

Taxon: Melastoma malabathricum L.	Family: Melastomataceae
Common Name(s): Indian rhododendron Malabar melastome	Synonym(s): Melastoma affine D. Don

Assessor: No Assessor	Status: Assessor Approved	End Date: 23 May 2018
WRA Score: 19.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Tropical Shrub, Agricultural Weed, Light-Demanding, Self-Compatible, Bird-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	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	?
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	y
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	y=1, n=0	n
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	y=1, n=0	y
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	y=1, n=-1	y
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	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[No evidence of domestication] " <i>Melastoma malabathricum</i> is the most widespread and morphologically most variable species of the genus, resulting in the description of many species." ... "The great variability of <i>M. malabathricum</i> may be connected with its preferred habitat. The plants grow in disturbed places that today are more common in Asia and Oceania than undisturbed ones. It is possible that the species expanded its natural area synanthropically resulting in the isolation of small populations and the subsequent stabilisation of morphological characters of the (self-compatible) founder individual."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 18 May 2018]	"Native Africa WESTERN INDIAN OCEAN: Mauritius, Seychelles Asia-Temperate EASTERN ASIA: Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bhutan, India, Nepal PAPUASIA: Papua New Guinea INDO-CHINA: Laos, Thailand MALESIA: Indonesia, Malaysia, Philippines Australasia AUSTRALIA: Australia [Queensland, Western Australia, Northern Territory]"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 18 May 2018]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Dave's Garden. 2018. Indian Rhododendron, Harendog, Malabar Melastome, Straits Rhododendron - <i>Melastoma malabathricum</i> . https://davesgarden.com/guides/pf/go/31990/ . [Accessed 21 May 2018]	"Hardiness: USDA Zone 11: above 4.5 °C (40 °F)"
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[Broad elevation range, demonstrating environmental versatility] "Habitat & Ecology-In disturbed places (roadsides, river banks, secondary forests), on fallow land, or on grasslands from sea level to up to 2900 m altitude."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Distribution - Indian Ocean (Mauritius, Seychelles), S and SE Asia, S China, Taiwan, S Pacific Ocean (Micronesia, Melanesia, Polynesia), Australia."
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 18 May 2018]	"Native Africa WESTERN INDIAN OCEAN: Mauritius, Seychelles Asia-Temperate EASTERN ASIA: Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bhutan, India, Nepal PAPUASIA: Papua New Guinea INDO-CHINA: Laos, Thailand MALESIA: Indonesia, Malaysia, Philippines Australasia AUSTRALIA: Australia [Queensland, Western Australia, Northern Territory]"

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	CABI. 2018. Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Reports from Hawaii may actually be <i>Melastoma candidum</i>] " <i>M. malabathricum</i> is native to tropical Asia and Polynesia, and Australia (Adams, 1972; Bodkin, 1991). It was introduced to Hawaii in 1916 as an ornamental (Haselwood and Motter, 1966)."

Qsn #	Question	Answer
301	Naturalized beyond native range	y
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"In the past, Hawaiian populations of this species were assigned to <i>Melastoma malabathricum</i> L., the Indian rhododendron. Because all specimens from our area correspond closely to what has passed as <i>M. candidum</i> , I have adopted this name." [Melastoma septemnerium Lour. - Synonyms: <i>Melastoma candidum</i> D. Don, <i>Melastoma malabathricum</i> (Misapplied)]
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. <i>Cunningham</i> , 12(1): 85-114	"NEW SOUTH WALES DISTRIBUTION / HABITATS: Central Coast. Recorded growing on sand in native bush with privet and lantana." ... "The species naturalised in the Lane Cove area of Sydney has a longer calyx than the taxa considered native to Australia, and the Sydney region is outside the native range of <i>Melastoma</i> in Australia. Notes associated with the specimen are 'Occasional weed in a number of bushland reserves in Lane Cove area.' The species is considered to be a weed of pastures and crops in much of its native range (Holm et al. 1997)."
	Dietz, H., Wirth, L. R., & Buschmann, H. (2004). Variation in herbivore damage to invasive and native woody plant species in open forest vegetation on Mahé, Seychelles. <i>Biological Invasions</i> , 6(4), 511-521	"Table 1. The species surveyed and their status in the Seychelles (after Friedmann 1994)." [Melastoma malabathricum - Status = Invasive; Abundance = Less common]
	CABI. 2018. Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Taxonomy may be unresolved] "There are differences of opinion on the use of the names <i>Melastoma malabathricum</i> and <i>M. affine</i> . Kostermans et al. (1987) describe <i>M. affine</i> D. Don (= <i>M. polyanthum</i> Bl.) as the weed of rice in Indonesia, giving <i>M. malabathricum</i> as a synonym, but 'auct non L.', that is, it is not the same as <i>M. malabathricum</i> L., though the two are very similar, the Linnaean species differing (only?) in the way flower buds are enclosed by the bracts. In Waterhouse (1994), however, <i>M. affine</i> is given as a synonym for <i>M. malabathricum</i> L. and the illustration of <i>M. affine</i> from Kostermans et al. (1987) is used to illustrate ' <i>M. malabathricum</i> '. It is reported by Kon (1993) that the name for the weedy species should be changed from <i>M. malabathricum</i> to <i>M. affine</i> , but this has not been universally accepted."

