

Taxon: Calopogonium mucunoides	Family: Fabaceae
Common Name(s): calopo frisolilla rabo de iguana	Synonym(s): Calopogonium brachycarpum Calopogonium orthocarpum Urb. Stenolobium brachycarpum Benth.

Assessor: No Assessor	Status: Assessor Approved	End Date: 2 Jul 2014
WRA Score: 16.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Naturalized, Agricultural Weed, Smothering Vine, Self-Seeding, Low Palatability

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)	n
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)	y
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	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	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
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	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)		
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	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
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		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
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
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	[No evidence] "Although widely grown for decades, no improved cultivars of calopo are known to exist. The name 'Tortilla' is used to indicate seed of calopo sometimes harvested from naturalized stands in the Adelaide River area of the Northern Territory (Australia). It was at one time thought to have been a long-term locally adapted ecotype, but it is now believed to have come to the area as a contaminant in tropical kudzu seed from Queensland which had been sown in the late 1960s at the Tortilla Flats Research Farm. 'Tortilla' is likely to be similar to Queensland commercial material, which is rarely harvested and has never been assigned a cultivar name."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2014. 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
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Calopo is indigenous to tropical America and the West Indies."

202	Quality of climate match data	High
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed]	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	[Elevation range exceeds 1000 m in tropical climates, demonstrating environmental versatility] "Calopo is grown from sea level to 2000 m altitude, but is best adapted to altitudes 300-1500 m. It is well suited to the hot humid tropics with an annual rainfall exceeding 1250 mm but not tolerant of frost. It is moderately drought-tolerant but may die out if the dry season is prolonged."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Calopo is indigenous to tropical America and the West Indies."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"It was introduced into tropical Africa and Asia in the early 1900s and to Australia in the 1930s. Calopo was taken into use as a green manure and cover crop in Sumatra in 1922 and soon thereafter in the rubber and sisal plantations of the central and eastern parts of Java. It was then brought to Malaysia as a cover crop for rubber. Calopo became naturalized in Indonesia and Malaysia, and has spread to most humid tropical areas of the world."

301	Naturalized beyond native range	y
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	" <i>C. mucunoides</i> is native to tropical America, from Mexico to Argentina, and to some islands in the West Indies (USDA-ARS, 2013). <i>C. mucunoides</i> has been erroneously cited as native to all islands in the West Indies. However, updated checklists consider this species as naturalized in Cuba and Puerto Rico (Acevedo-Rodríguez and Strong, 2012; González-Torres et al., 2012). Because <i>C. mucunoides</i> has been widely introduced for horticulture, it is now naturalized in a wide range of habitats in Africa, Asia, Australia, and the Pacific Islands (Cook et al., 2005)."
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Calopo became naturalized in Indonesia and Malaysia, and has spread to most humid tropical areas of the world."

Qsn #	Question	Answer
	Queensland Government. 2011. Weeds of Australia - Calopo - <i>Calopogonium mucunoides</i> . http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Calopogonium_mucunoides.htm . [Accessed 2 Jul 2014]	"Naturalised Distribution - Naturalised in northern Queensland and the northern parts of the Northern Territory. It is most widespread in the Darwin and Gulf regions of the Northern Territory and on the Cape York Peninsula in far northern Queensland. Also naturalised on Christmas Island and in other tropical regions of the world (e.g. Papua New Guinea, Indonesia, the Philippines and Malaysia)."

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Agriculture & environmental weed

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	" <i>C. mucunoides</i> grows mostly in humid tropical areas from sea level up to 2000 masl. It is especially common in disturbed areas, forest edges, along roadsides and waterways and in agricultural lands where it grows as a weed (Cooks et al., 2005; Queensland Department of Primary Industries and Fisheries, 2011; PIER, 2013)." ... " <i>C. mucunoides</i> has been listed as a problem weed in sugarcane and groundnut crops in Australia (Queensland Department of Primary Industries and Fisheries, 2011)."
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Can become a localised weed in humid-tropical environments. Has invaded tropical ecosystems in northern Australia and is listed as a weed in the Philippines, Malaysia and Indonesia."
	Queensland Government Department of Agriculture, Fisheries and Forestry. 2014. Calopo (<i>Calopogonium mucunoides</i>). http://www.daff.qld.gov.au/plants/weeds-pest-animals/ants/weeds/a-z-listing-of-weeds/photo-guide-to-weeds/calopo . [Accessed 2 Jul 2014]	"Impacts - Economic: Can smother sugar cane."

