

**Family:** *Fabaceae*

**Taxon:** *Mucuna bracteata*

**Synonym:** *Stizolobium bracteatum* (DC. ex Kurz) Kuntze **Common Name:** NA

<b>Questionnaire :</b>	current 20090513	<b>Assessor:</b>	Chuck Chimera	<b>Designation:</b> EVALUATE
<b>Status:</b>	Assessor Approved	<b>Data Entry Person:</b>	Chuck Chimera	<b>WRA Score</b> 6
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
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	n
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)	
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)	
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		y=1, n=0	
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	y
405	Toxic to animals		y=1, n=0	n
406	Host for recognized pests and pathogens		y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	n
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	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0	
411	Climbing or smothering growth habit		y=1, n=0	y

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	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	
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	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	
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	
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
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)	y=-1, n=1	

Designation: EVALUATE

WRA Score 6

## Supporting Data:

101	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. <i>Kew Bulletin</i> . 39(1): 23-65.	[Is the species highly domesticated? No] No evidence
101	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata</i> : A Cover Crop and Living Green Manure. Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Is the species highly domesticated? No] No evidence
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata</i> : A Cover Crop and Living Green Manure. Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Species suited to tropical or subtropical climate(s) 2-high] "...native to Bangladesh, China, Hainan, India, Laos, Myanmar, Thailand, Vietnam and Andaman Island..."
202	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata</i> : A Cover Crop and Living Green Manure. Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Quality of climate match data? 2-high] "...native to Bangladesh, China, Hainan, India, Laos, Myanmar, Thailand, Vietnam and Andaman Island..."
203	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. <i>Kew Bulletin</i> . 39(1): 23-65.	[Broad climate suitability (environmental versatility)? Yes] "HABITAT. Climbing on shrubs and trees, forest, thickets or open grassland, on mountain slopes, by paths or streams; 600 2000 m." [Elevation range exceeds 1000 m, demonstrating environmental versatility]
203	1987. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae : Phaseoleae) in the Indian Subcontinent and Burma. <i>Kew Bulletin</i> . 42(1): 23-46.	[Broad climate suitability (environmental versatility)? Yes] "HABITAT. Climbing on vegetation in forests and thickets or open ground; 200-1700 m." [Elevation range exceeds 1000 m, demonstrating environmental versatility]
203	1992. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae: Phaseoleae) in Thailand, Indochina and the Malay Peninsula. <i>Kew Bulletin</i> . 47(2): 203-245.	[Broad climate suitability (environmental versatility)? Yes] "HABITAT. Forest; scrub; roadsides; often dry or sandy soil; 150-1650 m alt." [Elevation range exceeds 1000 m, demonstrating environmental versatility]
204	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata</i> : A Cover Crop and Living Green Manure. Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Native or naturalized in regions with tropical or subtropical climates? Yes] "...native to Bangladesh, China, Hainan, India, Laos, Myanmar, Thailand, Vietnam and Andaman Island..."