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"In disturbed places (roadsides, river banks, secondary forests), on fallow land, or on grasslands from sea level to up to 2900 m altitude." [A disturbance-adapted plant that can impact agriculture]

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Faravani, M., & Bakar, B. B. (2007). Effects of light on seed germination, growth pattern of straits Rhododendron (<i>Melastoma malabathricum</i> L.). <i>Journal of Agricultural and Biological Science</i> , 2(3), 1-5	" <i>Melastoma malabathricum</i> is a serious weed in many crops, derelict and abandoned farmlands, and arable lands in Malaysia (Ridley 1922; Maxwell 1989, Baki 2004; 2006; Faravani and Baki 2007), and else where in the tropics and subtropics (Renner and Meyer 2001; Clausing and Renner 2001). The weed has a propensity to become invasive with adaptive life strategies including robust clonal and reproductive growths coupled with efficient seed dispersal, often aided by ants and birds, and are attracted by copious production of fruits."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Bananas, Orchards & Plantations, Pome Fruits, Vegetables"

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[Primarily a disturbance weed that may impact agriculture] "Weed of: Bananas, Orchards & Plantations, Pome Fruits, Vegetables"

305	Congeneric weed	y
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Melastoma affine</i> ... Weed of: Orchards & Plantations" ... " <i>Melastoma candidum</i> ... Weed of: Pastures"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	" <i>Melastoma candidum</i> ... on Kaua'i and Hawai'i, especially on the windward sides, where it is locally abundant and invasive from near sea level up to ca. 900 m. ... In the past, Hawaiian populations of this species were assigned to <i>Melastoma malabathricum</i> L., the Indian rhododendron. Because all specimens from our area correspond closely to what has passed as <i>M. candidum</i> , I have adopted this name. These 2 species are closely related but <i>M. candidum</i> appears to differ consistently in its larger bracts, longer calyx lobes and petals, longer lanceolate hypanthial scales, and higher chromosome number (<i>M. malabathricum</i> has 2n = 24). These differences are maintained in cultivated material, which suggests that they are genetic and not habitat mediated."
	1992. Tanimoto, V.M./Char, W.P.. <i>Alien Plant Control on State Lands Including Natural Areas</i> . Pp 536-550 in Stone, C.P. et al. (eds.). <i>Alien Plant Invasions in Native Ecosystems of Hawaii: Management & Research</i> . University of Hawaii CPSU, Honolulu, HI	"Table 1. Weeds listed for control by four Division of Forestry and Wildlife field offices, 1975-present." [includes <i>Melastoma sanguineum</i> on Hawaii and Kauai]

Qsn #	Question	Answer
401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[No evidence] "Shrub 1.5-3 m high or small tree up to 5 m tall; young branches quadrangular, covered with appressed or slightly spreading scales, bark grey or brown; old branches terete, glabrescent. Leaves elliptic to lanceolate, 6-15 by 2-6.5 cm, occasionally narrowly lanceolate to oblong, 4-6 by 0.6-1.5 cm, base rounded to acute, apex acuminate; lamina strigose above, beneath strigose to slightly pilose; nerves 5 or 7, beneath covered with appressed to spreading scales; petiole 7-20 mm long."

