Taxon: Moringa hildebrandtii **Family:** Moringaceae

Common Name(s): azomaroseranana **Synonym(s):** NA
Hildebrandt's moringa

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 14 May 2015

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

Keywords: Tropical Tree, Medicinal, Seed-propagated, Rapid Growth, 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	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		
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	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
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)	y=1, n=0	y
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	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	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	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		
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**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[No evidence of domestication that reduces weediness] "An example of the rare phenomenon of an organism that persists in cultivation but is extinct in the wild is reported. The tree Moringa hildebrandtii (Moringaceae) has been thought to grow wild along the west coast of Madagascar, but field work and interviews with local inhabitants show that native populations do not occur in this area, or anywhere else on the island. However, the tree is abundantly cultivated in villages, and all herbarium collections made since its discovery in 1880 stem from such plantings. Ethnobotanical and other data suggest that the tree originally grew in the extreme southwest of the country: 1) The common name of the tree (hazomaroseranana) implies an association with this area, which was under the control of the Maroseranana people for nearly 400 years; 2) All other Moringa species worldwide occur in similar semi-arid habitats, which are not found elsewhere in Madagascar. Exploration for the plant should focus on this area."

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

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**High**
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	"Members of the genus Moringa have been found wild in dry tropical habitats in various parts of Africa and Asia, but all collections of Moringa hildebrandtii come from Madagascar, and it seems certain that the species is native there (VERDCOURT 1985, and references therein)." ... "Ethnobotanical information suggests that thenative range of Moringa hildebrandtii was the extreme southwest of the island."

Qsn #	Question	Answer
202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[A heat-loving xerophyte] "Worldwide, all other Moringa species occur in areas with very short rainy seasons and low, open vegetation. In Madagascar, such areas occur only in the extreme southwest south of the Onilahy, the island's driest region. The other native Malagasy Moringa species is restricted to this region and it seems likely that the original range of M. hildebrandtii was also within the area. It is reasonable to discount the eastern rainforests and central highlands as potential areas in which the tree might be found, because M. hildebrandtii, like all members of the family, is a heat-loving xerophyte."
	Tropicos.org. 2015. Tropicos [Online Database]. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 14 May 2015]	Collected at across an elevation range of 0-300 m and a latitudinal range of 14°38'00"S to 23 43'00"S

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	"Members of the genus Moringa have been found wild in dry tropical habitats in various parts of Africa and Asia, but all collections of Moringa hildebrandtii come from Madagascar, and it seems certain that the species is native there..."
	Beentje, H. J. (1998). JM Hildebrandt (1847-1881): notes on his travels and plant collections. Kew Bulletin 53(4): 835-856	"the type collection of Moringa hildebrandtii Engl., which is endemic in South-west Madagascar between Morondava and the Onilahy R.; but is often planted further north, e.g. on royal graves (fide Keraudren-Aymonin 1982)."

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	**Notes**
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/. [Accessed 14 May 2015]	No records of cultivation
	Healing Moringa Tree. 2015. Buy Moringa Hildebrandtii seeds. https://www.healingmoringatree.com/store/p33/Buy_Moringa_Hilde randtii_seeds.html. [Accessed 14 May 2015]	Seeds available for on-line purchase

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2015. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm. [Accessed 14 May 2015]	No evidence

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**	
	Source(s)	**Notes**
	Navie, S. & Csurhes, S. 2010. Weed Risk Assessment. Horseradish tree. Moringa oleifera. The State of Queensland, Department of Employment, Economic Development and Innovation	[Regarded as a minor weed] "This species is regarded as potentially invasive or moderately invasive in tropical regions of the world. It has escaped from gardens in northern Australia, and is currently naturalised in north Queensland and northern Western Australia. Currently, it is considered a minor weed in northern Australia, but its status may change over time. Moringa oleifera appears to spread relatively slowly, eventually forming dense thickets around parent trees. Like other tree species with similar ecological characteristics, it may pose a long term threat to certain natural ecosystems in the wet/dry tropics of northern Australia. The large scale commercial cultivation of this species might accelerate the rate of naturalization and population development in northern Australia."

