

Family: *Meliaceae*

Taxon: *Cedrela odorata*

Synonym: *Cedrela glaziovii* C. DC.
Cedrela mexicana M. Roem.

Common Name: Mexican cedar
Barbados cedar
cigar box cedar
Spanish cedar
West Indian cedar
cedro hembra

Questionnaire :	current 20090513	Assessor:	Assessor	Designation: H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Assessor	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)	y
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		y=1, n=0	
403	Parasitic		y=1, n=0	n
404	Unpalatable to grazing animals		y=1, n=-1	y
405	Toxic to animals		y=1, n=0	n
406	Host for recognized pests and pathogens		y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		y=1, n=0	y

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	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	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	>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	
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	n
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	n
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	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	2014. WRA Specialist. Personal Communication.	NA
103	2014. WRA Specialist. Personal Communication.	NA
201	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Species suited to tropical or subtropical climate(s) 2-High] "Cedro is a tree of the New World tropics, appearing in forests of moist and seasonally dry Subtropical or Tropical life zones (24) from latitude 26° N. on the Pacific coast of Mexico, throughout Central America and the West Indies, to the lowlands and foothills of most of South America up to 1200 m (about 4,000 ft) altitude, finding its southern limit at about latitude 28° S. in Argentina (12,55)."
201	2014. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Species suited to tropical or subtropical climate(s) 2-High] "Native: NORTHERN AMERICA Mexico [s.] SOUTHERN AMERICA Caribbean: Antigua and Barbuda; Barbados; Cayman Islands; Cuba; Dominica; Dominican Republic; Grenada; Guadeloupe; Haiti; Jamaica; Martinique; Netherlands Antilles - Curacao; Puerto Rico; St. Lucia; Trinidad and Tobago Mesoamerica: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Guyana; Suriname; Venezuela Brazil: Brazil Western South America: Bolivia; Ecuador; Peru Southern South America: Argentina"
202	2014. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Quality of climate match data 2-High]
203	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Broad climate suitability (environmental versatility)? Yes] "Cedro is a climatic generalist, found over a wide geographic range of warm latitudinal belts, from Subtropical Dry Forest (wet transitional part) in Mexico and parts of the West Indies, through Subtropical Moist Forest to Subtropical Wet Forest in the West Indies and Central America, to Tropical Moist and Wet and Tropical Premontane Moist and Wet life zones in the equatorial regions (24). It is most abundant in the lowlands and foothills (other species, <i>C. montana</i> and <i>C. lilloi</i> , replace it at higher elevations) in moist forests. Its distribution is within the frost-free tropics for the most part, although it has been collected at latitudes 26° N. and 28° S., where occasional light frosts can be expected (26,55). Mean temperatures of 23° to 26° C (73° to 79° F) are found in the Caribbean part of its range; in tropical South America mean temperature is slightly higher, 28° C (82° F), with a mean minimum of 23° C (73° F) and a mean maximum of 32° C (90° F). At the southern limit of its range in Argentina the mean temperature is 24° C (75° F); mean maximum temperature is 30° C (86° F) and mean minimum is 18° C (64° F) (16,34,60)."
203	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Broad climate suitability (environmental versatility)? Yes] "Climatic amplitude (estimates) - Altitude range: 0 - 1500 m - Mean annual rainfall: 1200 - 2500 mm - Rainfall regime: summer; uniform - Dry season duration: 2 - 4 months - Mean annual temperature: 20 - 32°C - Mean maximum temperature of hottest month: 27 - 36°C - Mean minimum temperature of coldest month: 11 - 22°C - Absolute minimum temperature: > -1°C"
204	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Cedro is a tree of the New World tropics, appearing in forests of moist and seasonally dry Subtropical or Tropical life zones (24) from latitude 26° N. on the Pacific coast of Mexico, throughout Central America and the West Indies, to the lowlands and foothills of most of South America up to 1200 m (about 4,000 ft) altitude, finding its southern limit at about latitude 28° S. in Argentina (12,55)."

