

Key Words: High Risk, Naturalized, Ornamental Tree, Nitrogen-fixing, Autochoric

Family: *Fabaceae*

Taxon: *Senna multijuga*

Synonym: *Cassia multijuga* Rich.

Chamaesenna multijuga (Rich.) Pittier

Peirania multijuga (Rich.) Britton & P. Wils

Common Name: leafy cassia

false sicklepod

November shower

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation:	H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score	7
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		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)		
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		y=1, n=-1		n
405	Toxic to animals		y=1, n=0		n
406	Host for recognized pests and pathogens		y=1, n=0		
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		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0		y

411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	y
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	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	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
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	
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	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score **7**

Supporting Data:

101	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Is the species highly domesticated? No evidence]
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Species suited to tropical or subtropical climate(s) 2-High] "Its natural distribution ranges from Mexico to southern Brazil and Bolivia."
202	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Quality of climate match data 2-High]
203	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Broad climate suitability (environmental versatility)? Yes] "- Altitude range: 50 - 1100 m - Mean annual rainfall: 1000 - 4500 mm - Rainfall regime: summer; uniform - Dry season duration: 2 - 6 months - Mean annual temperature: 15 - 30°C - Mean maximum temperature of hottest month: 25 - 30°C - Mean minimum temperature of coldest month: 15 - 25°C - Absolute minimum temperature: > 0°C" [Elevation range exceeds 1000 m]
204	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Its natural distribution ranges from Mexico to southern Brazil and Bolivia. However, the species becomes naturalized readily and its use as an ornamental plant has resulted in dispersed populations outside of its native range throughout the world (Irwin and Barneby, 1982). The variety peregrinatrix has become naturalized in some savannah woodland."
205	2004. Villaseñor, J.L./Espinosa-Garcia, F.J.. The alien flowering plants of Mexico. Diversity and Distributions. 10: 113-123.	[Does the species have a history of repeated introductions outside its natural range? Yes] "Appendix 1 Checklist of alien flowering plants of Mexico. In parenthesis the place of origin is indicated: Old World includes either Africa, Asia, or Europe; ND means that the place of origin was not determined. The numbers after the geographical source indicate in how many Mexican States the species has been recorded" "Senna multijuga (L.C. Rich.) H.S. Irwin & Barneby (South America, 4)"
205	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? Yes] "Its natural distribution ranges from Mexico to southern Brazil and Bolivia. However, the species becomes naturalized readily and its use as an ornamental plant has resulted in dispersed populations outside of its native range throughout the world (Irwin and Barneby, 1982)."
205	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.,	[Does the species have a history of repeated introductions outside its natural range? Yes] "Cultivated in Guangdong (Guangzhou) [native to tropical America; widely cultivated in the tropics]."
301	1998. Herbarium Pacificum Staff. New Hawaiian Plant Records for 1997. Bishop Museum Occasional Papers. 56: 8-15.	[Naturalized beyond native range? Yes] "A neotropical species native to the northern half of South America, <i>S. multijuga</i> has been cultivated in Hawai'i since at least the 1920s; the oldest specimen at BISH is from a cultivated shrub collected at 'Ālewa Heights, O'ahu in 1926 (A. F. Judd 61). The species is now naturalizing on Kaua'i. Material examined: KAUA'I: Kōloa Dist., E of new Halfway Bridge, near Hwy 50 along turnoff into canefield just N of highway, tree 5 m. tall, spreading from grove of 5 large planted trees, 31 Oct 1990, D. Lorence & T. Flynn 6626 (PTBG, US)."
301	2000. Liogier, A.H./ Martorell, L.F.. Flora of Puerto Rico and adjacent islands: a systematic synopsis. Second Edition Revised. La Editorial, UPR, San Juan, Puerto Rico	[Naturalized beyond native range? Yes] "Planted as an ornamental in Puerto Rico, becoming naturalized..."
301	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Naturalized beyond native range? Yes] "Its natural distribution ranges from Mexico to southern Brazil and Bolivia. However, the species becomes naturalized readily and its use as an ornamental plant has resulted in dispersed populations outside of its native range throughout the world (Irwin and Barneby, 1982). The variety peregrinatrix has become naturalized in some savannah woodland."