401	**Produces spines, thorns or burrs**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	[No evidence] "Arbres pouvant atteindre 25 metres de hauteur, a port de baobab; ecorce lisse et blanchatre; rameaux nombreux." [Translation from French: Trees up to 25 meters tall, like a baobab ; bark smooth, whitish ; many branches.]

402	Allelopathic	
	Source(s)	**Notes**
	Hossain, M. M., Miah, G., Ahamed, T., & Sarmin, N. S. (2012). Allelopathic effect of Moringa oleifera on the germination of Vigna radiata. Intl. J. Agri. Crop Sci, 4(3): 114-121	[Unknown for M. hildebrandtii. Allelopathic properties documented in M. oleifera] "Abstract: The objectives of the study were to examine the allelopathic effect of different concentrations of leaf, root, bark, fruit kernel and seed aqueous extracts of Moringa oleifera on the germination of Vigna radiate ... The inhibitory effect of leaf, fruit kernel and seed aqueous extracts were almost similar, while those were relatively less than bark and root extracts. The effects of light and dark conditions on the rate of germination were not distinct. Therefore, the study revealed that allelochemicals released from different plant parts of M. oleifera impeded the rate of germination in laboratory condition."

403	Parasitic	n
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	"Arbres pouvant atteindre 25 metres de hauteur,...; ecorce lisse et blanchatre; rameaux nombreux." [No evidence. Moringaceae]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Omotesho, K. F., Sola-Ojo, F. E., Fayeye, T. R., Babatunde, R. O., Otunola, G. A., & Aliyu, T. H. (2013). The potential of Moringa tree for poverty alleviation and rural development: Review of evidences on usage and efficacy. International Journal of Development and Sustainability 2 (2): 799-813	[Most Moringa species are palatable to animals] "The leaves and twigs are used as fodder for cattle, sheep, goats and camels in many parts of its range (Mahatab et al., 1987; Negi, 1977)."

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	**Notes**
	Omotesho, K. F., Sola-Ojo, F. E., Fayeye, T. R., Babatunde, R. O., Otunola, G. A., & Aliyu, T. H. (2013). The potential of Moringa tree for poverty alleviation and rural development: Review of evidences on usage and efficacy. International Journal of Development and Sustainability 2 (2): 799-813	[No evidence] "The leaves and twigs are used as fodder for cattle, sheep, goats and camels in many parts of its range (Mahatab et al., 1987; Negi, 1977). Moringa Leaves are rich in vitamin A and C and are considered useful in Scurvy and respiratory ailments, It is also used as an emetic remedy (Roloff et al., 2009). The juice extracted from the leaves has strong antibacterial and antimalarial properties."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Olson, M.E. 2015. The International Moringa Germplasm Collection. Universidad Nacional Autónoma de México, México DF. http://www.moringaceae.org/. [Accessed 14 May 2015]	"Moringas planted out in the ground tend to have few pests, at least here far from their native range. Here at the collection the only real problem are leafcutter ants. ... Once the trees get bigger, a few leafcutters won't make much of a difference. "

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Arora, D. S., Onsare, J. G., & Kaur, H. (2013). Bioprospecting of Moringa (Moringaceae): microbiological perspective. Journal of Pharmacognosy and Phytochemistry 1(6): 193-215	"M. hilderbrandtii Engler" ... "Unspecified medicinal uses"
	Olson, M.E. 2015. The International Moringa Germplasm Collection. Universidad Nacional Autónoma de México, México DF. http://www.moringaceae.org/. [Accessed 14 May 2015]	[Claimed to be poisonous by local people in Madagascar] "Which Moringa species is the right one for me?" ... Madagascar and southwestern Africa: Moringa drouhardii and Moringa hildebrandtii are classic tomb ornamentals in southern and western Madagascar (see Olson and Razafimandimbison 2001). The bark of the trees is often scraped and gouged. Local people told me that they use the bark in decoctions for bronchial complaints. I asked them if they ever ate the leaves or the seeds, and they told me that they are poisonous. "

