melbourne	"Recommendation: Because this plant has a demonstrated capacity to spread from cultivation, it should not be grown outside its natural range close to national parks or watercourses. It should be declared a restricted plant that cannot be grown near sensitive areas. Some states have an appropriate declaration category but others do not." [Minor weedy tree with suspected potential to become invasive in agroforestry or natural areas]
	Llamas, K.A. 2003. Tropical Flowering Plants. Timber Press, Portland, OR	"Though commonly distributed by landscaping companies as a fastgrowing shade tree, pongam, Millettia indica, is a noxious pest in the garden and invasive in wild areas. It is heavily self-seeding and young seedlings require considerable hand-pulling to control" … "Strongly discouraged for landscaping. A controlled species in Florida."

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	[No evidence] "Description.—Medium-sized, usually multi-stemmed, shrub to large tree up to 13 m high under favourable conditions. Stems gnarled and stunted when growing in shale soil. Roots with nitrogen-fixing bacterial nodules. Bark dark grey to brown, often gnarled on older stems, smooth to flaky; young branchlets sparsely pubescent to almost glabrous. Leaves imparipinnate, 3–7-jugate; petiole and rachis channelled, finely appressed-pubescent; petiole 10–45 mm long; rachis 45–110 mm long; leaflets elliptic to oblong-elliptic or ovate-elliptic, 20–80 × 10–25 mm, apex rounded to apiculate, base rounded to cuneate, glabrous, dark bluish green adaxially and finely appressed-pubescent abaxially, lateral nerves in 9–14 parallel, evenly spaced pairs; margins entire; stipules 4–6 mm long, deciduous; stipels 3–5 mm long, persistent; leaf-axils with characteristic curved striate buds; new growth with young leaves and veins a distinctive dark reddish brown; petiolules 2–4 mm long."

402	Allelopathic	
	Source(s)	**Notes**
	Latha, S., Mariamma, J., & Daniel, M. (2001). Studies on the effects of leaf leachates of Pongamia pinnata on certain crops and weeds and the soil mycoflora. National Academy Science Letters, 24 (5-12), 63-68	[Unknown. Millettia pinnata demonstrates allelopathic properties in controlled laboratory conditions] "The allelopathic effects of the leachates of the leaves of Pongamia pinnata against rice, wheat, Cassia tora and C. occidentalis were studied. The leachates inhibited the performance of both rice and wheat, but exerted no effect on the weeds. The leachates of P. pinnata contained allelochemicals such as vanillic acid, syringic acid, melilotic acid and derivatives of quercetin and kaempferol. The residual phenolics of the soil were more in the case of the weeds. The variety of mycoflora below Pongamia were less compared to control."

Qsn #	Question	Answer
403	**Parasitic**	**n**
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Medium-sized, usually multi-stemmed, shrub to large tree up to 13 m high under favourable conditions." [Fabaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	[Palatability to browsing and grazing ungulates unknown] "Baboons are known to strip off and eat the bark (Palmer & Pitman 1972)." … "Caterpillars of Charaxes pondoensis, which is endemic to Pondoland, eat the leaves (Palmer & Pitman 1972; Dickson & Kroon 1978; Grant et al. 1998; Thomas et al. 2004)."

405	Toxic to animals	
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"The seeds are, however, poisonous when taken in large quantities." [Unknown if seeds would be consumed by animals. No evidence found]

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"The seeds are, however, poisonous when taken in large quantities." [Potentially]
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Potentially if seeds are consumed, but risk depends on amount consumed] "Millettia grandis … Seeds toxic. Powdered seed taken as an anthelmintic, ground seed soaked in milk a remedy for roundworm. Ground roots used to induce sleep. Powdered roots as fish and arrow poison, fish must be boiled before consumption; ground seed can be used as an arrow poison."

408	Creates a fire hazard in natural ecosystems	
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	"Millettia grandis occurs in coastal forest and open lowland forest up to 600 m altitude. It can be found as a pioneer along forest margins. It tolerates light frost. It often occurs on sandy soils, but also on shale, where trees are often gnarled. It grows best in deep soils where ample water is available. It is locally common." [No evidence that this tree grows in a region with frequent fires]

Qsn #	Question	Answer
409	**Is a shade tolerant plant at some stage of its life cycle**	**n**
	Source(s)	**Notes**
	Baloyi, K. J. & Reynolds, Y. (2004). Millettia grandis. PlantZAfrica. SANBI. http://pza.sanbi.org/millettia-grandis. [Accessed 6 Jun 2019]	"Aspect: Full Sun"
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	"Millettia grandis occurs in coastal forest and open lowland forest up to 600 m altitude. It can be found as a pioneer along forest margins." [Shade tolerance unknown. As a pioneer tree of open forest, it may require high light levels]

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	"It often occurs on sandy soils, but also on shale, where trees are often gnarled. It grows best in deep soils where ample water is available."
	Baloyi, K. J. & Reynolds, Y. (2004). Millettia grandis. PlantZAfrica. SANBI. http://pza.sanbi.org/millettia-grandis. [Accessed 6 Jun 2019]	"Soil type: Sandy, Loam"

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Medium-sized, usually multi-stemmed, shrub to large tree up to 13 m high under favourable conditions."

