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Ms. Ivonne Higuero
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Geneva
Switzerland

March 22, 2019

Subject: Consultation on proposals to amend the CITES Appendices for timber species at the 18th meeting of the Conference of the Parties to CITES

Dear Ms. Higuero,

Thank you for inviting IUCN to contribute to this consultation. IUCN and TRAFFIC have jointly undertaken an objective assessment of all the proposals to amend the CITES Appendices submitted to CoP18, against the criteria in Resolution Conf. 9.24 (Rev. CoP17) and other relevant Resolutions. This assessment, known as the *IUCN/TRAFFIC Analyses of the Proposals to Amend the CITES Appendices*, was produced in consultation with a broad range of experts from across the IUCN Species Survival Commission (SSC) and TRAFFIC networks. The Analyses for timber species proposals are provided in Annex 1 to this letter. The Analyses for these and all other proposals can also be downloaded here: <http://citesanalyses.iucnredlist.org/>.

IUCN and TRAFFIC would like to acknowledge the generous support of the following donors for the production of the Analyses for CoP18: The European Union, Canada, Finland, France, Germany, Monaco, Netherlands, New Zealand, Spain, Switzerland, and WWF International. Please note that the Analyses do not necessarily reflect the views of the project's donors.

We hope the Parties will find these Analyses to be a useful resource in their consideration of the proposals.

Sincerely,

A handwritten signature in black ink, appearing to read 'Inger Andersen', written over a circular stamp.

Inger Andersen
Director General

Encl: Annex 1.

Inclusion of Trumpet Trees *Handroanthus* spp., *Tabebuia* spp. and *Roseodendron* spp. in Appendix II with annotation #6

Proponent: Brazil

Summary: *Handroanthus*, *Tabebuia* and *Roseodendron* are genera of Bignoniaceae distributed from southern USA to Argentina and Chile, including the Caribbean. There are currently 106 recognised species across the three genera (30 in *Handroanthus*, 73 in *Tabebuia* and 3 in *Roseodendron*). The three genera were previously recognised as belonging to a single genus (*Tabebuia*) but were split in 2007 based on genetic studies, and new species continue to be described. There is considerable confusion in the taxonomy and nomenclature of the three genera with differing names used in the literature and in reported trade.

Species within these genera produce a very hard, heavy and durable wood that is used locally in the construction of houses and bridges, flooring, decking and handicrafts. Internationally it is one of the preferred timbers for decking. The wood is marketed with the same common name (ipê); distinguishing between species and between genera is reportedly difficult even at the microscopic level, and there are no identification guides covering all species.

Handroanthus timbers are some of the most valuable in the market, with prices in Brazil reported to be as high as those achieved historically by Big-leaf Mahogany *Swietenia macrophylla* before commercial exploitation of the latter species was prohibited in the country. Due to their natural low densities, growth rates and shade-intolerant seedlings, Ipê species appear to be particularly vulnerable to logging, even at substantially reduced intensities. Various species have been widely planted throughout the Americas for commercial plantations, reforestation and urban landscaping.

Although no estimates for the global trade in ipê exist, ITTO members reported exports totaling approximately 271,000 m³ sawn wood (96% from Brazil) and 5,000 m³ logs (all from Suriname) from 2011-2015. Brazil reportedly exports ipê to 60 countries, the principal importers being the USA and European countries. Trade from Brazil accounted for 93% of ipê sawn wood and ca. 87% of ipê flooring imports by the USA from 2008-2017. All ipê timber production in Brazil derives from natural populations. Potentially high levels of illegal harvest have been reported in the country, and there are concerns over inappropriate management measures including overestimation of sustainable offtakes, although it is unclear what proportion of illegally harvested timber enters international trade.

Handroanthus serratifolius

Of ipê exports reported by Brazil from 2010-2016, 70% (ca. 180,000 m³) were of *H. serratifolius*. Of the exports of this species, 75% were reported as decking, 16% as sawn wood and the remainder as flooring, clapboards and "other". The USA and European countries were the major importers. Although annual production of *H. serratifolius* in Brazil increased by 150% from 2012-2017, reaching 220,000 m³ in 2017, exports of this species decreased from 36,000 m³ in 2012 to 16,000 m³ in 2016. In the years for which both production and export figures are available for *H. serratifolius* in Brazil (2012-2016), export volumes were ~16% of production volumes. While this may indicate that domestic use exceeds international trade, a 2008 study reported a relatively low processing efficiency for ipê (42%) suggesting potentially high levels of wastage during processing of exported products. The average yield of this species is estimated at 2.4 m³/ha. Exploitation in some regions of Brazil has reportedly resulted in significant declines of *H. serratifolius*, with no evidence of long-term population recovery. The species is considered threatened in both Peru and Venezuela; relatively low levels of legal and illegal international trade in the species are reported by Peru, but it is unclear whether this trade has contributed to the reported declines.

Handroanthus impetiginosus

Like *H. serratifolius*, populations of *H. impetiginosus* in parts of Brazil have reportedly suffered significant declines through overexploitation, although reported exports of the species from Brazil were relatively low (1,665 m³ from 2010-2016). Exports of *H. impetiginosus* are also reported by Venezuela (20,491 m³ from 2007-2017). The species was categorised globally as Least Concern on the IUCN Red List in 1998, although exploitation was considered to have contributed to population

declines, particularly in Brazil. The species is currently categorised as near threatened in Brazil, threatened in Mexico and endangered in Peru.

Other species

Other species reported in international trade include *H. capitatus* (6,000 m³ sawn wood exported from Suriname from 2011-2015), *H. heptaphyllus* (5,000 m³ sawn wood exported from Guyana from 2011-2015), *Roseodendron donnell-smithii* (183 m³ sawn wood and 510 roundwood pieces exported from Mexico from 2010-2012), and *Tabebuia rosea* (exports from Venezuela totalling 29,637 m³ from 2007-2017 and seizures destined for international export totalling 66 m³ from 2013-2018). It is not clear whether international trade presents a threat to these species. Deforestation for land clearance is reportedly a threat to certain species in parts of their ranges, such as *H. chrysanthus* in Colombia and *T. rosea* in Mexico, while in other areas reforestation programs are underway.

The proponents seek to include the genera *Handroanthus*, *Tabebuia* and *Roseodendron* in Appendix II with annotation #6 (logs, sawn wood, veneer sheets and plywood).

Analysis: *Handroanthus*, *Tabebuia* and *Roseodendron* are genera of New World trees comprising over a hundred species, with new species still being described. The timbers of certain species are in high demand both domestically and internationally, and are reportedly some of the most valuable on the market. Woods of the three genera are marketed with the same common name (ipê); distinguishing between the species and genera is reportedly difficult even at the microscopic level. The most highly traded species based on reported data are *H. serratifolius* and *H. impetiginosus*, which occur in a number of countries from Mexico to Argentina.

While global data on trade are not available, Brazil appears to be the main exporter of ipê, the majority of which is of *H. serratifolius* with 15 other species also exported. There are also reports of illegal ipê harvest and trade taking place in the country. Overexploitation in some areas has reportedly resulted in significant population declines of *H. serratifolius* and *H. impetiginosus* which, like other species in these genera, appear to be particularly vulnerable to logging since they do not regenerate easily. On this basis, *H. serratifolius* and *H. impetiginosus* may meet the criteria for inclusion in Appendix II in Annex 2a of *Res. Conf. 9.24 (Rev. CoP 17)*. The remaining species in all three genera would therefore meet the criteria for inclusion in Annex 2b, based on the reported identification difficulties as well as taxonomic and nomenclatural uncertainties.

If this proposal is adopted, it is not clear whether the proposed annotation #6 (logs, sawn wood, veneer sheets and plywood) would cover the main commodities that first appear in trade and drive the demand. Decking and flooring accounted for more than three-quarters of Brazil's reported exports of *H. serratifolius* from 2010-2016, and Brazilian legislation currently prohibits the export of unfinished wood of native species (although large quantities of sawn wood are also reportedly imported into the USA from Brazil). None of the parts and derivatives defined in *Res. Conf. 10.13 (Rev. CoP15) Implementation of the Convention for timber species* currently explicitly covers flooring or decking, or refers to the HS code that seems most relevant (HS44.09). It may therefore be necessary to create a new annotation to include "Wood" as defined in HS44.09 and amend *Res. Conf. 10.13* accordingly. Proposal 53 seeks to amend the annotation for *Pericopsis elata* to read "Logs, sawn wood, veneer sheets, plywood, and transformed wood", with transformed wood defined as HS code 44.09, and if that proposal is adopted the same annotation could be applied in this case. This may be considered to be expanding the scope of the proposal, but would be in line with the guidance in *Res. Conf. 11.21 (Rev. CoP17) Use of annotations in Appendices I and II*.

Summary of Available Information

Text in non-italics is based on information in the Proposal and Supporting Statement (SS); text in italics is based on additional information and/or assessment of information in the SS.

Taxonomy

Originally, all species of *Handroanthus*, *Tabebuia* and *Roseodendron* were included in the genus *Tabebuia*. In 2007 it was proposed that *Tabebuia* be divided into three genera. Currently 30 species are recognised for

Handroanthus, 73 species for *Tabebuia* and 3 species for *Roseodendron*, however new species continue to be described and there is still confusion over nomenclature.

Range

Handroanthus, *Tabebuia* and *Roseodendron* are distributed from southern USA to Argentina and Chile, including the Caribbean.

IUCN Global Category

(Note that certain species assessed on the IUCN Red List are considered synonyms according to the taxonomy referenced in the proposal (the Plant List), details below.)

17 species of *Tabebuia*/*Handroanthus* have been assessed on the IUCN Red List, as follows:

Endangered:

T. conferta (assessed 2017),
T. elongata (assessed 1998)

Vulnerable:

T. anafensis (considered a synonym of *T. myrtifolia* in the Plant List; assessed 1998),
T. arimaoensis (assessed 1998),
T. bibracteolata (assessed 1998),
T. dubia (assessed 1998),
T. furfuracea (considered a synonym of *T. bibracteolata* in the Plant List; assessed 1998),
T. hypoleuca (assessed 1998),
T. jackiana (assessed 1998),
T. lapacho (considered a synonym of *H. lapacho* in the Plant List; assessed 1998),
T. oligolepis (considered a synonym of *T. shaferi* in the Plant List; assessed 1998),
T. palustris (assessed 2008),
T. polymorpha (assessed 1998),
T. shaferi (assessed 1998),
T. striata (assessed 1998)

Near Threatened:

T. platyantha (assessed 1998)

Least Concern:

T. impetiginosa (considered a synonym of *H. impetiginosus* in the Plant List; assessed 1998).

Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP 17) Annex 2a)

A) Trade regulation needed to prevent future inclusion in Appendix I

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Trade in ipê

Most of the *Handroanthus* species are slow-growing heliophytes and require large areas of forest with little competition from other plants to reach the canopy; they are said to be some of the most vulnerable to logging in Amazonian forests because of their natural low density and low growth rates.

It is not possible to maintain timber production at current harvest levels on 30-yr cutting cycles, or even at substantially reduced logging intensities with the current log-and-leave reduced impact (RIL) model, and there appears to be no reason to believe that populations of ipê subjected to logging are any more resilient than those of mahogany (M. Schulze, in litt., 2019). A study by Richardson & Peres (2016) in Pará found no evidence that the post-logging timber species composition and total value of forest stands recovers beyond the first cut, suggesting that the commercially most valuable timber species (including ipê) become predictably rare or economically extinct in old logging frontiers.

Woods of the three genera are marketed with the same common name (ipê). Most of the *Handroanthus* species produce a very hard, heavy and durable wood which is used locally in the construction of houses and bridges, pavements, decks, exterior woods and handicrafts. Its dark and dense wood is highly valued for residential decks in the USA; it is described as the internationally preferred timber for decking (Brancaion et al., 2018). The value of ipê processed into flooring or decking can reach USD 2,500/m³ at export ports (Greenpeace, 2018).