402	Allelopathic	
	Source(s)	Notes
	Faravani, M., Baki, H. B., & Khalij, A. (2008). Assessment of Allelopathic Potential of <i>Melastoma malabathricum</i> L. on Radish <i>raphanus sativus</i> L. and Barnyard Grass (<i>Echinochloacrus-galli</i>). <i>Notulae Botanicae Horti Agrobotanici Cluj-Napoca</i> , 36(2), 54-60	[Possibly Yes. Demonstrated with aqueous extracts in controlled laboratory conditions] " <i>Melastoma malabathricum</i> L. is a weedy invasive shrub in arable lands, abandoned farmlands, secondary forest openings and derelict areas in Malaysia. Some allelochemicals present in this plant extracts may, directly, prevent or promote germination when environmental conditions are conducive to growth and establishment. It may have an important role, indirectly, in determining plant community structures. The aqueous extract and methanol extracts, were assayed for the aqueous extract of fresh materials with concentrations of 0, 50,100,150 and 200 gl-1 and at aqueous of oven dried materials extract with concentrations of 40,80,120,160,and 200 gl-1 .The crude methanol extracts were prepared using extract concentrations of 10.8,14.28 ,18 and 30 gl-1 of shoot and root materials. The extracts were tested with the widely used radish seed barnyard grass seed. Radish seed germination was inhibited at concentrations ranging from 200 gl-1 in the extract aqueous of dried materials and in the methanol extract concentrations of 14.28 and 30 gl-1 .The inhibition of root and shoot growth was also observed in the Barnyard grass seed. Both species were susceptible to allelopathy by extracts isolated from shoot and root of <i>M. malabathricum</i> and also their rate of germination, root length and shoot length in were decreased upon the application of both type of extractions. The results from this study strongly suggest that allelopathy may be a possible mechanism controlling the timing of barnyard grass germination and seedling establishment."

403	Parasitic	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Shrub 1.5-3 m high or small tree up to 5 m tall; young branches quadrangular, covered with appressed or slightly spreading scales, bark grey or brown; old branches terete, glabrescent." [Melastomataceae. No evidence]

404	Unpalatable to grazing animals	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Rosleine, D., & Suzuki, E. (2012). Secondary succession at abandoned grazing sites, Pangandaran Nature Reserve, West Java, Indonesia. <i>Tropics</i> , 21(3), 91-104	"Melastoma malabathricum and <i>C. odorata</i> are less palatable to ungulates (Simbolon et al. 1986) and have possibility to suppress the growth of grasses and herbs." ... "Small shrubs such as <i>C. odorata</i> , <i>B. balsamifera</i> , and <i>M. malabathricum</i> increased in abundance at Cikamal and Nanggorak, where disturbance was still occurring. Unfortunately, these species are less palatable for ungulates (Simbolon et al. 1986). During our research, we observed that few leaves of <i>M. malabathricum</i> were eaten by ungulates. Kangiras (2009) studied the food of deer in PNR and reported that <i>M. malabathricum</i> was consumed less by deer, whose main food sources were <i>Fimbristylis annua</i> , <i>I. cylindrica</i> , <i>E. indica</i> , <i>Chrysopogon aciculatus</i> , and <i>D. triflorum</i> . It is possible that the lower preference for <i>M. malabathricum</i> and other species by ungulates might promote their invasion of the abandoned grazing sites."
	Chee, Y. K., & Wong, C. C. (1986). Forages in Malaysia. Pp. 84-88 in <i>Forages in Southeast Asian and South Pacific Agriculture</i> , ACIAR Proceedings Series No. 12	"The weeds are <i>Mimosa pudica</i> , <i>Mikania cordata</i> , <i>Melastoma malabathricum</i> and <i>Eupatorium odoratum</i> . The ferns are <i>Nephrolepis biserrata</i> , <i>Gleichenia linearis</i> , <i>Lygodium</i> spp. and others. The ground vegetation species <i>Imperata cylindrica</i> , <i>Melastoma malabathricum</i> and most ferns are not palatable."

405	Toxic to animals	
	Source(s)	Notes
	Patek-Mohd, N. N., et al. (2018). Potentiality of <i>Melastoma malabathricum</i> as Phytoremediators of soil contaminated with sewage sludge. <i>Scientia Agricola</i> , 75 (1), 27-35	[No evidence, but could be indirectly toxic if heavy metals are accumulated] "In our current study, we found heavy metal accumulation in the root, stem and leaf of <i>Melastoma malabathricum</i> . Thus, <i>Melastoma malabathricum</i> species can be used as a highly effective heavy metal accumulator and can remove the toxic effect of leachates."
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Faravani, M., & Bakar, B. B. (2007). Effects of light on seed germination, growth pattern of straits <i>Rhododendron</i> (<i>Melastoma malabathricum</i> L.). <i>Journal of Agricultural and Biological Science</i> , 2(3), 1-5	[Devoid of natural pests] "They are primary colonizers of secondary areas, disturbed habitats, pastures, roadsides, landslides, light gaps and rivers. This species is fast growing, shade tolerant, devoid of natural pests, and sets an abundance seeds with a high rate of germination leading to monospecific stands-easily out-competing native flora putting them at great risk (Penneys 2004)."
	WRA Specialist. 2018. Personal Communication	Unknown. No information found on pests or pathogens of this plant.

