Taxon: Calycophyllum spruceanum (Benth.) Hook. f. ex K. Schum. **Family:** Rubiaceae

Common Name(s): capirona **Synonym(s):** Eukylista spruceana Benth.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 4 Aug 2022

WRA Score: **-1.0** **Designation:** L **Rating:** Low Risk

Keywords: Tropical Tree, Timber, Pure Stands, Wind-Dispersed, Coppices

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	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
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)	n
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	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
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	>3
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	y
705	Propagules water dispersed	y=1, n=-1	y
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	n
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence of domestication] "C. spruceanum is distributed throughout Amazonia from Venezuela and the Guyanas South to Peru, Bolivia and Brazil. In the Amazon basin the species forms dense populations (Toledo, 1971; Toledo and Rincon, 1996). The species is mostly shade-intolerant and typical of mid-successional forests (Foster, 1990). It often occurs on flooded or poorly drained soils and along the margins of rivers. The species is harvested selectively for timber in natural forests, but is sometimes grown in plantations. The wood is hard and fine-grained with cream-coloured sapwood and yellowish-white heartwood. It is very resistant to rot and is used in heavy construction, floors, parquet, sleepers, vehicle bodies, turnery and furniture. However, the whitish wood is sometimes used for pulp. It makes excellent firewood."

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**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"C. spruceanum is distributed throughout Amazonia from Venezuela and the Guyanas South to Peru, Bolivia and Brazil. In the Amazon basin the species forms dense populations (Toledo, 1971; Toledo and Rincon, 1996)."
	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 1 Aug 2022]	"Native Southern America BRAZIL: Brazil WESTERN SOUTH AMERICA: Bolivia, Ecuador, Peru"

Qsn #	Question	Answer
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 1 Aug 2022]	

203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Campbell, C. W. (1961). Calycophyllum spruceanum, a New Flowering Tree for South Florida. Proceedings of the Florida State Horticultural Society 74: 424-425	"Because this tree is easily injured by temperatures below the freezing point, it probably is suitable for cultivation only in the southern coastal region of Florida. From its native habitat, it may be inferred that it will grow in low areas which are occasionally inundated."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Climatic amplitude (estimates) - Altitude range: 50 - 600 m - Mean annual rainfall: 1200 - 3000 mm - Rainfall regime: summer - Dry season duration: 0 - 5 months - Mean annual temperature: 24 - 26ºC - Mean maximum temperature of hottest month: 28 - 30ºC - Mean minimum temperature of coldest month: 21 - 24ºC - Absolute minimum temperature: > 5ºC"

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"C. spruceanum is distributed throughout Amazonia from Venezuela and the Guyanas South to Peru, Bolivia and Brazil. In the Amazon basin the species forms dense populations (Toledo, 1971; Toledo and Rincon, 1996)."

205	**Does the species have a history of repeated introductions outside its natural range?**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	Some limited evidence of cultivation within native range

301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No confirmed evidence to date
	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

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. (2022). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. https://naturalhistory2.si.edu/botany/hawaiianflora/. [Accessed 1 Aug 2022]	No evidence in the Hawaiian Islands

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Listed as a weed in India, but cited reference reports no evidence of impacts
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	GBIF Secretariat (2022). Calycophyllum spruceanum (Benth.) Hook.f. ex K.Schum. GBIF Backbone Taxonomy. Checklist dataset. https://www.gbif.org/species/2904000. [Accessed 2 Aug 2022]	Recorded as introduced in India. Evidence of impact = No

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

305	Congeneric weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Macbride, J.F. & Dahlgren, B.E. (1936). Flora of Peru. Volume XIII, Part VI, Publication 364. Field Museum of Natural History, Chicago	[No evidence] "A tree 15-27 meters high, with brown bark; leaves petiolate, the blades oblong to oblong-ovate, acute or obtuse, acute to obtuse at the base, 9-17 cm. long, minutely puberulent beneath at first but soon glabrate, barbate in the axils of the nerves; cymes dense and many-flowered, the inflorescences at first wholly enclosed by the thin bracts; calyx 6-9-dentate, the lobes all minute; corolla white, 6-7 mm. long, the lobes spreading; hypanthium densely white-pilosulous; capsule oblong, 8-11 mm. long, densely appressed-pilose."