No estimates for the global trade in ipê exist. However, ITTO biennial reports (ITTO, 2015 & 2017) include the following trade in ipê involving ITTO member countries over the period 2011-2015 (trading partner countries were not specified):

- Exports of ~5,000 m³ logs (all *H. serratifolius* from Suriname);
- Exports of ~271,000 m³ sawn wood (259,000 m³ of unspecified species from Brazil (96%), 6,000 m³ *H. capitatus* from Suriname, 5,000 m³ *H. heptaphyllus* from Guyana, 1,000 m³ *H. serratifolius* from Suriname), see Figure 1 below;
- Imports of ~2,000 m³ sawn wood by Brazil (species unspecified).

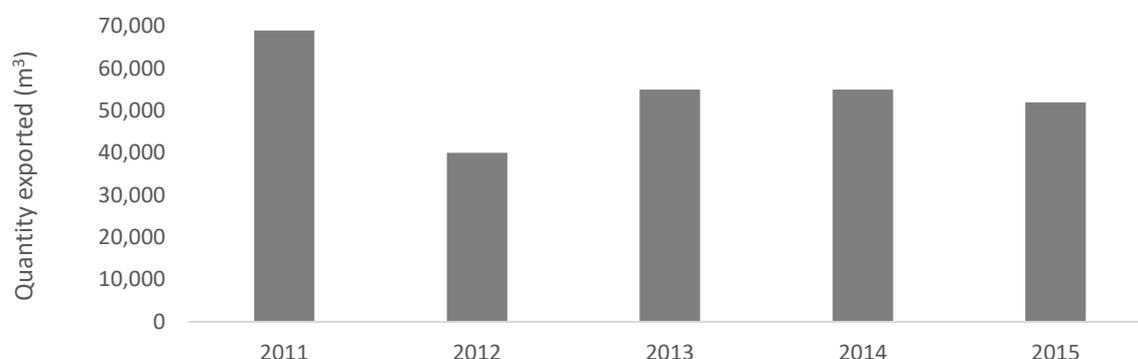


Figure 1: ITTO reported exports of ipê sawn wood over time from 2011-2015 (ITTO, 2015 & 2017).

From 2008-2017, the USA reported the import of 276,016 m³ ipê sawn wood (HS code 44.07.29.01.21: Ipê (*Tabebuia* spp.) wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm). The top exporter of ipê sawn wood was Brazil (93% of imports), followed by Guyana (3%) and Bolivia (1%). Reported imports of ipê sawn wood over this period were at their highest in 2008, declined by more than 50% in 2009 and subsequently increased overall (see figure below). In 2017 the USA also reported the import of 70,562 m² and 1,362 m³ Ipê flooring (HS code 44.09.22.05.25: ipê (*Tabebuia* spp.) wood (including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded or the like) along any of its edges, ends or faces, whether or not planed, sanded or end-jointed). The top exporter was Brazil (87% of imports reported in m²) followed by Paraguay (11% of imports reported in m²) (USITC DataWeb, 2019). USA reported imports of ipê sawn wood over the period 2008-2017 were at their highest in 2008, declined by over half in 2009 and subsequently increased overall (see Figure 2).

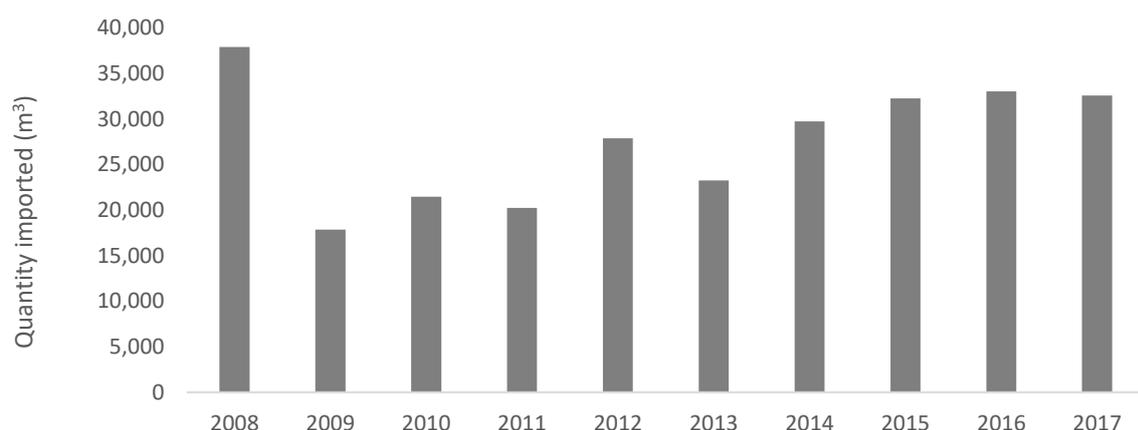


Figure 2: Imports of ipê sawn wood (HS code 44.07) reported by the USA from 2008-2017 (USITC DataWeb, 2019).

Available data on international exports indicate that Brazil is the most significant exporter. *Handroanthus* are said to be some of the most expensive species in the market in Brazil, with prices as high as those achieved historically for Big-leaf Mahogany (*Swietenia macrophylla*) before commercial exploitation was prohibited in Brazil in 2001 (Brancalion et al., 2018); the authors suggest that Ipê is the “new Big-leaf Mahogany”. The average price of Ipê sawn wood exports in the period 2011-2015 was USD 824/m³ (ITTO, 2015 & 2017). There was a 500% increase from 1998 to 2004 in ipê timber exports from the Brazilian Amazon (Schulze et al., 2008). Ipê exports from Brazil are reported to have been almost 256,000m³ between 2010 and 2016, 70% of which were reportedly

H. serratifolius (see table below). Most of the ipê timber harvested in Brazil is reported as *H. impetiginosus* and *H. serratifolius* (Schulze et al., 2008). Ipê wood is exported from Brazil to 60 countries; the main importers are the USA (28% of exported volume, not clear over what time period) and European countries. In Brazil all ipê wood comes from natural forests, since there are no plantations in the country. The export of unfinished timber of species native to Brazil (i.e. destined to be processed abroad) is prohibited according to Normative Instruction 15/2011 (IBAMA, 2011), amended by Normative Instruction 13/2018 (IBAMA, 2018).

Between 2010 and 2016, 16 species of ipê were reportedly exported from Brazil (see Table 1).

Table 1: ipê exports from Brazil by species from 2010-2016, as reported in the Supporting Statement (table below uses the accepted names from the Plant List):

Species	Volume (m ³)
<i>Handroanthus serratifolius</i>	180,110
<i>Handroanthus capitatus</i>	2,887
<i>Handroanthus incanus</i>	2,243
<i>Handroanthus impetiginosus</i>	1,665
<i>Handroanthus heptaphyllus</i>	1,565
<i>Tabebuia ochracea</i>	1,439
<i>Handroanthus vellosi</i>	1,436
<i>Handroanthus albus</i>	1,373
<i>Handroanthus chrysotrichus</i>	898
<i>Handroanthus barbatus</i>	316
<i>Tabebuia cassinoides</i>	223
<i>Tabebuia aurea</i>	128
<i>Handroanthus umbellatus</i>	115
<i>Handroanthus chrysanthus</i>	50
<i>Tabebuia angustata</i>	24
<i>Tabebuia roseoalba</i>	24
<i>Tabebuia</i> spp. (assumed to include <i>Handroanthus</i> spp.)	61,227

Illegal trade in ipê

In the study by Brancalion et al. (2018), ipê were by far the species with the strongest evidence of potential fraud in logging permits in Brazil. Only 61% of the 152 trees identified as *Handroanthus* spp. in logging permits were confirmed during field checking of logged forests. Ipê trees are quite easy to identify so misidentification can be attributed to fraud. In addition, the diameter of real ipê trees was frequently overestimated. Inventing trees, duplicating tree numbers, exceeding allowed harvest rates, and felling trees in forbidden zones were also observed, although less frequent. In all of the management areas investigated, there was evidence that the ipê timber volume reported on the permit could not have been produced from that area alone while following harvest regulations. The apparent substantial overestimation of timber volumes in logging licenses has the potential to significantly impact species like ipê (Brancalion et al., 2018).

Greenpeace-Brazil (2015), in collaboration with SEMA and Brazil's Public Prosecutor's Office, carried out a systematic review of all 1,325 extant management plans in Pará between 2006 and 2013 to assess the extent to which timber laundering occurred. In total, 746 (56%) plans listed ipê (*H. serratifolius*) in their inventories and approximately 14% overestimated volumetric offtakes (3,000 m³ per concession or 60% above the species average of 2.4 m³/ha). Subsequent in situ inspections revealed a range of fraudulent activities including illegal timber laundering through illegitimate plans where authorised areas showed no signs of logging. Electronic credit documents were crediting timber well in excess of what had been authorised by management plans before round logs were transferred to sawmills exporting timber worldwide (Greenpeace, 2015). Greenpeace-Brazil published a further report in 2018 highlighting weaknesses in the timber licensing regime in Pará with indiscriminate and illegal logging of ipê, driven by the high value of processed products of ipê wood (decking and flooring) in international markets (Greenpeace, 2018).

Brazil reported seizures of ipê destined for international export totalling 350 m³ in 2016 and 475 m³ in 2018.

Handroanthus serratifolius

Range: Antigua and Barbuda, Bahamas, Barbados, Bolivia, Brazil, Colombia, Cuba, Dominica, Dominican Republic, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St Kitts and Nevis,

St Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago, USA, Venezuela, Virgin Islands (US); Exotic – India, Kenya (Orwa et al., 2009).

Brazil: Forest inventories conducted in the state of Pará, in the Brazilian Amazon, recorded densities of between 0.2 and 0.4 *H. serratifolius* trees/ha with DBH \geq 50 cm. The average yield of this species is estimated at 2.4 m³/ha. The wood production of *H. serratifolius* in Brazil was 220,000 m³ in 2017, which was 150% higher than in 2012.

As noted above, available data on international exports indicate that Brazil is the most significant exporter of ipé. Exports of *H. serratifolius* from Brazil from 2010 to 2016 totalled over 180,000 m³, which corresponds to 70% of total exports of ipê for that period (255,723 m³). Of these exports 75% were reported as decking, 16% sawn wood and the remainder flooring, clapboards or “other”. The main importers were the USA (29%), France (17%) and Belgium (10%).

Production and export volumes of *H. serratifolius* from Brazil are summarised in Figure 3 below (*production data not available prior to 2012; export data not available for 2017*). The smallest volume was exported in 2010 (~10,000 m³) and the largest in 2012 (36,000 m³); export volumes then decreased up to 2016. Reported exports of *H. serratifolius* from Brazil were around 16% of total production over the period 2012-2016 (~135,000 m³ and 855,000 m³ respectively) and around 8% of reported production in the country in 2016 (~16,000 m³ and 194,000 m³ respectively). *Schulze et al. (2008) cite a processing efficiency of 42% for ipê and indicate that only 36% of processed ipê wood meets export standards; the gap between production and exports is therefore at least partly accounted for by inefficient and poor quality processing, the latter potentially indicative of a domestic market for lower quality products.*

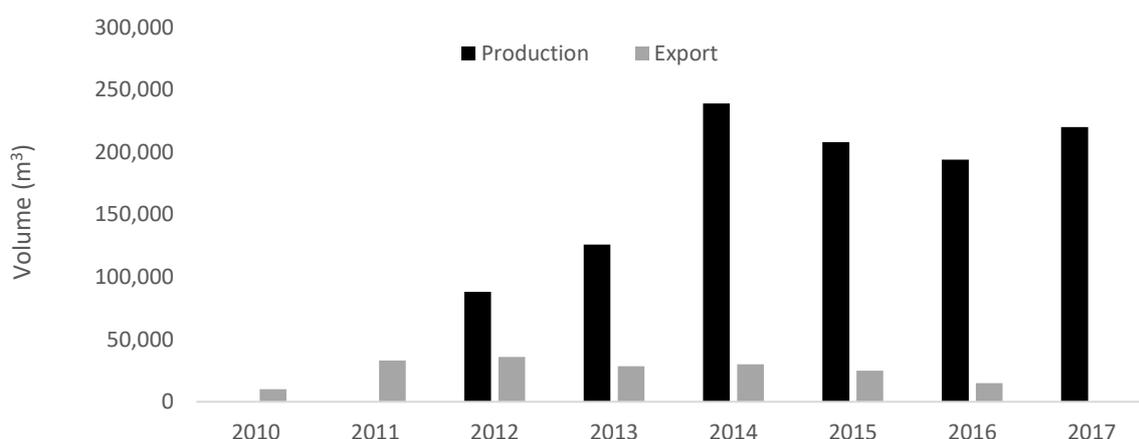


Figure 3: Production and export volumes of *H. serratifolius* from Brazil reported in the Supporting Statement from 2010-2017 (*production data not available prior to 2012; export data not available for 2017*).