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes

Qsn #	Question	Answer
	Hwee Ling Koh, Tung Kian Chua, & Chay Hoon Tan. 2009. A Guide to Medicinal Plants. An Illustrated, Scientific and Medicinal Approach, World Scientific, Singapore	[May be indirectly toxic through aluminum accumulation] "Traditional Medicinal Uses: In Indonesia and Malaysia, the leaves and roots are used as a remedy for diarrhoea and dysentery. The leaves are also used to wash ulcers, to treat piles and for small pox pustules to prevent development of scars.[10] Its bark is used to treat skin diseases.[11]" ... "Toxicity: M. malabathricum was reported to be an aluminium (Al) accumulator (with up to 10 g Al/kg of dry weight in old leaves and up to 7 g Al/kg dry weight in new leaves) and could lead to accumulation of aluminium in the bone and brain, leading to neurotoxicity, when consumed in large amount."
	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. Eaten & used medicinally] "young shoots and leaves eaten as a fresh or cooked vegetable, ripe fruits eaten" ... "(Plant astringent and antiseptic, used in diarrhea, dysentery and skin diseases. Young shoots astringent. Antibacterial, astringent and antifungal, bark juice given in skin troubles. A cold infusion of the flowers an ingredient in an oral remedy for anemia associated with gastrointestinal bleeding and epigastric pain; leaves and flowers given as astringent in diarrhea, dysentery and vaginal discharge. Leaves a remedy for diarrhea, dysentery, to treat stomach complaints and thrush, externally applied on painful arthritic joints; leaf paste applied externally to cuts and wounds; leaves pounded with garlic and ginger and taken for cough; leaf decoction applied on cuts, wounds and injuries; leaf juice to stop bleeding. Leaves and roots decoction a postpartum remedy. Magicoreligious beliefs, ritual, tender tips kept on main door of the house to free from evil spirits. Veterinary medicine, leaf decoction given to goats in fever.)"

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	[In moist tropics. No evidence] "M. malabathricum is a plant of secondary forests in the moist tropics of South-East Asia, flourishing in open, disturbed sites associated with plantation crops. It is also found in upland and tidal ricefields and tends to build up to dense, pure stands."
	Saharjo, B. H., & Watanabe, H. (1999). The flammability of shrubs and trees in an Acacia mangium plantation based on silica-free ash content. Journal of Forest Research, 4(1), 57-59	[Less flammable than other understory plants] "At shrub stage, D. linearis stems will burn first when fire invades the plantation because it has the lowest silica-tree ash. It then continues to L. cylindrica leaves, E. pubescens stems, L. camara stems, Eugenia sp. stems and C. laurifolia stems. It was suspected also that the last shrub that would be attacked was M. malabathricum because it has the highest silica-free ash content."

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

Qsn #	Question	Answer
	Metcalfe, D. J., & Grubb, P. J. (1997). The responses to shade of seedlings of very small-seeded tree and shrub species from tropical rain forest in Singapore. <i>Functional Ecology</i> , 11(2), 215-221	"As a comparator we used <i>Melastoma malabathricum</i> L. (Melastomataceae), which is much more light demanding in nature. In nearly natural landscapes it is essentially a species of forest-edges. In Singapore, where there are large populations of <i>Melastoma</i> in the very extensive secondary vegetation, seedlings of the species are commonly found in forest gaps, sometimes with <3% dsf, where they show marked etiolation. Seeds of <i>Melastoma</i> will not germinate, even after 37 weeks, in darkness or in light with a low red/far-red ratio while the seeds of all the shade-tolerant species will sooner or later germinate in at least one of those conditions (Metcalfe 1996)."
	Faravani, M., & Bakar, B. B. (2007). Effects of light on seed germination, growth pattern of straits <i>Rhododendron</i> (<i>Melastoma malabathricum</i> L.). <i>Journal of Agricultural and Biological Science</i> , 2(3), 1-5	"They are primary colonizers of secondary areas, disturbed habitats, pastures, roadsides, landslides, light gaps and rivers. This species is fast growing, shade tolerant, devoid of natural pests, and sets an abundance seeds with a high rate of germination leading to monospecific stands-easily out-competing native flora putting them at great risk (Penneys 2004)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	CABI. 2018. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	"The plant prefers rich, well-composted, well-drained, moist soils, in a protected sunny site."
	Wong, W. (2008). <i>Melastoma malabathricum</i> : Too beautiful to be called a weed. <i>Green Culture Singapore</i> , Singapore	"This flowering shrub is not fussy about soil type and <i>M. malabathricum</i> can also be grown in areas with clayey soil but it definitely does better in soil that is fertile and friable. It should be noted that its roots should be consistently moist and plants should not be allowed to dry out between watering. It is a suitable candidate as a marginal plant for bogs and water gardens."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Shrub 1.5-3 m high or small tree up to 5 m tall"

