

Taxon: *Senna macranthera* (DC. ex Collad.) H. S. Irwin & Barneby **Family:** Fabaceae

Common Name(s): caboclo
fedegoso
large-flowered cassia
pra-tudo **Synonym(s):** *Cassia macranthera* Collad.

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 13 Oct 2022

WRA Score: 8.0

Designation: H(HPWRA)

Rating: High Risk

Keywords: Shrub/Tree, Naturalized Elsewhere, Fast-Growing, Self-Fertile, Autochorous

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		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	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	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
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

Qsn #	Question	Answer Option	Answer
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	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	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)		
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		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m ²)	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		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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
	KewScience. (2022). Plants of the World Online - <i>Senna macranthera</i> . http://powo.science.kew.org . [Accessed 12 Oct 2022]	[No evidence of domestication] "The native range of this species is S. Tropical America. It is a shrub or tree and grows primarily in the seasonally dry tropical biome(s). It is used for food."

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

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 11 Oct 2022]	"Native Southern America NORTHERN SOUTH AMERICA: Venezuela [Bolívar, Anzoátegui, Guárico, Monagas, Lara] BRAZIL: Brazil [Bahia, Ceará, Espírito Santo, Goiás, Minas Gerais, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte] WESTERN SOUTH AMERICA: Colombia [Boyacá, Cundinamarca, Santander], Ecuador [Loja], Peru [Amazonas, Cajamarca, La Libertad]"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 11 Oct 2022]	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Bananas Raras. (2022). <i>Senna campicola</i> and <i>Senna macranthera</i> . http://www.bananasraras.org/frutasrarasingles/senna.htm . [Accessed 12 Oct 2022]	"Both species have rapid growth, are resistant to frost to 0°C or -1°C (30° to 32°F), and grow at higher altitudes of 200 to 800 m (667 to 2,667 feet). "
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[Elevation range of <i>Senna macranthera</i> var. <i>macranthera</i> >1000 m. Other varieties have a more constricted range] "Open woodlands of the Atlantic slope and inland in gallery forest and chapadao, spreading and persisting in capoeira, 10-1450 m"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 11 Oct 2022]	"Native Southern America NORTHERN SOUTH AMERICA: Venezuela [Bolívar, Anzoátegui, Guárico, Monagas, Lara] BRAZIL: Brazil [Bahia, Ceará, Espírito Santo, Goiás, Minas Gerais, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte] WESTERN SOUTH AMERICA: Colombia [Boyacá, Cundinamarca, Santander], Ecuador [Loja], Peru [Amazonas, Cajamarca, La Libertad]"
	Keller, H. A., Hurrell, J. A., Vanni, R. O., & Delucchi, G. (2012). <i>Senna macranthera</i> (Leguminosae), una especie ornamental naturalizada en la Argentina. <i>Bonplandia</i> , 21 (1), 55–60	"This paper includes the first report of <i>Senna macranthera</i> (DC. ex Collad.) H. S. Irwin & Barneby (Leguminosae) as naturalized species in the province of Misiones, Argentina. Its description, distribution, phenology, uses, comments about its naturalization and reference material are presented."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Keller, H. A., Hurrell, J. A., Vanni, R. O., & Delucchi, G. (2012). <i>Senna macranthera</i> (Leguminosae), una especie ornamental naturalizada en la Argentina. <i>Bonplandia</i> , 21 (1), 55–60	"Usos: Se cultiva en especial por su valor ornamental, para el arbolado urbano, parques y jardines; se ha introducido en diversos países." [t is grown especially for its value ornamental, for urban trees, parks and gardens; has been introduced in various countries.]

301	Naturalized beyond native range	y
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"References: Guyana-W-32, Brazil-I-984"