304	Environmental weed	y
	Source(s)	Notes
	Queensland Government. 2011. Weeds of Australia - Calopo - <i>Calopogonium mucunoides</i> . http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Calopogonium_mucunoides.htm . [Accessed 2 Jul 2014]	"Calopo (<i>Calopogonium mucunoides</i>) is a vine that was introduced into Australia as a pasture legume. It has become naturalised in disturbed sites, waste areas and crops, along roadsides and waterways, and on the edges of rainforests in the wetter tropical regions of northern Australia. It is most common in the Darwin region and in surrounding bushland, and has also become a weed in Kakadu National Park. In these areas, populations are extending rapidly and it has been observed to form dense mats that smother native vegetation."

Qsn #	Question	Answer
	Queensland Government Department of Agriculture, Fisheries and Forestry. 2014. Calopo (<i>Calopogonium mucunoides</i>). http://www.daff.qld.gov.au/plants/weeds-pest-animals/ants/weeds/a-z-listing-of-weeds/photo-guide-to-weeds/calopo . [Accessed 2 Jul 2014]	"Impacts - Environmental - An aggressive creeper that can smother supporting vegetation."
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	"This fast-growing vine has escaped from cultivation, becoming a serious environmental problem mainly in Australia and the Pacific Islands (Queensland Department of Primary Industries and Fisheries, 2011; PIER, 2013). Once established, <i>C. mucunoides</i> has the potential to completely smother native vegetation as well as crops in active agricultural areas. Currently, <i>C. mucunoides</i> is classified as a "noxious weed" in Australia (Queensland Department of Primary Industries and Fisheries, 2011), and as an invasive species in Malaysia, the Philippines, Puerto Rico, and several islands in the Pacific Ocean such as French Polynesia, the Cook Islands, Samoa, Palau and the Solomon Islands (see distribution table for details; Acevedo-Rodríguez and Strong, 2012; PIER, 2013)."

305	Congeneric weed	y
	Source(s)	Notes
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 2 Jul 2014]	" <i>Calopogonium caeruleum</i> " ... "Weed potential - Considerable weed potential. Weed of tropical plantation crops, often smothering desirable grasses and other understory species. Has invaded seasonally wet tropical environments."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"A vigorous, creeping, twining or trailing herb, up to several m long, forming a tangled mass of foliage 30-50 cm deep, with densely pilose stems with long spreading ferruginous hairs. Leaves trifoliolate, petiole up to 16 cm long, pilose; leaflets elliptical, ovate or rhomboid-ovate, (1.5-)4-1 (-15) cm x (1-)2-5(-9) cm, the laterals oblique, adpressed pilose or pubescent on both surfaces."

402	Allelopathic	
	Source(s)	Notes

Qsn #	Question	Answer
	Sahid, I., Tasrif, A., Sastroutomo, S. S., & Latiff, A. 1993. Allelopathic potential of legume cover crops on selected weed species. <i>Plant Protection Quarterly</i> , 8(2): 49-53	[<i>Calopogonium mucunoides</i> moderately allelopathic under controlled settings, but not as strong as other plants tested] "In laboratory, greenhouse and field trials (conducted on Serdang Series soils in Malaysia), the allelopathic effects were evaluated of legume cover crops (<i>Calopogonium caeruleum</i> , <i>Calopogonium mucunoides</i> , <i>Centrosema pubescens</i> , <i>Mucuna cochinchinensis</i> and <i>P. javanica</i>) on the germination and growth of 2 weed species (<i>Asystasia intrusa</i> and <i>Paspalum conjugatum</i>). <i>Calopogonium caeruleum</i> and <i>M. cochinchinensis</i> resulted in the greatest phytotoxicity to both weeds, as compared to other legume cover crops. <i>A. intrusa</i> and <i>P. conjugatum</i> germination decreased by 19 and 34%, resp., compared to the control, when grown in 66.6 g/litre aqueous extract of <i>Calopogonium caeruleum</i> and by 23 and 27%, resp., in 66.6 g aqueous extract of <i>M. cochinchinensis</i> . Radical length and the DW of both weeds were significantly reduced by 66.6 g extracts of both <i>Calopogonium caeruleum</i> and <i>M. cochinchinensis</i> . Emergence and the DW of both weeds were affected when grown under greenhouse conditions in the presence of increasing amounts of <i>M. cochinchinensis</i> and <i>Calopogonium caeruleum</i> debris incorporated into the soil medium, but were not affected by the presence of <i>Centrosema pubescens</i> ."

