Taxon: Dalbergia melanoxylon

Family: Fabaceae

Common Name(s): African blackwood
African ebony
Chinese blackwood
Mozambique ebony
poyi

Synonym(s): Amerimnon melanoxylon (Guill. &
Amerimnon stocksii (Benth.) Kuntze
Dalbergia stocksii Benth.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 27 Apr 2015

WRA Score: 8.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Tropical Tree, Spiny, Timber Tree, Self-Incompatible, Wind-Disperse

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	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic	y=1, n=0	n
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		

Qsn #	Question	Answer Option	Answer
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	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	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
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		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	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**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence to date] "Breeding programmes which select for characters such as fast growth, wood quality, volume production and stem straightness are thought to have considerable potential, as is hybridization with Dalbergia sissoo (Nshubemuki, 1993)."

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**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon occurs naturally in much of sub-Saharan Africa from northern Ethiopia south to Angola, Mozambique and the Transvaal, and west to Senegal (Jenkins et al., 2002)."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	

203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Climatic amplitude (estimates) - Altitude range: 0 - 1500 m - Mean annual rainfall: 200 - 1250 mm - Rainfall regime: summer; winter; bimodal; uniform - Dry season duration: 4 - 8 months - Mean annual temperature: 24 - 30ºC - Mean maximum temperature of hottest month: 30 - 35ºC - Mean minimum temperature of coldest month: 10 - 13ºC - Absolute minimum temperature: > -15ºC"

Qsn #	Question	Answer
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	"D. melanoxylon grows under a wide range of conditions including semi-arid, subhumid and tropical lowland areas. It is often found on dry, rocky sites but is most frequent in the mixed deciduous forests and savannahs of the coastal region. This species demands water and light and therefore is common near water and will not regenerate under heavy cover. Mature trees are fire tolerant. BIOPHYSICAL LIMITS Altitude: 0-1200 m, Mean annual temperature: 18-35 deg. C, Mean annual rainfall: 700-1200 mm"
	WRA Specialist. 2015. Personal Communication	Elevation range exceeds 1000 m in tropical latitudes, demonstrating environmental versatility

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon occurs naturally in much of sub-Saharan Africa from northern Ethiopia south to Angola, Mozambique and the Transvaal, and west to Senegal (Jenkins et al., 2002)."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon has been introduced to several states in southern India (Tamil Nadu, Maharashtra and Karnataka) and appears to be naturalized there, yet the extent of such populations is uncertain (Jenkins et al., 2002). D. melanoxylon was imported to Australia as a promising timber species and planted in a trial in Western Australia; however, it was soon discovered that the species is a very aggressive weed and it was quickly eradicated (Farm Forest Line, 2004)."

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon has been introduced to several states in southern India (Tamil Nadu, Maharashtra and Karnataka) and appears to be naturalized there, yet the extent of such populations is uncertain (Jenkins et al., 2002). D. melanoxylon was imported to Australia as a promising timber species and planted in a trial in Western Australia; however, it was soon discovered that the species is a very aggressive weed and it was quickly eradicated (Farm Forest Line, 2004)."
	Lemmens, R.H.M.J., 2008. Dalbergia melanoxylon Guill. & Perr. [Internet] Record from PROTA4U. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. http://www.prota4u.org/search.asp. [Accessed 27 Apr 2015]	"In India and western Australia, where Dalbergia melanoxylon has been introduced, it has become naturalized. In western Australia it behaved as a very aggressive weed and was quickly eradicated."
	Parker, J. 2015. BIISC Early Detection Botanist. Pers. Comm. 16 April	"We recently found some Dalbergia melanoxylon in a Forest Reserve on the Hamakua coast. Less than a dozen plants and they all appeared to be of the same cohort. I didn't notice them spreading but I know there is at least one weedy relative." [Awaiting confirmation of species ID]