Qsn #	Question	Answer
	Keller, H. A., Hurrell, J. A., Vanni, R. O., & Delucchi, G. (2012). <i>Senna macranthera</i> (Leguminosae), una especie ornamental naturalizada en la Argentina. <i>Bonplandia</i> , 21 (1), 55–60	"This paper includes the first report of <i>Senna macranthera</i> (DC. ex Collad.) H. S. Irwin & Barneby (Leguminosae) as naturalized species in the province of Misiones, Argentina. Its description, distribution, phenology, uses, comments about its naturalization and reference material are presented."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"References: Guyana-W-32, Brazil-I-984" [Cited as a weed of unspecified impacts]
	Ziller, S. R., & de Sá Dechoum, M. (2009). Developing state strategies on invasive alien species in Brazil. <i>Aliens: The invasive Species Bulletin</i> , 28: 33-37	[Removed from a native ecosystem in Brazil, where it was cultivated. Impacts otherwise not specified] "The Vila Velha State Park, which protects some 3,000 hectares of temperate grasslands and araucaria forests, was chosen to be a model park implementing invasive species control" ... "Other species removed were black wattle <i>Acacia mearnsii</i> , china berry <i>Melia azedarach</i> , pearl acacia <i>Acacia podalyriifolia</i> , tree privet <i>Ligustrum lucidum</i> , japanese cherry <i>Hovenia dulcis</i> , loquat <i>Eriobotrya japonica</i> , gums <i>Eucalyptus</i> spp. and species native to other ecosystems in Brazil aleluia <i>Senna macranthera</i> and angico <i>Anadenanthera colubrina</i> , formerly used for ornamental purposes."
	CABI. (2022). <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"References: Guyana-W-32, Brazil-I-984" [No evidence. Cited as a weed of unspecified impacts]
	CABI. (2022). <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

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	"References: Guyana-W-32, Brazil-I-984" [Listed as a weed of unspecified impacts]
	CABI. (2022). <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

305	Congeneric weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	" <i>Senna alata</i> ...Where invasive it forms dense thickets, shading out all other plants and preventing any regeneration of native species. The shrub establishes quickly in disturbed sites. Heavy infestations may restrict access to water for livestock and wildlife (Parsons and Cuthbertson, 2001)." ... " <i>Senna didymobotrya</i> ... Christmas bush forms extensive and dense thickets climbing over native vegetation, impeding growth and regeneration of native species. The shrub grows abundantly along rivers and in savannas. Extensive thickets affect wildlife by reducing habitats and restricting access to water (Macdonald, 1983; Henderson, 2001). Little is known about the ecology of this plant as an invader."
	Wakibara, J. V., & Mnaya, B. J. (2002). Possible control of <i>Senna spectabilis</i> (Caesalpinaceae), an invasive tree in Mahale mountains National Park, Tanzania. <i>Oryx</i> , 36(4), 357-363	" <i>Senna spectabilis</i> is a tree native to South and Central America. Thirty-five years ago it invaded the Mahale Mountains National Park in western Tanzania where it presently covers c. 225 ha. We quantified its occurrence relative to that of sympatric species of native trees, and compared girdling and felling as methods for its control in three 0.25 ha plots. Within invaded areas of forest this exotic species was both the most abundant and dominant of the 26 species of tree recorded. During 4 years of monitoring the experimental plots the abundance of <i>S. spectabilis</i> declined markedly in the plots where control methods were practised, but increased slightly in the unmanipulated plot. In contrast, the abundance of native tree species increased markedly in the plots where <i>S. spectabilis</i> had been removed or killed, with higher densities in the girdled rather than the felled plot. <i>S. spectabilis</i> appears to suppress the recruitment of native trees in the Park, and its removal can encourage regeneration of the degraded forest without the need for artificial seeding."
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	<i>Senna alata</i> , <i>S. bicapsularis</i> , <i>S. didymobotrya</i> , <i>S. obtusifolia</i> [listed as significant weeds of natural areas]

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[No evidence] "Weak leaning or sarmentose, or more often erect and bushy shrubs or treelets at anthesis 1-3 m and slender trees of rapid growth reaching 3-9 m with trunk 6-15 cm diam, the terete or low-ribbed branchlets like the bicolored or subcon-colorous foliage variably pilosulous or strigulose with straight spreading, forwardly incurved, or narrowly ascending to subappressed, or truly appressed hairs up to 0.2-0.8 mm, the lfts pubescent beneath even if only thinly so, commonly on both faces, exceptionally subglabrous, the blades chartaceous, either olivaceous or brownish-olivaceous on both faces or paler beneath, sometimes papillate above, the inflorescence usually paniculate and exserted but either fully elevated above developed lvs or the lower racemes subtended by reduced lvs, the distal ones often by bladeless petioles. Stipules early dry, caducous from a slightly elevated scar before or with full expansion of associated lf, sometimes persistent into maturity of lf but then deciduous, linear-lanceolate to setiform 3-16 x 0.25-0.6 mm."