412	Forms dense thickets	y
	Source(s)	Notes
	Faravani, M., & Bakar, B. B. (2007). Effects of light on seed germination, growth pattern of straits <i>Rhododendron</i> (<i>Melastoma malabathricum</i> L.). <i>Journal of Agricultural and Biological Science</i> , 2(3), 1-5	"They are primary colonizers of secondary areas, disturbed habitats, pastures, roadsides, landslides, light gaps and rivers. This species is fast growing, shade tolerant, devoid of natural pests, and sets an abundance seeds with a high rate of germination leading to monospecific stands-easily out-competing native flora putting them at great risk (Penneys 2004)."

Qsn #	Question	Answer
501	Aquatic	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[Terrestrial] "Habitat & Ecology-In disturbed places (roadsides, river banks, secondary forests), on fallow land, or on grasslands from sea level to up to 2900 m altitude."
502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 18 May 2018]	Family: Melastomataceae
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 18 May 2018]	Family: Melastomataceae
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Shrub 1.5-3 m high or small tree up to 5 m tall"
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Indian Ocean (Mauritius, Seychelles), S and SE Asia, S China, Taiwan, S Pacific Ocean (Micronesia, Melanesia, Polynesia), Australia." ... "Melastoma malabathricum is the most widespread and morphologically most variable species of the genus, resulting in the description of many species."
602	Produces viable seed	y
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Fruit a fleshy capsule, 6.5-10(-11.5) by (5-)6-9(-10.5) mm, rupturing irregularly transversally at maturity, exposing the soft, dark blue pulp with the orange seeds."

Qsn #	Question	Answer
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	"Rao and Chin (1972) found an average of more than one thousand seeds per fruit from plants near Singapore. They harvested fresh seeds and planted them within 24 hr on moist paper, a thin layer of water or moist sand. All germinating vessels were held at 24 to 28°C in low light intensity. They obtained 65% germination in the first 10 to 15 days and 80% at 4 wk."
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. 2011. Plant species first recognised as naturalised or naturalising for New South Wales in 2004 and 2005. <i>Cunningham</i> , 12(1): 85-114	"Spread by seed. Meyer (2001) sunk the Australian native <i>Melastoma</i> species <i>Melastoma affine</i> D.Don and <i>Melastoma denticulatum</i> Labill. into a broadly circumscribed <i>M. malabathricum</i> . This has not been accepted in Australia where the only native species is considered to be <i>M. affine</i> (Whiffin in George 1990, APC 2005+). The species naturalised in the Lane Cove area of Sydney has a longer calyx than the taxa considered native to Australia, and the Sydney region is outside the native range of <i>Melastoma</i> in Australia. Notes associated with the specimen are 'Occasional weed in a number of bushland reserves in Lane Cove area.' The species is considered to be a weed of pastures and crops in much of its native range (Holm et al. 1997)."

603	Hybridizes naturally	
	Source(s)	Notes
	Dai, S., Wu, W., Zhang, R., Liu, T., Chen, Y., Shi, S., & Zhou, R. (2012). Molecular evidence for hybrid origin of <i>Melastoma intermedium</i> . <i>Biochemical Systematics and Ecology</i> , 41, 136-141	[Potentially Yes. Further research needed] "Moreover, pollinators are largely shared among <i>Melastoma</i> species (Luo and Zhang, 2005; Luo et al., 2008, 2009; Lu et al., 2009), offering ample opportunities for hybridization. Artificial crosses have been made between certain species of <i>Melastoma</i> , and many combinations (e.g., <i>M. malabathricum</i> × <i>M. candidum</i> , <i>M. affine</i> × <i>M. sanguineum</i> and <i>M. malabathricum</i> × <i>M. sanguineum</i>) could set viable seeds (S. Dai, unpublished data). These results suggest that the reproductive isolation of <i>Melastoma</i> species is not complete."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Luo, Z., Zhang, D., & Renner, S. S. (2008). Why two kinds of stamens in buzz-pollinated flowers? Experimental support for Darwin's division-of-labour hypothesis. <i>Functional Ecology</i> , 22(5), 794-800	"Experimental selfing confirmed earlier findings that <i>M. malabathricum</i> (synonym <i>M. affine</i>) is self-compatible (Gross 1993)."
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"The great variability of <i>M. malabathricum</i> may be connected with its preferred habitat. The plants grow in disturbed places that today are more common in Asia and Oceania than undisturbed ones. It is possible that the species expanded its natural area synanthropically resulting in the isolation of small populations and the subsequent stabilisation of morphological characters of the (self-compatible) founder individual."