205	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Does the species have a history of repeated introductions outside its natural range? No] "It has only been introduced into Malaysia as a leguminous cover crop (LCC) for oil palm in 1991 (Matthews, 1998) from Kerala, south India, where it has been planted under rubber for a longer period." [Used as a cover crop within native range, but no evidence of widespread or repeated introductions outside its natural distribution]
301	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	[Naturalized beyond native range? No] No evidence
302	2008. Wilmot-Dear, C.M.. <i>Mucuna adans.</i> (Leguminosae) in Thailand. <i>Thai Forest Bulletin</i> . 36: 114–139.	[Garden/amenity/disturbance weed? Potentially] "Ecology.— Forest (seasonal evergreen hardwood, pine or mixed forest, especially disturbed or degraded areas, bamboo thickets and scrub, roadsides; often dry or sandy soil; 150–1700 m alt." [Often occurs in degraded habitats. Rapid growth rate and habit could contribute to its weediness in these areas]
303	1999. Galinato, M.I./Moody, K./Piggin, C.M.. Upland rice weeds of south and southeast Asia. International Rice Research Institute, <a href="http://books.google.com/books?id=NLLDcrAyn2kC&amp;pg=PA31&amp;dq=commelina+diffusa&amp;hl=en&amp;ei=v1XRTqtE4OH2AWjpK29CQ&amp;sa=X&amp;oi=book_res">http://books.google.com/books?id=NLLDcrAyn2kC&amp;pg=PA31&amp;dq=commelina+diffusa&amp;hl=en&amp;ei=v1XRTqtE4OH2AWjpK29CQ&amp;sa=X&amp;oi=book_res</a>	[Agricultural/forestry/horticultural weed? Possibly] "Appendix 4. An inventory of spontaneous and cultivated vegetation occurring in upland rice in South and Southeast Asia." [Includes <i>Mucuna bracteata</i> in Indonesia, but does not describe impacts on rice cultivation, or control efforts, if any, being employed against this plant]
303	2009. Fairhurst, T./McLaughlin, D.. Sustainable Oil Palm Development on Degraded Land in Kalimantan. World Wildlife Fund, Washington, DC	[Agricultural/forestry/horticultural weed? Potentially] "Many planters now advocate the use of <i>Mucuna bracteata</i> because it establishes very rapidly on degraded land. Whilst healthy nodules can usually be found there is no published information on the amount of N <sub>2</sub> fixed by <i>M. bracteata</i> (Goh and Chiu, 2007). The advantage of <i>M. bracteata</i> is that it grows very rapidly and can outcompete other species in palm inter rows, but this also means that a round of circle weeding is required every three weeks to prevent the cover plants from smothering the palms." [If unmaintained, could become a weed in palm plantations]

304	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	[Environmental weed? No] No evidence
305	2003. Hammerton, J.. <i>Mucuna pruriens</i> : Weed, invasive, or multi-use crop for the Bahamas. College of the Bahamas Research Journal. 12: 4-15.	[Congeneric weed? Yes] "M. pruriens cannot be considered a serious weed on a global scale. Holm et al. (1977, 1997) do not list it as among the 180 worst weeds in the world. Holm et al. (1979), in their atlas of world weeds, do however list M. pruriens as "serious" in two countries (Mexico and Mozambique), as a "principal weed" also in two countries (Jamaica and Madagascar), and as a "common" weed in four countries (Guatemala, Kenya, Micronesia and Tanzania). It is reported as "present" as a weed in 16 countries, including the Dominican Republic and Puerto Rico. Cardenas et al. (1972) consider M. pruriens "common in cultivated fields, perennial crops, pastures, roadsides, and fencerows" in Latin America and the Caribbean. Ivens et al. (1978) regard M. pruriens as occurring "...throughout the tropics and common in West Africa in abandoned cultivation and forest clearings". Fournet & Hammerton (1991) describe it as almost exclusively a weed of cane fields in the Lesser Antilles, an Fournet (1978) describes it as also growing over bushes and hedges in Guadeloupe and Martinique. Adams (1972) records it as "frequent in cultivations, thickets and woodland margins" in Jamaica. In Barbados it is reported to be mainly a weed of cane fields, primarily in the higher parts of the island (Gooding et al., 1965). Neither the Global Invasive Species Database (GISP) of the World Conservation Union (IUCN) (retrieved at <a href="http://www.issg.org/database/welcome/html">http://www.issg.org/database/welcome/html</a> ), nor the Florida Exotic Pest Plant Council (FLEPPC, 2001), or other Pest Plant Councils in the Southern USA (see <a href="http://www.exoticpestplantcouncil.org">http://www.exoticpestplantcouncil.org</a> ) lists M. pruriens as an invasive species. Hammerton (2002) suggests that this species bears watching closely for invasiveness."