Qsn #	Question	Answer
402	Allelopathic	n
	Source(s)	Notes
	Souza, H.N., Cardoso, I.M., Fernandes, J.M., Garcia, F.C., Bonfim, V.R., Santos, A.C., Carvalho, A.F. & Mendonca, E.S. (2010). Selection of native trees for intercropping with coffee in the Atlantic Rainforest biome. <i>Agroforestry systems</i> , 80(1), 1-16	[No evidence. Reported to be compatible with coffee] "Considering that all trees listed in Table 3 are compatible with coffee, we suggest that the best five tree species to intercrop with coffee are <i>A. sellowiana</i> , <i>Inga</i> spp., <i>Musa paradisiaca</i> , <i>S. macranthera</i> and <i>S. mauritianum</i> , because they scored highest (Table 1) in the second hierarchical level of criteria mentioned in Fig. 2."

403	Parasitic	n
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	"Weak leaning or sarmentose, or more often erect and bushy shrubs or treelets at anthesis 1-3 m and slender trees of rapid growth reaching 3-9 m with trunk 6-15 cm diam" [No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 12 Oct 2022]	"Edible Uses - None known" [Palatability to animals not addressed]

405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 12 Oct 2022]	"Known Hazards None known"
	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
	Wagstaff, D.J. (2008). <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Lin, M. T., Kitajima, E. W., & Costa, C. L. (1980). Association of cassia mild mosaic virus with dieback of <i>Cassia macranthera</i> in central Brazil. <i>Plant Disease</i> , 64(6), 587-589	[May impact ornamental members of the <i>Cassia</i> or <i>Senna</i> genera] "Abstract : The virus was isolated from leaves of an infected tree in Brasilia zoo which showed chlorotic spots and vein chlorosis in young leaves, and mild mosaic in old leaves. Symptoms of the disease were reproduced in 5 seedlings inoculated with the isolate, which also infected <i>C. occidentalis</i> and <i>C. coluteoides</i> . A survey of 101 <i>C. macranthera</i> in Brasilia, Sobradinho and Planaltina (where the species is extensively used as a shade tree in parks and streets) in Oct., 1977, demonstrated that only infected trees showed dieback."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 12 Oct 2022]	"Known Hazards None known"
	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
	Wagstaff, D.J. (2008). <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiinae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[No evidence of increased fire risk in forests where it occurs] "Open woodlands of the Atlantic slope and inland in gallery forest"

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	de Souza, R. P., & Válio, I. F. M. (2001). Seed size, seed germination, and seedling survival of Brazilian tropical tree species differing in successional status. <i>Biotropica</i> , 33(3), 447-457	"Through the analysis of regression curves of seedling survival versus time and by using the slope of regression as an index for shade tolerance, <i>M. peruifernm</i> appeared as the most shade tolerant species, followed in sequence by <i>S. macranthera</i> ..."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 12 Oct 2022]	"Succeeds in a wide range of soils[419]."

Qsn #	Question	Answer
	Bananas Raras. (2022). <i>Senna campicola</i> and <i>Senna macranthera</i> . http://www.bananasraras.org/frutasrarasingles/senna.htm . [Accessed 12 Oct 2022]	"The soil may be deep, moist, neutral, with sandy or clay formation (red soil) and rich in organic matter or acid and low for <i>Senna campicola</i> ."
411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	"Weak leaning or sarmentose, or more often erect and bushy shrubs or treelets at anthesis 1-3 m and slender trees of rapid growth reaching 3-9 m with trunk 6-15 cm diam"
412	Forms dense thickets	
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[Some varieties described as a component of thicket vegetation. Unknown if trees are capable of forming dense stands in native or introduced range] " <i>Senna macranthera</i> (Colladon) var. <i>nervosa</i> ... Gallery forest, thickets along streams, chapadao, outcrops in cerrado, thriving in disturbed or relic woodland and sometimes in hedges" ... " <i>Senna macranthera</i> (Colladon) var. <i>lindeni</i> ... Thickets in fields and relic scrub forest"
501	Aquatic	n
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[Terrestrial] "Open woodlands of the Atlantic slope and inland in gallery forest"
502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 12 Oct 2022]	"Family: Fabaceae (alt. Leguminosae) Subfamily: Caesalpinioideae Tribe: Cassieae Subtribe: Cassiinae"
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Souza, H.N., Cardoso, I.M., Fernandes, J.M., Garcia, F.C., Bonfim, V.R., Santos, A.C., Carvalho, A.F. & Mendonca, E.S. (2010). Selection of native trees for intercropping with coffee in the Atlantic Rainforest biome. <i>Agroforestry systems</i> , 80(1), 1-16	"Table 4 Leguminosae trees surveyed in seven agroforestry systems, Zona da Mata, Minas Gerais, Atlantic Coastal Rainforest, Brazil" [<i>Senna macranthera</i> - Nodulation = No]