204	2014. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Native: NORTHERN AMERICA Mexico [s.] SOUTHERN AMERICA Caribbean: Antigua and Barbuda; Barbados; Cayman Islands; Cuba; Dominica; Dominican Republic; Grenada; Guadeloupe; Haiti; Jamaica; Martinique; Netherlands Antilles - Curacao; Puerto Rico; St. Lucia; Trinidad and Tobago Mesoamerica: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Guyana; Suriname; Venezuela Brazil: Brazil Western South America: Bolivia; Ecuador; Peru Southern South America: Argentina"
205	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? Yes] "It is widely planted throughout the tropics and its timber is well known for its use in cigar boxes and a broad range of other products, including musical instruments."
301	1997. Mauchamp, A.. Threats from Alien Plant Species in the Galápagos Islands. Conservation Biology. 11: 260–263.	[Naturalized beyond native range? Yes] "Today, 2.5% of the alien species, 5.6% of the naturalized alien species, are actually aggressive and represent a serious threat to native ecosystems. These invasive species, which are only present on inhabited islands, are Psidium guajava , Rubus niveus , Cinchona succirubra , Lantana camara , Kalanchoe pinnata , Pennisetum clandestinum , Pennisetum purpureum , Cedrela odorata , Eugenia jambos , Passiflora edulis , and Cestrum auriculatum." ... "Today, two of the invasive species are still planted despite their known behavior, Pennisetum purpureum for pasture and the fast-growing tree Cedrela odorata for its wood (its light, wind-borne seeds facilitate colonization of park areas)."
301	2006. Starr, F./Starr, K./Loope, L.L.. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers. 87: 31-43.	[Naturalized beyond native range? Yes] "In the state of Hawai'i, over 26,000 C. odorata trees were planted from 1910–1960 (Skolmen, 1960). About 9,000 of these were planted on the island of Maui in the vicinities of Hana, Ko'olau, and Makawao (Skolmen, 1960). Cedrela odorata is now naturalized in these areas and is spreading from forestry plantations into nearby lowland disturbed wet forest. This collection documents this species on Maui and represents a new naturalized record for the state of Hawai'i. Cedrela odorata was also planted in mass on Kaua'i, O'ahu, Moloka'i, and Hawai'i, and should be investigated on those islands to determine if similar spread from plantations is occurring. Material examined. MAUI: East Maui, Nua'ailua, Häna Hwy, near Keanae in small gulch east of Nua'ailua bay, established in the area, numerous seedlings, saplings, and large adult trees observed, 200 ft [60 m], 29 Nov 2000, Starr & Starr 030807-1."
301	2011. BioNET-EAFRINE. Cedrela odorata (Cedarwood). http://keys.lucidcentral.org/keys/v3/eafrinet/weeds/key/weeds/Media/Html/Cedrela_odorata_%28Cedarwood%29.htm [Accessed 17 Jan 2014]	[Naturalized beyond native range? Yes] "Cedrela odorata is invasive in parts of Tanzania (Tropical Biology Association 2010) (Global Invasive Species Database). It has been introduced to Kenya and Uganda. It has been listed as an invasive species in the Amani Nature Reserve, in the East Usambara Mountains in northeast Tanzania."
301	2013. Odeniyi, M.A./Babalola, A.O./ Ayorinde, J.O.. Evaluation of Cedrela gum as a binder and bioadhesive component in ibuprofen tablet formulations. Brazilian Journal of Pharmaceutical Sciences. 49(1): 95-105.	[Naturalized beyond native range? Yes] "Cedrela odorata, the most common species among the Cedrela, is widespread in seasonally dry tropical and subtropical forests. It is an important timber tree and has become naturalised in Africa and southeast Asia."
302	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Garden/amenity/disturbance weed? A disturbance adapted tree with negative environmental impacts] "C. odorata has the potential to rapidly colonise disturbed sites in tropical and sub tropical rainforests, primarily along riverbanks and forest edges in areas where rainfall exceeds 1000mm per annum."
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No] No evidence
304	1997. Mauchamp, A.. Threats from Alien Plant Species in the Galápagos Islands. Conservation Biology. 11: 260–263.	[Environmental weed? Yes] "Today, 2.5% of the alien species, 5.6% of the naturalized alien species, are actually aggressive and represent a serious threat to native ecosystems. These invasive species, which are only present on inhabited islands, are Psidium guajava , Rubus niveus , Cinchona succirubra , Lantana camara , Kalanchoe pinnata , Pennisetum clandestinum , Pennisetum purpureum , Cedrela odorata , Eugenia jambos , Passiflora edulis , and Cestrum auriculatum." ... "Today, two of the invasive species are still planted despite their known behavior, Pennisetum purpureum for pasture and the fast-growing tree Cedrela odorata for its wood (its light, wind-borne seeds facilitate colonization of park areas)."