305	2004. Bakar, B.H.. Invasive Weed Species in Malaysian Agro-Ecosystems : Species, Impacts and Management. Malaysian Journal of Science. 23: 1-42.	[Congeneric weed? Yes] "Leguminous cover crops are a common feature in young oil palm, rubber, and cocoa plantations in Malaysia. Commonly used legumes species from the genera Calopogonium, Styloanthus, Mucuna, and Pueraria, although M. pruriens was later abandoned due its strangling effects on the young oil palm, rubber, and cocoa crops (Ahmad Faiz, pers. comms.)."
401	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. Kew Bulletin. 39(1): 23-65.	[Produces spines, thorns or burrs? No] "Herbaceous or semi-woody climber up to 4 m; stem longitudinally ridged, old branches smooth or slightly wrinkled, glabrous or with sparse or dense short adpressed pale weak hairs on both young and relatively old stems. Leaves 14-31(-39) cm long; stipules early deciduous, not seen; terminal leaflet rhombic or sometimes broadly elliptic, broadly ovate or obovate, relatively wide, 7-14 x 5"6- 11(-13) cm, apex acute, rarely very shortly acuminate up to 5 mm, mucronate, base rounded; lateral leaflets very asymmetrical, 7-14 cm long, abaxial half 3-8.5 cm wide with base $\pm$ truncate, widening from base and apex to widest point with rather straight outline giving $\pm$ triangular shape, adaxial 2-3 cm wide. All leaflets: lateral veins 5-7, slightly curved and running right into margin, raised and often grooved above, rather stoutly prominent beneath, tertiary veins not or hardly branched, all $\pm$ parallel, running transversely often $\pm$ at right angles to lateral veins, slightly raised above, thin but often prominent beneath, fine reticulation sometimes visible beneath; often fairly thick, markedly paler below at least in dry state, upper surface very dark, with sparse or abundant usually fairly short $\pm$ erect pale fine hairs especially on midrib and lateral veins, lower surface very pale, indumentum usually similar but denser and midrib, lateral veins and sometimes reticulation rather less pubescent, usually conspicuously darker than surface and pubescence; rarely both surfaces glabrous; petiole 6-27 cm long, rachis 1-4 cm, petiolules 5 mm, all, or only petiolules, with short erect dark brown hairs; stipels 2-5 mm long, terete, quite robust."
401	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Produces spines, thorns or burrs? No. Irritating hairs] "The outstanding features about M. bracteata are that the flowers stink of rotten meat and the seed pods are covered with sharp, needle-like hair called trichomes (Plate 5, overleaf) that cause great irritation when touched because they penetrate the skin easily." [Non-toxic, but irritating]
402	1998. Matthews, C.. The introduction and establishment of a new leguminous cover crop, <i>Mucuna bracteata</i> under oil palm in Malaysia. Planter. 74: 359-368.	[Allelopathic? Possibly] "The initial three months requires purification of leguminous cover crop. Its vigorous growth coupled with its probable allelopathic property, noxious weeds and grasses are well smothered; thus requiring less maintenance other than monthly circle spraying." ... "The probable presence of allelo-chemicals in the tips of young vein inhibits the growth of engulfed weeds."
403	1992. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae: Phaseoleae) in Thailand, Indochina and the Malay Peninsula. Kew Bulletin. 47(2): 203-245.	[Parasitic? No] "Climber very similar to M. pruriens var. pruriens, differing somewhat in shape, pubescence and venation of leaflets and greatly in nature and persistence of bracts." [A vine in the Fabaceae. Not parasitic]

404	1998. Matthews, C.. The introduction and establishment of a new leguminous cover crop, <i>Mucuna bracteata</i> under oil palm in Malaysia. <i>Planter</i> . 74: 359-368.	[Unpalatable to grazing animals? Yes] "It has a high level of phenolic compounds which deters insects and cattle." ... "It is also non palatable to cattle due to presence of high levels of phenolic compounds and there is no menace from cattle."