Qsn #	Question	Answer
412	**Forms dense thickets**	
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	[No evidence in native range] "Millettia grandis occurs in coastal forest and open lowland forest up to 600 m altitude. It can be found as a pioneer along forest margins. It tolerates light frost. It often occurs on sandy soils, but also on shale, where trees are often gnarled. It grows best in deep soils where ample water is available. It is locally common."
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	[No evidence] "Millettia grandis is an important species of the Pondoland Centre of endemism within the greater regional mosaic of the Maputaland-Pondoland Region (White 1983; Van Wyk & Smith 2001). Furthermore, M. grandis is the southernmost species of this genus (as currently circumscribed), in Africa. The southern boundary for its natural distribution is around East London in the Albany Thicket but it also occurs in forest patches within Sub-Escarpment Grassland, Sub-Escarpment Savanna and along the Indian Ocean Coastal Belt (Mucina & Rutherford 2006). It occurs in coastal and associated vegetation up to about Richard's Bay in KwaZulu-Natal Province."

501	Aquatic	n
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 5 Jun 2019]	[Terrestrial] "Millettia grandis occurs in coastal forest and open lowland forest up to 600 m altitude. It can be found as a pioneer along forest margins."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Jun 2019]	Family: Fabaceae (alt.Leguminosae) Subfamily: Faboideae Tribe: Millettieae

503	Nitrogen fixing woody plant	y
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Several species of Millettia, including M. grandis, are used in agroforestry to fix nitrogen, thus supporting the rehabilitation of soil." … "Roots with nitrogen-fixing bacterial nodules."

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Medium-sized, usually multi-stemmed, shrub to large tree up to 13 m high under favourable conditions. Stems gnarled and stunted when growing in shale soil. Roots with nitrogen-fixing bacterial nodules. Bark dark grey to brown, often gnarled on older stems, smooth to flaky; young branchlets sparsely pubescent to almost glabrous."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Because of its relatively widespread distribution, Millettia grandis is Red-listed in the least concern category and the species has no specific conservation requirements or associated legislation (Raimondo et al. 2009)."

602	Produces viable seed	y
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 5 Jun 2019]	"Fresh seed is used for propagation; soaking in hot water for one night improves germination. Young trees transplant well."
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"They are easily grown from seed."

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Firetti, F. (2018). Apomixis in Neotropical Vegetation. Pp 129–148 In Sebata, A. (ed) Vegetation. IntechOpen, London	"Apomixis was reported only in Fabaceae, where there was a predominance of adventitious embryony. Trifolium was the only genus registered with apospory. Acacia, Cassia, Copaifera and Millettia showed adventitious embryony." [Adventitious embryony is a form of apomixis where a nucellar embryo arises from the diploid nucellus tissue surrounding the embryo sac. Unknown which Millettia species reproduce in this manner]

605	Requires specialist pollinators	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Johannsmeier, M.F. (2016). Beeplants of South Africa. Sources of nectar, pollen, honeydew and propolis for honeybees. Strelitzia 37. South African National Biodiversity Institute, Pretoria	"Decorative, medium size, deciduous tree of coastal areas of EC and KZN. Erect, narrow inflorescence with hairy, reddish-brown flower buds, from which the lilac pea flowers develop. These are too stiff for honeybees to open, but carpenter bees and large leafcutter bees readily access the nectar. However, honeybees collect extrafloral nectar from bracts at the base of young pods when these are 2–6 mm long. There are several Millettia species in central Africa that are visited by honeybees, probably because they have smaller, more pliant flowers."
	Yusuf, S. F. G., Cishe, E., & Skenjana, N. (2018). Beekeeping and crop farming integration for sustaining beekeeping cooperative societies: a case study in Amathole District, South Africa. GeoJournal, 83:1035–1051	"Other plants with bee floral benefits identified included Carrissa macrocarpa (Xhosa name Umthugulu), which has white flowers and large red oval fruit; Ficus thonniggii (wild fig); Hibiscus rosa-sinensis; Millettia grandis (Xhosa name Umsimbithi); Psidium cattleianum and Psidium guajava (Table 4)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"They are easily grown from seed. Although they are more or less deciduous, they often become evergreen when growing under favourable conditions." [No evidence]