605	Requires specialist pollinators	n
	Source(s)	Notes

Qsn #	Question	Answer
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Inflorescences terminal cymes of 3 -12 flowers. Flowers 5-merous, seldom 6-, 7-, or 8-merous, often varying in a single plant; bracts deciduous, lanceolate or ovate, acuminate, varying from small and inconspicuous (2.3 by 2 mm) to large and enclosing the buds (16 by 14 mm), outside covered with small appressed scales at least along the midrib, inside glabrous. Hypanthium campanulate, varying from 5-11 by 5-10 mm, covered with appressed or slightly spreading, (0.8 -) 1.2-2.5(-3.4) mm long, golden to red scales; sepals lanceolate, (3.2 -)4.5-7(-10.5) by (1.9-)2.5-3.5(-6.2) mm, outside covered with appressed scales at least along the midrib, inside glabrous or hairy at the apex; intersepal emergences subulate, (1-) 1.5-3.5(-5.5) mm long. Petals violet, seldom white (especially in the Pacific Islands), obovate, 15-35 by 10-22 mm, ciliate at the apical margin. Stamens dimorphic (seldom isomorphic); outer stamens: filaments 6-12 mm long, connectives 9.7-17 mm long, with a ventral bilobed, yellow appendage 0.9-3.3 mm long, anthers 6.5-13. 1 mm long, slightly sigmoid, violet; inner stamens: filaments 5.5-9.5 mm long, connective not prolonged or seldom up to 2 mm long, with 2 ventral appendages c. 0.6-2 mm long, yellow, anthers 5.5-10.5 mm long, ± straight, yellow. Ovary shorter than the hypanthium, crowned by golden bristles; style 23-32 mm long, sigmoid."
	Soh, Z. W. W., & Ngiam, R. W. J. (2013). Flower-visiting bees and wasps in Singapore parks (Insecta: Hymenoptera). <i>Nature in Singapore</i> , 6, 153-172	"The first plant is the native <i>Melastoma malabathricum</i> , which received the highest diversity of visitors of all the native plants surveyed in this study. As this plant is native and is visited by a wide variety of flower-visiting insect species, it may be beneficial to grow more of this species in other parks to support the flower-visiting insect communities there. In addition, this plant may support bird populations, as species of flower-peckers and bulbuls have been observed to feed on the fruits of <i>Melastoma malabathricum</i> (pers. obs.)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	CABI. 2018. <i>Invasive Species Compendium</i> . Wallingford , UK: CAB International. www.cabi.org/isc	"Propagation as an ornamental is by seed or cuttings (Bodkin, 1991)." [No evidence of natural vegetative spread]

607	Minimum generative time (years)	1
	Source(s)	Notes
	Loh, V. C. (2008). Ecology of <i>Melastoma malabathricum</i> L. in West Sabah. BSc, Dissertation. Universiti Malaysia, Sabah	"The maximum recorded height of this species was 3 m and the height at first flowering is 0.5 m (Metcalf et al., 1998)." [Probably between <1 to 2 years of age]

Qsn #	Question	Answer
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[Probably Yes. Occurs in heavily trafficked areas & possesses small seeds] "In disturbed places (roadsides, river banks, secondary forests), on fallow land, or on grasslands from sea level to up to 2900 m altitude."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World weeds: natural histories and distribution</i> . John Wiley and Sons, Inc., New York, NY	"The plant thrives on poor soil, tolerates dry, waste places, lends itself to cultivation as an ornamental for its lovely flowers, but quickly becomes dominant when it enters fields and plantations if not properly cared for."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Contaminant, Crop, Herbal, Ornamental" [A weed of crops with small seeds. Inadvertent movement with agricultural practices likely]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[Adapted for animal dispersal] "Fruit a fleshy capsule, 6.5-10(-11.5) by (5)-6-9(-10.5) mm, rupturing irregularly transversally at maturity, exposing the soft, dark blue pulp with the orange seeds."