302	**Garden/amenity/disturbance weed**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[A weedy tree, with potentially negative environmental consequences] "D. melanoxylon was imported to Australia as a promising timber species and planted in a trial in Western Australia. However, it was soon discovered that the species is a very aggressive weed and was quickly eradicated from the trial. (Farm Forest Line, 2004)."
	Punalekar, S., Mahajan, D. M., & Kulkarni, D. K. (2010). Impact of exotic tree species on the native vegetation of Vetal Hill, Pune. Indian Journal of Forestry, 33(4): 549-554	[Appears to reduce diversity] "The study reveals the impact or three exotic tree species namely Dalbergia melanoxylon, Guill. and Per., Gliricidia sepium , Kunth ex Steud. and Leucaena leucocephala de Wit. on the indigenous tree and shrub species through Ia phytosociological study and statistical analysis on Vetal hill in Pune. It reveals the declining status or native woody species due to rapid growth and spreading or these exotic species." ... "Fig. 1 shows that those quadrates which have larger number of Dalbergia melanoxylon have comparatively lesser number of individuals of other species..." ... "The herbaceous vegetation on the slope shows good diversity in the open patches. ... However, under the thick canopy of Dalbergia melanoxylon, the herbaceous flora seems to be declining. These canopy covered patches show gregariously growing plantlets of Dalbergia melanoxylon and dominance of exotic invasive weed Lantana camara L."
	Ghayal, N., Dhumal, K., Gupta, S., Phadke, M., & Parange, S. (2009). Morphophysiological investigations in some dominant alien invasive weeds. Journal of Plant Interactions, 4(1): 33-39	[Regarded as an invasive tree of the university campus] "The campus of the University of Pune represents a unique deciduous forest ecosystem as it is highly dominated by an introduced shrub Dalbergia melanoxylon Guill. This campus shows rich herbaceous phytodiversity of native and invasive plants. At present most of the alien weeds are suppressing the native diversity."

Qsn #	Question	Answer
303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon does not compete with most agricultural crops and could therefore be maintained on farms (Ball et al., 1998)."
304	**Environmental weed**	
	Source(s)	**Notes**
	WRA Specialist. 2015. Personal Communication	A potential environmental weed. See Question 3.02
305	**Congeneric weed**	**y**
	Source(s)	**Notes**
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Dalbergia sissoo" … "Dense thickets have now formed on sand dunes near Mandorah in Darwin harbour and there are scattered infestations elsewhere in the city." … "Under favourable conditions, such as occurs at Darwin, it forms dense thickets to the virtual exclusion of most other plants."
401	**Produces spines, thorns or burrs**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Twigs are whitish, glabrous, with terminal thorns 0.5-5.0 cm long, though the branches and boles of younger trees carry straight, conical spines at the nodes which are modified shoots, and these may bear both leaves and flowers (Palmer and Pitman, 1972)."
402	**Allelopathic**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] [No evidence] "D. melanoxylon fixes nitrogen and the trees serve as nurses for secondary succession on abandoned fields. In Tanzania, local people recognize the importance of the tree to crop production, reporting that maize, pumpkins and groundnuts growing underneath the tree canopy do much better than those outside (Albano, 2001)."
403	**Parasitic**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "D. melanoxylon is a deciduous shrub or tree, usually 4-10 m tall, although on particularly good sites attaining 15m, with a narrow, irregular, open crown, increasingly rounded and heavier with age, characteristically multi-stemmed and heavily branched."
404	**Unpalatable to grazing animals**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	"Fodder: The pods and leaves can be used as animal fodder." ... "Small game may feed on young shoots and leaves. Agroforestry"
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"It has value for wildlife, as leaves are eaten by giraffe, elephant, impala and kudu, the roots by elephant, and the pods by kudu (Palmer and Pitman, 1972)."
	Lemmens, R.H.M.J., 2008. Dalbergia melanoxylon Guill. & Perr. [Internet] Record from PROTA4U. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. http://www.prota4u.org/search.asp. [Accessed 27 Apr 2015]	"Numerous herbivores including large mammals feed on the leaves and young shoots."

