Taxon: Moringa concanensis Nimmo **Family:** Moringaceae

Common Name(s): kattumurungai
Konkan moringa

Synonym(s):

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 4 Feb 2022

WRA Score: **-3.0** **Designation:** L **Rating:** Low Risk

Keywords: Small Tree, Tropical, Unarmed, Medicinal, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	?
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
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		
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		

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	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		
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
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	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	y=1, n=-1	y
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**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	[Not domesticated] "Moringa concanensis, which is being found in certain forest zones of Tamil Nadu, India, is referred to as Kattumurungai and the pods and leaves are used by the tribal people as an important vegetable or medicinal supplement to lactating mothers."

102	Has the species become naturalized where grown?	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	**Notes**
	WRA Specialist. (2022). 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**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis Nimmo., also belongs to the family Moringaceae, is widely found throughout the states of Rajasthan and Tamil Nadu, India."

202	Quality of climate match data	High
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis Nimmo., also belongs to the family Moringaceae, is widely found throughout the states of Rajasthan and Tamil Nadu, India."

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Trade Winds Fruit. (2022). Moringa concanensis - Konkan Moringa. https://www.tradewindsfruit.com/moringa-concanensis-konkan-moringa-seeds. [Accessed 2 Feb 2022]	"does well in tropical climates and drier, frost free areas"
	Olson, M. E. (2017). Moringa frequently asked questions. Acta Horticulturae 1158: 19-32	"Moringa concanensis is the closest living relative of M. oleifera. It is native throughout the lowland dry tropics of eastern and southern Pakistan, much of India, and a few small localities in Bangladesh."
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	"Where does it naturally occur? A rare plant restricted to hills and rocky uplands. It is distributed in the forest -particularly on hills, slopes and in wastelands."

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis Nimmo., also belongs to the family Moringaceae, is widely found throughout the states of Rajasthan and Tamil Nadu, India."

205	**Does the species have a history of repeated introductions outside its natural range?**	**?**
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Seeds sold online, but unclear how widely this tree has been introduced and cultivated outside its native range

301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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

Qsn #	Question	Answer
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**	
	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**
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	[No evidence] "M. concanensis is a small tree (but can grow 6–12 m in height) with branches that hang almost near to the ground (Fig. 2.5). It has a circular stem that produces few erect and small branches with yellow wood. Branch produces two pinnate leaves with 5–8 pair opposite leaflets and each leaflet is broad, ovate to elliptic having 1–2 cm width and 1–3 cm length. It has a taproot system. The inflorescence of M. concanensis is a panicle that bears flowers with the following characteristics: petals are white in colour with purple streaks, oblong to obovate (1.5 x 0.5 cm) and unequal. It has five fertile stamens and declinant staminodes. M. concanensis has stipitate ovary and capsules beaked fruits with winged seeds."

402	**Allelopathic**	
	Source(s)	**Notes**
	Tahir, N. A., Majeed, H. O., Azeez, H. A., Omer, D. A., Faraj, J. M., & Palani, W. R. M. (2020). Allelopathic plants: 27. Moringa species. Allelopathy Journal, 50(1), 35-48	[Possibly yes. Contains chemicals that may have allelopathic effects] "Moringa plant parts contain numerous phytochemical constituents (Tables 3, 4 and 5) from various parts and some of these have allelopathic effects (17,18,23,53,57,64,73)." ... "Pantolactone and squalene are vital constituents in the leaf and bark of M. concanensis (17)." ... "M. concanensis seed oil was hydrolysed and the fatty acids profile showed high amounts of saturated fatty acids with oleic acid (71). Some of these fatty acids have allelopathic effects (73,74), they reported that l-(+)-ascorbic acid 2,6-dihexadecanoate and octadecanoic acid were allelopathic to the germination and seedlings elongations of wild mustard weed."

Qsn #	Question	Answer
403	**Parasitic**	**n**
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis is a small tree (but can grow 6–12 m in height) with branches that hang almost near to the ground" [No evidence. Moringaceae]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	"Young seedlings are eaten by squirrels, birds and peacocks. Hence, it should be protected by wire mesh cages. Irrigation is provided twice a week."
	Van Wyk, B. & Van Wyk, P. (1997). Field Guide to Trees of Southern Africa. Struik Publishers, Cape Town, South Africa	[Other species are palatable] "The leaves and fruit are browsed by elephant, giraffe and springbok. Bark, wood, and root eaten by small stock and porcupine. Root edible, but sour-tasting."