403	Parasitic	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"A vigorous, creeping, twining or trailing herb, up to several m long" [No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	[Poor palatability] "It is grown as a forage, used especially during the latter part of the dry season." ... "Calopo forage is not very palatable to cattle because taste and smell limit the intake, but animals are forced to eat it during the dry season when little green fodder is available. Its low palatability, which is usually ascribed to the abundance of hairs on the stems and leaves, contributes to its persistence in mixed swards." ... "Whether grazed or cut and fed, calopo is often refused by cattle although they eat it less reluctantly during the dry season. It is usually cut by hand and is seldom conserved as hay or silage."

405	Toxic to animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Toxicity - Does not contain toxic factors."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Calopo is susceptible to viruses in Costa Rica, Guatemala and Panama. Beetles and leaf-eating caterpillars have been observed on calopo in Malaysia, but they have not been a serious problem."
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Pests and diseases - Affected by viruses, including cowpea severe mosaic comovirus geminiviruses, and Centrosema mosaic potexvirus, but these rarely significantly impede growth. Susceptible to the root-knot nematode, <i>Meloidogyne javanica</i> ."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 2 Jul 2014]	"Does not contain toxic factors."
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	No evidence

Qsn #	Question	Answer
408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Will not tolerate fire. However, can regenerate from seed." [Unlikely, but fuel loads may increase fire risk or act as a fire ladder during dry periods]
	FAO. 2014. Grassland Species Profiles - <i>Calopogonium mucunoides</i> . http://www.fao.org/ag/agp/AGPC/doc/gbase/data/Pf000011.HTM . [Accessed 2 Jul 2014]	[Dry biomass may increase fuel load] "May die out under dry conditions and regenerate in the wet season as an annual form seed, or simply drop its leaves, depending on the intensity of the dry season."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Poor tolerance of heavy shade."
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	"This species is able to grow in partially shaded areas but is not tolerant of heavy shade (Cook et al., 2005)."
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	[Tolerates, but does not thrive in shade] "Calopo is poorly adapted to shade, showing a marked decline in top growth, root growth and nodulation with decreasing light intensities. This may be attributed to the 'non-plasticity' of leaves under shade as compared with other, shade-tolerant plants such as <i>Calopogonium caeruleum</i> (Benth.) Sauv., <i>Centrosema pubescens</i> and <i>Desmodium heterocarpon</i> (L.) DC. subsp. <i>heterocarpon</i> var. <i>ovalifolium</i> (Wallich ex Prain) Rugayah. Under low light intensities (< 20%) calopo leaves are reduced in size by 70% compared with leaves in full sunlight."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Grows on a wide range of soil types, but prefers clay soils with pH 4.5-5.0. In tropical America, grows well on acid soils with high Al saturation. Poor tolerance of salinity."

411	Climbing or smothering growth habit	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Regular slashing is needed when calopo is planted as cover crop in young oil palm and rubber plantations, to prevent the cover from overgrowing the trees."

412	Forms dense thickets	n
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	"Once established, <i>C. mucunoides</i> has the potential to completely smother native vegetation as well as crops in active agricultural areas."

501	Aquatic	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Calopo is grown from sea level to 2000 m altitude, but is best adapted to altitudes 300-1500 m." [Terrestrial]

502	Grass	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	'A vigorous, creeping, twining or trailing herb, up to several m long' [Fabaceae]

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	[N-fixing, but not woody] "Calopo is well recognized as being a valuable pioneer legume to protect the soil surface, reduce soil temperature, fix atmospheric nitrogen, improve soil fertility and control the growth of weeds." ... "A vigorous, creeping, twining or trailing herb..."