408	Creates a fire hazard in natural ecosystems	
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[Unknown. Occurs in dry areas, but no longer found in the wild] "It is hard to overlook the two Moringa species native to Madagascar's drylands, both of them large, conspicuous trees. They are planted in most settlements of the south and west of the island."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Top Tropicals. 2015. Moringa hildebrandtii. https://toptropicals.com/catalog/uid/Moringa_hildebrandtii.htm. [Accessed 14 May 2015]	"Moringa tolerate most soil types and grow well in full sun."
	Dave's Garden. 2015. Hildebrandt's Moringa - Moringa hildebrandtii. http://davesgarden.com/guides/pf/go/177082/. [Accessed 14 May 2015]	"Sun Exposure: Full Sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Top Tropicals. 2015. Moringa hildebrandtii. https://toptropicals.com/catalog/uid/Moringa_hildebrandtii.htm. [Accessed 14 May 2015]	"Moringa tolerate most soil types and grow well in full sun."
	Dave's Garden. 2015. Hildebrandt's Moringa - Moringa hildebrandtii. http://davesgarden.com/guides/pf/go/177082/. [Accessed 14 May 2015]	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)"

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	"Arbres pouvant atteindre 25 metres de hauteur..." [Trees up to 25 meters in height]

412	Forms dense thickets	
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[No wild populations exist] "An example of the rare phenomenon of an organism that persists in cultivation but is extinct in the wild is reported. The tree Moringa hildebrandtii (Moringaceae) has been thought to grow wild along the west coast of Madagascar, but field work and interviews with local inhabitants show that native populations do not occur in this area, or anywhere else on the island. However, the tree is abundantly cultivated in villages, and all herbarium collections made since its discovery in 1880 stem from such plantings."

501	Aquatic	n
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	[Terrestrial tree] "Arbres pouvant atteindre 25 metres de hauteur..." [Trees up to 25 meters in height]

502	Grass	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	Moringaceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	Olson, M.E. 2014. Does Moringa fix nitrogen? The International Moringa Germplasm Collection, Mexico City, Mexico. http://moringaceae.org/1/post/2014/02/does-moringa-fix-nitrogen.html. [Accessed 14 May 2015]	"Moringaceae is a member of the mustard-oil plants, the great group of families that includes the mustards, the capers, the papayas, and a lot else besides. None of these plants seem to have learned the trick of living with nitrogen fixing bacteria."

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	"Arbres pouvant atteindre 25 metres de hauteur..." [Trees up to 25 meters in height]

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[Wild populations unknown, but thrives in cultivation] "...given that no scientist has ever found wild M. hildebrandtii in the nearly 120 years since its discovery, and that local people have no memory of where the tree grew, it is possible that the species has been extinct in the wild for a long time, perhaps even before the first European botanists began collecting in Madagascar in the mid-1600s (DORR 1997). Despite the catastrophic loss of biodiversity occurring throughout Madagascar and the rest of the tropics, our assesment for the continued survival of M. hildebrandtii in cultivation is good."

602	Produces viable seed	y
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	"...our assesment for the continued survival of M. hildebrandtii in cultivation is good. It is frequently planted in villages all along the west coast of the island, and produces seeds abundantly."