304	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Environmental weed? Yes] "C. odorata has been recorded as a weed in 22 countries (Holm et al. 1979). Under favourable conditions, it forms dense thickets 2-5m high, choking out all other vegetation. In South Africa, C. odorata is a significant weed in national parks (MacDonald 1983). In India, Nigeria and south-west China, it forms dense, tangled masses in plantations of teak and other trees."
304	2002. Tye, A./Soria, M.C./Gardener, M.R.. A strategy for Galapagos weeds. Pp. 336-341 in Veitch, CR and MN Clout. Turning the tide: the eradication of invasive species.. IUCN, Gland Switzerland	[Environmental weed? Yes] "There have been few rigorous studies of the effects of the invasions, but some species have caused drastic habitat changes, forming monospecific stands, shading out or otherwise replacing native vegetation communities, or preventing seedling regeneration by forming impenetrable carpets. Where detailed studies have been made, dramatic community changes have been revealed (Jäger 1999). The worst effects seem to be caused by woody species, especially trees such as Psidium guajava, Cedrela odorata and Cinchona pubescens,..." ... "Control is undertaken where eradication is not currently considered feasible but where the plant is considered to pose a significant conservation risk. Such plants include most of the most serious invaders, such as Rubus niveus, Lantana camara, vines such as Passiflora edulis, and very widespread invasive trees such as Psidium guajava and Cedrela odorata."
304	2011. BioNET-EAFRINE. Cedrela odorata (Cedarwood). http://keys.lucidcentral.org/keys/v3/eafrinet/weeds/key/weeds/Media/Html/Cedrela_odorata_%28Cedarwood%29.htm [Accessed 17 Jan 2014]	[Environmental weed? Yes] "Cedrela odorata displaces native plants by blocking out sunlight with its large leaves. It spreads very quickly due to prolific seed production and wind dispersal. C. odorata quickly invades the disturbed areas, blocking natural succession processes. Dense growths of the plant are likely to increase the frequency and intensity of fires. the increase risk may disrupt settlements and affect economic benefits of forests such as timber. C. odorata has been included in the Global Invasive Species Database (GISD 2006)."
304	2014. CABI. Cedrela odorata In: Invasive Species Compendium. CAB International, Wallingford, UK www.cabi.org/isc	[Environmental weed? Yes] "Invasion of C. odorata is threatening the native biodiversity of species in transition zone forests on Santa Cruz Island, and is likely to be reducing biodiversity of native species through direct competition in other areas where it is becoming invasive. It does have positive environmental effects also, however, for shade on crops, people and animals."
305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? No evidence]
401	2008. Lemmens, R.H.M.J.. Cedrela odorata L. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). Prota 7(1): Timbers/Bois d'œuvre 1. [CD-Rom]. PROTA, Wageningen, Netherlands	[Produces spines, thorns or burrs? No] "Deciduous or evergreen, monoecious, medium-sized to large tree up to 40(-50) m tall; bole branchless for up to 20(-25) m, up to 180(-300) cm in diameter, without buttresses or with low, blunt buttresses at base; bark surface greyish brown to reddish brown, fissured, inner bark pinkish brown; crown rounded; young branches with lenticels. Leaves alternate, paripinnately compound with (5-)6-14(-15) pairs of leaflets; stipules absent; rachis slightly hairy or glabrous; petiolules up to 2 cm long; leaflets ovate to oblong-lanceolate, 5-17 cm x 2.5-7 cm, asymmetric at base, acute or acuminate at apex, entire, glabrous, pinnately veined. Inflorescence a terminal, much-branched, pendent panicle up to 50 cm long, glabrous or slightly hairy."
402	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Allelopathic? No evidence] "It is also used as an agroforestry species in cocoa and coffee plantations (Lemmens et al., 1995)."
402	2011. Abugre, S./Apetorgbor, A.K./Antwiwaa, A./Apetorgbor, M.M.. Allelopathic effects of ten tree species on germination and growth of four traditional food crops in Ghana. Journal of Agricultural Technology. 7(3): 825-834.	[Allelopathic? Demonstrates allelopathic properties on Hibiscus esculentus seed germination] "Tree species selection to inter-cultivate with food crops has often been made on the basis of traditional knowledge by farmers in Ghana. Lately, Taungya system has been introduced to enable farmers produce food and at the same time retain the forest cover in communities bordering forest reserves. Fresh matured leaves and roots extracts of ten tree species were examined for their allelopathic effects on four agricultural crops to explore the allelopathic potential of the tree species and to recommend the appropriate tree species to be used under the Modified Taungya System in Ghana. Germination of Hibiscus esculentus seeds was significantly reduced in all the root and leaf extracts while germination of Zea mays seeds increased in all the root extracts except in that of Terminalia superba. Roots extract of Senna siamea promoted germination of both Zea mays and Lycopersicon esculentum seeds. Plumule and radicle extension of seedlings of the four crops were significantly reduced by all the root and leaf extracts with the exception of Zea mays whose plumule and radicle development was increased by Eucalyptus grandis leaf extracts. On the basis of the results obtained in this study the following tree species (Senna siamea, Albizzia lebeck, and Jatropha curcas) could be recommended for planting."
403	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Parasitic? No] "C. odorata is a large tree up to 40 m tall and 2 m in diameter..." [Meliaceae]