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

Qsn #	Question	Answer
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"A vigorous, creeping, twining or trailing herb, up to several m long" ... "It forms a dense entangled sward in 4-5 months after sowing, but the plants are short-lived and may only persist for 1-2 years."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	No evidence

602	Produces viable seed	y
	Source(s)	Notes
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"Calopo is usually propagated by seed, sown at 1-3 kg/ha."

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

604	Self-compatible or apomictic	y
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	" <i>C. mucunoides</i> has been described as a hermaphroditic self-compatible species (FAO, 2013)."
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 1 Jul 2014]	"It is self-pollinated and seeds freely."

605	Requires specialist pollinators	n
	Source(s)	Notes

Qsn #	Question	Answer
	Chen Chin Peng & Aminah, A., 1997. <i>Calopogonium mucunoides</i> Desv.[Internet] Record from Proseabase. Faridah Hanum, I & van der Maesen, L.J.G. (Editors). PROSEA (Plant Resources of South East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . [Accessed 2 Jul 2014]	[No evidence from floral morphology] "Inflorescence a slender raceme, up to 20 cm long, peduncle 0-17 cm long, ferruginous pilose; flowers in fascicles of 2-6, blue or purple; calyx campanulate, unequally 5-lobed; corolla with emarginate standard, about 1 cm long." ... "It is self-pollinated and seeds freely."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	" <i>C. mucunoides</i> only spreads by seeds. However, it is a fast-growing vine with the potential to grow forming dense mats at ground level once established at a new site."

607	Minimum generative time (years)	1
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	[annual to short-lived perennial] "Under humid tropical conditions, <i>C. mucunoides</i> grows as a perennial plant, however, in dry environments it behaves as an annual (Cook et al., 2005). <i>C. mucunoides</i> has been reported flowering and fruiting from December to March in Puerto Rico (Acevedo-Rodríguez, 2005)."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	[Possibly, although seeds lack means of external attachment] "Fruit is a legume, oblong-linear, flattened, hirsute, 2-4 × 0.3-0.5 cm. Seeds almost quadrangular, approximately 3 mm wide, reddish brown and shiny (Acevedo-Rodríguez, 2005)." ... " <i>C. mucunoides</i> spreads by seeds which can be easy dispersed as a contaminant in hay or in mud adhering to vehicles and stock. Seeds are also expelled short distances from the pods which twist upon drying (Smith, 2002)."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	" <i>C. mucunoides</i> has been widely introduced as a forage legume and nitrogen fixing plant in tropical and subtropical regions (Cook et al., 2005)."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	[Possibly Yes] " <i>C. mucunoides</i> spreads by seeds which can be easy dispersed as a contaminant in hay or in mud adhering to vehicles and stock. Seeds are also expelled short distances from the pods which twist upon drying (Smith, 2002)."

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	"Seeds are ejected short distances from the pods which twist upon drying. Additionally, because plants are common in disturbed and agricultural areas, seeds can easily be dispersed as contaminants in mud or hay adhering to vehicles, humans or livestock (Smith, 2002; Cook et al., 2005)."

705	Propagules water dispersed	n
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	[No evidence] "Seeds are ejected short distances from the pods which twist upon drying. Additionally, because plants are common in disturbed and agricultural areas, seeds can easily be dispersed as contaminants in mud or hay adhering to vehicles, humans or livestock (Smith, 2002; Cook et al., 2005)."