402	Allelopathic	
	Source(s)	**Notes**
	Sartor, L. R., Lopes, L., Martin, T. N., & Ortiz, S. (2015). Alelopatia de acículas de pínus na germinação e desenvolvimento de plântulas de milho, picão preto e alface. Bioscience Journal, 31(2), 470-480	[Potentially. Unable to access and verify with cited literature] "Souza Filho (2006), comparando a atividade alelopática de Calycophyllum spruceanum em diferentes plantas, observou também que o potencial alelopático variou em função da espécie receptora." [Translation from Portugues: ouza Filho (2006), comparing the allelopathic activity of Calycophyllum spruceanum in different plants, also observed that the allelopathic potential varied according to the receptor species.]

403	Parasitic	n
	Source(s)	**Notes**
	Macbride, J.F. & Dahlgren, B.E. (1936). Flora of Peru. Volume XIII, Part VI, Publication 364. Field Museum of Natural History, Chicago	"A tree 15-27 meters high, with brown bark" [Rubiaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Mathis, A. (2013). A woolly monkey travel guide: an assessment of the foraging patterns among Lagothrix poeppigii on Sumak Allpa Island, Ecuador. SIT Graduate Institute/SIT Study Abroad	[Foraged on by woolly monkeys] "In general, chorongos are generalized frugivores that prefer ripe fruits full of pulp, fruits from palms, and seeds (Stevenson, 2004; H. Vargas, personal communication, Apr. 2013). They also supplement their diet with young leaves (referred to as shoots in this report), arthropods, flowers, and some small vertebrates." ... "The other eight of the top ten most important species in woolly foraging in descending order are Iriartea deltoideae, Calycophyllum spruceanum, Socratea exorrhiza, Otoba parvifolia, V003, Ficus cuatrecasana, Ochroma pyramidale, Cecropia membranacea."
	Boivin-Chabot, S., Margolis, H. A., & Weber, J. C. (2004). Variation in coppice-shoot growth among provenances of Calycophyllum spruceanum Benth. in the Peruvian Amazon Basin. Forest Ecology and Management, 198(1-3), 249-260	[Grazed by cows] "Two of the 10 replications were eliminated from this study in June–July 2001: one in the lower zone because a fire destroyed the trees, and another in the upper zone because cows grazed the shoots."

Qsn #	Question	Answer
	Landholm, D. M., Pradhan, P., Wegmann, P., Sánchez, M. A. R., Salazar, J. C. S., & Kropp, J. P. (2019). Reducing deforestation and improving livestock productivity: greenhouse gas mitigation potential of silvopastoral systems in Caquetá. Environmental Research Letters, 14 (11), 114007	[Trees used for shade and supplementary feed supply] "Shade trees (ST) scenario. The ST scenario continues to increase the complexity of the SPSs in relation to the two previous scenarios. Different tree species are planted in rows directly on the IP (figure 3(d)). In addition to the IP and to the existence of a fodder bank, two medium-fast growing tree species are considered, Calycophyllum spruceanum and Gmelina arborea, within a tree planting design of 104 trees ha−1. By substantially reducing temperatures under the canopy, trees provide shade for livestock and contribute to mitigate heat stress [26], which in turn offers a further increase in milk productivity. This constitutes as well an important measure for climate change adaptation, particularly given that the increasing temperature variability expected in the Amazonia [41] could further exacerbate heat stress in livestock systems. The leaves and branches of the trees themselves offer as well a supplementary supply of feed for the cattle, while the sale of timber can provide an additional source of income for the farmer."