404	2005. Griscom, H.P./Ashton, P.M.S./Berlyn, G.P.. Seedling survival and growth of native tree species in pastures: implications for dry tropical forest rehabilitation in central Panama. <i>Forest Ecology and Management</i> . 218(1): 306-318.	[Unpalatable to grazing animals? Yes] "Cedrela odorata seedlings were rarely browsed upon by cattle and never excavated by rodents." ... "We suggest differences between species were caused by cattle browse preference and seed size. Cattle negatively affected both species, though only <i>E. cyclocarpum</i> was heavily browsed upon. Cattle forage on fresh stems and leaves of <i>E. cyclocarpum</i> and avoid bitter-tasting <i>C. odorata</i> ."
405	2008. Wagstaff, D.J.. <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	[Toxic to animals? No] No evidence
405	2014. CABI. <i>Cedrela odorata</i> In: <i>Invasive Species Compendium</i> . CAB International, Wallingford, UK www.cabi.org/isc	[Toxic to animals? No] No evidence
406	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. <i>Agroforestry Database: a tree reference and selection guide version 4.0</i> . World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Host for recognized pests and pathogens?] "Damping-off recorded in Philippines nurseries is mainly due to <i>Pythium ultimum</i> and to a lesser extent to <i>Rhizoctonia</i> spp. and <i>Fusarium</i> spp. Fungi including <i>Armillaria mellea</i> may cause damage to the roots of young trees during the 1st few years, but this has not yet been recorded in Southeast Asia. In Haiti, an unidentified aphid-borne virus causes leaves of young seedlings to shrivel with mosaic-type symptoms. Die-back has been observed but is possibly an indication that climatic or soil conditions are not optimal and that the root system is suffering from insufficient aeration. Die-back of previously healthy 1-2-year-old stands is a common phenomenon in Central America and the Caribbean, characterized by poor crowns going out of leaf at frequent intervals, dead-looking bark and die-back from the top."
406	2014. CABI. <i>Cedrela odorata</i> In: <i>Invasive Species Compendium</i> . CAB International, Wallingford, UK www.cabi.org/isc	[Host for recognized pests and pathogens? No evidence that this species is a pest of native or other commercially important taxa] "By far the most serious insect pest of <i>C. odorata</i> is the mahogany shootborer, <i>Hypsipyla grandella</i> (Cintron, 1990). Larvae of this moth eat the pith just behind shoot growing tips causing death of the apical meristem, slowing plant growth, reducing tree form by promoting multiple leaders or causing seedling mortality. The tree is also attacked by termites and a number of other generalist boring insects and fungal pathogens."
407	2008. Wagstaff, D.J.. <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No] No evidence
407	2014. CABI. <i>Cedrela odorata</i> In: <i>Invasive Species Compendium</i> . CAB International, Wallingford, UK www.cabi.org/isc	[Causes allergies or is otherwise toxic to humans? No] No evidence
408	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Creates a fire hazard in natural ecosystems? Yes] "In India, Nigeria and south-west China, it forms dense, tangled masses in plantations of teak and other trees. The mass of dry stems produced in the dry season is considered to pose a serious fire hazard in several countries (McFadyen, pers. comm.)."
408	2014. CABI. <i>Cedrela odorata</i> In: <i>Invasive Species Compendium</i> . CAB International, Wallingford, UK www.cabi.org/isc	[Creates a fire hazard in natural ecosystems? Yes] "Dense growths of the plant are likely to increase the frequency and intensity of fires, disturbing the forest further and allowing <i>C. odorata</i> and other invasive plants to become widely established."
409	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Early development of the seedling is rapid as long as moisture and light are adequate (5,46,62). Shade-grown seedlings saturate photosynthetically at low intensities and are shade tolerant, but sun grown seedlings require high light intensities for best growth (27,28,29). Shade-grown seedlings are susceptible to sunscald and subsequent insect attack when moved to sun" ... "Early growth is vigorous under partial shade, when the shootborer attack is not severe (8,51,62)."
409	2003. Weber, E.. <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	[Is a shade tolerant plant at some stage of its life cycle? Shade intolerant] "It is intolerant of shade and does not coppice or sucker from roots." [Despite classification as "shade intolerant", this species has demonstrated an ability to establish in the understory of Maui forests. See Starr et al. 2006]
409	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Is a shade tolerant plant at some stage of its life cycle? Yes] "- Tolerates drought; fire; wind; shade; frost; termites"
410	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Tolerates a wide range of soil conditions? Yes] "Cedro is always found naturally on well-drained soils, often but not exclusively on limestone"