405	Toxic to animals	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "It has value for wildlife, as leaves are eaten by giraffe, elephant, impala and kudu, the roots by elephant, and the pods by kudu (Palmer and Pitman, 1972)."

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	"Heart rot has been observed on some logs, apparently associated with fungal infection following fire damage."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Mpingo is known to be attacked by larvae of a species of boring cerambycid, and pinholes made by the larvae are often found in logs (Moore and Hall, 1987). Trial plantings in Nachingwea district in Tanzania were infested with termites (Gregory et al., 1999). D. melanoxylon is subject to heart rot thought to be associated with fungal infection following fire damage."

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	"Medicine: The roots are used in traditional medicines to treat abdominal pain, diarrhoea and syphilis; the wood smoke is inhaled to treat headaches and bronchitis."
	The Wood Database. 2014. African Blackwood. http://www.wood-database.com/lumber-identification/hardwoods/african-blackwood/. [Accessed 27 Apr 2015]	[Wood or sawdust possibly allergenic to susceptible individuals] "Allergies/Toxicity: Although severe reactions are quite uncommon, African Blackwood has been reported as a sensitizer. Usually most common reactions simply include eye, skin, and respiratory irritation."

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Lemmens, R.H.M.J., 2008. Dalbergia melanoxylon Guill. & Perr. [Internet] Record from PROTA4U. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. http://www.prota4u.org/search.asp. [Accessed 27 Apr 2015]	[Uncertain fire risk. Mature trees resistant to fire. May reduce fire risk] "The trees are often multi-stemmed, and the average number of stems per tree in burned localities is higher than in unburned ones. Trees shed their leaves during the dry season and new growth starts at the beginning of the rainy season." ... "Mature trees are fairly fire tolerant, although the bark is thin (c. 3.5 mm) and soft; young seedlings are very susceptible to fire."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Unlikely. Adapted to a fire prone ecosystem & mature trees tolerate fire. Does not form dense natural stands] "D. melanoxylon is not gregarious and may be difficult to establish in pure plantations." ... "In natural stands, mpingo passes through a suffrutex phase when for several years the shoots produced are not perennial. While this reflects adaptation to withstand fire, it is not a desirable attribute if the shortest possible exploitation cycle is to be adopted (Chuwa, 2004)."

409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**
	Hines, D.A. & Eckman , K. 1993. Indigenous Multipurpose Trees of Tanzania: Uses and Economic Benefits for People. Food and Agriculture Organization (FAO), Rome	"Light Requirements: Light demanding."
	Lemmens, R.H.M.J., 2008. Dalbergia melanoxylon Guill. & Perr. [Internet] Record from PROTA4U. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. http://www.prota4u.org/search.asp. [Accessed 27 Apr 2015]	"Seedlings require light and regeneration is absent in closed forest. Regeneration is often plentiful after land clearance in regions where Dalbergia melanoxylon is common, not only resulting from the establishment of seedlings but also of coppice shoots and root suckers."