404	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Unpalatable to grazing animals? Yes] "Non palatable to cattle"
405	2012. WRA Specialist. Personal Communication.	[Toxic to animals? No] No evidence, but unpalatable to cattle [See 4.04]
406	1998. Matthews, C.. The introduction and establishment of a new leguminous cover crop, <i>Mucuna bracteata</i> under oil palm in Malaysia. <i>Planter</i> . 74: 359-368.	[Host for recognized pests and pathogens? No] "So far no serious pest or disease problems were noticed in this cover plant. In the months of December/January, insect infestation was manifested by tiny holes on the leaves of this cover plant, however the infestations were mild as high level of phenolic compounds deter the insects (Kothandram et al., 1989)."
406	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Host for recognized pests and pathogens? No evidence] "Free from pest and disease incidence" ... "Mucuna bracteata has no serious pest and diseases. Even cattle do not prefer to feed on <i>Mucuna bracteata</i> . Very rarely leaf eating caterpillars ( <i>Tiracola plagiata</i> ) are noticed which do not warrant control measures as it is sporadic and affected plants establish quickly. Root knot nematodes common in most of leguminous plants is not recorded in <i>Mucuna bracteata</i> ."
407	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata</i> : A Cover Crop and Living Green Manure. Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Causes allergies or is otherwise toxic to humans? Yes] "The outstanding features about <i>M. bracteata</i> are that the flowers stink of rotten meat and the seed pods are covered with sharp, needle-like hair called trichomes (Plate 5, overleaf) that cause great irritation when touched because they penetrate the skin easily." [Non-toxic, but irritating]
408	1998. Matthews, C.. The introduction and establishment of a new leguminous cover crop, <i>Mucuna bracteata</i> under oil palm in Malaysia. <i>Planter</i> . 74: 359-368.	[Creates a fire hazard in natural ecosystems? No] "Its drought resistance and shade tolerance is far superior to conventional covers thus poses less of a fire hazard in the dry weather. "
409	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Even under the shade of 10 years old palms, they cover 100% of the ground, 50 cm thick with 15 cm of litter mulch below (Plate 7)."
409	2007. Matthews, C./Shamsuddin, Z.H./Xaviar, A.. Nodulation of <i>Mucuna bracteata</i> & acid tolerance of its Bradyrhizobia. Pp. 11-20 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Besides being shade tolerant, it is also drought tolerant."
410	2009. Fairhurst, T./McLaughlin, D.. Sustainable Oil Palm Development on Degraded Land in Kalimantan. World Wildlife Fund, Washington, DC	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Probably Yes] "Many planters now advocate the use of <i>Mucuna bracteata</i> because it establishes very rapidly on degraded land. Whilst healthy nodules can usually be found there is no published information on the amount of N <sub>2</sub> fixed by <i>M. bracteata</i> (Goh and Chiu, 2007)."
411	1993. Mistry, J./Stott, P.. The Savanna Forests of Manipur State, India: An Historical Overview. <i>Global Ecology and Biogeography Letters</i> . 3(1): 10-17.	[Climbing or smothering growth habit? Yes] "The dipterocarp savanna forests of Manipur State, India, comprise the western limit of a formation spread over the whole of mainland South- East Asia. This paper reviews the past literature on these forests, and discusses key points of interest
411	2004. Mendham, D.S./Kumaraswamy, S./Balasundaran, M./Sankaran, K.V./Corbeels, M./Grove, T.S./O'Connell, A.M./Rance, S.J.. Legume cover cropping effects on early growth and soil nitrogen supply in eucalypt plantations in south-western India. <i>Biology and F</i>	[Climbing or smothering growth habit? Yes] "Pueraria and <i>Mucuna</i> can also cause physical suppression, as they have a climbing habit and require regular pruning around the tree base to prevent them from smothering the tree crop. The <i>Mucuna</i> cover crop had large leaves and coarse stems, and also competed with the young trees for light more than the other legumes, even though the biomass of <i>Mucuna</i> was considerably lower than that of <i>Stylosanthes</i> . Hence maintenance of perennial legumes can be labour intensive during the early stages of growth, when the trees are of a similar height to the cover crop."