A 2008 study found that all populations of *H. serratifolius* in the forests of north-eastern Brazil showed drastic population declines, with no evidence of long-term population recovery. At best, only one individual of one of the two species *H. serratifolius* and *H. impetiginosus* in each 10 ha could reach adult size, and this could take a century or more. The authors suggest that cutting cycles applied for *H. serratifolius* in the western Brazilian Amazon may not be sustainable. *Shade intolerant seedlings, size class distributions skewed towards large adults, and poor colonisation of logging gaps make populations of this species unlikely to rebound from logging (Schulze, 2003).*

Bolivia: *Bolivian forest inventory data indicate that *H. serratifolius* occurs at relatively high densities (0.45 trees/ha (Justiniano et al., 2000). However, population structures are skewed towards large, very old adults, meaning few young trees are present in stands. This is a pattern typical for light-demanding long-lived timber species in the Amazon, including mahogany, and is frequently cited as a major limitation for sustainable timber production (Schulze et al., 2008).*

Peru: **H. serratifolius* is assessed nationally as threatened. During recent decades *H. serratifolius* has entered the market as the preferred wood for decking. The country reported exports of this species totalling 1,131 m³ from January 2016- March 2018. The biggest importers were China, the Dominican Republic, the USA and France. The country reports ipê seizures destined for international export of 119 m³, 14.96 kg and 4,738 pieces between 2011 and 2017 (species unspecified).*

Suriname: ITTO biennial reports for the period 2011-2015 include exports from Suriname of 5,000 m³ logs and 1,000 m³ sawn wood of *H. serratifolius*, destination unspecified (ITTO, 2015 & 2017).

Venezuela: *H. serratifolius* is assessed nationally as threatened. The species has shown a marked decrease in its natural populations as a consequence of the popular demand for wood for the manufacture of handicrafts in the states of Lara and Falcón. No exports of *H. serratifolius* from the country are mentioned.

Handroanthus impetiginosus

Range: Argentina, Bolivia, Brazil, Colombia, Costa Rica, El Salvador, French Guiana, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Venezuela (IPNI, 2019).

Brazil: As with *H. serratifolius*, all populations of *H. impetiginosus* in the forests of north-eastern Brazil showed drastic population declines in a 2008 study, with no evidence of long-term population recovery. *Shade intolerant seedlings, size class distributions skewed towards large adults, and poor colonisation of logging gaps make populations of this species unlikely to rebound from logging* (Schulze, 2003). Exports of *H. impetiginosus* from 2010-2016 totalled 1,665 m³. *H. impetiginosus* is assessed as near threatened in Brazil with overexploitation reported as a threat (CNCFlora, 2012).

Bolivia: As with *H. serratifolius*, Bolivian forest inventory data indicate that *H. impetiginosus* occurs at relatively high densities (2.5 trees/ha; Justiniano et al., 2000). However, population structures are skewed towards large, very old adults, meaning few young trees are present in stands. This is a pattern typical for light-demanding long-lived timber species in the Amazon, including mahogany, and is frequently cited as a major limitation for sustainable timber production (Schulze et al., 2008).

Mexico: Assessed nationally as threatened.

Peru: Assessed nationally as endangered.

Venezuela: From 2007 to 2017 Venezuela exported 20,491 m³. During this period, exports decreased from a maximum of 5,570 m³ in 2007 to a minimum of 23 m³ in 2017.

Handroanthus capitatus

Range: Bolivia, Brazil, Colombia, French Guiana, Guyana, Peru, Suriname, Trinidad and Tobago, Venezuela (IPNI, 2019).

Suriname: ITTO biennial reports for the period 2011-2015 include exports from Suriname of 6,000 m³ sawn wood of *H. serratifolius*, destination unspecified (ITTO, 2015 & 2017).

Handroanthus chrysanthus

Range: Belize, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Peru, Trinidad and Tobago, Venezuela (IPNI, 2019).

Ecuador: In a study of forest species most used in the southern region of Ecuador between 2014 and 2015, *H. chrysanthus* was one of the most commercialised species. Data reported through the Provincial Department of the Environment of Guayas show exports of 270 m³ in 2012. The population has recovered mainly due to management actions, including a declared ban on exploitation in 1978.

Mexico: Assessed nationally as threatened.

Handroanthus heptaphyllus

Range: Argentina, Bolivia, Brazil, Paraguay (IPNI, 2019).

Guyana: ITTO biennial reports for the period 2011-2015 include exports from Guyana of 5,000 m³ sawn wood of *H. heptaphyllus*, destination unspecified (ITTO, 2015 & 2017).

Roseodendron donnell-smithii

Range: Colombia, El Salvador, Guatemala, Honduras, Mexico, Venezuela; **Introduced:** Ecuador, Puerto Rico (IPNI, 2019).

Mexico: Described as an important timber yielding species in Mexico with high potential to trade on the international market (Colín-Urieta et al., 2015). From 2010-2011 Mexico exported 183.4 m³ sawn wood to Guatemala, and in 2012 exported 510 roundwood pieces to Honduras. In 1989 it was reported to be exported from Guatemala and Mexico to the USA (Little and Skolmen, 1989).

Tabebuia cassinoides

Range: Brazil (IPNI, 2019).

Brazil: This endemic species is assessed nationally as endangered (CNCFlora, 2012) noting that its habitats are severely fragmented and that although protected by conservation units, it is widely exploited for timber. It has light wood considered the second best wood in the world for pencil production, and is also used to make clogs, musical instruments, toys and for crafts. Currently, there are few viable subpopulations for commercial exploitation (CNCFlora, 2012).

Tabebuia rosea

Range: Belize, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panamá, Venezuela. Introduced to: Brazil, Cayman Islands, Cuba, Dominican Republic, Gambia, Jamaica, Leeward Is., Puerto Rico, Trinidad-Tobago, Venezuelan Antilles, Windward Is. (IPNI, 2019).

Mexico: *T. rosea* was highly exploited in the Yucatan Peninsula, so its stocks are low. Cutting cycles in Mexico have favoured the renewal of all important commercial species, except *T. rosea*. Exploitation is reportedly primarily for local use (E. Martínez Salas, in litt., 2019).

Venezuela: From 2007 to 2017 there were exports of 29,637 m³. The country reports seizures destined for international export totalling 66 m³ between 2013 and 2018.

Other species

H. chrysotrichus: critically endangered in Bolivia

H. guayacan: threatened in Costa Rica

H. lapacho: threatened in Argentina, endangered in Bolivia

H. pulcherrimus: highly threatened across its whole distribution in South America

H. arianae, *H. riococensis*, *H. spongiosus*: endangered in Brazil (CNCFlora, 2012)

H. botelhensis, *H. cristatus*, *H. selachidentatus*: near threatened in Brazil (CNCFlora, 2012)

T. conferta: endangered in Haiti

T. obovata: threatened in Cuba, endangered in Dominican Republic

T. palustris: threatened in Colombia, Costa Rica and Panama

T. striata: threatened in Colombia and Panama

T. bullata, *T. crispiflora*, *T. dominguensis*, *T. maxonii*, *T. ophiolithica*, *T. paniculata*, *T. ricardii*, *T. vinosa*, *T.*

zanonii: endangered in the Dominican Republic

T. heterophylla, *T. lepidota*, *T. pulverulenta*, *T. sauvallei*: critically endangered in Cuba

T. bibracteolata, *T. clementis*: endangered in Cuba

H. billbergii, *T. arimaensis*, *T. bahamensis*, *T. berteroi*, *T. calcicola*, *T. caleticana*, *T. densifolia*, *T. elongata*, *T. inaequipes*, *T. pinetorum*, *T. polymorpha*: threatened in Cuba

T. jackiana: vulnerable in Cuba

T. brooksiana, *T. elegans*: near threatened in Cuba.

Additional Information**Threats**

Over-exploitation is considered a threat, as well as habitat loss. Based on satellite imagery, the total area deforested in the Brazilian Amazon in 2004 was 2.8 million ha. The annual rate of deforestation between 2012 and 2013 was 5.9 million ha, an increase of 28% compared to 2011. Deforestation was driven mainly by the demand for agricultural land. In Colombia, the reduction of forest fragments caused by the expansion of areas for agricultural and livestock use has restricted *H. chrysanthus* to the drier transition zone of xerophytic scrub vegetation in the south of the country. In Michoacán, Mexico, natural populations of *T. rosea* have decreased considerably due to anthropogenic factors, mainly deforestation for the construction of human settlements combined with obtaining wood, contributing to the reduction of their habitat.

Conservation, management and legislation

There are broad bans/restrictions on timber logging/export in several range States, examples include:

- **Brazil:** the export of unfinished timber of native species (i.e. destined to be processed abroad) is prohibited according to Normative Instruction 15/2011 (IBAMA, 2011), amended by Normative Instruction 13/2018 (IBAMA, 2018).

- **Bolivia:** export of unprocessed forestry products is subject to restrictions and highly regulated, mainly through forest certification (from 1996 onwards, last updated 2016; Forest Legality Initiative, 2016).

- **Ecuador:** there is an export ban on roundwood, except in limited quantities for scientific and experimental purposes, and semi-finished forest product exports are allowed only when "domestic needs and the minimum levels of industrialization have been met" (from 2005 onwards, last updated 2016; Forest Legality Initiative, 2016).

- **Peru:** there is an export ban on logs and forest products “in their natural state” except when they originate from nurseries or forest plantations, and if they do not require processing for final consumption (from 1972 onwards, last updated 2016; Forest Legality Initiative, 2016).

In Ecuador, in vitro cultures are being used to recover endangered species of *Handroanthus*. Populations of *H. chrysanthus* and *H. billbergii* have been recovered mainly by management actions, among them the declared ban on exploitation in 1978. In 2006, Venezuela decreed a ban on exploitation of *T. spectabilis*.

Artificial propagation/captive breeding

Various species in this genus are grown in nurseries for forest plantations, reforestation and urban planting throughout the Americas. In Panama, *T. rosea* was experimented with to reforest degraded areas and the yield was good in all sites. In Venezuela there are plantations of this species in the Barinas and Monagas States. In Jamaica *T. rufescens* and *T. rosea* are commonly cultivated. In Mexico there are 62,736 ha of plantations of ipê of several species, mostly *T. rosea* (48,748 ha) which is managed in commercial plantations, as well as being used to enrich secondary forests and degraded paddocks. There are no ipê plantations in Brazil.

Implementation challenges (including similar species)

Due to the great similarity between the woods of the different species and genera, they are marketed with the same common name (ipê). The quantitative characteristics of the wood anatomy can present variations between individuals of a species and even within the same individual, so distinguishing species is very difficult. *A clear differentiation of the individual species is not possible on either the macroscopic or microscopic level (G. Koch, in litt., 2019).* There are no identification guides for all species of the three genera. *While the proposal outlines distinguishing characters between the three genera, a clear differentiation between the genera Handroanthus and Tabebuia is not considered possible, especially for non-experts. The species of the genus Roseodendron may be distinguishable from Handroanthus and Tabebuia on the microscopic level (with relevant reference samples and expertise). However, based on the very complex taxonomy of the three genera with many synonyms, a clear and assured differentiation may be difficult in practice (G. Koch, in litt., 2019).*

The following species are commonly confused with ipê in trade, although they can be differentiated using microscopic characters (G. Koch, in litt., 2019). None of these species are currently included in the CITES Appendices; all are present in range States where the three proposed genera are also present:

Acosmium spp.: occur in Bolivia and Brazil (Rodriguez & Tozzi, 2009)

Leptolobium spp. (Lapachillo, lapachin): occur from Mexico to Argentina (Rodriguez & Tozzi, 2012)

Dicorynia guianensis Amsh.: occurs in Suriname and French Guiana (ITTO, 2019)

Dicorynia paraensis Benth. (Angélique, basralocus): occurs in Brazil, Colombia and Venezuela (Canteiro, 2018)

Dipteryx odorata (Aubl.) Willd.: occurs in Brazil, Colombia, French Guiana, Guyana, Suriname and Venezuela (Requena Suarez, 2017)

Dipteryx alata Vog. (Cumarú): occurs in Brazil (World Conservation Monitoring Centre, 1998).