301	2007. Hosking, J.R./Conn, B.J./Lepschi, B.J./Barker, C.H.. Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognised as naturalised in 2000–2001. <i>Cunninghamia</i> . 10(1): 139-166.	[Naturalized beyond native range? Yes] "New South Wales Distribution / Habitats: North Coast. At Bellingen, this species is most common in a wide unmanaged strip between a road and a pine plantation, but it is also naturalised alongside roads elsewhere in Bellingen and at Thora." ... "Notes: Many thousands of trees in native forest, a pine plantation and disturbed areas near Bellingen Hospital, some as tall as mature pines in the pine plantation. Collections of flowering plants were sent as herbarium specimens to NSW in 1965 and records of plantings in the Bellingen Hospital grounds show that this species was self-sown in the area in 1975. Plants are spread by movement of seed. The species is an attractive ornamental and is grown in many areas as a result. This species is not recorded as naturalised elsewhere in Australia. The only other known record of this species becoming a problem is from Puerto Rico, where it is a garden escape (Liogier 2000). It has also been recorded as naturalised in Hawaii, continental North America, West Indies and the Old World tropics (Wagner & Herbst 1999, Barneby in Steyermark et al. 1998)."
302	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Garden/amenity/disturbance weed? Potentially] "S. multijuga flourishes in disturbed forests as well as riverine forests. It is also present in forest islands and gallery forests within savannahs and cerrado." [Adapted to disturbed sites]
303	2007. Randall, R.P.. Global Compendium of Weeds - <i>Senna multijuga</i> . http://www.hear.org/gcw/species/senna_multijuga/	[Agricultural/forestry/horticultural weed? No evidence]
304	2007. Randall, R.P.. Global Compendium of Weeds - <i>Senna multijuga</i> . http://www.hear.org/gcw/species/senna_multijuga/	[Environmental weed? No] No evidence
305	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Congeneric weed? Yes] <i>Senna alata</i> , <i>S. bicapsularis</i> , <i>S. didymobotrya</i> , <i>S. obtusifolia</i> , <i>S. pendula</i> [listed as significant weeds of natural areas]
401	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.,	[Produces spines, thorns or burrs? No] "Shrubs, small trees, or trees, 7–20(–40) m tall. Young parts generally puberulent; branchlets reddish brown when dry. Leaves 12–20 cm; stipules early caducous, linear; rachis and petiole puberulent, with a long, ovoid gland on rachis between lowest pair of leaflets (often early caducous); leaflets 10– 26(–50) pairs, linear-oblong or oblong, 1.2–4 × 0.6–0.8 cm, both surfaces puberulent or adaxially glabrous, apex obtusely rounded, mucronate, slightly oblique."
402	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Allelopathic? No evidence] "Current research is focusing on land reclamation potential after disturbance (Faria et al., 1997), nitrogen fixing capacity (Pereira et al., 1996) and nutritional efficiency studies (Silva et al., 1996; Silva et al., 1997)."
403	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.,	[Parasitic? No] "Shrubs, small trees, or trees, 7–20(–40) m tall." [Fabaceae]
404	2011. Wolowski, M./Freitas, L.. Reproduction, pollination and seed predation of <i>Senna multijuga</i> (Fabaceae) in two protected areas in the Brazilian Atlantic forest. <i>Revista de Biología Tropical</i> . 59(4): 1939-1948.	[Unpalatable to grazing animals? No] "...its leaves, flowers and fruits are sources of food for the spider-monkey (<i>Brachyteles arachnoids</i> , Mendonça-Filho 1996)..."
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No evidence]
406	1998. Ribeiro-Costa, C.S./Reynaud, D.T.. Bruchids from <i>Senna multijuga</i> (Rich) I. & B. (Caesalpinaceae) in Brazil with Descriptions of Two New Species. <i>The Coleopterists Bulletin</i> . 52(3): 245-252.	[Host for recognized pests and pathogens? Possibly] "Samples of mature fruits of <i>Senna multijuga</i> (Rich) I. & B. (Caesalpinaceae), an ornamental tree, were collected in Curitiba, Parani, Brazil. The bruchid species that emerged were: <i>Sennius bondari</i> (Pic), <i>Sennius puncticollis</i> (Ff.hraeus) new combination, <i>Sennius crudelis</i> , new species and <i>Sennius nappi</i> , new species, here described and illustrated. A key to all bruchid species found developing on seeds of <i>Senna multijuga</i> is also provided."
406	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Host for recognized pests and pathogens? Possibly] "Although the species is relatively disease free, there are a number of bruchid beetles that predate upon the seeds (Ribeiro and Reynaud, 1998)."
407	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Causes allergies or is otherwise toxic to humans? No evidence]
407	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No evidence]