405	Toxic to animals	n
	Source(s)	**Notes**
	Tropical Plants Database, Ken Fern. (2022). Calycophyllum spruceanum. http://tropical.theferns.info. [Accessed 3 Aug 2022]	"Known Hazards - None known"
	Landholm, D. M., Pradhan, P., Wegmann, P., Sánchez, M. A. R., Salazar, J. C. S., & Kropp, J. P. (2019). Reducing deforestation and improving livestock productivity: greenhouse gas mitigation potential of silvopastoral systems in Caquetá. Environmental Research Letters, 14 (11), 114007	[No evidence. Trees used for shade and supplementary feed supply] "Shade trees (ST) scenario. The ST scenario continues to increase the complexity of the SPSs in relation to the two previous scenarios. Different tree species are planted in rows directly on the IP (figure 3 (d)). In addition to the IP and to the existence of a fodder bank, two medium-fast growing tree species are considered, Calycophyllum spruceanum and Gmelina arborea, within a tree planting design of 104 trees ha−1. By substantially reducing temperatures under the canopy, trees provide shade for livestock and contribute to mitigate heat stress [26], which in turn offers a further increase in milk productivity. This constitutes as well an important measure for climate change adaptation, particularly given that the increasing temperature variability expected in the Amazonia [41] could further exacerbate heat stress in livestock systems. The leaves and branches of the trees themselves offer as well a supplementary supply of feed for the cattle, while the sale of timber can provide an additional source of income for the farmer."

Qsn #	Question	Answer
406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Minor host of: Albonectria rigidiuscula (green point gall)"
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Pests recorded Insects: Leuronota calycophylli Pests recorded at the family level (Rubiaceae): Insects: Cephonodes picus Planococcoides njalensis (west African cocoa mealybug)

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Tropical Plants Database, Ken Fern. (2022). Calycophyllum spruceanum. http://tropical.theferns.info. [Accessed 3 Aug 2022]	"Known Hazards - None known"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[A number of medicinal uses listed, but no indication or evidence of acute toxicity] "Bark antibacterial, antitrypanosomal, contraceptive, antiaging, antifungal, antioxidant, astringent, parasiticide, insecticidal and wound-healing; bark decoction to treat diabetes, malaria, bleeding cuts, diarrhea, eye infections, infected wounds, wrinkles and scars; a poultice topically in treating cuts, wounds and burns. Magic, ritual, ceremonial, bark used as an admixture in the Ayahuasca rituals."

408	Creates a fire hazard in natural ecosystems	
	Source(s)	**Notes**
	Boivin-Chabot, S., Margolis, H. A., & Weber, J. C. (2004). Variation in coppice-shoot growth among provenances of Calycophyllum spruceanum Benth. in the Peruvian Amazon Basin. Forest Ecology and Management, 198(1-3), 249-260	[Cultivated trees burned in a fire] "Two of the 10 replications were eliminated from this study in June–July 2001: one in the lower zone because a fire destroyed the trees, and another in the upper zone because cows grazed the shoots."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Unlikely. Fire does not appear to be an important aspect in this tree's ecology] "C. spruceanum is distributed throughout Amazonia from Venezuela and the Guyanas South to Peru, Bolivia and Brazil. In the Amazon basin the species forms dense populations (Toledo, 1971; Toledo and Rincon, 1996). The species is mostly shade-intolerant and typical of mid-successional forests (Foster, 1990). It often occurs on flooded or poorly drained soils and along the margins of rivers."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"The species is mostly shade-intolerant and typical of mid-successional forests (Foster, 1990)."

Qsn #	Question	Answer
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Soil descriptors - Soil texture: medium; heavy - Soil drainage: impeded; seasonally waterlogged - Soil reaction: acid; neutral"
	Campbell, C. W. (1961). Calycophyllum spruceanum, a New Flowering Tree for South Florida. Proceedings of the Florida State Horticultural Society 74: 424-425	"This species is apparently well adapted to the limestone soils of the Homestead area. It had received no special care other than an occasional application of general purpose fertilizer. No symptoms of nutrient deficiencies have been observed."

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Macbride, J.F. & Dahlgren, B.E. (1936). Flora of Peru. Volume XIII, Part VI, Publication 364. Field Museum of Natural History, Chicago	"A tree 15-27 meters high, with brown bark"