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Light demanding, but cultivated under shade of Pinus caribaea] "D. melanoxylon is water and light demanding (Hines and Eckman, 1993) and juveniles have been observed as more than twice as likely to be found in open areas than under tree canopies, suggesting that light or absence of competition are important for regeneration, and supporting the hypothesis that D. melanoxylon may be a pioneer species (Ball et al., 1998)." ... "Stem form is improved by raising trees under medium shade provided by Pinus caribaea (Nshubemuki, 1993)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"It tolerates a wide range of poor sites, ranging from loamy sands to clayey vertisols (Nshubemuki, 1994) (Högberg, 1986) and especially on gravelly soils in areas where productive agriculture is impossible due to shallow, rocky soils (Hines and Eckman, 1993). It is, however, rare in volcanic, saline and loose sandy soils (Mailimbwe and Epaphra, 2001)." "Soil descriptors - Soil texture: light; medium; heavy - Soil drainage: free - Special soil tolerances: shallow - Soil types: alluvial soils; arid soils; vertisols; clay soils; gravelly soils; sandy soils"
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	"Soil type: Soils vary from loamy sands to clayey Vertisols (black cotton soils)."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon is a deciduous shrub or tree, usually 4-10 m tall, although on particularly good sites attaining 15m, with a narrow, irregular, open crown, increasingly rounded and heavier with age, characteristically multi-stemmed and heavily branched."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Lemmens, R.H.M.J., 2008. Dalbergia melanoxylon Guill. & Perr. [Internet] Record from PROTA4U. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. http://www.prota4u.org/search.asp. [Accessed 27 Apr 2015]	"In plots in Tanzania naturally growing adult Dalbergia melanoxylon trees were found at a mean density of 8.5 trees/ha. They tend to grow in clusters. Regeneration is usually fair under natural conditions when there is no burning of the vegetation."

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Not gregarious] "The distribution of D. melanoxylon in Tanzania is observed to be patchy, with adult trees found in densities of 8.5-87.5 trees/ha, and it is commonly believed amongst local people and foresters that D. melanoxylon tends to grow in clusters (Ball, 2004)." ... "As D. melanoxylon does not readily tolerate competition, weed control is highly important in the establishment of seedlings." ... "D. melanoxylon is not gregarious and may be difficult to establish in pure plantations."

501	Aquatic	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Terrestrial tree] "As a tree of dry savanna woodland, it is not reported from the moister regions of the Congo basin. It is a common component of open miombo woodlands of southern Africa."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 26 Apr 2015]	"Family: Fabaceae (alt. Leguminosae) subfamily: Faboideae tribe: Dalbergieae. Also placed in: Papilionaceae "

503	Nitrogen fixing woody plant	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon is a deciduous shrub or tree, usually 4-10 m tall, although on particularly good sites attaining 15m, with a narrow, irregular, open crown, increasingly rounded and heavier with age, characteristically multi-stemmed and heavily branched." ... "Along with other species of Dalbergia, D. melanoxylon is known to fix nitrogen (Högberg, 1986)."

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon is a deciduous shrub or tree, usually 4-10 m tall, although on particularly good sites attaining 15m, with a narrow, irregular, open crown, increasingly rounded and heavier with age, characteristically multi-stemmed and heavily branched. The diameter at breast height is up to 38 cm, although has been recorded as over 1 m."

601	Evidence of substantial reproductive failure in native habitat	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	World Conservation Monitoring Centre 1998. Dalbergia melanoxylon. The IUCN Red List of Threatened Species. Version 2014.3. www.iucnredlist.org	"Population: As a species there is no imminent threat of extinction. "
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Overharvesting leading to rarity in parts of range] "While the native range extends throughout much of sub-Saharan Africa, once abundant, commercially exploited wild stocks in Eastern Africa suffer from bushfires and over-harvesting, in Kenya to the point of commercial extinction, yet commercial supply persists from Tanzania and Mozambique.."

602	Produces viable seed	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Natural regeneration occurs through seeds, suckers and coppicing, although the ability to coppice seems to be lost as the tree matures."

603	Hybridizes naturally	
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Unknown if natural hybrids occur] "Breeding programmes which select for characters such as fast growth, wood quality, volume production and stem straightness are thought to have considerable potential, as is hybridization with Dalbergia sissoo (Nshubemuki, 1993)."