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	"Weak leaning or sarmentose, or more often erect and bushy shrubs or treelets at anthesis 1-3 m and slender trees of rapid growth reaching 3-9 m with trunk 6-15 cm diam"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	WFO (2022). World Flora Online. Published on the Internet; http://www.worldfloraonline.org . [Accessed 13 Oct 2022]	"IUCN Red List Status: Least Concern"
	Groom, A. (2012). <i>Senna macranthera</i> . The IUCN Red List of Threatened Species 2012: e.T19892006A20140434. http://dx.doi.org/10.2305/IUCN.UK.2012.RLTS.T19892006A20140434.en . [Accessed 13 Oct 2022]	"The range of this taxon exceeds the threshold of 20,000 km ² for a threatened category under criterion B. The taxon is known to occur within the protected areas network and is not considered to be threatened at present. A rating of Least Concern is therefore given."

602	Produces viable seed	y
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 12 Oct 2022]	"Propagation - Seed - it has a hard seedcoat and may benefit from scarification before sowing to speed up germination. This can usually be done by pouring a small amount of nearly boiling water on the seeds (being careful not to cook them!) and then soaking them for 12 - 24 hours in warm water. By this time they should have imbibed moisture and swollen - if they have not, then carefully make a nick in the seedcoat (being careful not to damage the embryo) and soak for a further 12 hours before sowing. Sow the seed in a partially shaded position in a nursery seedbed. A moderate germination rate can usually be expected, with the seed sprouting within 10 - 30 days [419]. When the seedlings are 4 - 6cm tall, pot them up into individual containers and they should be ready to plant out 4 - 5 months later [419]."
	Bananas Raras. (2022). <i>Senna campicola</i> and <i>Senna macranthera</i> . http://www.bananasraras.org/frutasrarasingles/senna.htm . [Accessed 12 Oct 2022]	"Propagation: Seed of Manduí are elongated and similar to cucumber seed and the seed of Manduirana are round, color of coffee with milk. These should be harvested when the fruit is brown and dry, that is if the birds do not eat before. Should be sown as soon as harvested, germinated in 20 to 40 days, the seedlings grow rapidly and adapt to any type of soil."

Qsn #	Question	Answer
	Ferreira, R. A., Davide, A. C., & Motta, M. S. (2004). Vigour and viability of <i>Senna multijuga</i> (Rich) Irwin et Barn. and <i>Senna macranthera</i> (Collad.) Irwin et Barn., in a seed soil bank in a nursery. <i>Revista Brasileira de Sementes</i> , 26, 24-31	"Seed viability of tropical forest species in seed soil banks is not well known. This research aimed to evaluate the seed vigour and potential viability of <i>S. multijuga</i> and <i>S. macranthera</i> in direct sowing under nursery conditions and to test the efficiency of the tetrazolium test to determine quickly the seed viability of these species. The germination test, tetrazolium test and seedling emergence test can be used to evaluate seed viability of two species. The tetrazolium test (concentration 0,075%, and 30°C) was also used to evaluate the potential viability at 6, 12 and 18 months from seeds in a soil bank. <i>S. multijuga</i> seeds presented 93,1%; 65,3%; 52,5% and 17,7% potential viability at sowing and after 6, 12 and 18 months, in the soil bank respectively, and <i>S. macranthera</i> presented 79,3%; 73,9%; 32,5% and 14,7% at sowing and after 6, 12 and 18 months in soil bank, respectively. The species studied had typical behavior of a persistent seed bank."