412	**Forms dense thickets**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"C. spruceanum is distributed throughout Amazonia from Venezuela and the Guyanas South to Peru, Bolivia and Brazil. In the Amazon basin the species forms dense populations (Toledo, 1971; Toledo and Rincon, 1996)."
	Schurz, W.L., Hargis, O.D., Marbut, C.F. & Manifold, C.B. (1925). Rubber Production in the Amazon Valley. Trade Promotion Series-No. 23. Government Printing Office, Washington, D. C.	"The forests of the flood plains are divided into a number of distinct zones reaching from the edge of the river to the terra firme. Thus the first forest zone is known as the imbaubal, for species of Cecropia (imbauba) predominate in it; likewise the next higher zone is characterized by the jauary palm (Astrocaryum jauary); in the third zone, that next to the terra firme, the urucuri (Attalea ex-celsa) is prominent. In general, the forests of these zones increase in complexity as the terra firme is approached. Thus over large areas the imbaubas form pure stands, in the lower Amazon often intermixed with the munguba (Bombax munguba); in others the pao mulatto (Calycophyllum spruceanum) replaces it, and especially m Peru forms pure stands of the "upper story " of vegetation." ... "Pao mulatto (Calycophyllum spruceanum). One of the most common trees in the flood plains of the Amazon and because of its proximity to the rivers is burned as fuel by the river steamers. In places in the Peruvian Amazon it occurs in pure stands."

501	**Aquatic**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Terrestrial tree common in riparian habitats] "It often occurs on flooded or poorly drained soils and along the margins of rivers."

502	**Grass**	**n**

Qsn #	Question	Answer
	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 1 Aug 2022]	Family: Rubiaceae Subfamily: Ixoroideae Tribe: Condamineeae

503	Nitrogen fixing woody plant	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 1 Aug 2022]	Family: Rubiaceae Subfamily: Ixoroideae Tribe: Condamineeae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Macbride, J.F. & Dahlgren, B.E. (1936). Flora of Peru. Volume XIII, Part VI, Publication 364. Field Museum of Natural History, Chicago	"A tree 15-27 meters high, with brown bark"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"C. spruceanum is distributed throughout Amazonia from Venezuela and the Guyanas South to Peru, Bolivia and Brazil. In the Amazon basin the species forms dense populations (Toledo, 1971; Toledo and Rincon, 1996)." [No evidence]

602	Produces viable seed	y
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"An abundance of seeds are produced annually and are dispersed over great distances. There are as many as 50,000 seeds/kg. Germination occurs within 25-30 days. The viability of seeds is 5 months."
	Sears, R. R. (2003). New forestry on the floodplain: the ecology and management of Calycophyllum spruceanum (Rubiaceae) on the Amazon landscape. PhD Dissertation. Columbia University, NY	"Under laboratory conditions, seeds germinated after three weeks in waterlogged soil, after the soil was drained. They also germinated after 48 hours in suitably humid soil, without having been soaked. Seeds collected from dehisced fruits on a fallen tree did not germinate after 12 months o f storage in bags and no exposure to direct sunlight, however."

Qsn #	Question	Answer
603	**Hybridizes naturally**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown. No evidence found

604	**Self-compatible or apomictic**	
	Source(s)	**Notes**
	Sotelo Montes, C., Hernández, R. E., Beaulieu, J., & Weber, J. C. (2008). Genetic variation in wood color and its correlations with tree growth and wood density of Calycophyllum spruceanum at an early age in the Peruvian Amazon. New Forests, 35(1), 57-73	"The breeding system of C. spruceanum has not been studied, but we assume that some inbreeding has occurred and continues to occur in these subpopulations and open-pollinated families are not pure half-sibs, as others have also assumed for other tropical hardwood species (Hodge et al. 2002; Hodge and Dvorak 2004)."
	Cornelius, J. P., Sotelo Montes, C., Ugarte-Guerra, L. J., & Weber, J. C. (2011). The effectiveness of phenotypic selection in natural populations: a case study from the Peruvian Amazon. Silvae Genetica, 60(5), 205-209	[Undetermined] "The breeding system of C. spruceanum is unknown, although at least one congener (C. candidissimum) has been reported to be self-compatible (BAWA, 1974)." ... "Finally, our results indicate that progeny of isolated trees are not slower growing than progeny of trees growing close to conspecifics. This suggests that either C. spruceanum is self-incompatible, or, if self-compatible, that the distance between trees in C. spruceanum is not correlated with selfing rates, or that selfing does not lead to inbreeding depression."