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	"the trees can be easily propagated by seed and grow fairly fast" [Time to maturity unspecified]
	Duke, J.A. 1983. Handbook of Energy Crops - Pongamia pinnata. http://www.hort.purdue.edu. [Accessed 6 Jun 2019]	"Trees of ten reach adult height in 4 or 5 years, bearing at the age of 4-7 years." [Related tree, now Millettia pinnata, reaches maturity in 4+ years. Unknown for M. grandis]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black." [Unlikely. Pods and seeds relatively large and lack a means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 5 Jun 2019]	"Millettia grandis is planted as an ornamental shade and wayside tree. It can also be used as a windbreak along pastures."
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Millettia grandis trees are often kept for their horticultural value, since they are fast-growing, decorative and able to withstand some degree of frost, quite an unusual attribute considering their frost-free natural distribution. They are easily grown from seed."
	eBay. (2019). Millettia Grandis - Umzimbeet - Rare Tropica Plant Tree Seeds (5). https://www.ebay.com/itm/Millettia-Grandis-Umzimbeet-Rare-Tropical-Plant-Tree-Seeds-5-/271349945872. [Accessed 5 Jun 2019]	Seeds sold commercially in the U.S.

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black." [No evidence. Unlikely. Pods and seeds relatively large]

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black." [Seeds dehisce, but lack adaptations for wind dispersal]

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Botzat, A., Fischer, L., & Farwig, N. (2015). Regeneration potential in South African forest fragments: extinction debt paid off or hampered by contemporary matrix modification?. Plant Ecology, 216(4), 535-551	"Appendix … Millettia grandis (Fabaceae) … dispersal mode (dm: G = gravity]
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed]	"Millettia grandis occurs in coastal forest and open lowland forest up to 600 m altitude. It can be found as a pioneer along forest margins." [Occurs in coastal areas, but no evidence of presence in riparian corridors. Other Millettia species are dispersed by water, but there is no evidence that Millettia grandis is water-dispersed]

706	Propagules bird dispersed	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Botzat, A., Fischer, L., & Farwig, N. (2015). Regeneration potential in South African forest fragments: extinction debt paid off or hampered by contemporary matrix modification?. Plant Ecology, 216(4), 535-551	"Appendix … Millettia grandis (Fabaceae) … dispersal mode (dm: G = gravity]
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	[No evidence] "Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Botzat, A., Fischer, L., & Farwig, N. (2015). Regeneration potential in South African forest fragments: extinction debt paid off or hampered by contemporary matrix modification?. Plant Ecology, 216(4), 535-551	"Appendix … Millettia grandis (Fabaceae) … dispersal mode (dm: G = gravity]
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black."

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Botzat, A., Fischer, L., & Farwig, N. (2015). Regeneration potential in South African forest fragments: extinction debt paid off or hampered by contemporary matrix modification?. Plant Ecology, 216(4), 535-551	"Appendix … Millettia grandis (Fabaceae) … dispersal mode (dm: G = gravity]
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black." [No evidence that seeds are consumed]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Grobler, A. and Condy, G. (2011). Millettia grandis. Flowering Plants of Africa 62: 80-86	"Pods woody, 1–3-seeded, oblong to oblanceolate, 50–130 × 15–30 mm, densely covered with dark brown pubescence when young becoming glabrescent with age, splitting transversely and explosively dehiscent. Seeds oblong, compressed, 13 × 9 mm, brownish black." [Seed densities unknown. Unlikely given relatively few, large-seeded pods]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Lemmens, R.H.M.J. (2008). Millettia grandis (E.Mey.) Skeels. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. https://uses.plantnet-project.org/en/Millettia_grandis_(PROTA). [Accessed 6 Jun 2019]	"Fresh seed is used for propagation; soaking in hot water for one night improves germination." [Longevity in seed bank unknown]
	Royal Botanic Gardens Kew. (2019) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed 6 Jun 2019]	"Storage Behaviour: No data available for species. Of 11 known taxa of genus Millettia, 100.00% Orthodox(p/?)"

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2019). 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. (2019). Personal Communication	Unknown. Related species, Millettia pinnata, able to coppice and sucker

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Grows in tropical climates
• Other Millettia species are invasive
• Seeds are toxic if ingested in large numbers
• Nitrogen fixing (may modify soil chemistry)
• Reproduces by seeds
• Seeds dispersed by explosive dehiscence and intentionally by people
• Gaps in biological and ecological information may reduce accuracy of risk prediction

Low Risk Traits
• No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
• Unarmed (no spines, thorns, or burrs)
• Valued for timber and ornamental use in native range
• Requires full sun
• Not reported to spread vegetatively
• Seeds relatively large and unlikely to be accidentally dispersed