411	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Climbing or smothering growth habit? Yes] " <i>M. bracteata</i> is unlike other LCC in that in its natural habitat it is an aggressive liana/vine that climbs in the canopy of forest trees and over thickets and open ground. It grows and spreads fast and has thick major stems, and pseudo tap roots that penetrate 2-3 m deep (Mathews, 1998; Plate 1)." ... " <i>M. bracteata</i> has the habit to smother weeds: lalang, shrubs and woodies, and ferns included. In fact, it could even smother 10 years old palms if not maintained..."

411	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Climbing or smothering growth habit? Yes] "Weeds menace is a serious problem in plantations and invite immense expense to control them. Luxurious growth of <i>Mucuna bracteata</i> smother the growth of weeds like mikania and completely eradicate them. Even shrubs are over grown by <i>Mucuna bracteata</i> and kill them."
412	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata: A Cover Crop &amp; Living Green Manure</i> . Agricultural Crop Trust, Petaling Jaya, Malaysia	[Forms dense thickets? No] " <i>M. bracteata</i> has the habit to smother weeds: lallang, shrubs and woodies, and ferns included. In fact, it could even smother 10 years old palms if not maintained..."
501	1984. Wilmot-Deary, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. <i>Kew Bulletin</i> . 39(1): 23-65.	[Aquatic? No] "Herbaceous or semi-woody climber up to 4 m;" [Terrestrial]
502	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata: A Cover Crop and Living Green Manure</i> . Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Grass? No] Fabaceae
503	2004. Mendham, D.S./Kumaraswamy, S./Balasundaran, M./Sankaran, K.V./Corbeels, M./Grove, T.S./O'Connell, A.M./Rance, S.J.. Legume cover cropping effects on early growth and soil nitrogen supply in eucalypt plantations in south-western India. <i>Biology and Fertilization of Soils</i>	[Nitrogen fixing woody plant? Yes] "Abstract Growth and soil N supply in young <i>Eucalyptus tereticornis</i> stands at two sites in Kerala, India, were examined in response to cover cropping with three legume species ( <i>Pueraria phaseoloides</i> , <i>Stylosanthes hamata</i> , and <i>Mucuna bracteata</i> )...Nitrogen release rates declined in the order <i>Mucuna</i> > <i>Pueraria</i> > <i>Eucalyptus</i> > <i>Stylosanthes</i> ."
503	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata: A Cover Crop and Living Green Manure</i> . Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Nitrogen fixing woody plant? Yes] " <i>M. bracteata</i> is unlike other LCC in that in its natural habitat it is an aggressive liana/vine that climbs in the canopy of forest trees and over thickets and open ground." [a woody vine]
504	1984. Wilmot-Deary, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. <i>Kew Bulletin</i> . 39(1): 23-65.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Herbaceous or semi-woody climber up to 4 m;"
601	1984. Wilmot-Deary, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. <i>Kew Bulletin</i> . 39(1): 23-65.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
601	1992. Wilmot-Deary, C.M.. A Revision of <i>Mucuna</i> (Leguminosae: Phaseoleae) in Thailand, Indochina and the Malay Peninsula. <i>Kew Bulletin</i> . 47(2): 203-245.	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	1998. Matthews, C.. The introduction and establishment of a new leguminous cover crop, <i>Mucuna bracteata</i> under oil palm in Malaysia. <i>Planter</i> . 74: 359-368.	[Produces viable seed? Yes] "Propagation of <i>M. bracteata</i> is possible through seeds and stem cuttings. As seeds are not easily available, propagation by cuttings or tissue culture could be adopted."