604	Self-compatible or apomictic	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"All members of the tribe Dalbergiae that have been tested are found to be self-incompatible (World Agroforestry Centre, 2004)."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	"Dalbergia species are visited by bees."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Bee-pollinated] "Flowers are white; 0.5 cm long, in dense clusters of axillary panicles reaching a length of 10 cm; calyx funnel shaped, 5-toothed; corolla much longer than the calyx; usually nine stamens, united or variously divided, the central stamen longer than others." ... "The flower architecture of D. melanoxylon, in common with others of the genus Dalbergia, has required specialized manipulation which excludes all but bees as pollinators. The limited pollen production and enclosed anthers tend to exclude wind pollination."

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Reproduces by suckering] "Natural regeneration occurs through seeds, suckers and coppicing, although the ability to coppice seems to be lost as the tree matures. Clearing land with abundant mpingo is followed by the appearance of numerous coppice shoots, rootsuckers and seedlings in the following rainy season."

607	Minimum generative time (years)	>3
	Source(s)	**Notes**
	Hines, D.A. & Eckman , K. 1993. Indigenous Multipurpose Trees of Tanzania: Uses and Economic Benefits for People. Food and Agriculture Organization (FAO), Rome	"Growth is slow, especially in the first few years." ... "It takes between 70 and 100 years to reach maturity for harvesting (UNEP 1988)."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Plantation management of D. melanoxylon has not yet been shown to be economically viable, given the length of time estimated before first harvesting. Observations of increment have been made in nursery trials at the juvenile stage (Mugasha and Mruma, 1983) or estimated from mature trees in native stands (Ball et al., 1998). In well-tended planted trees during the first five years, annual increment was 0.3-1 m in height and 1.5-2 cm in diameter. In the wild for the first 5-8 years, annual increment was in height was 0.5-0.7 m a year and 1-1.4 cm in diameter (Chuwa, 2004). Estimates for the time taken for D. melanoxylon to reach a harvestable size of 39 cm dbh vary widely; with 70-100 years the figure often quoted (Gregory et al., 1999) and supported by observations in the field (Ball et al., 1998)."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence. Pods & seeds lack means of external attachment] "Pods indehiscent, papery, pale brown (Hines and Eckman, 1993) to dark, oblong to elliptic lanceolate, 3-6 cm long x 1-1.5 cm wide; glabrous, acuminate at both ends, with one to four small, reniform seeds per pod (von Breitenbach, 1963; Ghazanfar, 1989)." ... "The seeds have a papery wing that aids dispersal by wind (Gregory et al., 1999)."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon has been introduced to several states in southern India (Tamil Nadu, Maharashtra and Karnataka) and appears to be naturalized there, yet the extent of such populations is uncertain (Jenkins et al., 2002). D. melanoxylon was imported to Australia as a promising timber species and planted in a trial in Western Australia; however, it was soon discovered that the species is a very aggressive weed and it was quickly eradicated (Farm Forest Line, 2004)."

Qsn #	Question	Answer
	www.seedvendor.com. 2015. Dalbergia melanoxylon African Blackwood Tree Seeds. http://www.seedvendor.com/10sedameafbl.html. [Accessed 27 Apr 2015]	[Seeds sold commercially] "10 Seeds Dalbergia melanoxylon African Blackwood Seeds"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Unlikely. Tree with long time to maturity, & wind-dispersed seeds that lose viability quickly] "Pods indehiscent, papery, pale brown (Hines and Eckman, 1993) to dark, oblong to elliptic lanceolate, 3-6 cm long x 1-1.5 cm wide; glabrous, acuminate at both ends, with one to four small, reniform seeds per pod (von Breitenbach, 1963; Ghazanfar, 1989)." ... "The seeds have a papery wing that aids dispersal by wind (Gregory et al., 1999)." ... "Rapid loss of seed viability might also make it difficult to establish plantations in new areas (Nshubemuki, 1993)."

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"The seeds have a papery wing that aids dispersal by wind (Gregory et al., 1999)."