408	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Creates a fire hazard in natural ecosystems? No evidence] "S. multijuga flourishes in disturbed forests as well as riverine forests. It is also present in forest islands and gallery forests within savannahs and cerrado."
409	2012. Desert Tropicals. False Sicklepod. Faucon, P., http://www.desert-tropicals.com/Plants/Fabaceae/Cassia_multijuga.html	[Is a shade tolerant plant at some stage of its life cycle? Possibly No] "Sun Exposure: Full sun"
409	2012. Top Tropicals. Senna multijuga. Top Tropicals Botanical Garden, http://toptropicals.com/catalog/uid/Senna_multijuga.htm	[Is a shade tolerant plant at some stage of its life cycle? Possibly Yes] Full sun, semi-shade
410	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Tolerates a wide range of soil conditions ? Yes] "Due to its capability to form mycorrhizal associations in soil (Pereira et al., 1996), S. multijuga can tolerate poor or infertile soils, and is commonly found on slightly acidic soils." ... "Soil descriptors - Soil texture: light; medium - Soil drainage: free; seasonally waterlogged - Soil reaction: acid - Special soil tolerances: infertile"
411	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Climbing or smothering growth habit? No] "S. multijuga ranges in size at maturity from 6 40 m, although more commonly it takes the form of a medium, slender tree ranging from 6 15 m with a wide spreading crown (Irwin and Barneby, 1982; Killeen et al., 1993; Parrotta et al., 1995)."
412	1998. Herbarium Pacificum Staff. New Hawaiian Plant Records for 1997. Bishop Museum Occasional Papers. 56: 8-15.	[Forms dense thickets? Not listed among impacts]
412	2007. Hosking, J.R./Conn, B.J./Lepschi, B.J./Barker, C.H.. Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognised as naturalised in 2000–2001. Cunninghamia. 10(1): 139-166.	[Forms dense thickets? Not listed among impacts] "New South Wales Distribution / Habitats: North Coast. At Bellingen, this species is most common in a wide unmanaged strip between a road and a pine plantation, but it is also naturalised alongside roads elsewhere in Bellingen and at Thora." ... "Notes: Many thousands of trees in native forest, a pine plantation and disturbed areas near Bellingen Hospital, some as tall as mature pines in the pine plantation. Collections of flowering plants were sent as herbarium specimens to NSW in 1965 and records of plantings in the Bellingen Hospital grounds show that this species was self sown in the area in 1975. Plants are spread by movement of seed. The species is an attractive ornamental and is grown in many areas as a result. This species is not recorded as naturalised elsewhere in Australia. The only other known record of this species becoming a problem is from Puerto Rico, where it is a garden escape (Liogier 2000). It has also been recorded as naturalised in Hawaii, continental North America, West Indies and the Old World tropics (Wagner & Herbst 1999, Barneby in Steyermark et al. 1998)."
501	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Aquatic? No] Terrestrial
502	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Grass? No] Fabaceae
503	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Nitrogen fixing woody plant? Yes] "- Ability to fix nitrogen; regenerate rapidly"
504	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.,	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Shrubs, small trees, or trees, 7–20(–40) m tall. Young parts generally puberulent; branchlets reddish brown when dry. Leaves 12–20 cm; stipules early caducous, linear; rachis and petiole puberulent, with a long, ovoid gland on rachis between lowest pair of leaflets (often early caducous); leaflets 10– 26(–50) pairs, linear-oblong or oblong, 1.2–4 × 0.6–0.8 cm, both surfaces puberulent or adaxially glabrous, apex obtusely rounded, mucronate, slightly oblique."
601	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Evidence of substantial reproductive failure in native habitat? No evidence]
602	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Produces viable seed? Yes] "Seeds are produced in flat, red to purple coloured pods. The narrow, oblong seeds are compressed, range from 1.5-2.1 mm in size, and have a pale, brownish-grey testa (Irwin and Barneby, 1982)."
603	2012. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]