405	Toxic to animals	
	Source(s)	**Notes**
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence, but presence of hydrogen cyanide suggests the possibility of toxic effects] "various parts can be cooked as vegetable" ... "Leaves exhibit the presence of hydrogen cyanide."
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	[No evidence] "Young seedlings are eaten by squirrels, birds and peacocks. Hence, it should be protected by wire mesh cages. Irrigation is provided twice a week."

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Boopathi, N. M., Raveendran, M., & Kole, C. (2021). Moringa and Its Genome: Future Prospects. In The Moringa Genome (pp. 181-185). Springer, Cham	[Possibly. Generic description of pests and pathogens] "Furthermore, global Moringa production also experiences the following hurdles, which seriously affects the Moringa leaf or biomass production: (i) non-availability of suitable cultivars that are adapted to the local environment, (ii) occasional incidence of pests (for example, budworm (Noorda Moringae), leaf caterpillar (Noorda blitealis), hairy caterpillar (Eupterote mollifera), fruit fly (Gitonadi stigmata) and tea mosquito bug (Helopeltis theivora) are found to be devastating pests in Southern India), and (iii) diseases (examples of diseases that occur in Moringa includes brown leaf spot (Cercospora moringicola), septoria leaf spot (Septoria lycopersici Speg.), alternaria leaf spot (Alternaria solani Sorauer), powdery mildew (Leveillula taurica Lev. Arn.), root rot (Diplodia sp.), fusarium wilt (Fusarium oxysporium f. sp. Moringae), fusarium wilt (Fusarium oxysporium f. sp. Moringae), fruit rot (Cochliobolus hawaiiensis Alcorn), damping off (Rhizoctonia solani Kuehn), dieback (Fusarium semitectum Berk), anthracnose (Colletotrichum chlorophyti Chandra), twig canker (Fusarium pallidoroseum Cooke Sacc.) and rust (Puccinia Moringae Koorders))."

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis, which is being found in certain forest zones of Tamil Nadu, India, is referred to as Kattumurungai and the pods and leaves are used by the tribal people as an important vegetable or medicinal supplement to lactating mothers."
	Olson, M. E. (2017). Moringa frequently asked questions. Acta Horticulturae 1158: 19-32	"The young pods, and sometimes leaves and flowers of M. concanensis are occasionally eaten locally (e.g., Arinathan et al., 2007), but in general this species is regarded as medicinal, including intervening in cholesterol levels, diabetes, and parasite infections, much like other species of Moringa"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Used medicinally. Presence of hydrogen cyanide suggests possible toxic properties] "Leaves exhibit the presence of hydrogen cyanide. Whole plant and roots for epilepsy and skin diseases, eczema. All parts can be used in the treatment of ascites, venomous bites, rheumatism and as cardiac and circulatory stimulants. Fruits for liver diseases, spleen, paralysis. For indigestion, leaves or fruits cooked and given. Roots febrifuge. Bark decoction in diabetes, obesity, rheumatism"

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	"A rare plant restricted to hills and rocky uplands. It is distributed in the forest -particularly on hills, slopes and in wastelands." [Fire ecology unknown]

409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	"Freshly collected seeds were shade dried and then germinated in partial shade."
	Sankara Rao, K., Raja K Swamy, Deepak Kumar, Arun Singh R. and K. Gopalakrishna Bhat (2019). Flora of Peninsular India. http://peninsula.ces.iisc.ac.in/plants.php?name=Moringa concanensis. [Accessed 3 Feb 2022]	"Occasional on hills above 1000m in full sun."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	
	Source(s)	**Notes**
	Emongor, V. E. (2011). Moringa (Moringa oleifera Lam.): a review. Acta Hortic. 911, 497-508	"Moringa is adapted to a wide range of soil types, but does well in fertile and well-drained clay or clay loam without prolonged water logging" [Closely related species not substrate limited]

Qsn #	Question	Answer
411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis is a small tree (but can grow 6–12 m in height) with branches that hang almost near to the ground"

412	Forms dense thickets	
	Source(s)	**Notes**
	Olson, M.E. (2016). India 2016: Moringa concanensis in Rajasthan. The International Moringa Germplasm Collection. Universidad Nacional Autónoma de México, México DF. http://www.moringaceae.org/. [Accessed 4 Feb 2022]	[Unknown] "Moringa concanensis definitely seems to make up a natural part of the dense tropical dry woodlands in the Aravalli Hills. Areas with sufficiently low disturbance for Moringa concanensis aren't hyperabundant, but we were able to find them dependably in the area we searched, between Pushkar and Deogarh. We didn't make it as far south as we would have liked, but they seem to grow all the way down the Aravalli. For example, they are reported in the hills in Gujarat, just over the border from Rajasthan: www.eastgfd.com/ Whether Moringa concanensis ever grew in large stands on the flats is anyone's guess. Given reports of occasional trees on the flats, it seems possible. These might just be occasional waifs, and it's striking that they are never grown in the towns and fields of the flats, but always in the hills. With their dense and long standing human habitation, these uncertainties are just a part of biology in the dry tropics."