706	Propagules bird dispersed	n
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	"Seeds are ejected short distances from the pods which twist upon drying. Additionally, because plants are common in disturbed and agricultural areas, seeds can easily be dispersed as contaminants in mud or hay adhering to vehicles, humans or livestock (Smith, 2002; Cook et al., 2005)."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	CABI. 2014. <i>Calopogonium mucunoides</i> In: Invasive Species Compendium. www.cabi.org/isc	[Possibly, although seeds lack means of external attachment] "Fruit is a legume, oblong-linear, flattened, hirsute, 2-4 × 0.3-0.5 cm. Seeds almost quadrangular, approximately 3 mm wide, reddish brown and shiny (Acevedo-Rodríguez, 2005)." ... "C. mucunoides spreads by seeds which can be easy dispersed as a contaminant in hay or in mud adhering to vehicles and stock. Seeds are also expelled short distances from the pods which twist upon drying (Smith, 2002)."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Gardener, C.J., Mclvor, J.G. & Jansen, A. 1993. Survival of Seeds of Tropical Grassland Species Subjected to Bovine Digestion. <i>Journal of Applied Ecology</i> 30(1): 75-85	"Table 1. Fraction of germinable, hard and rotten seed before and after digestion for 44 tropical and temperate legumes" [Calopogonium mucunoides survives bovine digestion]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes

Qsn #	Question	Answer
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	[Possibly Yes] "Produces high yields of seed. In the Brazilian savannas, pure seed yields ranged from 118-860 kg/ha/year, with early-flowering accessions being higher yielding than late-flowering accessions. Elsewhere, yields of 200-300 kg/ha have been recorded. Seed may sprout in the pod in wet conditions."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 1 Jul 2014]	"Storage Behaviour: Orthodox Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collections 13 years; average germination change 90 to 100%, mean storage period 11 years, 4 collections"
	FAO. 2014. Grassland Species Profiles - <i>Calopogonium mucunoides</i> . http://www.fao.org/ag/agp/AGPC/doc/gbase/data/Pf000011.HTM . [Accessed 1 Jul 2014]	"To break dormancy: (a) treat with concentrated sulphuric acid (sp. gr. 1.8) for 20 min. (Prodonoff, 1968) or with 24 or 36 N sulphuric acid for seven minutes, wash and dry (Black, 1968); (b) scarify with sand (Otero, 1952, obtained 99 percent germination); (c) infra-red irradiation-Philips Infraphil lamp 13373/479 (150 watts) for eight hours or Osram I.R.R. 4892 (250 watts) for 16 hours (Wycherley, 1960). Inoculation not necessary, but preferable. Pelleting not necessary unless to protect rhizobia when rock phosphate should be used (Norris, 1967). Insect and disease control usually not necessary."

803	Well controlled by herbicides	
	Source(s)	Notes
	Queensland Government Department of Agriculture, Fisheries and Forestry. 2014. Calopo (<i>Calopogonium mucunoides</i>). http://www.daff.qld.gov.au/plants/weeds-pest-animals/ants/weeds/a-z-listing-of-weeds/photo-guide-to-weeds/calopo . [Accessed 2 Jul 2014]	"Herbicide control: Only one chemical (glufosinate-ammonium) is registered for use on calopo in various agricultural and non-agricultural situations including rights-of-way, commercial, industrial and public land in Queensland. Off-label use permit (Permit No. PER11463) allows other herbicides for the control of environmental weeds in non-agricultural areas, bushland, forests, wetlands, and coastal and adjacent areas."
	FAO. 2014. Grassland Species Profiles - <i>Calopogonium mucunoides</i> . http://www.fao.org/ag/agp/AGPC/doc/gbase/data/Pf000011.HTM . [Accessed 2 Jul 2014]	"Tolerance to herbicides - No data available."

Qsn #	Question	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M., & Schultze-Kraft, R. 2005. Tropical Forages: an interactive selection tool., [CD-ROM], SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm . [Accessed 1 Jul 2014]	"Will not tolerate fire. However, can regenerate from seed." ... "Intolerant of heavy grazing or regular cutting. "

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely naturalized
- Agricultural and environmental weed (esp. in Australia)
- Other *Calopogonium* species have become invasive
- Possibly allelopathic
- Poor palatability to livestock
- Tolerates many soil types
- Smothering growth habit
- Self-compatible
- Rapid growth rate & able to reach maturity in 1 year
- Seeds readily dispersed by a variety of vectors
- Able to form a persistent seed bank

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Provides fodder for livestock, although palatability is low
- Non-toxic
- Not reported to spread vegetatively
- Intolerant of heavy cutting & fire