Potential risk(s) of a listing

Trade shifts to other non-listed species, as appears to have affected these genera following the listing of mahogany (Brancaion et al., 2018).

Other comments

It is not clear whether the proposed annotation #6 (logs, sawn wood, veneer sheets and plywood) would cover the main commodities that first appear in trade and drive the demand. The end use of much of the export (at least to the USA) is reported to be decking and flooring. The USA uses two HS codes for ipê imports: HS44.07 (wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm) and HS44.09 (wood (including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded or the like) along any of its edges, ends or faces, whether or not planed, sanded or end-jointed). The definition of sawn wood in Res. Conf. 10.13 (Rev. CoP15) Implementation of the Convention for timber species already refers to HS44.07, but no part or derivative defined in Res. Conf. 10.13 explicitly covers flooring or decking, or refers to HS44.09 (the HS code that seems most relevant). Proposal 53 seeks to amend the annotation for Pericopsis elata to read “Logs, sawn wood, veneer sheets, plywood, and transformed wood”, with transformed wood defined as HS code 44.09, and if that proposal is adopted the same annotation could be applied for the listing of these taxa. This may be considered to be expanding the scope of the proposal, but would be in line with the guidance on annotations in Res. Conf. 11.21 (Rev. CoP17) paragraph 6, which recommends that “i) controls should concentrate on those commodities that first appear in international trade as exports from range States; these may range from crude to processed material; and ii) controls should include only those commodities that dominate the trade and the demand for the wild resource.” Ensuring the most appropriate annotation is adopted would avoid the need to amend it through a further proposal at a subsequent CoP.

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Inclusion of Mulanje Cedar *Widdringtonia whytei* in Appendix II

Proponent: Malawi

Summary: The Mulanje Cedar *Widdringtonia whytei* is a slow growing, coniferous tree in the cypress family, endemic to the Mount Mulanje Massif in south-eastern Malawi, which occurs over 650 km². It can reach a height of 40 m and over 1 m in diameter, taking 80–100 years fully to mature. Much of its habitat is found in the Mount Mulanje Forest Reserve. It historically grew at 1500–2200 m above sea level. There are around 70 ha of plantations on Zomba Mountain and another 80 ha in the large timber plantations of the Viphya Plateau, which may include a mix of *W. whytei* and *Widdringtonia nodiflora*.

Widdringtonia whytei faces numerous threats, the most serious of which are changing fire regimes, fuelwood collection, illegal logging, invasive tree species and conifer aphids.

Widdringtonia whytei was assessed as Critically Endangered in 2011 on the basis that threats were likely to cause a decline of more than 80% by 2030. In 2014, a Forest Department survey found 38,138 mature, living *W. whytei* (with a further 25,609 standing dead individuals) but by 2017 only seven mature *W. whytei* trees were found, all of which had been felled by 2018. There are no reproductively mature trees on the Mulanje Mountain. The remaining population is thought to comprise of seedlings that have been planted since 2017 as part of a major restoration project. Due to low regeneration and recruitment, the success of the project will not be known for years to come. Plantation forestry has been conducted in other areas of Malawi with limited success.

The export of native hardwood logs has been banned since 2008 and *W. whytei* is listed as a protected species in Malawi. Licences were only meant to be issued for salvage logging of dead trees, but illegal logging that targeted the remaining large, living trees escalated throughout the period 2007–2018. While *W. whytei* has been commercially exploited for over a century, it is unclear whether international trade or national utilisation has driven the recent decline.

The proposal is to list the species *W. whytei* in Appendix II without annotation.

Analysis: There are no mature *Widdringtonia whytei* trees remaining in its natural habitat, the last remaining seven having been felled by 2018. The species can be considered to be commercially extinct in the wild and therefore meets the biological criteria for listing in Appendix I already. Seedlings planted since 2017 are unlikely to mature for tens of years and therefore any trade in this species from the wild is not likely in the near future. Appendix II listing is therefore unlikely to have any significant conservation impact.

It is possible that trade in *W. whytei* from plantations may occur as plantation forestry has been attempted for over a century with limited success.

Summary of Available Information

Text in non-italics is based on information in the Proposal and Supporting Statement (SS); text in italics is based on additional information and/or assessment of information in the SS.

Taxonomy

Widdringtonia whytei or *Mulanje Cedar* is one of four species in the genus *Widdringtonia* (*Widdringtonia nodiflora*, *Widdringtonia schwarzii*, *Widdringtonia wallichii* and *Widdringtonia whytei*).

Widdringtonia whytei was long thought to be the same species as the more widespread *Widdringtonia nodiflora*, which has a more narrow and multi-stemmed growth form. However, genetic analysis at the University of Cape Town has conclusively shown that they are distinct species. Both species grow on Mount Mulanje.

Range

Malawi

IUCN Global Category

Critically Endangered *A4acde* + *B2ab* (*i,ii,iii,iv,v*) (2011) ver 3.1

Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP 17) Annex 2a)

C) Trade regulation needed to prevent future inclusion in Appendix I

Biology

Widdringtonia whytei is a coniferous tree in the cypress family that can reach 40 m in height and over 1 m in diameter. The tree is wide-crowned and often branchless up to about 21 m. Its bark is spongy and thickens with age, splitting along longitudinal cracks. *Widdringtonia whytei* wood has copious amounts of aromatic resin whose resistance to fungal rot, decay and insects make its yellow-white timber highly valuable. Its basic density is 385–430 kg/m³.

Widdringtonia whytei grows relatively slowly, particularly in comparison to the non-native conifer species with which it now competes on the mountain. It takes 80–100 years fully to mature but will eventually become a dominant or co-dominant tree in its ecosystem if canopy out-competition, natural or human disturbances do not intervene.

Population size

Widdringtonia whytei is endemic to the Mount Mulanje massif in south-eastern Malawi, whose total area covers approximately 650 km². Much of this area is gazetted as the Mount Mulanje Forest Reserve (MMFR) and known locally as *chilumba mu mlengalenga*, “island in the sky”. *Widdringtonia whytei* historically grew across the upper reaches of the MMFR (1500–2200 m above sea level).

The most recent ecological baseline survey, conducted in 2017, found that “Mulanje Cedar is considered to be practically extinct on Mulanje mountain. It is very likely that the small number of sizeable standing individuals that remain will be gone before the end of 2017.” This survey found only seven mature individual *Widdringtonia whytei* trees, clustered together in a single inaccessible gully (for purposes of the survey, mature individuals were those capable of producing seed). Out of 34 20 m² plots surveyed, 25 plots had fewer than 20 living individuals, most of which were young seedlings recently planted by a restoration project in the Forest Reserve. Eight of these plots had no living individuals. As of 2018, the seven reproductively mature standing individuals had been felled.

Population trends

The IUCN Red List assessment (assessed in 2011) stated that a population decline of over 80% was likely by 2030 and considers the species Critically Endangered. The actual decline has been even more drastic. In 2007, densities of between 41 and 131 stems/ha of trees above 5 cm diameter, and 78,159 m³ of standing live volume were reported. In 2014, a Forest Department survey found 38,138 mature, living cedar trees (and a further 25,609 standing dead trees). But by 2017, field surveys found only seven mature living trees. *This decline was caused by lawlessness, resulting in illegal harvesting (T. Chanyenga and D. Nagoma, in litt., 2019).*

Trade

Widdringtonia whytei timber is highly valued in Malawi, as its light-to-moderately-heavy yellow-brown wood is easy to work with and is decay- and insect-resistant. It is a highly desirable species for construction and boat building, and has been commercially harvested for over a century. The British colonial regime established Mount Mulanje Forest Reserve largely to manage its extraction.

The Malawi Department of Forestry currently licenses only the utilisation of dead Widdringtonia whytei trees and is reviewed annually, averaging 20 pit-sawyers in 2007 (Bayliss et al., 2007). As recently as 2007, the government of Malawi issued harvesting licences for cedar to build 400 plank boats. The species is also preferred for furniture, roof shingles (weathering to a silver-grey), panelling, flooring and handicrafts such as walking sticks sold to tourists. An oil called “Mulanje tar” can be distilled and used as a preservative. *Widdringtonia whytei* has been traded as logs, sawn wood, or smaller dimensional pieces of timber salvaged from dead trees. Derivative products can also be made from its resin. *It is reported to be prized for use in making furniture, chests and curios sold to tourists (Hecht, 2008).*

Widdringtonia whytei has become a prestige wood with a high scarcity value: one large tree might have fetched a price of £1000 (USD 1300, GBP 1=USD 1.3 calculated on 28/01/19) in 1992 (Chapman, 1992, reported in Pauw and Linder 1997) (valued at £2033 in 2018 (USD 2643, GBP 1=USD 1.3 calculated on 28/01/19)).

More recently, stockpiled wood is listed on a “Rare Woods” website in South Africa priced at R46,120/m³ (USD 3,385/m³, ZAR 1=USD 0.07 calculated on 28/01/19, available in 38 mm and 50 mm thickness (Rare Woods SA, 2018).

Additional Information

Threats

Changing fire regime: *Widdringtonia whytei* regeneration is linked to periodic fire that kills off shade canopy and exposes new mineral soil. But these natural fires are usually caused by lightning during the rainy season and are less damaging than the now-frequent fires caused by humans for various reasons. Many are set during the hot dry season to renew grasses for local livestock grazing. Hunting flush fires and crop waste fires are also common and can spread out of control, particularly on the drier northeastern slopes of the mountain adjacent to communities. Loggers set fires to expose remaining pieces of cedar in already-cut areas. Such fires damage or kill the adult trees and, critically, also have a heavy impact on regenerating seedlings.

Invasive tree species: Mexican Pine *Pinus patula*, originally planted by the colonial administration as a nurse crop for *Widdringtonia whytei*, turns out to grow much faster and shade it out. *Pinus patula* is also a pioneer species co-adapted with fire. It has taken over areas of the mountain to the exclusion of other species including *Widdringtonia whytei*.

Conifer aphids: The Giant Cypress Aphid *Cinara cupressivora*, originally from Europe and North America was first recorded in Malawi in 1986. This aphid attacked and killed many *Widdringtonia whytei* trees in the 1980s and 1990s, before a parasitic wasp was released as a biological control. It has not been eradicated and remains a factor in the high mortality levels.

Other threats: Deposits of around 30 million t of bauxite have been found over about one third of the Mulanje plateau. While large-scale open cast mining has not yet occurred, the possibility remains and would completely destroy any cedar forest habitat in these areas. Most recently, rare earth minerals needed by computer and cell phone technologies have been found on the plateau.

Conservation, management and legislation

Native hardwood log exports have been banned since 2008. There is no legal export of *Widdringtonia whytei*.

Widdringtonia whytei was listed as a Protected Species in a revision to the National Parks and Wildlife Protected Species Act which was revised and published in September 2017. Under this Act one could receive a jail sentence of up to 30 years if found to be illegally possessing *W. whytei*.