604	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Self-compatible or apomictic? Possibly Yes. In contrast to Wotowski and Freitas 2011] " <i>Senna multijuga</i> is a pioneer tropical tree species that occurs mainly in the Brazilian Atlantic forest. We investigated the mating system of two populations of <i>S. multijuga</i> , one located in a reserve area (RD1) and the other (RD2) about 15 km away. The mating system parameters were estimated using the mixed mating model (software MLTR). The two populations had significantly different outcrossing rates, with population RD2 having a high rate ($t_m = 0.838$) and population RD1, a lower rate ($t_m = 0.540$). The values of t_s were different between the two populations and also lower than those of t_m . Significant $t_m - t_s$ estimates indicated that biparental inbreeding contributed to the apparent selfing rate in these populations. The correlation of paternity was significant in population RD2 ($r_p = 0.309$), suggesting that the progeny were more closely related than inferred by the observed outcrossing rate. The estimates of correlation of paternity, biparental inbreeding and the significant differences in pollen and ovule allele frequencies indicated that population RD2 is genetically substructured. For a pioneer species such as <i>S. multijuga</i> , selfing can be an important strategy for occupying open areas." ... "In pioneer species, selffertilization is considered a strategy to ensure reproduction during the colonization of new habitats by one or a few individuals (Stebbins, 1974). Thus, the capacity for selffertilizing probably represents an important strategy for the colonization of open areas by <i>S. multijuga</i> , as also suggested for <i>Helicteres brevispira</i> (Franceschinelli and Bawa, 2000)."
604	2011. Wolowski, M./Freitas, L.. Reproduction, pollination and seed predation of <i>Senna multijuga</i> (Fabaceae) in two protected areas in the Brazilian Atlantic forest. <i>Revista de Biología Tropical</i> . 59(4): 1939-1948.	[Self-compatible or apomictic? Possibly No] "Sexual reproduction of <i>S. multijuga</i> depends on the transfer of pollen by large bees (<i>Bombus</i> , <i>Centris</i> , <i>Epicharis</i> and <i>Xylocopa</i>), as the species is self-incompatible." [In contrast to Ribeiro and Lovato 2004] ... "It is self-incompatible and depends on bees for its pollination (Wolowski & Freitas 2010)." ... "Sexual reproduction depends on the transfer of pollen by pollinators, as no fruit is formed by self-pollination due to either inbreeding depression or by a mechanism of late-acting self incompatibility (Wolowski & Freitas 2010)."
605	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Requires specialist pollinators? No] " <i>Senna</i> species are pollinated by bees of different genera and species (Gottsberger and Silberbauer-Gottsberger, 1988)." ... "Although <i>S. multijuga</i> is probably pollinated by bees (Gottsberger and Silberbauer-Gottsberger, 1988), we have no information about the behavior of the pollinators on flowering individuals."
605	2011. Wolowski, M./Freitas, L.. Reproduction, pollination and seed predation of <i>Senna multijuga</i> (Fabaceae) in two protected areas in the Brazilian Atlantic forest. <i>Revista de Biología Tropical</i> . 59(4): 1939-1948.	[Requires specialist pollinators? Possibly, but <i>Xylocopa</i> bees are present in Hawaiian Islands] "Only certain bees with the ability to vibrate can pollinate flowers with these characteristics (Buchmann 1983). Accordingly, pollinators of <i>S. multijuga</i> are large bees belonging to the genera <i>Bombus</i> , <i>Centris</i> , <i>Epicharis</i> and <i>Xylocopa</i> (Wolowski & Freitas 2010)."
606	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Reproduction by vegetative fragmentation? No] No evidence
607	2012. Brazil Plant Seeds. <i>Senna multijuga</i> - Seeds. http://brazilplantseeds.com/index.php/senna-multijuga-seeds.html	[Minimum generative time (years)? Unknown] "Transplant the seedlings to individual containers when they reach 4-6 cm, which can be grown in situ in 4-5 months. The growth of plants in the field is very fast."
701	2007. Hosking, J.R./Conn, B.J./Lepschi, B.J./Barker, C.H.. Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognised as naturalised in 2000–2001. <i>Cunninghamia</i> . 10(1): 139-166.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Yes. Seeds presumably spread unintentionally] "Many thousands of trees in native forest, a pine plantation and disturbed areas near Bellingen Hospital, some as tall as mature pines in the pine plantation. Collections of flowering plants were sent as herbarium specimens to NSW in 1965 and records of plantings in the Bellingen Hospital grounds show that this species was self-sown in the area in 1975. Plants are spread by movement of seed."
702	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Propagules dispersed intentionally by people? Yes] "In Brazil, <i>S. multijuga</i> occurs mainly in the Atlantic forest, where it is a pioneer species adapted to poor soils and is suitable for mixed plantations used in the regeneration of degraded areas (Lorenzi, 1992; Carvalho, 1994)."
702	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] "Although the wood of <i>S. multijuga</i> has no apparent industrial use, it is regarded as a handsome ornamental tree which grows rapidly, is relatively disease free and flowers prolifically. It is commonly planted in gardens and parks. <i>S. multijuga</i> is often used for shade in pastures and cocoa plantations (Irwin and Barneby, 1982). Current research is focusing on land reclamation potential after disturbance (Faria et al., 1997), nitrogen fixing capacity (Pereira et al., 1996) and nutritional efficiency studies (Silva et al., 1996; Silva et al., 1997)."