605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Russell, J. R., Weber, J. C., Booth, A., Powell, W., Sotelo-Montes, C. & Dawson, I. K. (1999). Genetic variation of Calycophyllum spruceanum in the Peruvian Amazon Basin, revealed by amplified fragment length polymorphism (AFLP) analysis. Molecular Ecology, 8(2), 199-204	"Whilst little published information on the reproductive ecology of C. spruceanum exists, the species is believed to be outcrossing, insect pollinated, with seed dispersed by wind and water (hydrochory)."

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**n**
	Source(s)	**Notes**
	Boivin-Chabot, S., Margolis, H. A., & Weber, J. C. (2004). Variation in coppice-shoot growth among provenances of Calycophyllum spruceanum Benth. in the Peruvian Amazon Basin. Forest Ecology and Management, 198(1-3), 249-260	[Coppices and reproduces by seeds] "C. spruceanum is an indigenous species found throughout much of the western Amazon (Linares et al., 1992). It is a pioneer species in floodplains and in disturbed old-growth and second-growth forests below 650 m elevation (Spichiger et al., 1990; Sears, 2003). It can attain heights of 40 m with diameters of 90 cm. It reproduces sexually and its small seeds are distributed by wind and water. Farmers value C. spruceanum because of its rapid growth rate, excellent wood quality for construction, high calorific value for firewood and charcoal (Sotelo Montes et al., 2003), and its capacity to produce coppice shoots for successive harvests of woody tissue (Lad, 1988). The shoots from a single stump can be harvested up to five times before the stump is weakened and needs to be abandoned. Farmers prefer stumps that produce straight shoots which exhibit fast growth. Generally, only one shoot is left to grow from a stump. This practice favors the production of strong, straight trunks that can be used for construction."

Qsn #	Question	Answer
607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Campbell, C. W. (1961). Calycophyllum spruceanum, a New Flowering Tree for South Florida. Proceedings of the Florida State Horticultural Society 74: 424-425	[6 years to flowering in Florida] "Two trees were grown from the seed. These were planted in the field in 1953." ... "The tree first flowered at the Sub-Tropical Experiment Station in December of 1959."

Qsn #	Question	Answer
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Sears, R. R. (2003). New forestry on the floodplain: the ecology and management of Calycophyllum spruceanum (Rubiaceae) on the Amazon landscape. PhD Dissertation. Columbia University, NY	"The many-seeded locule contains winged seeds 3 .7x1.5 mm. The propagule is dispersed by the wind from the septicidal dehiscent capsules when mature. Upon reaching the river the seed can presumably travel long distances (Russell et al. 1999)." [Seeds small, but lack means of attachment. Could adhere to footwear, vehicles or equipment, but direct evidence is lacking]

Qsn #	Question	Answer
702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Forestry, Ornamental Dispersed by: Humans"

Qsn #	Question	Answer
703	**Propagules likely to disperse as a produce contaminant**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Sears, R. R. (2003). New forestry on the floodplain: the ecology and management of Calycophyllum spruceanum (Rubiaceae) on the Amazon landscape. PhD Dissertation. Columbia University, NY	"The many-seeded locule contains winged seeds 3.7 x 1.5 mm. The propagule is dispersed by the wind from the septicidal dehiscent capsules when mature. Upon reaching the river the seed can presumably travel long distances (Russell et al. 1999)." [Unlikely. No direct evidence]

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	Foster, R. B., Arce, J. B., & Wachter, T. S. (1986). Dispersal and the sequential plant communities in Amazonian Peru floodplain. In Frugivores and Seed Dispersal (pp. 357-370). Springer, Dordrecht	"On 'abandoned' river beds, resulting from rapid shift in river position - including oxbow lake formation, the two dominant large trees that characterize the resulting forest - Calycophyllum spruceanum (Rubiaceae) and Calophyllum brasiliense (Guttiferae) - are wind- and bat-dispersed."
	Russell, J. R., Weber, J. C., Booth, A., Powell, W., Sotelo-Montes, C. & Dawson, I. K. (1999). Genetic variation of Calycophyllum spruceanum in the Peruvian Amazon Basin, revealed by amplified fragment length polymorphism (AFLP) analysis. Molecular Ecology, 8(2), 199-204	"Whilst little published information on the reproductive ecology of C. spruceanum exists, the species is believed to be outcrossing, insect pollinated, with seed dispersed by wind and water (hydrochory). Seed is winged and lightweight (> 3 ´ 106 per kg), indicating wind dispersal (Dourojeanni 1987)."