602	2007. Chee, C.F.. <i>Mucuna bracteata</i> seeds and seed quality. Pp. 21-28 in Goh & Chiu (eds.). <i>Mucuna bracteata: A Cover Crop &amp; Living Green Manure</i> . Agricultural Crop Trust, Petaling Jaya, Malaysia	[Produces viable seed? Yes] "Germination study indicates that BR seeds attained 83.3% germination by the 12th day after sowing." [BR = Big and Round]
603	2012. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown] No evidence
604	2006. Padmesh, P./Reji, J./Jinish Dhar, M./Seeni, S.. Estimation of genetic diversity in varieties of <i>Mucuna pruriens</i> using RAPD. <i>Biologia Plantarum</i> . 50(3): 367-372.	[Self-compatible or apomictic? Unknown] "Genetic diversity was estimated in 13 accessions of the otherwise self pollinated <i>Mucuna pruriens</i> (L.) DC. (velvetbean) comprising varieties <i>pruriens</i> and <i>utilis</i> collected from tropical humid forest using 15 RAPD primers. " [Unknown for <i>M. bracteata</i> , but closely related <i>M. pruriens</i> exhibits self-compatibility]
605	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata: A Cover Crop &amp; Living Green Manure</i> . Agricultural Crop Trust, Petaling Jaya, Malaysia	[Requires specialist pollinators? Likely fly pollinated] "The inflorescence is a raceme that is 10-13 cm long, carrying 40-100 beak-like blackish purple flowers that closely resemble <i>M. cochinchinensis</i> flowers (Plate 3). The cluster of flowers last 4-5 days and unlike <i>M. cochinchinensis</i> flowers, they emit a stinking smell of rotting meat to attract certain insect pollinators (Chiu, 2004 a.)"



605	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Requires specialist pollinators? No] " <i>Mucuna bracteata</i> produce flowers mainly from matured vines during the months of January and February. The inflorescence is a raceme of 15 to 20 cm long. Flowers from the places of fruit set are different from those in non fruit set area. Fruit set in the favourable localities is from the flowers which are soft and the keel petals open easily. On the contrary the flowers where no fruit set is taking place are more dark coloured and hard. Keel petals joined firmly and never open. Fruits do not form even if the flowers are opened mechanically. In high ranges of western ghat of India fruit set is observed showing fairly cold climate is essential for fruit set. Insect pollination is noticed in <i>Mucuna bracteata</i> ."
606	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Reproduction by vegetative fragmentation? Possibly] " <i>M. bracteata</i> does not easily form adventitious roots from the nodes of vines touching the ground when compared with the other common LCC species."
606	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Reproduction by vegetative fragmentation? Possibly] "Vine cuttings having three node are selected and used. A slanting cut was given about 5cm below the bottom node. Another cut was given in the vine above the top node leaving as much length of vine as possible, and planted in bags filled with potting mixture. The bags are kept in partial shade till the buds open from top node. Phenolic compound from the cut ends oxidise and cause decay of cuttings. Cutting of vines dipped in water mixed with ascorbic acid (50 mg per litre) to avoid oxidation processes. The decay starts from the tip of the top inter node and proceed downwards. Before it reaches the middle node the dormant buds have to sprout. That is reason why, long inter node is provided in the top of the cutting."
607	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Minimum generative time (years)? Probably <1 to 1] "The vines grow very fast by branching from each node, growing 3-4 m long in 4 weeks..." ... "It has flowered in both cases, as early as 5 months after planting from cuttings, but has not seeded yet."