703	2012. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? No] No evidence that this tree is grown with or contaminates produce
704	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Propagules adapted to wind dispersal? Apparently yes] "The plane seeds show autochoric dispersion and are part of the soil seed bank (Carvalho, 1994)."
704	2012. McGinty, M.M.. Native forest tree conservation in tropical agroforests: Case study of cacao farms in the Atlantic Forest of southern Bahia, Brazil. PhD Dissertation. Columbia University, New York	[Propagules adapted to wind dispersal? Yes] "Table 2. Native forest tree species found regenerating in cacao agroforests in southern Bahia, Brazil 2010" [<i>Senna multijuga</i> - Seed dispersal = wind]
705	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Propagules water dispersed? Unknown] "The plane seeds show autochoric dispersion and are part of the soil seed bank (Carvalho, 1994)."
706	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Propagules bird dispersed? No] "The plane seeds show autochoric dispersion and are part of the soil seed bank (Carvalho, 1994)."
707	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Propagules dispersed by other animals (externally)? No] "Seeds are produced in flat, red to purple coloured pods. The narrow, oblong seeds are compressed, range from 1.5 2.1 mm in size, and have a pale, brownish-grey testa (Irwin and Barneby, 1982)." [No means of external attachment]
708	2012. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? Unknown] Seeds not adapted for internal dispersal, and unlikely to be consumed by vertebrate dispersers.
801	2009. Martinez-Garza, C./Flores-Palacios, A./De La Pena-Domene, M./Howe, H.F.. Seed rain in a tropical agricultural landscape. <i>Journal of Tropical Ecology</i> . 25: 541-550.	[Prolific seed production (>1000/m ²)? Unlikely] "Appendix 1. Adult size (m) and density of seeds of 57 early and late successional species during 11 mo in the seed rain of pastures and primary and secondary forests at Los Tuxtlas, Veracruz, Mexico. Nomenclature follows Ibarra-Manriquez & Sinaca (1995, 1996a, b). For <i>Heliocarpus appendiculatus</i> the number of seeds shown is obtained by the relationship of 1.5 seeds per fruit (Martinez-Ramos 1985). Those species dispersed by gravity are noted with an asterisk (*)." [<i>Senna multijuga</i> - Density of seeds (m-2) = 3.92 in secondary forest. Unknown directly under mature tree]
802	2004. Lacerda, D.R./Lemos Filho, J.P./Goulart, M.F./Ribeiro, R.A./Lovato, M.B.. Seed-dormancy variation in natural populations of two tropical leguminous tree species: <i>Senna multijuga</i> (Caesalpinoideae) and <i>Plathymenia reticulata</i> (Mimosoideae). <i>Seed Scienc</i>	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "Dormant seeds of <i>S. multijuga</i> form a seed bank in the soil (Carvalho, 1994), and while information concerning germination and dormancy in <i>P. reticulata</i> was not found, it is probable that this species also forms seed banks in natural habitats."
802	2004. Ribeiro, R.A./Lovato, M.B.. Mating system in a neotropical tree species, <i>Senna multijuga</i> (Fabaceae). <i>Genetics and Molecular Biology</i> , 27(3): 418-424.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "The plane seeds show autochoric dispersion and are part of the soil seed bank (Carvalho, 1994)."
802	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Evidence that a persistent propagule bank is formed (>1 yr)? Presumably Yes] "Seed dormancy is common, although the time that seeds remain viable in the soil is not known. Research has shown that mechanical scarification of the seeds greatly increases germination rate (Lemos Filho et al., 1997)."
803	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching, L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.htm	[Well controlled by herbicides? Probably Yes. Herbicides are effective at controlling other invasive <i>Senna</i> species] " <i>Senna alata</i> - Management: Susceptible to triclopyr, picloram, and 2,4-D." ... " <i>Senna surattensis</i> - Sensitive to triclopyr and perhaps to other hormone-type herbicides. <i>Senna obtusifolia</i> , another weedy senna, was sensitive to dicamba and triclopyr but not to MCPA."
804	2012. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown]
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

Summary of Risk Traits

High Risk / Undesirable Traits

- Naturalized in Puerto Rico, Hawaii, and Australia
- Thrives in tropical climates
- Broad elevation range
- Genus with many weedy species
- Seeds depredated by bruchid beetles
- Tolerates many soil types
- Seeds dispersed by people and wind
- Forms a persistent seed bank

Low Risk / Desirable Traits

- Despite ability to spread, negative impacts not specified
- Unarmed (no spines, thorns or burrs)
- Non-toxic
- Landscaping and ornamental value