603	Hybridizes naturally	
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiinae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	Unknown. No evidence. Hybrids documented in genus

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Vidal, W.N., Vidal, M.R.R., & Leite, H.G. (1988). Floral biology of <i>Cassia macranthera</i> DC. var. <i>macranthera</i> , <i>Viscosa</i> . <i>Revista Arvore</i> , 12(1): 58-71	"Reproduction occurs mainly by autogamy, geitonogamy, and less frequently by xenogamy."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Vidal, W.N., Vidal, M.R.R., & Leite, H.G. (1988). Floral biology of <i>Cassia macranthera</i> DC. var. <i>macranthera</i> , <i>Viscosa</i> . <i>Revista Arvore</i> , 12(1): 58-71	"Effective pollinators were <i>Bombus morio</i> , <i>Centris</i> (<i>Melanocentris</i>) <i>dorsata</i> and occasional ones were <i>Xylocopa</i> ep., <i>Xylocopa frontalis</i> and <i>Exomalopsis</i> sp."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 13 Oct 2022]	"Propagation: Seed - it has a hard seedcoat and may benefit from scarification before sowing to speed up germination." [No evidence of vegetative spread]

Qsn #	Question	Answer
607	Minimum generative time (years)	
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2022). <i>Senna macranthera</i> . http://tropical.theferns.info . [Accessed 13 Oct 2022]	"Growth Rate: Fast" ... "A fast-growing tree, easily reaching a height of 3.5 metres within 2 years from seed [419]." [Unknown. Probably 1-2 years]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	de Lima, E. A., & de Melo, J. I. M. (2015). Biological spectrum and dispersal syndromes in an area of the semi-arid region of north-eastern Brazil. <i>Acta Scientiarum. Health Sciences</i> , 37(1), 91-100	"Table 1. Floristic list containing fruit types, respective dispersal syndromes and life forms." [<i>Senna macranthera</i> - Dispersal syndrome = autochory. Self-dispersal of seeds, the physical and often explosive discharge of seeds from the fruit]
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiinae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[Seeds relatively small, but lack means of attachment] "Pod pendulous or (when short) irregularly spreading, the stipe ±4-9 mm, the subcylindroid body straight or sinous 6-26 x 0.6-1.4 cm, the green valves becoming lustrously castaneous or blackish and glabrate, early corrugated by expression of the valves over the biseriate seeds, tardily dehiscent through the ventral suture and thus exposing the seeds embedded in foetid pulp; seeds turned broadside to the septa, compressed-pyriform 2.4-5.3 mm, the testa lustrous castaneous or mahogany-brown, cross-crackled, exareolate."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Keller, H. A., Hurrell, J. A., Vanni, R. O., & Delucchi, G. (2012). <i>Senna macranthera</i> (Leguminosae), una especie ornamental naturalizada en la Argentina. <i>Bonplandia</i> , 21(1), 55-60	"Usos: Se cultiva en especial por su valor ornamental, para el arbolado urbano, parques y jardines; se ha introducido en diversos paises." [it is grown especially for its value ornamental, for urban trees, parks and gardens; has been introduced in various countries.]

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	de Lima, E. A., & de Melo, J. I. M. (2015). Biological spectrum and dispersal syndromes in an area of the semi-arid region of north-eastern Brazil. <i>Acta Scientiarum. Health Sciences</i> , 37(1), 91-100	"Table 1. Floristic list containing fruit types, respective dispersal syndromes and life forms." [<i>Senna macranthera</i> - Dispersal syndrome = autochory. Self-dispersal of seeds, the physical and often explosive discharge of seeds from the fruit]
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[No evidence] "Dispersed by: Humans" [Not grown with produce, and as an ornamental tree, unlikely to become a produce contaminant]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes

Qsn #	Question	Answer
	de Lima, E. A., & de Melo, J. I. M. (2015). Biological spectrum and dispersal syndromes in an area of the semi-arid region of north-eastern Brazil. <i>Acta Scientiarum. Health Sciences</i> , 37(1), 91-100	[No specific adaptations for wind dispersal, but wind may aid in distance and direction of dispersal] "Table 1. Floristic list containing fruit types, respective dispersal syndromes and life forms." [<i>Senna macranthera</i> - Dispersal syndrome = autochory. Self-dispersal of seeds, the physical and often explosive discharge of seeds from the fruit]