410	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Tolerates a wide range of soil conditions? Yes] "Soil descriptors - Soil texture: light; medium; heavy - Soil drainage: free; seasonally waterlogged - Soil reaction: neutral - Special soil tolerances: shallow?"
410	2008. Lemmens, R.H.M.J.. Cedrela odorata L. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). Prota 7(1): Timbers/Bois d'œuvre 1. [CD-Rom]. PROTA, Wageningen, Netherlands	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] "It prefers well-drained sites on a variety of soils, but is usually more common on limestone-derived soil, especially in areas with a high annual rainfall (2000–3000 mm). It tolerates some drought once the tree is well established. It is best planted in fertile, well-drained soil, providing good aeration required by the root system."
411	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Climbing or smothering growth habit? No] "C. odorata is a large tree up to 40 m tall and 2 m in diameter..."
412	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Forms dense thickets? "Dense infestations of C. odorata may delay or block natural successional processes that would otherwise occur following disturbance to rainforest canopy cover (eg, following storm damage), a problem comparable to Lantana camara in eastern Australia. Dense growth of C odorata could increase the frequency and intensity of fire, causing further damage to rainforest remnants. Gallery forests and vine thickets are important natural remnants in northern Australia and C odorata may have the potential to damage such communities."
412	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Forms dense thickets? Yes] "High seedling densities are common. The tree shades out native plants with its large leaves, displacing them and building up species-poor monospecific stands. Native shrubs and trees are unable to establish in these stands"
501	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Aquatic? No] "Cedro is a tree of the New World tropics, appearing in forests of moist and seasonally dry Subtropical or Tropical life zones..."
502	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Grass? No] Meliaceae
503	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Nitrogen fixing woody plant? No] Meliaceae
504	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "C. odorata is a large tree up to 40 m tall and 2 m in diameter which produces a light-weight timber."
601	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Evidence of substantial reproductive failure in native habitat? No] "Cedro's reproductive cycle is synchronized with the growing season of the site; throughout its range it flowers at the beginning of the rainy season: May to August in Mexico, the „West Indies, and northern South America (4,30,48); September to October in Argentina (34)."
602	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Produces viable seed? Yes] "Germination begins with the onset of the rainy season and is epigeous. Vigorous germination is the rule, with seed viability reportedly up to 90 percent (40). No seed dormancy period is known. Germination is rapid, usually completed within 2 to 4 weeks (37,38)."
603	1990. Burns, R.M./Honkala, B.H.. Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC.	[Hybridizes naturally? Unknown] "Smith (51) suggested that the widely distributed species of cedro, C. odorata and C. fissilis, as well as the doubtful taxon C. angustifolia (which he recognized as a separate species), hybridized freely, and that hybrids could explain the great phenotypic variability in these taxa. Unfortunately, there is still no experimental evidence to support or reject the hybridization hypothesis. Recent cytological studies have shown that at least two separate basic diploid chromosome numbers (2n= 50 and 56) occur in C. odorata; this occurrence of different intraspecific chromosomal races seems widespread in the Meliaceae and may inhibit free hybridization (54,56)."
603	1990. Marquetti, J.R.. Cedrela hybrids resistant to Hypsipyla grandella. Revista Forestal Baracoa. 20(1): 97-101.	[Hybridizes naturally? Possibly Yes] "A note on observations made for a 7-yr period in young plantations of a natural Cedrela hybrid (C. odorata X C. cubensis) at three sites in Cuba. Initially, the trees were heavily attacked by H. grandella, but after a few years the attack decreased, and the trees appeared to become tolerant or resistant."
604	1988. Cruden, R.W.. Temporal Dioecism: Systematic Breadth, Associated Traits, and Temporal Patterns. Botanical Gazette. 149(1): 1-15.	[Self-compatible or apomictic? Unknown] "Table 1. Reproductive Traits of Temporally Dioecious Species" [Cedrela odorata - Compatibility = Unknown]