Previous plantation or restoration attempts have been seriously hampered by a poor understanding of ecology, pathology and horticulture, although the tree has been successfully planted at a small scale elsewhere in Malawi as well as in botanic gardens. The “Save our Species” project planted 220,000 seedlings between 2003 and 2010, but almost all were lost to wildfire. Low seedling survival has been a consistent problem in the nursery as plants attain 5–10 cm, and survival dropped off again once they were out planted to the natural habitat. *A similar pattern of poor survival has been found with planting the Cederberg Cedar Widdringtonia wallichii in the South Western Cape of South Africa (N. Allsopp, in litt., 2019).*

Currently an initiative funded by the Darwin Initiative and implemented by Botanic Gardens Conservation International, in partnership with the Mulanje Mountain Conservation Trust and the Forestry Research Institute of Malawi, is attempting a major *Widdringtonia whytei* replanting project within appropriate habitat of MMFR. Ten community nurseries were established around the base of the mountain and apparently traditional authorities were consulted and involved in project implementation. The project trained nursery supervisors and extension staff in horticultural protocols, refinement of which is ongoing. Trial plots were also set up across Malawi to “test growth limits and identify optimal growing conditions for Mulanje Cedar”. The project has planted 325,000 seedlings and its goal is to plant another 250,000 on the mountain by 2019 while selling 250,000 seedlings commercially to remove pressure from the Mount Mulanje population.

Artificial propagation/captive breeding

Plantation forestry of *Widdringtonia whytei* has been attempted for over a century with limited success. The species’ growth is far slower than exotic conifers like *Cupressus lusitanica* and *Pinus patula*. It also appears that in some cases *Widdringtonia whytei* and *W. nodiflora* have been mixed together in these plantations. There are 66 ha of plantation on Zomba Mountain and another 76 ha in the large timber plantations of the Viphyia Plateau.

It is reported to be found in various botanical gardens around the world (Kenya, Tanzania, Indonesia and New Zealand) (Shaw & Smith, 2017).

Implementation challenges (including similar species)

Widdringtonia whytei was long thought to be the same species as the more widespread *W. nodiflora*, which has a more narrow and multi-stemmed growth form. However, genetic analysis at the University of Cape Town has

conclusively shown that they are distinct species. Both species grow on Mount Mulanje. *Widdringtonia nodiflora* is widespread in southern Africa and assessed as Least Concern (ver 3.1, assessed 2011), although it can be readily coppiced it is probably only used for firewood locally, with no commercial use reported for this species (Farjon, 2013).

Traditional chiefs have significant authority over harvest rights in their villages or territories. Their decisions may not always be in line with the national government's policies.

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Deletion of North Indian Rosewood *Dalbergia sissoo* from Appendix II

Proponents: Bangladesh, Bhutan, India and Nepal

Summary: North Indian Rosewood *Dalbergia sissoo* is a fast-growing perennial tree, native to Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Iraq, Myanmar, Nepal and Pakistan, and is also widely introduced, especially in Africa and Asia. In some regions it is considered invasive. The population size is not known, and although disease has impacted both wild and cultivated populations in a number of range States, the species' high regeneration and growth rate provides resilience to this threat. In Bangladesh, India, Nepal and Pakistan the species is widely cultivated, and has also successfully naturalised within some new areas, following afforestation programmes. *Dalbergia sissoo* is primarily harvested for its timber, which is used for a wide range of products including handicrafts and furniture. It has become one of the most widely utilised plantation tree species in the Indian subcontinent where it is economically important for its value in forestry, agroforestry and horticulture.

The genus *Dalbergia* was listed in Appendix II at CoP17 (2016) with annotation #15, except for the species already listed in Appendix I. It was argued at the time of the proposed listing that only some *Dalbergia* species met the criteria in Annex 2a, but enforcement and customs officers who encountered specimens of *Dalbergia* products would be unlikely to be able to distinguish between the various species of *Dalbergia* reliably so the whole genus should be listed. In 2017 the predominant commodities of *D. sissoo* reported in international trade were carvings (~5.8 million kg) and wood products (735,000 items plus ~80,000 kg), and most were reported as pre-Convention (although there was some trade reported as from artificially propagated and wild sources). The majority of trade was from India, and European countries (particularly Germany) and the USA were the major importers.

Many experts acknowledge that, without the use of technology, it is difficult for non-experts readily to identify *Dalbergia sissoo* once made into finished products, and these appear to be the predominant form in which *D. sissoo* is traded. While technological methods to identify *D. sissoo* exist, they require expertise and/or equipment not currently available on a global scale.

A proposal to amend annotation #15 has also been submitted (CoP18 Prop. 52). Should this be accepted, trade in some items, including products containing less than 500 g of wood and musical instruments, would be exempted from controls. This may have a significant impact depending on what proportion of India's carvings contain less than 500 g of wood; India raised particular concerns over the impact that the listing of *Dalbergia sissoo* has had on their handicraft industry.

Analysis: Wild populations of *Dalbergia sissoo* are found over a large range and in general there is no evidence that they are declining due to trade. The species is of significant economic importance in several range States, particularly India and Pakistan, where large volumes of trade are sourced from plantations. While the species does not meet the Appendix II listing criteria in Annex 2a of *Res. Conf. 9.24 (Rev. CoP17)*, differentiating this species in trade from all other *Dalbergia* species does, at present, remain a major implementation challenge. While methods exist to differentiate *D. sissoo* from other members of the genus in trade, these require expertise and technology not currently widely available globally. The species therefore still meets the criteria in Annex 2bA in that "the specimens of the species in the form in which they are traded resemble specimens of a species included in Appendix II under the provisions of Article II, paragraph 2 (a), or in Appendix I, so that enforcement officers who encounter specimens of CITES-listed species are unlikely to be able to distinguish between them." If the species is not removed from the Appendices, it may be that any impact on the handicraft industry might be mitigated by the proposed change to annotation #15.

Summary of Available Information

Text in non-italics is based on information in the Proposal and Supporting Statement (SS); text in italics is based on additional information and/or assessment of information in the SS.

Range

Native: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Iraq, Myanmar, Nepal, Pakistan (*although according to Javaid et al., (2014) it was introduced to Pakistan in the mid-1800s*).

Introduced: Antigua and Barbuda, Australia, Cameroon, Chad, China, Cyprus, Dominican Republic, Ethiopia, French Polynesia, Ghana, Guinea Bissau, Indonesia, Israel, Kenya, Mauritius, Malaysia, Mozambique, New Caledonia, Niger, Nigeria, Oman, Pakistan, Paraguay, Philippines, Puerto Rico, Senegal, Sierra Leone, South Africa, Sri Lanka, Sudan, Thailand, Togo, Uganda, United Republic of Tanzania, United States of America, Virgin Islands of the USA, Zambia, Zimbabwe.

IUCN Global Category

Not assessed.

Biological and trade criteria for retention in Appendix II (Res. Conf. 9.24 (Rev. CoP 17) Annex 2a)

D) Trade regulation needed to prevent future inclusion in Appendix I

E) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Dalbergia sissoo is primarily harvested for its timber, which is used to produce a wide range of products including handicraft items, boats, carts, carriages, gun handles, rail-sleepers, cabinets, furniture, decorative veneer, ornamental turnery, plywood, musical instruments, skis, carvings, tool handles, floorings, etc. Within India, *D. sissoo* is said to be the second most important cultivated timber tree.

The species is native to nine range States and has also been introduced to many others. In some cases, it is considered to be an invasive species (CABI, 2019). While there is a lack of data regarding the status of natural populations (Dhayani, in litt., 2019), Dalbergia sissoo's natural range primarily occurs throughout the sub-Himalayan tract and outer Himalayan valley, ranging from Bangladesh to Afghanistan (Khan, 2000).

It is also reported to be widespread in plantations within Bangladesh, India, Nepal and Pakistan (Hossain and Martin, 2012; Javaid et al., 2014). While their current extent is unclear, in 1979, Pakistan was said to have 100,000 ha of irrigated plantations (National Research Council, 1979).

Within India the Extent of Occurrence (EOO) is at least 198,974 km² considering only the sub-Himalayan tracts from where wild subpopulations of the species are reported. In parts of India, following afforestation programmes, this adaptable species has also become naturalised, further increasing its range.

The density of wild populations in different parts of India is reported to be 8–38 mature individuals per ha, compared with 3–39 per ha for cultivated stocks and up to 1,600 per ha for pure and mono specific plantations.

Though disease has caused population declines in some parts of India during the last few decades, *based on a recent non-detriment finding (NDF) study submitted by the Botanical Survey of India, the species is not considered to be under threat (Dhyani in litt., 2019)*. Harvest or trade primarily utilises cultivated trees, *although wild exports have been reported (see below)*.

The Supporting Statement reports that between February 2013 and November 2016, a total of 4,739 shipments of *Dalbergia sissoo* were exported from India, worth USD1,079,870, (with an average price per unit of USD4.15 and average value per shipment of USD228), destined for a number of countries around the globe.

*According to the CITES Trade Database, the predominant commodities in trade in 2017 were wood products and carvings (see Table 1). Trade data are not yet complete for 2018. There were significant discrepancies reported by exporting countries and importing countries, with importers reporting far more than exporters (see Table 1). India and the main importers (Germany and the USA) have all submitted annual reports for 2017. India has taken a reservation on *Dalbergia* spp. (since January 2017) and a Notification (2018/031) states that it has banned the export for commercial purposes of all wild-taken specimens of species in the Appendices apart from certain products of *Dalbergia sissoo* and *D. latifolia*.*

Table 1. Global trade in *Dalbergia sissoo* in 2017 reported by importing (Imp.) and exporting (Exp.) countries (according to the CITES Trade Database).

Trade Term	kg		Number of items (no unit specified)	
	Imp.	Exp.	Imp.	Exp.
carvings	5,753,236	-	6,897	-
wood product	79,763	-	735,549	34,324
timber	33,152	-	-	-
derivatives	7,958	-	-	-

Nearly all exports were reported as pre-Convention ("O") (86% carvings reported in kg) with some reports of artificially propagated ("A") (14% of carvings reported in kg) and wild ("W") (66% wood products reported in kg). All trade was for commercial purposes.

Of the products reported as imported, the vast majority were from India, with Pakistan reporting the export of just over 34,000 wood products. The main importers were European countries (predominantly Germany but also others including France and Portugal) and the USA. Most of the trade has been reported as pre-Convention and therefore it is not possible to tell what proportion of trade is wild-sourced or from plantations.

In the years 2017 and 2018, 2,206 import permits for 12,243 t of furniture made of *Dalbergia sissoo* have been issued by the German Management Authority (in litt., 2019). In comparison, only approx. 5.1 t of other small wood products (most of which have been chess boards/men) have been imported with 28 import permits over that period.

Seizures of *Dalbergia sissoo* have been reported by the UK and the Netherlands because they were shipped without CITES permits. The UK seized four shipments from India and three from Pakistan, while the Netherlands seized one shipment from India and one from Suriname (EU-TWIX, 2019). Further *Dalbergia* seizures recorded to genus level may also include *D. sissoo*.

Retention in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP17) Annex 2 a or listed in Appendix I

In 2017, the entire *Dalbergia* genus was listed in CITES Appendix II except for the species listed in Appendix I. It was argued at the time of the proposed listing that some species met the criteria in Annex 2a but that enforcement and customs officers who encountered specimens of *Dalbergia* products would be unlikely to be able to distinguish between the various species of *Dalbergia* reliably so that the whole genus should be listed. It was also noted that many species of *Dalbergia* have the same wood anatomy, and the process of identification of different species is very difficult, due to the hardness of the wood which hampers the preparation of thin sections for microscopic analysis (McLure et al., 2015).

The SS notes that *Dalbergia sissoo* is easy to identify in living condition, unlikely to be confused with other species. However, live specimens are not the main product in trade.

"Topical legumes: Resources for the future" published in 1979, states that "Although closely related to the rosewoods *Dalbergia sissoo* wood is light coloured and lacks the rosewoods' striking grain" (National Research Council, 1979). However, many experts acknowledge that, without the use of technology or high levels of expertise, it is difficult for non-experts readily to identify *Dalbergia sissoo* once made into finished products (Hartvig et al., 2015; Dhyani, in litt., 2019; Koch, in litt., 2019; Sivadas, in litt., 2019; Vlam and Zuidema, in litt., 2019).

Koch (in litt., 2019), also notes that, in particular, *Dalbergia oliveri* (range: Myanmar, Thailand, Lao People's Democratic Republic (PDR), Viet Nam and Cambodia) bears a similar colour and texture to *D. sissoo* and requires expertise for a differentiation, particularly if the origin of the wood is unknown.