701	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. Kew Bulletin. 39(1): 23-65.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No] "Fruit fleshy, curved, linear but tapering towards tip and somewhat swollen around seeds, somewhat flattened laterally, acute and downcurved or hooked at apex, 6-9 x 1-2-1-6 cm X 3 mm, dark brown or grey with dense dark brown or golden deciduous irritant bristles, 3-6 seeded, internal septa 2-4 mm thick, visible externally as slightly oblique grooves; margins thickened and with slight groove along suture. Seeds very similar to those of <i>M. pruriens</i> , ellipsoid, slightly flattened, ± 9 x 6 x 4 mm, brownish black, usually with pinkish brown mottling, shiny or dull, smooth, hilum 5 mm long, (1/8 circumference), grey with black central line and narrow raised black marginal aril." [Fruits and seeds relatively large, with no means of external attachment]
702	1970. Duke, J.A.. Ethnobotanical Observations on the Chocó Indians. Economic Botany. 24(3): 344-366.	[Propagules dispersed intentionally by people? Yes] "Used to stain calabashes black. One species, with a bulbous root, used to treat a Choco spider hex (called PUCURU)" [Ethnobotanical uses]
702	2007. Chiu, S.B.. Botany, habits & economic uses of <i>Mucuna bracteata</i> DC. Ex Kurz. Pp. 1-10 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Propagules dispersed intentionally by people? Yes] "It has only been introduced into Malaysia as a leguminous cover crop (LCC) for oil palm in 1991 (Matthews, 1998) from Kerala, south India, where it has been planted under rubber for a longer period."
703	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. Kew Bulletin. 39(1): 23-65.	[Propagules likely to disperse as a produce contaminant? No] "Fruit fleshy, curved, linear but tapering towards tip and somewhat swollen around seeds, somewhat flattened laterally, acute and downcurved or hooked at apex, 6-9 x 1-2-1-6 cm X 3 mm, dark brown or grey with dense dark brown or golden deciduous irritant bristles, 3-6 seeded, internal septa 2-4 mm thick, visible externally as slightly oblique grooves; margins thickened and with slight groove along suture. Seeds very similar to those of <i>M. pruriens</i> , ellipsoid, slightly flattened, ± 9 x 6 x 4 mm, brownish black, usually with pinkish brown mottling, shiny or dull, smooth, hilum 5 mm long, (1/8 circumference), grey with black central line and narrow raised black marginal aril." [Fruits and seeds relatively large, and unlikely to become a contaminant of produce or other crops]
704	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Propagules adapted to wind dispersal? No] "The fruits of <i>Mucuna bracteata</i> are green pods covered with brown hairs. Matured pods are golden brown to black containing four to six seeds. The dried fruits break open and disperse the seeds." [No evidence]

705	2010. Wu, Z.Y./Raven, P.H./Hong, D.Y. ( eds.). Flora of China. Vol. 10 (Fabaceae). Science Press Beijing, and Missouri Botanical Garden Press, St. Louis.,	[Propagules water dispersed? Possibly] "Forests, grasslands, roadsides, by rivers; 600–2000 m. Guangdong, Hainan, Yunnan" [No direct evidence, but distribution along water courses suggests pods may be occasionally dispersed by water]
706	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	"The fruits of <i>Mucuna bracteata</i> are green [Propagules bird dispersed? No] "The fruits of <i>Mucuna bracteata</i> are green pods covered with brown hairs. Matured pods are golden brown to black containing four to six seeds. The dried fruits break open and disperse the seeds." [No evidence]
707	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. Kew Bulletin. 39(1): 23-65.	[Propagules dispersed by other animals (externally)? No] "Fruit fleshy, curved, linear but tapering towards tip and somewhat swollen around seeds, somewhat flattened laterally, acute and downcurved or hooked at apex, 6-9 x 1-2-1-6 cm X 3 mm, dark brown or grey with dense dark brown or golden deciduous irritant bristles, 3-6 seeded, internal septa 2-4 mm thick, visible externally as slightly oblique grooves; margins thickened and with slight groove along suture. Seeds very similar to those of <i>M. pruriens</i> , ellipsoid, slightly flattened, ± 9 x 6 x 4 mm, brownish black, usually with pinkish brown mottling, shiny or dull, smooth, hilum 5 mm long, (1/8 circumference), grey with black central line and narrow raised black marginal aril." [No evidence, and with no means of external attachment]