501	Aquatic	n
	Source(s)	**Notes**
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	[Terrestrial] "Where does it naturally occur? A rare plant restricted tc hills and rocky uplands. It is distributed in the forest -particularly on hills, slopes and in wastelands."

502	Grass	n
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis Nimmo., also belongs to the family Moringaceae, is widely found throughout the states of Rajasthan and Tamil Nadu, India."

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis Nimmo., also belongs to the family Moringaceae, is widely found throughout the states of Rajasthan and Tamil Nadu, India."

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

Qsn #	Question	Answer
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis is a small tree (but can grow 6–12 m in height) with branches that hang almost near to the ground (Fig. 2.5). It has a circular stem that produces few erect and small branches with yellow wood. Branch produces two pinnate leaves with 5–8 pair opposite leaflets and each leaflet is broad, ovate to elliptic having 1–2 cm width and 1–3 cm length. It has a taproot system."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"Moringa concanensis Nimmo., also belongs to the family Moringaceae, is widely found throughout the states of Rajasthan and Tamil Nadu, India."

602	Produces viable seed	
	Source(s)	**Notes**
	Trade Winds Fruit. (2022). Moringa concanensis - Konkan Moringa. https://www.tradewindsfruit.com/moringa-concanensis-konkan-moringa-seeds. [Accessed 3 Feb 2022]	"5 seeds per pack."
	Cameron, J. (1894). The Forest Trees of Mysore and Coorg. Mysore Government Central Press, Bangalore	"Cultivation - Although it may be difficult to procure seed in quantity, for the reasons explained above, it is abundantly produced in reserved trees and germinates very readily."
	Kumar, S. & Purohit, C.S. (2015). Conservation of Threatened Desert Plants. Scientific Publishers, Jodhpur	"Seeds were collected from wild plants in Barmer. • Freshly collected seeds were shade dried and then germinated in partial shade. • Seeds were sown in two ways (1) in coco-peat, (2) in a mixture of soil and Farm Yard Manure (FYM). • Seedling growth was rapid in first 3 weeks in coco-peat medium (Fig. 18.10) while it took four weeks to attain same height in soil medium (Fig. 18.11)."

603	Hybridizes naturally	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Olson, M.E. (2018). India 2016: Where are the true Moringa concanensis? The International Moringa Germplasm Collection. Universidad Nacional Autónoma de México, México DF. http://www.moringaceae.org/. [Accessed 4 Feb 2022]	[Possibly hybridization with M. oleifera] "What has become clear as we have been able to grow out the plants and seeds is that there seems to be a lot of introgression from Moringa oleifera into Moringa concanensis. Depending on the source population, anywhere from a third to all of the supposed concanensis grow up to exhibit some to very many M. oleifera characteristics. These include fast growth (M. concanensis spends more time in a tuberous sapling phase than M. oleifera), early flowering (M. concanensis usually takes more time to flowering than M. oleifera), and leaves with small leaflets, à la Moringa oleifera. All of these seeds came from wild populations, but the habitats of Moringa concanensis are now very small and surrounded by human settlements. And where there are humans in India, there are Moringa oleifera trees. So, it seems plausible that there is pollen flow from domesticated Moringa oleifera plants into the adjacent wild populations. None of the trees, even the seedlings, in the wild populations had oleifera like features. So, if there are hybrid seeds being produced in wild populations, presumably natural selection eliminates the more oleifera-like individuals. But in the coddled conditions of the germplasm collection, they are free to grow to adulthood. That oleifera hybrids seem common in seeds from wild Moringa concanensis localities raises the question of how much gene flow is occurring across India from Moringa oleifera into Moringa concanensis and what effects this gene flow might be having on wild Moringa concanensis populations."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Olson, M. E. (2003). Ontogenetic origins of floral bilateral symmetry in Moringaceae (Brassicales). American Journal of Botany, 90(1), 49-71	"Little is known regarding breeding systems in Moringa, although M. oleifera is known to outcross and occasionally self (G. Muluvi, Kenya Forestry Research Institute, personal communication)."
	East, E. M. (1940). The distribution of self-sterility in the flowering plants. Proceedings of the American Philosophical Society 82: 449-518	[Unknown. Self-fertility reported in genus] "Moringa oleifera Lam. is self-fertile though slightly protandrous."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Verdcourt, B. (1985). A synopsis of the Moringaceae. Kew Bulletin 40(1): 1-23	"The smooth pollen and narrow stylar canal opening down to the ovary cavity are striking characters particularly as the very sweet-scented flowers are clearly insect-pollinated." [Generic description]
	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 beepollinated, and nectar secretion seems to take place on the inside of the receptacle"