A range of scientific techniques to enable the identification of *Dalbergia sissoo* in trade are available (Hartvig et al., 2015; Espinoza in litt., 2019; Koch in litt., 2019; Vlam and Zuidema, in litt., 2019). However, the application of these is currently severely restricted, due to the financial resources and expertise required to implement them.

For example: Macroscopic visual identification methods using identification guides can be utilised by non-experts to identify *Dalbergia sissoo* to genus level (Koch, in litt., 2019). However, to identify *D. sissoo* to species level,

microscopic inspection of a range of additional structural features is required, which demands a high level of expertise and laboratory equipment to perform (Koch et al., 2011; Koch in litt., 2019). The only exception is for distinguishing between *D. sissoo* and *D. latifolia*, when macroscopic inspection would suffice (Koch in litt., 2019). The level of expertise and experience required to perform microscopic inspection (Dormontt et al., 2015; Koch, in litt., 2019), means that, at present, this technique is not widely available to global enforcement efforts. In addition, others consider that visual techniques cannot always be used to identify wood within composite materials, or that have been stained/dyed a different colour.

Technological methods include DART TOFMS (Direct Analysis in Real Time, Time of Flight Mass Spectrometry), which has proven ability to identify *Dalbergia sissoo* in trade (Espinoza, pers. comm., 2019). This system works by combusting a small sample of wood, which enables its chemical profile to be analysed. It is capable of identifying samples to species level, with 2,000 species (including 90% of those listed within CITES) catalogued within its database, including *D. sissoo*. The system is also accurate regardless of the age or part of the tree that is tested, and with the exception of very thin plywood (which is contaminated with glue), it is capable of identifying all forms of wooden products in trade. The cost of this system (USD 250,000 to install and, in the US, USD 250 to process each sample) may currently be a barrier to its implementation, and to date, uptake of the system by global enforcement agencies has been low (Espinoza, pers. comm., 2019).

DNA barcoding has also been demonstrated as capable of identifying *Dalbergia sissoo* to species level (Hartvig et al., 2015). To be used practically however, this technique first requires the creation of reference data sets, or species-specific assays. DNA extracted from timber may also be of poor quality, which can hamper the process (Hartvig et al., 2015).

At the present time, therefore, a considerable gap remains between the potential and realised application of such methodologies (Dormontt et al., 2015).

While prior knowledge of the wood's origin is likely to help in the identification of *Dalbergia sissoo*, (Koch in litt., 2019), as it is not endemic to any one country, this may be of little assistance to global enforcement efforts.

Additional Information

Threats

The main threats to both wild and cultivated populations of *Dalbergia sissoo* are fungal and bacterial diseases (wild and dieback being the diseases that have the largest impact) and insect infestations. Wilt disease has been reported from some plantations within India, where *D. sissoo* has been raised in unsuitable conditions. Plantations of *D. sissoo* have suffered from significant dieback in Bangladesh, where mortalities in excess of >50% have been reported (Winfield et al., 2016). The species' high regeneration and growth rate, however, reduces their impact upon the species as a whole. The frequency of mortality due to diseases is also lower in wild subpopulations than in cultivated plantations.

Conservation, management and legislation

The Government of India has banned the export for commercial purposes of all wild-taken specimens of species included in Appendices I, II and III. It has, however, taken a general reservation to *Dalbergia* spp. (except species in Appendix I) and permits the export of cultivated varieties of plant species included in Appendices I and II and of products from wild sourced *D. sissoo* and *D. latifolia* that are authorised for export by a CITES Comparable Certificate, **except** logs, timber, stumps, roots, bark, chips, powder, flakes, dust and charcoal. CITES Comparable Certificates will be issued with a footnote, stating that the wild (W) source specimens are covered under Legal Procurement Certificate as per regional and national laws in India (Notification No. 2018/031).

The SS also notes that within India, wild populations of *Dalbergia sissoo* are found within several protected areas. Harvest outside of protected areas is regulated but this varies geographically. Its fast growth rate and use within a number of industries have made *D. sissoo* a preferred choice for forest departments and other agencies undertaking afforestation programmes, and also for farmers who grow this species for commercial use.

Artificial propagation/captive breeding

The species can be found in plantations and/or agroforestry systems in almost every part of India. It can be found growing under controlled conditions within farms, gardens and plantations. Artificial propagation is possible from almost all common practices such as: sowing seeds; planting stumps, root sections and stem cuttings; cloning cuttings; and entire transplanting.

Commercial plantations exist in both the area of natural distribution (Indian subcontinent), as well as in China and some African countries (Koch, in litt., 2019).

Potential risk(s) of a deletion

A lack of enforcement capability would leave open the possibility of other rosewood species being mis-declared as *Dalbergia sissoo*, with the detection and prosecution of these crimes hampered by the practical difficulties

outlined above. As the range of *D. sissoo* overlaps with that of other *Dalbergia* species, (Winfield et al., 2016), it is conceivable that such opportunities may arise. Prior to the *Dalbergia* genus listing, traffickers were said to have taken advantage of gaps in the CITES listings for rosewood, for example, by mis-declaring *D. retusa*, as the then unlisted and similar-looking, *D. bariensis* (EIA, 2016).

Potential benefit(s) of deletion for trade regulation

It is likely that deleting *Dalbergia sissoo* from Appendix II would mitigate the negative impacts that this listing has reportedly had on some areas of international trade, particularly the negative impacts on the trade in wooden handicrafts from India.

Other comments

Many species of *Dalbergia* are under a range of threats, including deforestation, forest conversion for agriculture/human development, and legal and illegal logging to supply domestic and international markets (Winfield et al., 2016). Trade in some species of *Dalbergia* considered to be "precious woods" with high market values, has resulted in their over-exploitation (Jenkins et al., 2012). The IUCN currently lists 57 species within the Vulnerable (26 species), Endangered (29 species) and Critically Endangered (2 species) categories.

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Amendment of Annotation #15

Proponents: Canada and the European Union

Summary: The scope of the listing for species of *Dalbergia* included in Appendix II as well as *Guibourtia demeusei*, *G. pellegriniana* and *G. tessmannii* is defined by annotation #15 to the listing, which currently reads:

All parts and derivatives are included, except:

- a) Leaves, flowers, pollen, fruits, and seeds;
- b) Non-commercial exports of a maximum total weight of 10 kg per shipment;
- c) Parts and derivatives of *Dalbergia cochinchinensis*, which are covered by Annotation # 4;
- d) Parts and derivatives of *Dalbergia* spp. originating and exported from Mexico, which are covered by Annotation # 6.

The changes proposed to this annotation are:

- to remove the current part b) and add a new b) "Finished products to a maximum weight of wood of the listed species of 500g per item"
- add a new c) "Finished musical instruments, finished musical instrument parts and finished musical instrument accessories"
- relabel the current c) and d) as d) and e) respectively.

There have been challenges in interpretation and implementation of this annotation. These include concerns that some of the commodities currently covered by the listing (including finished products such as musical instruments and furniture) are not those that first appear in international trade as exports from range States and therefore their inclusion under the annotation was inconsistent with the guidance on annotations provided in *Res. Conf. 11.21 (Rev. CoP17)*. These issues have led to considerations on this matter by the Standing Committee and its Working Group on Annotations.

Analysis: The proposed amendment to annotation #15 is the result of the extensive discussions and consensus reached by the Standing Committee Working Group on Annotations (see SC70 Com.17). The Standing Committee has supported the proposed amendment, which is intended to reduce the challenges with interpretation and implementation of the current annotation #15 experienced by Parties and ensure the annotation is in line with guidance on use of annotations in *Res. Conf. 11.21 (Rev. CoP17)*. Given the extensive debate on these changes and the consensus reached by the Standing Committee, the proposed changes should address the issues raised by (the majority of) stakeholders. Finished pieces of furniture made from the species to which the annotation applies are unlikely to contain wood of those species weighing less than 500g, so if the proposal is accepted these would continue to be covered by the listing, regardless of whether they were being exported by a range State or a processing country.

Summary of information and discussion

Before CoP17 the following taxa in the *Dalbergia* genus were already included in Appendix I and II.

Appendix I

Dalbergia nigra

Appendix II

Dalbergia granadillo (Logs, sawn wood, veneer sheets and plywood)

Dalbergia retusa (Logs, sawn wood, veneer sheets and plywood)

Dalbergia stevensonii (Logs, sawn wood, veneer sheets and plywood)

Dalbergia spp. (populations of Madagascar) (Logs, sawn wood and veneer sheets)

At CoP17 (2016) a proposal to list all *Dalbergia* species (except for species already listed in Appendix I, namely *D. nigra*) with no annotation was submitted (CoP17 Prop. 55). A separate proposal (CoP17 Prop. 54) was submitted to list 13 species of the genus *Dalbergia* native to Mexico and Central America in Appendix II with annotation #6 (Logs, sawn wood, veneer sheets and plywood) (*Dalbergia calderonii*, *D. calycina*, *D. congestiflora*,

D. cubilquitzensis, *D. glomerata*, *D. longepedunculata*, *D. luteola*, *D. melanocardium*, *D. modesta*, *D. palo-escrito*, *D. rhachiflexa*, *D. ruddae*, *D. tucurensis*).

A third proposal (CoP17 Prop. 56) was submitted to include three species of *Guibourtia* (*Guibourtia demeusei*, *G. pellegriniana* and *G. tessmannii*) in Appendix II with annotation #4:

All parts and derivatives, except:

- a) seeds (including seedpods of Orchidaceae), spores and pollen (including pollinia). The exemption does not apply to seeds from Cactaceae spp. exported from Mexico, and to seeds from *Beccariophoenix madagascariensis* and *Dyopsis decaryi* exported from Madagascar;
- b) seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers;
- c) cut flowers of artificially propagated plants;
- d) fruits, and parts and derivatives thereof, of naturalized or artificially propagated plants of the genus *Vanilla* (Orchidaceae) and of the family Cactaceae;
- e) stems, flowers, and parts and derivatives thereof, of naturalized or artificially propagated plants of the genera *Opuntia* subgenus *Opuntia* and *Selenicereus* (Cactaceae); and
- f) finished products of *Euphorbia antisyphilitica* packaged and ready for retail trade).

The final decisions at CoP17 resulted in inclusion of all species of *Dalbergia* (except for those in Appendix I) and the three species of *Guibourtia* in Appendix II with annotation #15, which combined different annotations that had been agreed for *D. cochinchinensis* (CoP17 Prop. 53) and the 13 species from Mexico and Central America.

The proponents of the current proposal (CoP18 Prop. 52) wish to amend annotation #15, which currently reads:

"All parts and derivatives are included, except:

- a) Leaves, flowers, pollen, fruits, and seeds;
- b) Non-commercial exports of a maximum total weight of 10 kg per shipment;
- c) Parts and derivatives of *Dalbergia cochinchinensis*, which are covered by Annotation #4;
- d) Parts and derivatives of *Dalbergia* spp. originating and exported from Mexico, which are covered by Annotation # 6."

To

"All parts and derivatives, except:

- a) leaves, flowers, pollen, fruits, and seeds;
- b) finished products to a maximum weight of wood of the listed species of 500g per item;
- c) finished musical instruments, finished musical instrument parts and finished musical instrument accessories;
- d) parts and derivatives of *Dalbergia cochinchinensis*, which are covered by annotation #4;
- e) parts and derivatives of *Dalbergia* spp. originating and exported from Mexico, which are covered by annotation #6.

The substantive changes being the removal from the annotation of "non-commercial exports with a maximum weight of 10 kg per shipment", instead specifying that finished products with a maximum weight of wood of the listed species of 500g per item, whether commercial or non-commercial, and finished musical instruments, finished musical instrument parts and finished musical instrument accessories, are all excluded from the controls of the Convention.

There have been challenges in interpretation and implementation of this annotation. For example, there are concerns that some of the commodities currently covered by the annotation (including finished products such as musical instruments and furniture) are not those that first appear in international trade as exports from range States, and therefore that their inclusion under the annotation was inconsistent with the guidance on annotations provided in *Res. Conf. 11.21 (Rev. CoP17) Use of annotations in Appendices I and II*. These issues have led to considerations by the Standing Committee and its Working Group on Annotation.