Qsn #	Question	Answer
603	**Hybridizes naturally**	
	Source(s)	**Notes**
	Dogra, P. D., Pal, A. & Tandon, S. 1975: Studies on breeding systems in Moringa. 3. Fruit-, seed-set and seed germination in two flowering periods of one year of the Baramassi Moringa oleifera and chromosomal pairing in the F1 hybrid from M. oleifera X M. concanensis. Incompatibility Newsletter 6: 46-51	[Hybridization documented in genus] "F1 meiosis was normal, and pollen and seed fertility was good. "

604	**Self-compatible or apomictic**	
	Source(s)	**Notes**
	East, E. M. 1940. The distribution of self-sterility in the flowering plants. Proceedings of the American Philosophical Society 82: 449-518	[Unknown for M. hildebrandtii] "Moringa oleifera Lam. is self-fertile though slightly protandrous."
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	[Unknown. Family description] "Flowers regular to zygomorphic, hermaphroditic, white, yellow or red, with cup-like or in one species tubular, nectar-secreting receptacle. Sepals 5,much like the petals, free above the receptacle, equal or unequal, imbricate in bud. Petals 5, equal or unequal, imbricate. Fertile stamens 5, antepetalous, inserted on the margin of the disk, sometimes declinate, alternating with 3–5 staminodes; filaments free or partly adherent; anthers dorsifixed, 1-thecous, opening length-wise by a slit. Ovary superior, stipitate, cylindrical, 3-carpellate, 1-locular, with 3 parietal placentas; style terminal, slender, tubular with open canal, truncate at apex and without stigmatic lobes; ovules numerous in 2 series on each placenta, pendulous, anatropous, crassinucellate."

605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	"...the trees are grown in rows as living fences and are esteemed as ornamentals because of their stature, large leaves, scented flowers,..."
	Olson, M.E. 2015. The International Moringa Germplasm Collection. Universidad Nacional Autónoma de México, México DF. http://www.moringaceae.org/. [Accessed 14 May 2015]	"The four bottle tree Moringa species (M. drouhardii, M. hildebrandtii, M. stenopetala, and M. ovalifolia) have flowers that are very much unlike M. oleifera. Instead of being bilaterally symmetrical when seen from the front, they are more or less radially symmetrical." ... "They have a powerful jasmine scent that you can smell from several meters away, perfuming the air around the trees. The flowers were perfumed during the day in Madagascar and were visited by bees, and here they are attracting bees and bumblebees as well."
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	[Family description] "The sweet-scented flowers are clearly bee-pollinated, and nectar secretion seems to take place on the inside of the receptacle"

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**n**
	Source(s)	**Notes**
	Bihrmann's Caudiciforms. 2015. Moringa hildebrandtii. http://www.bihrmann.com/caudiciforms/SUBS/mor-hil-sub.asp. [Accessed 14 May 2015]	"Reproduction: Seeds/Cuttings"

607	**Minimum generative time (years)**	**3**
	Source(s)	**Notes**
	Olson, M.E. 2015. The International Moringa Germplasm Collection. Universidad Nacional Autónoma de México, México DF. http://www.moringaceae.org/. [Accessed 14 May 2015]	[Rapid growth rate. The related Moringa drouhardiis start bearing 3 years after planting when they have reached a height of 3-4 m] "Collection update: May 2015 ... The first plant is the largest Moringa hildebrandtii at the moment in the collection. It was about the size of a pencil when planted, less than a year ago. Now it's twice my height." ... Collection update: February 2015 ... It is trite among moringaphiles to make a big deal out of moringa growth rates, but I can't help it. The photos of M. drouhardii and M. hildebrandtii are a seedlings from mid-2014 and they are already taller than me (to my infinite relief- bigger trees are less susceptible to goats, ants, etc.). See photos below. "

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	[No evidence. Capsular fruit & winged-seeds lack means of external attachment] "Capsule allongee, glabre, subcylindrique ou legerement trigone, rostree, presentant de faibles etranglements entre les graines, dehiscente par 3 valves, de 45-65 x 2-3 cm. Graines brun-clair, de 3,5-4 x 2,2-2,5 cm, trigones, ovoides, a angles ornes d'une aile longitudinale."