705	Propagules water dispersed	
	Source(s)	**Notes**
	Lemmens, R.H.M.J., 2008. Dalbergia melanoxylon Guill. & Perr. [Internet] Record from PROTA4U. Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. http://www.prota4u.org/search.asp. [Accessed 27 Apr 2015]	[Seeds wind-dispersed, but proximity to rivers or other waterways may result in secondary dispersal by water] "It is often found on dry, rocky sites and termite mounds, but is most common near water or in valleys of impeded drainage."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence. Not fleshy-fruited] "Pods indehiscent, papery, pale brown (Hines and Eckman, 1993) to dark, oblong to elliptic lanceolate, 3-6 cm long x 1-1.5 cm wide; glabrous, acuminate at both ends, with one to four small, reniform seeds per pod (von Breitenbach, 1963; Ghazanfar, 1989)." ... "The seeds have a papery wing that aids dispersal by wind (Gregory et al., 1999)."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence. Pods & seeds lack means of external attachment] "Pods indehiscent, papery, pale brown (Hines and Eckman, 1993) to dark, oblong to elliptic lanceolate, 3-6 cm long x 1-1.5 cm wide; glabrous, acuminate at both ends, with one to four small, reniform seeds per pod (von Breitenbach, 1963; Ghazanfar, 1989)." ... "The seeds have a papery wing that aids dispersal by wind (Gregory et al., 1999)."

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Orwa C,, Mutua, A., Kindt R,, Jamnadass, R, & Anthony, S. 2009 Agroforestree Database: a tree reference and selection guide version 4.0. http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp. [Accessed 27 Apr 2015]	[Unknown if seeds survive after pods are consumed] "Fodder: The pods and leaves can be used as animal fodder."

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"D. melanoxylon exhibits heavy annual seed production (Mugasha, 1978; Ball et al., 1998)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Rapid loss of seed viability] "Seeds (up to 42,000 per kg) are orthodox and when extracted from pods germinate readily without pretreatment, but have a short viability period and should be planted within 6 months after collection, although viability could be prolonged by storage in sealed containers (Hines and Eckman, 1993)." ... "Rapid loss of seed viability might also make it difficult to establish plantations in new areas (Nshubemuki, 1993)."

803	Well controlled by herbicides	
	Source(s)	**Notes**
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Methods to control the invasive D. sissoo would possibly be effective for D. melanoxylon] "Dalbergia sissoo … Dalbergia is susceptible to picloram as a cut stump, basal bark or stem injection application." [Methods to control the invasive D. sissoo would possibly be effective for D. melanoxylon]

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Able to coppice & tolerates fire] "Natural regeneration occurs through seeds, suckers and coppicing, although the ability to coppice seems to be lost as the tree matures. Clearing land with abundant mpingo is followed by the appearance of numerous coppice shoots, rootsuckers and seedlings in the following rainy season." ... "Multiple stems in miombo trees are often the result of vegetative regeneration from old rootstock or fire damage during the juvenile phase. Mature trees are damaged but not usually killed by bush fires characteristic of many of the ecosystems it survives in (Hines and Eckman, 1993)."

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
• Broad ecological tolerance & elevation range exceeds 1000 m, demonstrating environmental versatility
• Thrives in tropical climates
• Naturalized in India
• A weed in India & Western Australia, where it was eradicated
• Other Dalbergia species have become invasive
• Twigs with terminal thorns
• Wood may cause allergic reaction or dermatitis
• Tolerates many soil types
• Nitrogen fixing
• Reproduces by seeds, root suckers & coppicing
• Seeds dispersed by wind & intentionally by people
• Heavy annual seed production (densities unknown)
• Able to coppice & resprout after cutting
• Mature trees tolerate fire

Low Risk Traits
• Leaves & pods are palatable. Provides fodder for livestock
• Non-toxic to animals
• Valuable timber tree
• Light-demanding (may be shade intolerant)
• Not gregarious. Not known to form dense stands in native range
• Self-incompatible
• Slow growth & long time to reproductive maturity
• Seeds rapidly lose viability & may not form a persistent seed bank