705	Propagules water dispersed	y
	Source(s)	**Notes**
	de Oliveira Wittmann, A., Lopes, A., Conserva, A. D. S., Wittmann, F., & Piedade, M. T. (2010). Seed germination and seedling establishment of Amazonian floodplain trees. In Amazonian Floodplain Forests (pp. 259-280). Springer, Dordrecht	"Only few tree species with non-floating seeds are known to germinate while submerged, as observed by Castro (2004) and Conserva (2007) in Campsiandra comosa, Calycophyllum spruceanum, and Hura crepitans."
	Russell, J. R., Weber, J. C., Booth, A., Powell, W., Sotelo-Montes, C. & Dawson, I. K. (1999). Genetic variation of Calycophyllum spruceanum in the Peruvian Amazon Basin, revealed by amplified fragment length polymorphism (AFLP) analysis. Molecular Ecology, 8(2), 199-204	"Whilst little published information on the reproductive ecology of C. spruceanum exists, the species is believed to be outcrossing, insect pollinated, with seed dispersed by wind and water (hydrochory). Seed is winged and lightweight (> 3 ´ 106 per kg), indicating wind dispersal (Dourojeanni 1987). In addition, considerable seed, which can remain viable for several days in water, is found floating downstream of populations and trees establish in linear cohorts along previous high-flood levels, indicating a possible role for hydrochory (J. C. Weber, unpublished)."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Sears, R. R. (2003). New forestry on the floodplain: the ecology and management of Calycophyllum spruceanum (Rubiaceae) on the Amazon landscape. PhD Dissertation. Columbia University, NY	"The many-seeded locule contains winged seeds 3 .7x1.5 mm. The propagule is dispersed by the wind from the septicidal dehiscent capsules when mature. Upon reaching the river the seed can presumably travel long distances (Russell et al. 1999)."

707	Propagules dispersed by other animals (externally)	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Boivin-Chabot, S., Margolis, H. A., & Weber, J. C. (2004). Variation in coppice-shoot growth among provenances of Calycophyllum spruceanum Benth. in the Peruvian Amazon Basin. Forest Ecology and Management, 198(1-3), 249-260	"It reproduces sexually and its small seeds are distributed by wind and water."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"The greenish-white flowers are actinomorphic and arranged in cymes 5- 6 cm wide with a pair of white bracts at the base. Fruits are small, globose, pubescent capsules with each containing numerous pilose seeds." [No means of external attachment]

708	**Propagules survive passage through the gut**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Fruits are small, globose, pubescent capsules with each containing numerous pilose seeds." [Fruits and seeds not adapted for frugivory]
	Boivin-Chabot, S., Margolis, H. A., & Weber, J. C. (2004). Variation in coppice-shoot growth among provenances of Calycophyllum spruceanum Benth. in the Peruvian Amazon Basin. Forest Ecology and Management, 198(1-3), 249-260	"It reproduces sexually and its small seeds are distributed by wind and water."

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Flowering occurs between June and September and fruiting from August to December. An abundance of seeds are produced annually and are dispersed over great distances. There are as many as 50,000 seeds/kg." [Prolific seed production, but unclear if seeds ever reach densities in excess of 1000/m2]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Flowering occurs between June and September and fruiting from August to December. An abundance of seeds are produced annually and are dispersed over great distances. There are as many as 50,000 seeds/kg. Germination occurs within 25-30 days. The viability of seeds is 5 months."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Resprouting from roots and cut stems is common."

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
• Thrives and could potentially spread in regions with tropical climates
• Tolerates many soil types
• Forms pure stands in native range
• Reproduces by prolific seed production
• Seeds dispersed by wind, water and intentional cultivation
• Resprouts from roots and stems after repeated cutting

Low Risk Traits
• No reports of naturalization or invasiveness, but limited evidence of cultivation outside native range
• Unarmed (no spines, thorns, or burrs)
• Palatable to browsing animals
• Non-toxic
• Grows best in high light environments (dense shade may inhibit spread)
• Reaches maturity in 6+ years (in cultivation)
• Seeds remain viable for 5 months (unlikely to form a persistent seed bank)