705	Propagules water dispersed	
	Source(s)	Notes
	Irwin, H. S., & Barneby, R. C. (1982). The American Cassiinae a synoptical revision of Leguminosae tribe Cassiiae subtribe Cassiinae in the new world. <i>Memoirs of The New York Botanical Garden</i> , 35(part 1), 1-918	[Unknown. Dispersal of seeds from trees occurring along streams may be facilitated by water] " <i>Senna macranthera</i> (Colladon) var. <i>nervosa</i> ... Gallery forest, thickets along streams" ... " <i>Senna macranthera</i> (Colladon) var. <i>andina</i> ... Dry rocky slopes, hedgerows and along drainage runoff channels"

706	Propagules bird dispersed	n
	Source(s)	Notes
	Gagetti, B. L., Piratelli, A. J., & Piña-Rodrigues, F. C. M. (2016). Fruit color preference by birds and applications to ecological restoration. <i>Brazilian Journal of Biology</i> , 76, 955-966	"Appendix A. Plant species available in the nursery or planted in the Centro de Experimentos Florestais, in the region of Itu, state of São Paulo, with colors of fruits/diasporas and dispersal syndrome (biotic or abiotic)." [<i>Senna macranthera</i> - Seed dispersal = Abiotic]
	Silva, M. C. N. A., & Rodal, M. J. N. (2009). Padrões das síndromes de dispersão de plantas em áreas com diferentes graus de pluviosidade, PE, Brasil. <i>Acta Botanica Brasílica</i> , 23(4), 1040-1047	"Tabela 1. Atributos das espécies estudadas nas áreas de Floresta (FLO), Caruaru (CAR) e Tapacurá (TAP), PE, Brasil." [<i>Senna macranthera</i> - SD = Dispersal Syndrome - autochory]
	Fadini, R. F. & De Marco Jr., P. (2004). Interações entre aves frugívoras e plantas em um fragmento de mata atlântica de Minas Gerais. <i>Ararajuba</i> 12(2): 97-103	[Birds observed eating mesocarp, and leaving seeds in fruit] "A única espécie de ave predadora de sementes registrada foi a maitaca-verde (<i>Pionus maximiliani</i>), que predou os frutos de <i>Inga edulis</i> para consumir as sementes. Outras duas espécies, o sanhaço-cinza (<i>Thraupis sayaca</i>) e a saíra-cabocla (<i>Tangara cayana</i>) foram observadas consumindo o mesocarpo carnoso de <i>Senna macranthera</i> e deixando a semente no fruto, não atuando como dispersoras. As demais espécies consumiram os frutos por inteiro." [Translation: The only species of seed predator recorded was the green parrot (<i>Pionus maximiliani</i>), which preyed on the fruits of <i>Inga edulis</i> to consume the seeds. The other two species, the gray tanager (<i>Thraupis sayaca</i>) and the cabocla tamarin (<i>Tangara cayana</i>) were observed consuming the fleshy mesocarp of <i>Senna macranthera</i> and leaving the seed in the fruit, not acting as dispersers. The other species consumed the whole fruit.]

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

Qsn #	Question	Answer
	Pikart, T. G., Souza, G. K., Zanuncio, T. V., Zanetti, R., Polanczyk, R. A., Serrão, J. E., & Zanuncio, J. C. (2010). Dispersion of seeds of tree species by the leaf-cutting ant <i>Acromyrmex subterraneus molestans</i> (Hymenoptera: Formicidae) in Viçosa, Minas Gerais State, Brazil. <i>Sociobiology</i> 56(3): 645-652	"Seeds of four tree species were foraged by <i>A. subterraneus molestans</i> : <i>Copaifera langsdorfii</i> Desf. (Leguminosae), <i>Mabea fistulifera</i> Mart. (Euphorbiaceae), <i>Ricinus communis</i> Linnaeus (Euphorbiaceae) and <i>Senna macranthera</i> (Collad.) Irwin et Barn. (Leguminosae). The first three species present seeds with external structures attractive to ants (Leal & Oliveira 1998; Martins et al. 2006; Peternelli et al. 2009; Webster 1994), typical of myrmecochorous species (Handel & Beattie 1990). The seeds of <i>S. macranthera</i> do not present external attractive structures, but even seeds of non-myrmecochorous species may be rich in lipids, proteins and carbohydrates and, therefore, they may also be attractive to ants. However, this kind of interaction is still poorly known (Pizo & Oliveira 2001)." ... "On the other hand, all the seeds of <i>S. macranthera</i> were removed from the location and carried to the nest." ... "Only small seeds (<i>M. fistulifera</i> and <i>S. macranthera</i>) were dispersed by <i>A. subterraneus molestans</i> . Large seeds (<i>C. langsdorfii</i> and <i>R. communis</i>) were not dispersed, but their attractive structures were removed by the ants."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Alves-Costa, C. P., & Eterovick, P. C. (2007). Seed dispersal services by coatis (<i>Nasua nasua</i> , Procyonidae) and their redundancy with other frugivores in southeastern Brazil. <i>Acta Oecologica</i> , 32(1), 77-92	[Rarely consumed by coatis] "Table 1 – Fruit species consumed by coatis in Mangabeiras Park. SF – semideciduous forest" ... Species with seeds in <5 faecal samples: ... Leguminosae: <i>Senna macranthera</i> Irwin et Barneby"