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Emongor, V. E. (2011). Moringa (Moringa oleifera Lam.): a review. Acta Hortic. 911, 497-508	[Moringa oleifera capable of reaching maturity quickly] "Unlike most perennial trees, which have a juvenile period of 3-7 years before seedlings can flower, moringa can start flowering 3-8 months"
	WRA Specialist. (2022). Personal Communication	Unknown. Other species reported to flower in 3 or more years

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis has stipitate ovary and capsules beaked fruits with winged seeds." [No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Trade Winds Fruit. (2022). Moringa concanensis - Konkan Moringa. https://www.tradewindsfruit.com/moringa-concanensis-konkan-moringa-seeds. [Accessed 3 Feb 2022]	"5 seeds per pack. A much lesser known Horseradish Tree, native to India. Shows some similarities to M. oleifera with an interesting history that continues to be studied. Some sources suggest this species has uses both medicinally and as a vegetable, for its unripe pods, though little information is available. Similar growth habits and requirements to M. oleifera, does well in tropical climates and drier, frost free areas." [Seeds sold online]

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	No evidence. Unlikely. Rare in cultivation and not grown with produce

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" [General family description]
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis has stipitate ovary and capsules beaked fruits with winged seeds."

Qsn #	Question	Answer
	Pragasan, L. A. (2021). Seed dispersal modes of tree species and their relation with altitudinal gradient from tropical forests of Eastern Ghats, India. Acta Ecologica Sinica. https://doi.org/10.1016/j.chnaes.2021.10.006. [Accessed]	"Table 1 List of species that shared greater than or equal to 1% of total abundance (TA), with family, fruit type (FT) and dispersal mode (DM). FT: A- achene; B- berry; Ccapsule; D- drupe; F- follicle; N- nut; P- pod; S- samara; Sy- syncarp. DM: A - anemochory; Au- autochory; Z- zoochory." [Moringa concanensis - DM = anemochory]

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. Other species could possibly 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**
	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" [General family description]
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis has stipitate ovary and capsules beaked fruits with winged seeds."

707	Propagules dispersed by other animals (externally)	n
	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" [General family description]
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	"M. concanensis has stipitate ovary and capsules beaked fruits with winged seeds."

708	Propagules survive passage through the gut	n
	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" [General family description]

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Boopathi, N. M., & Abubakar, B. Y. (2021). Botanical Descriptions of Moringa spp. In The Moringa Genome (pp. 11-20). Springer, Cham	[Unknown but unlikely] "M. concanensis is a small tree (but can grow 6–12 m in height) with branches that hang almost near to the ground" ... "M. concanensis has stipitate ovary and capsules beaked fruits with winged seeds."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Boopathi, N. M., Harshith, J. D., Santhanakrishnan, V. P., & Raveendran, M. (2021). Tissue Culture and Genetic Engineering in Moringa. In The Moringa Genome (pp. 67-83). Springer, Cham	[Unknown, but possibly no based on generic storage data] "It should also be noted that Moringa seed lose its viability, if they are stored for more than 2 months. Sharma and Raina (1982) reported loss of Moringa seed germination at the rate of 50%, 48%, and 7.5% when they are sowed after 1, 2, and 3 months, respectively, of seed collection due to its high oil content (and also in certain cases, due to storage pest infestation). Thus, long-term storage of Moringa seeds critically affects the germination process, and hence, keeping the seeds even for the next season may have adverse effect on the germination."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2022). 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**
	Cameron, J. (1894). The Forest Trees of Mysore and Coorg. Mysore Government Central Press, Bangalore	"It coppices well, and is usually renovated by that practice when the crops of fruit are falling off or when a tree becomes unshapely."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	NA

Summary of Risk Traits:

High Risk / Undesirable Traits
• Grows, and could spread, in regions with tropical climates
• Other Moringa species have weedy traits and tendencies
• Reproduces by seeds
• Seeds dispersed by wind, gravity and intentionally by people
• 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)
• Grows in high light environments (dense shade may inhibit ability to spread)