708	2007. Chee, C.F.. <i>Mucuna bracteata</i> seeds and seed quality. Pp. 21-28 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Propagules survive passage through the gut? Unknown] "M. bracteata seeds naturally come with hard seed coat (testa). For these seeds to germinate under ambient conditions, this hard seed coat needs to be broken via some form of scarification. There are several methods that can be used to scarify the seeds, namely rubbing the M. bracteata seeds against sand paper or sharpening stones; treating M. bracteata seeds with sulphuric acid for 30 minutes, clipping off one end of the seed coat with a large nail clipper, boiling the seeds in water for 20 minutes or removing the seed coat totally." [Unknown if seeds would be consumed, but seed coat could potentially protect them from gut passage through an animal]
801	1984. Wilmot-Dear, C.M.. A Revision of <i>Mucuna</i> (Leguminosae-Phaseoleae) in China and Japan. Kew Bulletin. 39(1): 23-65.	[Prolific seed production (>1000/m <sup>2</sup> )? No] "Fruit fleshy, curved, linear but tapering towards tip and somewhat swollen around seeds, somewhat flattened laterally, acute and downcurved or hooked at apex, 6-9 x 1-2-1-6 cm X 3 mm, dark brown or grey with dense dark brown or golden deciduous irritant bristles, 3-6 seeded, internal septa 2-4 mm thick, visible externally as slightly oblique grooves; margins thickened and with slight groove along suture. Seeds very similar to those of <i>M. pruriens</i> , ellipsoid, slightly flattened, ± 9 x 6 x 4 mm, brownish black, usually with pinkish brown mottling, shiny or dull, smooth, hilum 5 mm long, (1/8 circumference), grey with black central line and narrow raised black marginal aril." [Unlikely, given relatively large seed size]
801	2007. Goh, K.J./Chiu, S.B.. <i>Mucuna bracteata</i> : A Cover Crop and Living Green Manure. Agricultural Crop Trust (ACT), Petaling Jaya, Malaysia	[Prolific seed production (>1000/m <sup>2</sup> )? No] No evidence of such high seed densities in cultivation or native range
802	2007. Chee, C.F.. <i>Mucuna bracteata</i> seeds and seed quality. Pp. 21-28 in Goh & Chiu (eds.). <i>Mucuna bracteata</i> : A Cover Crop & Living Green Manure. Agricultural Crop Trust, Petaling Jaya, Malaysia	[Evidence that a persistent propagule bank is formed (>1 yr)? Presumably Yes] "M. bracteata seeds naturally come with hard seed coat (testa). For these seeds to germinate under ambient conditions, this hard seed coat needs to be broken via some form of scarification. There are several methods that can be used to scarify the seeds, namely rubbing the M. bracteata seeds against sand paper or sharpening stones; treating M. bracteata seeds with sulphuric acid for 30 minutes, clipping off one end of the seed coat with a large nail clipper, boiling the seeds in water for 20 minutes or removing the seed coat totally."
802	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "The viability of good <i>Mucuna bracteata</i> seeds is more than 3 years even if they are subjected to strong sun and rain. Few immature seeds germinate, if they are kept in moist condition even if they are not subjected to pretreatment and the percentage of germination is poor"
803	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Well controlled by herbicides? Yes] "Robust growth of <i>Mucuna bracteata</i> may grow on main crop and hence circle weeding around the plant basin is a must. Strip weeding along the inter rows of the main crop may be carried out. facilitate easy cultural operations. To reduce cost on removing vines they can be controlled by spraying 2,4-D (Fenoxone) 250g and urea 100 gr dissolved in 100 liters of water." [As long as not growing on other desirable vegetation]
804	2011. Anonymous. <i>Mucuna bracteata</i> . <a href="http://www.mucunabracteata.org/">http://www.mucunabracteata.org/</a>	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Slashing of <i>Mucuna bracteata</i> for the purpose of removing vines trailing on the plants and making passage do not affect the growth of the cover crop. It regains growth within a month."
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown] Unlikely