604	2004. Navarro, C./Montagnini, F./Hernández, G.. Genetic variability of <i>Cedrela odorata</i> Linnaeus: results of early performance of provenances and families from Mesoamerica grown in association with coffee. <i>Forest Ecology and Management</i> . 192(2): 217-227.	[Self-compatible or apomictic? Possibly self-incompatible] "Estimate of the multilocus outcrossing rate for <i>C. odorata</i> was 0.969 and suggests this species may be self-incompatible (James et al., 1988)."
605	2008. Lemmens, R.H.M.J.. <i>Cedrela odorata</i> L. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). <i>Prota 7(1): Timbers/Bois d'œuvre 1</i> . [CD-Rom]. PROTA, Wageningen, Netherlands	[Requires specialist pollinators? No] "Flowers unisexual, male and female flowers very similar in appearance, regular, 5 merous, fragrant; pedicel up to 2 mm long; calyx cup shaped, c. 2 mm long; petals free, 7–9 mm long, creamy white, fused in lower half to columnar androgynophore; stamens free, 2–3 mm long; ovary superior, globose, glabrous, 5 celled, style 1–3 mm long, stigma disk-shaped; male flowers with rudimentary ovary, female flowers with non-dehiscing, smaller anthers." ... "The flowers are pollinated by insects such as bees and moths."
606	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Reproduction by vegetative fragmentation? No] "Cedro does not coppice readily nor produce root suckers; it is not fire resistant (5,40)."
607	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Minimum generative time (years)? 10+] "Trees begin to fruit at an age of 10 to 12 years."
701	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No evidence] "The fruit, a large woody capsule, is borne near branch tips. Fruits ripen, split, and shed seeds while still attached to the parent tree." ... "Seeds are 20 to 25 mm (0.75 to 1.0 in) long, wing included, and are wind dispersed."
702	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] "It is widely planted throughout the tropics and its timber is well known for its use in cigar boxes and a broad range of other products, including musical instruments. It is also occasionally planted for shade and used as an ornamental tree on roadsides and in parks. <i>C. odorata</i> has great potential as a plantation species, due to its fast growing and timber producing characteristics. It is also used as an agroforestry species in cocoa and coffee plantations (Lemmens et al., 1995)."
703	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Propagules likely to disperse as a produce contaminant? Possibly] "The seed of <i>C. odorata</i> is believed to have been originally imported into Queensland as a contaminant of pasture seed used on a grazing property in the 1960's and 1970's." [Unknown how frequently this would be a vector of dispersal]
704	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Propagules adapted to wind dispersal? Yes] "The fruit, a large woody capsule, is borne near branch tips. Fruits ripen, split, and shed seeds while still attached to the parent tree." ... "Seeds are 20 to 25 mm (0.75 to 1.0 in) long, wing included, and are wind dispersed."
705	2014. CABI. <i>Cedrela odorata</i> In: <i>Invasive Species Compendium</i> . CAB International, Wallingford, UK www.cabi.org/isc	[Propagules water dispersed? Unknown] "Seeds are winged and thus have evolved for wind dispersal; however, some dispersal by water and wild animals cannot be completely discounted."
706	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Propagules bird dispersed? No] "Seeds are 20 to 25 mm (0.75 to 1.0 in) long, wing included, and are wind dispersed."
707	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Propagules dispersed by other animals (externally)? No evidence] "Seeds are 20 to 25 mm (0.75 to 1.0 in) long, wing included, and are wind dispersed." [Unlikely, as seeds lack means of external attachment]
708	2014. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut? Unlikely to be consumed or internally dispersed by animals]
801	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Prolific seed production (>1000/m ²)? Possibly Yes] "Heavy seed crops are produced annually in some areas and biennially or irregularly in others (41,59)."
801	1998. Csurhes, S./Edwards, R.. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	[Prolific seed production (>1000/m ²)? Possibly] "Rapid colonisation is made possible by the copious production of wind-dispersed seeds that can be blown over several kilometres."