The Standing Committee considered various options for amending the annotation presented by the Working Group and the proposed revision is a result of the consensus reached (see SC70 Com.17). No definition for "musical instruments" has been put forward for inclusion in *Res. Conf. 10.13 (Rev. CoP15) Implementation of the Convention for timber species*, but the Standing Committee has recommended the re-establishment of an annotation working group after CoP18, which would consider this, and other terms used in definitions. If the proposed amendments to #15 are accepted, this would result in finished pieces of furniture comprising the species subject to the annotation remaining covered by the listing unless they contain wood of those species weighing less than 500 g, which may be unlikely, whether being exported by a range State or a processing country.

The Standing Committee Working Group on Annotations did note that "the inclusions in annotations of external considerations such as the status in trade of a specimen or shipment, or of thresholds defined by weight or volume that affect the application of an annotation to a part or derivative, require subjective evaluation and are likely to create uncertainty with regard to their interpretation and application" (See SC70 Doc 67.1 for further information).

Amendment of the annotation to the listing of *Pericopsis elata* in Appendix II: expand the scope of the annotation (currently #5) to include plywood and transformed wood

Proponents: Côte d'Ivoire and the European Union

Summary: *Pericopsis elata*, commonly known as Afromosia or African Rosewood, is a highly valued tropical timber native to Central and West Africa. *Pericopsis elata* was listed in Appendix II in 1992 with annotation #5 (amended in 2007), which restricts the listing to “logs, sawn wood and veneer sheets”. At the time the annotation was intended to cover the major products in trade.

The European Union (EU), one of the main importers of timber of this species, has observed instances where traders from range States have been exporting sawn wood with minor, superficial transformation in order to circumvent CITES controls. The Standing Committee Annotations Working Group considered that the extent and scale of cases where the listing was being circumvented warranted a change to the annotation to ensure that CITES controls cover those commodities that dominate the trade, and supports the amendment proposed by Côte d'Ivoire and the EU. Although the full extent of trade in this transformed wood is unknown, it is likely to be only superficially different to sawn wood, which currently dominates the reported international trade.

The proposed amendment would expand the current annotation for *P. elata* to include plywood and transformed wood to read:

"Logs, sawn wood, veneer sheets, plywood, and transformed wood¹."

In addition, a footnote is included to “transformed wood” that would read:

“¹ Whereby transformed wood is defined by HS code 44.09: Wood (including strips, friezes for parquet flooring, not assembled), continuously shaped (tongued, grooved, v-jointed, beaded or the like) along any edges, ends or faces, whether or not planed, sanded or end-jointed.”

The proposed amendment is intended to expand the scope of the listing of *P. elata* to close the observed loophole and include commodities that first appear in international trade as exports from range States, and commodities that dominate the trade and demand for the wild resource, as advised in *Res. Conf. 11.21 (Rev. CoP17) Use of Annotations in Appendices I and II*.

A similar proposal was submitted for *Dalbergia cochinchinensis* at CoP17 (2016) where the same loophole under annotation #5 was identified as being exploited. That proposal was accepted and the species is now listed with annotation #4.

Other species are currently listed in Appendix II and III with annotation #5, including some species of *Cedrela*. A separate proposal has been submitted to list the *Cedrela* genus in Appendix II with no annotation (CoP18 Prop. 57). It does not appear that the present proposal (CoP18 Prop. 53) is intended to apply to all taxa listed with annotation #5. Therefore, amending the annotation for *P. elata* only would require a new annotation solely for *P. elata*.

Analysis: International trade in *Pericopsis elata* appears to involve products not included in the current listing under annotation #5, based on the observation of shipments into the EU of superficially transformed sawn wood. The intention to include transformed wood (and plywood) to close the observed loophole seems an appropriate amendment and has been supported by the Standing Committee Working Group on Annotations.

As other species are also listed with annotation #5, if the proposed amendment is accepted a new annotation would be required specifically to cover *P. elata*.

The proposed amended annotation includes the term plywood, which is already defined in *Res. Conf. 10.13 (Rev. CoP15) Implementation of the Convention for Timber Species*. No other existing annotations include the term “transformed wood”. The proposed footnote to the annotation provides a

definition of “transformed wood” (as HS44.09) in line with guidance in *Res. Conf. 10.13 (Rev. CoP15)*. However, it may be more appropriate to include the proposed definition in *Res. Conf 10.13 (Rev. CoP15)* rather than to have this as a footnote to the annotation. Thus, any changes to the definition could be amended through an amendment to the Resolution rather than through another proposal to amend the Appendices.

Other Considerations: There is a proposal (CoP18 Prop. 49) to include the genera *Handroanthus*, *Tabebuia* and *Roseodendron* in Appendix II with annotation #6 to cover “logs, sawn wood, veneer sheets and plywood”, however transformed wood also appears to be one of products in trade and if the amended annotation for *Pericopsis elata* is accepted then the same annotation may also be appropriate for those genera.

The trade term “transformed wood” is not included in the Annex to the *Guidelines for the preparation and submission of CITES annual reports* (Notification No. 2017/006), which may need addressing.

Summary of additional information

Range

Cameroon, Central African Republic, Côte d'Ivoire, Democratic Republic of the Congo, Ghana, Nigeria and Republic of Congo.

IUCN Global Category

Endangered A1cd [ver. 2.3](#) (1998) - needs updating.

Discussion

Pericopsis elata, commonly known as Afrosomia or African Rosewood, is a highly valued tropical timber species native to Central and West Africa. *Pericopsis elata* was included in Appendix II in 1992. It is currently listed with annotation #5 to restrict the listing to “logs, sawn wood and veneer sheets”.

The EU, one of the main importers of timber of this species, has observed instances where traders from range States have been exporting sawn wood with minor, superficial transformation in order to circumvent CITES controls. The Standing Committee Annotations Working Group considered that the extent and scale of cases where the listing was circumvented warranted a change to the annotation to ensure that CITES controls cover those commodities that dominate the trade, and supports the amendment proposed by Côte d'Ivoire and the EU.

Sawn wood currently dominates the reported trade in *P. elata* (see Table 1). It is unclear whether superficially transformed wood is being reported (if the assumption is that it is not covered by the annotation), and therefore it is not possible to determine the full extent of the trade. However it is likely to be only superficially different to sawn wood, which currently dominates the reported international trade.

The proposed amendment would expand the current annotation for *P. elata* to include plywood and transformed wood to read:

"Logs, sawn wood, veneer sheets, plywood, and transformed wood¹."

With a footnote to “transformed wood” that would read:

¹ Whereby transformed wood is defined by HS code 44.09: Wood (including strips, friezes for parquet flooring, not assembled), continuously shaped (tongued, grooved, v-jointed, beaded or the like) along any edges, ends or faces, whether or not planed, sanded or end-jointed.”

Res. Conf 10.13 (Rev CoP15) Implementation of the Convention for timber species recommends that “for the purpose of annotations in the Appendices for parts and derivatives of species traded as timber, definitions to be used should, to the extent possible, be based on the tariff classifications of the Harmonized System of the World Customs Organization”; the following terms used in timber-related annotations are already defined in *Res. Conf. 10.13 (Rev CoP15)*:

i) Logs

All wood in the rough, whether or not stripped of bark or sapwood, or roughly squared, for processing, notably into sawn wood, pulpwood or veneer sheets (HS code 44.03);

ii) Sawn wood

Wood simply sawn lengthwise or produced by a profile-chipping process. Sawn wood normally exceeds 6 mm in thickness (HS code 44.06, HS code 44.07);

iii) Veneer sheets

Thin layers or sheets of wood of uniform thickness, usually 6 mm or less, usually peeled or sliced, for use in making plywood, for veneering furniture, veneer containers, etc. (HS code 44.08); and

iv) Plywood

Consisting of three or more sheets of wood glued and pressed one on the other and generally disposed so that the grains of successive layers are at an angle (HS code 44.12.13, HS code 44.12.14, and HS code 44.12.22); and

The definitions also include footnotes for the different HS codes used as follows;

44.03: Wood in the rough, whether or not stripped of bark or sapwood, or roughly squared

44.06: Railway or tramway sleepers of wood

44.07: Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness exceeding 6 mm

44.08: Veneer sheets and sheets for plywood (whether or not spliced) and other wood sawn lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness not exceeding 6 mm

The amended annotation includes plywood, which is already defined in *Res. Conf. 10.13 (Rev. CoP15)*. Although proposed annotation includes plywood it is not clear whether this is a significant product in trade. No other existing annotations include the term “transformed wood”. The proposed footnote provides a definition of “transformed wood” in line with guidance in *Res. Conf. 10.13 (Rev. CoP15)*. Currently there is no trade term for “transformed wood” included in the *Guidelines for the preparation and submission of CITES annual reports* (Notification No. 2017/006).

The proposed amendment is intended to expand the listing of *P. elata* to close the observed loophole and include commodities that first appear in international trade as exports from range States, and commodities that dominate the trade and demand for the wild resource, as advised in *Res. Conf. 11.21 (Rev. CoP17) Use of Annotations in Appendices I and II*.

A similar proposal was submitted for *Dalbergia cochinchinensis* at CoP17 where CITES controls under annotation #5 were being circumvented through superficial transformation. The proposal by Thailand (CoP17 Prop. 53) was to change the annotation to #4 thus including all parts except,

- a) seeds, spores and pollen.
- b) seedling or tissue cultures obtained in vitro,
- c) cut flowers of artificially propagated plants;
- d) fruits, and parts and derivatives thereof,
- e) stems, flowers, and parts and derivatives thereof.

Thus, any timber-related, semi-processed or finished product for *Dalbergia cochinchinensis* is now included in the listing.

Other species in the Appendices are currently listed with annotation #5 including:

- Appendix II: *Diospyros* spp. (Populations of Madagascar) and *Swietenia mahagoni*
- Appendix III: *Quercus mongolica* (Russian Federation), *Cedrela fissilis* (Plurinational State of Bolivia, Brazil), *Cedrela lilloi* (Plurinational State of Bolivia, Brazil), *Cedrela odorata* (Plurinational State of Bolivia, Brazil, Colombia, Guatemala and Peru), *Fraxinus mandshurica* (Russian Federation), *Pinus koraiensis* (Russian Federation).

Therefore, amending the current annotation #5 for *P. elata* only would require a new annotation solely for *P. elata* as it does not appear from the proposal that the proposed amendment is intended to apply to all taxa currently listed with #5. There is a proposal (CoP18 Prop. 49) to include the genera *Handroanthus*, *Tabebuia* and *Roseodendron* in Appendix II with annotation #6 to cover “logs, sawn wood, veneer sheets and plywood”, however transformed wood also appears to be one of products in trade and if the amended annotation for *P. elata* is accepted then the same annotation may also be appropriate for those genera. There is also a proposal to list the *Cedrela* genus in Appendix II at CoP18 with no annotation (CoP18 Prop. 57).

Table 1: Summary of trade reported by importers in the CITES Trade Database for *Pericopsis elata* 2008-2017

Term/ unit	Quantity reported by importers
chips	
# specimens	41
derivatives	
m ³	54

live	
# specimens	28
logs	
m ³	66,345
# specimens	140
sawn wood	
kg	
m ³	160,783
# specimens	158
timber	
kg	383
m ³	1,129
veneer	
m ²	6
m ³	51
# specimens	24
wood products	
m ³	64

References

African Regional Workshop (Conservation & Sustainable Management of Trees, Zimbabwe, July 1996) (1998).
Pericopsis elata. The IUCN Red List of Threatened Species 1998.

Inclusion of African Padauk *Pterocarpus tinctorius* in Appendix II

Proponent: Malawi

Summary: *Pterocarpus tinctorius* is a tree species native to nine countries across Africa's belt of miombo woodland vegetation. It is a slow-growing tree, estimated to take up to 90 years to reach maturity. The species is in international trade, mainly for its timber which is used for furniture and flooring. It is commonly traded under the general name "mukula" or sometimes "African Padauk", names that are also applied to similar species, such as *P. angolensis*, *P. soyauxii* and *P. castelsii*. Domestic demand is also said to be high for timber, firewood and a variety of other uses.