705	Propagules water dispersed	
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	[Found on river banks. Potentially moved by water] "Habitat & Ecology-In disturbed places (roadsides, river banks, secondary forests), on fallow land, or on grasslands from sea level to up to 2900 m altitude."

706	Propagules bird dispersed	y
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Fruit a fleshy capsule, 6.5-10(-11.5) by (5)-6-9(-10.5) mm, rupturing irregularly transversally at maturity, exposing the soft, dark blue pulp with the orange seeds."
	Cheke, A. S., Nanakorn, W., & Yankoses, C. (1979). Dormancy and dispersal of seeds of secondary forest species under the canopy of a primary tropical rain forest in northern Thailand. <i>Biotropica</i> , 11(2): 88-95.	"Fruiting specimens of both the <i>Macaranga</i> and the <i>Melastoma</i> were in fact present in the clearing at the beginning of this part of the study (July). All these species appear to be principally bird dispersed, probably largely by bulbuls (Pycnonotidae, of which there are many species on Doi Suthep) and laughing-thrushes <i>Garrulax</i> spp."

Qsn #	Question	Answer
	Soh, Z. W. W., & Ngiam, R. W. J. (2013). Flower-visiting bees and wasps in Singapore parks (Insecta: Hymenoptera). <i>Nature in Singapore</i> , 6, 153-172	"The first plant is the native <i>Melastoma malabathricum</i> , which received the highest diversity of visitors of all the native plants surveyed in this study. As this plant is native and is visited by a wide variety of flower-visiting insect species, it may be beneficial to grow more of this species in other parks to support the flower-visiting insect communities there. In addition, this plant may support bird populations, as species of flower-peckers and bulbuls have been observed to feed on the fruits of <i>Melastoma malabathricum</i> (pers. obs.)."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World weeds: natural histories and distribution</i> . John Wiley and Sons, Inc., New York, NY	"The weed has an inconspicuous pink berry which dehisces to show a black viscous mess full of very small seeds. Birds relish the black pulp, swallow it in great quantities, and thus help to spread the propagules."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Meyer, K. (2001). Revision of the Southeast Asian genus <i>Melastoma</i> . <i>Blumea</i> , 46, 351-398	"Fruit a fleshy capsule, 6.5-10(-11.5) by (5-)6-9(-10.5) mm, rupturing irregularly transversally at maturity, exposing the soft, dark blue pulp with the orange seeds." [Small seed size suggests seeds could be dispersed in mud, or on feet and/or fur of mammals]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Albert, A., Hambuckers, A., Culot, L., Savini, T., & Huynen, M. C. (2013). Frugivory and seed dispersal by northern pigtailed macaques (<i>Macaca leonina</i>), in Thailand. <i>International Journal of Primatology</i> , 34(1), 170-193	"Finally, the macaques dispersed several small-seeded species that are considered pioneer species, e.g., <i>Eurya nitida</i> (Nature Conservation Foundation and Vattakanal Conservation Trust 2006) and <i>Melastoma malabathricum</i> (Faravani and Bakar 2007)."
	Soh, Z. W. W., & Ngiam, R. W. J. (2013). Flower-visiting bees and wasps in Singapore parks (Insecta: Hymenoptera). <i>Nature in Singapore</i> , 6, 153-172	"In addition, this plant may support bird populations, as species of flower-peckers and bulbuls have been observed to feed on the fruits of <i>Melastoma malabathricum</i> (pers. obs.)."