801	2008. Lemmens, R.H.M.J.. <i>Cedrela odorata</i> L. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). <i>Prota 7(1): Timbers/Bois d'œuvre 1</i> . [CD-Rom]. PROTA, Wageningen, Netherlands	[Prolific seed production (>1000/m ²)? Possibly Yes] "Seeds are often produced in great number, and can be collected from the soil or from a canvas mat placed below a fruiting tree, but seed collected from ripe fruits still on the tree shows better germination results."
802	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Seeds are shed during the dry season. They lose viability quickly if not stored very dry at reduced temperatures (12,37,38). Germination begins with the onset of the rainy season and is epigeous. Vigorous germination is the rule, with seed viability reportedly up to 90 percent (40). No seed dormancy period is known. Germination is rapid, usually completed within 2 to 4 weeks (37,38)."
802	2002. Vozzo, J.A.. <i>Tropical Tree Seed Manual</i> . USDA Forest Service, Washington, D.C.	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Vega and others (1981) note that the seeds of this tree can be stored at ambient temperatures for a period of 10 months without significantly losing viability. However, other studies (Centro Aronómico Tropical de Investigación y Enseñanza 1997b) show that the viability of the seeds stored under natural conditions diminishes quickly after 1 month. Therefore, storing seeds in polyethylene bags at a temperature of 5 °C and a moisture content of 7 percent is recommended. Stored this way, seeds maintain a viability of 50 to 60 percent for 2 years."
803	2006. Global Invasive Species Database. <i>Cedrela odorata</i> . http://www.issg.org/database/species/ecology.asp?si=343&fr=1&sts=sss&lang=EN [Accessed 17 Jan 2014]	[Well controlled by herbicides? Yes] "In Galapagos hack and squirt application of 50% Tordon 22K has been found successful (Gardener, 2002)."
803	2006. Rentería, J.L./Atkinson, R./Guerrero, A.M./Mader, J.. <i>Manual de Identificación y Manejo de Malezas. Segunda edición. Fundación Charles Darwin, Quito - Ecuador</i>	[Well controlled by herbicides? Yes] "Para árboles mayores a 40 cm de diámetro, aplique Combo al 20% (20 partes del herbicida disueltos en 80 partes de agua) o Tordon 22K al 10% (10 partes del herbicida disueltas en 90 partes de agua). El anillo de 30 a 50 cm de ancho a 1 m de la base." [Translation: For larger trees to 40 cm in diameter, apply Combo 20% (20 parts herbicide dissolved in 80 parts water) or Tordon 22K 10% (10 herbicide parts dissolved in 90 parts water). The ring of 30 to 50 cm wide at 1 m from the base.]
804	1990. Burns, R.M./Honkala, B.H.. <i>Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654</i> . U.S. Department of Agriculture, Forest Service, Washington, DC.	[Tolerates, or benefits from, mutilation, cultivation, or fire? No] "Cedro does not coppice readily nor produce root suckers; it is not fire resistant (5,40). It is capable of pollard regrowth (partial terminal regrowth after moderate wind damage or partial dieback) if the tree is well established."
804	2008. Lemmens, R.H.M.J.. <i>Cedrela odorata</i> L. In: Louppe, D., Oteng-Amoako, A.A. & Brink, M. (Editors). <i>Prota 7(1): Timbers/Bois d'œuvre 1</i> . [CD-Rom]. PROTA, Wageningen, Netherlands	[Tolerates, or benefits from, mutilation, cultivation, or fire? No] "Cedrela odorata cannot be managed by coppicing."
805	2014. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)?

Summary of Risk Traits

High Risk / Undesirable Traits

- Thrives in tropical climates
- Elevation range exceeds 1000 m
- Naturalized in East Maui, Hawaiian Islands, the Galapagos, and in Africa and southeast Asia
- An environmental weed
- Unpalatable to cattle
- Tolerates many soil types
- May form dense monocultures that exclude other vegetation
- Produces numerous wind-dispersed seeds

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Useful timber and shade tree
- Does not spread vegetatively
- Long time to reproductive maturity (10-15 years)
- Does not form a persistent seed bank
- Does not coppice or tolerate heavy pruning
- Herbicides may provide effective control