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Grombone-Guaratini, M. T., & Rodrigues, R. R. (2002). Seed bank and seed rain in a seasonal semi-deciduous forest in south-eastern Brazil. <i>Journal of Tropical Ecology</i> , 18(5), 759-774	[High densities not recorded in this study] "Appendix 2. Phytosociological parameters of the species sampled in 35 traps set up in the Santa Genebra Reserve, Campinas, SP from March 1997 to April 1998" [<i>Senna macranthera</i> - Density (diaspores m-2)]
	Knörr, U. (2010). Fruit availability and dispersal processes in a highly fragmented landscape in the northeastern Brazilian Atlantic Forest region. PhD Dissertation. Ulm University, Ulm, Germany	[Not recorded in this study] "Table 3.2 All species with the highest number of seeds (=at least 10 seeds collected in the course of one year) in order of the most frequent named first. Life form subdivided into tree, treelet (includes shrubs), liana (includes woody lianas and vines), and herb. Extrapolated number of seeds m-2 as measured with 0.25 m2 seed traps." [<i>Senna macranthera</i> - total number of seeds m-2 = 1.14]

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	de Souza, R. P., & Válio, I. F. M. (2001). Seed size, seed germination, and seedling survival of Brazilian tropical tree species differing in successional status. <i>Biotropica</i> , 33(3), 447-457	"Physical dormancy imposed by the impermeability of the seed coat was observed in <i>S. parahyba</i> , and scarification promoted germination. In <i>S. macranthera</i> and <i>B. forficata</i> , the presence of a hard coat did not prevent germination but delayed it. Absorption of water by seeds of these species is very heterogeneous, resulting in a scattered germination in time (Souza 1996)."

Qsn #	Question	Answer
	Ferreira, R. A., Davide, A. C., & Motta, M. S. (2004). Vigour and viability of <i>Senna multijuga</i> (Rich) Irwin et Barn. and <i>Senna macranthera</i> (Collad.) Irwin et Barn., in a seed soil bank in a nursery. <i>Revista Brasileira de Sementes</i> , 26, 24-31	[14/7% seed viability after 18 months in the seed bank] " <i>S. multijuga</i> seeds presented 93,1%; 65,3%; 52,5% and 17,7% potential viability at sowing and after 6, 12 and 18 months, in the soil bank respectively, and <i>S. macranthera</i> presented 79,3%; 73,9%; 32,5% and 14,7% at sowing and after 6, 12 and 18 months in soil bank, respectively. The species studied had typical behavior of a persistent seed bank."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown. No evidence of control. Several invasive <i>Senna</i> species are effectively controlled with herbicides, which would likely work on <i>Senna macranthera</i> if needed

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown

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

Summary of Risk Traits:

High Risk / Undesirable Traits

- Adapted to tropical climates
- Broad climate suitability and elevation range
- Naturalized in Argentina (but no evidence in the Hawaiian Islands to date)
- A pioneer tree that could establish in open, disturbed habitats
- Other *Senna* species are invasive weeds
- Shade tolerant
- Tolerates many soil types
- Reproduces by seeds
- Self-fertile (autogamous)
- Fast growth rate (but time to maturity unknown)
- Seeds dispersed by autochory (self-dispersal), by mammals (internally), by ants (externally), potentially by water and through intentional cultivation
- Seeds may form a persistent seed bank

Low Risk Traits

- Despite naturalization, negative impacts have not been reported to date
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Grows best in high light environments (dense shade may inhibit spread)