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[Planted locally] "It is frequently planted in villages all along the west coast of the island, and produces seeds abundantly."
	Healing Moringa Tree. 2015. Buy Moringa Hildebrandtii seeds. https://www.healingmoringatree.com/store/p33/Buy_Moringa_Hilde randtii_seeds.html. [Accessed 14 May 2015]	Seeds available for on-line purchase

Qsn #	Question	Answer
703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Padayachee, B., & Baijnath, H. (2012). An overview of the medicinal importance of Moringaceae. J. Med. Plants Res, 6(48): 5831-5839	[Unlikely. Fruits & seeds relatively large. Not grown with produce] "The fruits are spindle-shaped capsules that are 450 to 650 mm long and constricted between the seeds which is pale brown, ovoid trigonous, edge-winged and35 to 40 mm long (Eggli, 2004)."

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	"Dispersal for species with alate seeds is by wind"
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	[Winged-seeds, presumably wind-dispersed] "Graines brun-clair, de 3,5-4 x 2,2-2,5 cm, trigones, ovoides, a angles ornes d'une aile longitudinale." [Translation from French: "Seeds tan, of 3.5 -4 x 2.2-2.5 cm, trigonouss, ovoid, has angles adorned with a longitudinal wing."]

705	Propagules water dispersed	
	Source(s)	**Notes**
	Navie, S. & Csurhes, S. 2010. Weed Risk Assessment. Horseradish tree. Moringa oleifera. The State of Queensland, Department of Employment, Economic Development and Innovation	[M. oleifera possibly water dispersed. Unknown if M. hildebrandtii could be dispersed in a similar manner] "While the seeds are relatively large, they are strongly winged. This may allow them to be spread short distances from the parent tree by wind. It may also aid their dispersal downstream in water during floods (the mature pods may also float in water), as populations are sometimes found growing along waterways."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Keraudren-Aymonin, M. (1982). Flore de Madagascar et des Comores. Famille 85 - Moringacees. Muséum National D'histoire Naturelle, Paris	[With dehiscent capsules & winged seeds. Not fleshy-fruited] "Capsule allongee, glabre, subcylindrique ou legerement trigone, rostree, presentant de faibles etranglements entre les graines, dehiscente par 3 valves, de 45-65 x 2-3 cm. Graines brun-clair, de 3,5 -4 x 2,2-2,5 cm, trigones, ovoides, a angles ornes d'une aile longitudinale."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Padayachee, B., & Baijnath, H. (2012). An overview of the medicinal importance of Moringaceae. J. Med. Plants Res, 6(48): 5831-5839	[No evidence. No means of external attachment] "The fruits are spindle-shaped capsules that are 450 to 650 mm long and constricted between the seeds which is pale brown, ovoid trigonous, edge-winged and35 to 40 mm long (Eggli, 2004)."

Qsn #	Question	Answer
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." [Seeds adapted for wind or gravity dispersal]

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Olson, M. E., & Razafimandimbison, S. G. (2000). Moringa hildebrandtii (Moringaceae): a tree extinct in the wild but preserved by indigenous horticultural practices in Madagascar. Adansonia, 2 (2): 217-221	[Densities unknown] "It is frequently planted in villages all along the west coast of the island, and produces seeds abundantly."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/. [Accessed 14 May 2015]	Unknown "Storage Behaviour: No data available for species. Of 5 known taxa of genus Moringa, 100.00% Orthodox"

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2015. 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**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Unknown for M. hildebrandtii. M. oleifera tolerates frequent pruning & is able to coppice] "Moringa oleifera" ... "Frequent pruning, lopping, coppicing or pollarding increases and maintains leaf production as the leaves sprout back profusely."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Grows in tropical climates
• Other Moringa species have weedy traits & tendencies
• Unconfirmed reports of toxicity from native range
• Reproduces by seeds
• Rapid growth rate
• Reaches maturity in 3+ years
• Seeds possibly dispersed by wind, gravity & intentionally by people
• Known only from cultivation, so ecological information from the wild is lacking
• Limited ecological information may limit 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)
• Provides fodder for livestock
• Medicinal uses
• Light demanding
• Not reported to spread vegetatively