Qsn #	Question	Answer
801	Prolific seed production (>1000/m²)	
	Source(s)	Notes
	Luo, X., Cao, M., Zhang, M., Song, X., Li, J., Nakamura, A., & Kitching, R. (2017). Soil seed banks along elevational gradients in tropical, subtropical and subalpine forests in Yunnan Province, southwest China. <i>Plant Diversity</i> , 39(5), 273-286	"At higher elevations (1200m and 1400 m) where tropical montane evergreen broad-leaved forest occurs, <i>Melastoma malabathricum</i> , <i>Wendlandia tinctoria</i> and <i>Eurya pittosporifolia</i> dominated the soil seed banks, although <i>Maesa montana</i> was dominant only at 1200 m." [Densities unspecified]
	Blackham, G. V., Thomas, A., Webb, E. L., & Corlett, R. T. (2013). Seed rain into a degraded tropical peatland in Central Kalimantan, Indonesia. <i>Biological Conservation</i> , 167, 215-223	"Table 1 Seed species collected in 100 1m ² seed traps from February 2011 to February 2012 in degraded tropical peatland, Central Kalimantan, Indonesia" [<i>Melastoma malabathricum</i> - Traps under trees - Seeds (m ⁻² yr ⁻¹) = 1.04]
	Faravani, M., & Bakar, B. B. (2007). Effects of light on seed germination, growth pattern of straits <i>Rhododendron</i> (<i>Melastoma malabathricum</i> L.). <i>Journal of Agricultural and Biological Science</i> , 2(3), 1-5	[Sets an abundance of seeds with a high rate of germination. Densities unspecified] "They are primary colonizers of secondary areas, disturbed habitats, pastures, roadsides, landslides, light gaps and rivers. This species is fast growing, shade tolerant, devoid of natural pests, and sets an abundance seeds with a high rate of germination leading to monospecific stands-easily out-competing native flora putting them at great risk (Penneys 2004)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Farnsworth, E. (2000). The Ecology and Physiology of Viviparous and Recalcitrant Seeds. <i>Annual Review of Ecology and Systematics</i> , 31, 107-138	"TABLE 1 Plant species with recalcitrant or viviparous seeds" [<i>Melastoma malabathricum</i> - Seed status = R - recalcitrant]
	Metcalf, D. J. (1996). Germination of small-seeded tropical rain forest plants exposed to different spectral compositions. <i>Canadian Journal of Botany</i> , 74(4), 516-520	[Seeds buried in soil remain viable for >104 weeks (2 years)] " <i>Melastoma malabathricum</i> (<i>M. affine</i> according to Whiffin 1990), along with 28 other pioneer or secondary species, has been shown to retain viability for more than 104 weeks buried in the soil (Hopkins and Graham 1987), although responsiveness to light after burial was not tested. There appears to be no previously documented case of a tropical rain forest plant keeping its light requirement for several months, but it seems likely that other melastomes and possibly some of the light-demanding Rubiaceae and Euphorbiaceae will fall into this category."
	Cheke, A. S., Nanakorn, W., & Yankoses, C. (1979). Dormancy and dispersal of seeds of secondary forest species under the canopy of a primary tropical rain forest in northern Thailand. <i>Biotropica</i> , 11(2): 88-95.	[Seeds germinate at least up to 8 months, if not longer] "TABLE 5. Delayed germination of seeds from forest soil." [<i>Melastoma malabathricum</i> - Total No. of seedlings that had appeared - March 1972 (after 8 months) = 87]

Qsn #	Question	Answer
803	Well controlled by herbicides	y
	Source(s)	Notes
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Triclopyr has apparently been used for control of <i>M. malabathricum</i> (and other shrubs) in Malaysia; a study comparing three methods of application concluded that controlled-droplet application at very low volume required least labour, but that knapsack or power sprayers were more suitable for dense and tall infestations (Ahmad-Faiz, 1989). In trials in pineapples at three sites in Malaysia, <i>M. malabathricum</i> was best controlled by diuron, this being superior to butralin, atrazine, bromacil and fluometuron (Lee, 1983)."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Wong, W. (2008). <i>Melastoma malabathricum</i> : Too beautiful to be called a weed. Green Culture Singapore, Singapore	{Tolerates pruning} "Plants should be pruned back to shape them and because of its self-seeding habit, shrubs in bloom should have their spent flowers removed promptly, that is, dead-heading, is required to limit fruit and subsequent seed production."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. Other <i>Melastoma</i> species are naturalized in the Hawaiian Islands.

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Naturalized outside native range (no evidence in Hawaiian Islands to date. *Melastoma septemnerium* now recognized as naturalized (*Melastoma malabathricum* (Misapplied)])
- A disturbance-adapted weed that impacts agriculture
- Other *Melastoma* species are invasive
- Potentially allelopathic
- Unpalatable to browsing animals
- Potentially indirectly toxic if heavy metals are accumulated in vegetative material
- Tolerates many soil types
- Reproduces by seeds
- May hybridize
- Self-compatible
- Reaches maturity in <1 year
- Seeds dispersed by birds, frugivorous animals, intentionally by people, & probably unintentionally as a contaminant in soil, agricultural crops, or attached to footwear or equipment
- Prolific seed production
- Seeds can persist in soil for at least 2 years
- Able to resprout after cutting

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Light-demanding pioneer plant
- Ornamental
- Not reported to spread vegetatively
- Herbicides may provide effective control