There is very little information about population size, structure and rates of decline for *P. tinctorius*, although it is thought to be locally common, but declining across its range, and some national populations are known to be decreasing (e.g. Zambia). Taking into account the risk of over-harvesting, *P. tinctorius* was assessed as Least Concern in 2017. The assessment recommended the species' harvest and trade be monitored to identify any major increase in its use, particularly as other *Pterocarpus* species in trade become rare or protected.

The main international market is considered to be China, and to a lesser extent Viet Nam. Although *Pterocarpus tinctorius* is not officially recognised as a "hongmu" species (other species of *Pterocarpus* are) or included on China's list of precious furniture woods, reports suggest that the species has seen an increase in exploitation due to a growth in consumption of "hongmu" and other "rosewoods" in China since 2010.

As multiple species are commonly traded under the same names, it is difficult to determine specific trade levels of *P. tinctorius*. There is some confusion surrounding legislation in certain range States, so it is not clear how much of the trade is illegal, although a number of seizures have taken place. Examples of trade volumes include from the Democratic Republic of the Congo (DRC) where it was estimated in 2015 that almost 45,000 m³ of "mukula" was transported across the border annually to Zambia, and onwards to China. Trade data from Tanzania show that exports of *P. tinctorius* increased seven-fold between 2012 and 2014 from around 800 m³ to 5,600 m³.

Pterocarpus erinaceus, listed in Appendix II in 2017, is a "hongmu" species native to west and central Africa, including in countries that border range States of *P. tinctorius*. There is conflicting information regarding the ease of identification of this species and others in the genus. Some consider *P. erinaceus* wood to be distinguishable from other *Pterocarpus* species due to the light base colour of the heartwood, although others say that identification is only reliable at the genus level.

The proposal is to list *P. tinctorius* in Appendix II without annotation, in order to include all readily recognisable parts and derivatives.

Analysis: *Pterocarpus tinctorius* is harvested for timber and has a number of other local uses. There is evidence of a recent increase in export of timber from some range States, largely to meet demand in China for furniture-making. A proportion of this export appears to be unauthorised or illegal. The species is widespread and locally common, and although it is thought to be declining it was assessed by IUCN as Least Concern in 2017. It is a slow-growing, late-maturing species. The current level of harvest for timber is likely to be unsustainable, in that it almost certainly exceeds the rate at which harvestable-sized trees are being replenished in the population. However, very little species-specific trade data are available, and it is unknown how much harvest is for domestic versus international markets. While there is insufficient evidence to determine clearly whether the species meets the criteria in Annex 2a of Res. Conf. 9.24 (Rev. CoP17), given the uncertainty and the apparent serial exploitation of similar precious wood-producing trees, it may be precautionary to list the species in Appendix II.

There seem to be some difficulties in distinguishing between *P. tinctorius* and *P. erinaceus* (already listed in Appendix II), and therefore it seems likely that *P. tinctorius* meets the look-alike criteria for listing in Appendix II provided in Annex 2b of Res. Conf. 9.24 (Rev. CoP17).

The proposal without annotation is intended to avoid the potential for regulations to be circumvented as has been seen with other rosewood listings and seems a sensible approach.

Other Considerations: Some trade is likely to be illegal as certain range States have export bans in place. Any additional benefits of an Appendix II listing are not clear unless enforcement efforts are increased. If this proposal is accepted, those range States with export bans could request that the CITES Secretariat posts zero quotas on the CITES website if they wished to reflect national legislation.

Summary of Available Information

Text in non-italics is based on information in the Proposal and Supporting Statement (SS); text in italics is based on additional information and/or assessment of information in the SS

Taxonomy

Synonyms: Pterocarpus chrysothrix, Pterocarpus megalocarpus, Pterocarpus stolzii:

There is ongoing debate regarding the taxonomy of Pterocarpus tinctorius, and the wider genus. Of the two species in the genus that are currently listed in the Appendices, only one has a CITES Standard Reference—Pterocarpus erinaceus (Mabberley, 1997), although other taxonomic references are provided (UNEP-WCMC, 2019). CoP18 Doc. 99 notes that the Plants Committee at its 24th meeting recommended that Mabberley (1997) be deleted from the list of Standard References, and thereafter that relevant decisions will be made on a case by case basis. For P. tinctorius it is unclear which Standard Reference will be used.

In a wider taxonomic debate, the circumscription of Pterocarpus tinctorius varies considerably. In Flora Zambesiaca upholds P. chrysothrix, P. megalocarpus and P. stolzii as separate species, whereas the African Plants Database maintains them as synonyms of P. tinctorius (Conservatoire et Jardin botaniques de la Ville de Genève and South African National Biodiversity Institute, 2019; Timberlake, 2012). Furthermore, a recent publication on the trees and shrubs of Mozambique considers P. chrysothrix and P. megalocarpus as separate species to P. tinctorius (Burrows et al., 2019).

For the purpose of the analyses provided below, P. chrysothrix and P. stolzii have been considered as synonyms of P. tinctorius as per the IUCN Red List assessment (Barstow, 2018).

Range

Angola, Burundi, Democratic Republic of Congo, Malawi, Mozambique, and Rwanda (Winfield, Scott, & Grayson, 2016), Republic of Congo (Barstow, 2018), Tanzania and Zambia,

IUCN Global Category

Least Concern (Assessed 2017, criteria version 3.1)

Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP 17) Annex 2a)

F) Trade regulation needed to prevent future inclusion in Appendix I

Habitat trends: *Pterocarpus tinctorius* is found across Africa's broad belt of miombo woodland, a 2.7 million km² area of tropical seasonal forest and dry forests. Forest disturbance and loss are occurring throughout the miombo woodlands and associated ecosystems that form *P. tinctorius*'s range. Agriculture and fuel wood collection play a role in the degradation of existing forest areas. While a number of protected areas do exist across the range, these are not always well-protected in practice and can be subject to encroachment and illegal logging.

Population size: The total population of *Pterocarpus tinctorius* is not known, nor are quantitative data available on the total area of relevant habitat or average density of stems per hectare. The SS notes that the species was apparently locally common in areas including east and south Tanzania and north Malawi, at least before the rosewood demand increase; it is now in decline throughout Zambia and likely other countries as well.

A recent study in Zambia estimated a stems per hectare figure of 0.274 for Pterocarpus tinctorius (Ng'andwe et al., 2017), using this figure, it would require a forested area of less than 200 km² for the population to be greater than 5,000 individuals. The study did not report if saplings were included in the final analysis, or if the densities only referred to mature trees.

In Tanzania, a survey of the Katavi-Rukwa ecosystem classified Pterocarpus tinctorius as uncommon (Banda et al., 2008), whilst at one study site in Ugalla area of Tanzania, P. tinctorius was found to make up 9.3% of the forest (Ogawa et al., 2007).

Population structure: Very little information is available. However, given that the largest specimens are disproportionately targeted for timber production, it can be expected that the recent increase in illegal and unsustainable harvesting will be leading to a skewing of the population structure towards immature specimens. In Zambia, the minimum cutting diameter of *Pterocarpus tinctorius* was reduced to 30 cm in 2015 in response to commercial pressures. Rosewoods as a group exhibit poor recruitment, even in protected areas where large numbers of mature trees exist. While some local loggers in Zambia claimed to observe large numbers of seedlings in areas where they worked, this may mean little in terms of survivorship. Other *Pterocarpus* species in this region demonstrate low regeneration patterns.

Where species specific information is lacking, comparisons are made with a similar species within the genus, Pterocarpus angolensis, although the IUCN Red List assessment for P. tinctorius does state that it is a slow-growing tree, estimated to take up to 90 years to reach maturity (Barstow, 2018). Whereas other sources for P. angolensis state that maturity is reached at around 20 years (Winfield et al., 2016)

Data on a similar species Pterocarpus angolensis suggests that this species is slow-growing and it takes a minimum of 85 years and up to 100 years to reach a harvestable size (Therrell, Stahle, Mukelabai, & Shugart, 2007).

Recent research on a similar species (Pterocarpus angolensis) in the Miombo woodland in Zambia, shows that selective logging can hinder regeneration. Pterocarpus spp. are light-demanding and therefore activities such as slash and burn or felling for charcoal production can promote faster regrowth as more light penetrates through the canopy, whereas in areas of selective logging trees exhibited static stem diameters (Syampungani & Geldenhuys, 2015).

Population trends: At a genus level, 90% of the *Pterocarpus* and *Dalbergia* populations, where studies exist, show declining or unstable population dynamics. According to the 2018 IUCN Red List assessment, the *P. tinctorius* population "is considered to be in decline as a result of the harvesting of the species for its timber...currently in high demand in local markets and it is predicted that in the future its international demand could increase as other *Pterocarpus* timber species become rare or protected.". A study of the mukula value chain in Zambia found that 84% of community cutters had entered the business since 2012. 68% of these cutters observed depletion of population stocks in the field and thought that they would not be able to continue harvesting this tree at the same rate in five years' time, 95% of respondents in the same study agreed with this assessment and anticipated the species "going extinct".

In Kiwengoma Forest, Tanzania, there was a high proportion of high value timber species (notably Pterocarpus tinctorius) in 1991, but in 2005 logging had reduced the number of high value and large timber trees (Ahrends et al., 2010).

G) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

While *Pterocarpus tinctorius* has non-timber uses, its current unsustainable extraction in various range States is thought to be almost entirely linked to international trade.

It has been reported that the main two threats to Pterocarpus tinctorius are selective logging for domestic use and harvest for export (Winfield et al., 2016).

Prices of Pterocarpus tinctorius have increased from USD 2.40/plank (equivalent to USD 43.60/m³) in 1990, to USD 4.00/plank (equivalent to USD 72.00/m³) in 2000 (Winfield et al., 2016).

National utilisation

Pterocarpus tinctorius has various uses within range States. As well as timber use, these include, use of sap for fabric dyes and body colouring; medicinal treatments for respiratory congestion, anaemia, diarrhoea, snakebites, stomach aches, and eye pain; to prevent miscarriage, and to prevent wound infection; firewood, charcoal and honey production.

Legal international trade

It should be noted that much of the trade in this species is reported under the general trade name "mukula", that includes other species within the genus such as Pterocarpus angolensis (Cerutti et al., 2018).

It is difficult to separate out legal and illegal trade from the available data, given the patchy data, irregular enforcement and lack of clarity around national regulations in some countries. Official Chinese data show rapidly increasing imports of rosewood species from African nations—up 700% since 2010. While *Pterocarpus tinctorius* is not on the official hongmu list or the list of precious furniture woods, it has achieved market demand due to its look-alike characteristics. Chinese buyers in Zambia reported to CIFOR interviewers that an early increase in *Pterocarpus tinctorius* (beginning in 2010) was actually due to its being used as a false rosewood: shipments were sent through intermediary traders and nations to Viet Nam and the Philippines, where it was mixed with *P. santalinus* (red sandalwood) and sold onto the Chinese furniture market.

It is not possible to analyse specific-species data, but general trends are showing an increasing proportion of China's rosewood imports are coming from Africa and that Asian rosewood imports are decreasing in quantity and log diameter reflecting the decline in Asian rosewood species due to decades of over-harvesting (Treasor, 2015).

*Although species-specific trade data are difficult to compile for timber, imports of *Pterocarpus* spp. into Viet Nam between 2013 and 2016 have been assessed and show *P. erinaceus* dominate imports of *Pterocarpus* spp. into Viet Nam. Imports of *P. tinctorius* logs are almost negligible in comparison and examinations of re-exports show that no *P. tinctorius* sawn wood was re-exported by Viet Nam to China between 2013 and 2015 (Winfield et al., 2016).*

However, over time the species has become recognised in its own right and direct shipments to China are more common. Chinese customs data show log imports from Zambia going from 35,000 m³ in 2015, to 65,000 m³ in just the first half of 2017; CIFOR research indicates that “the vast majority” of these logs are *Pterocarpus tinctorius* (SS attributes this to FAOSTAT and Chinese Customs and Cerutti 2017, Fig. 14 and 15). However, the increase in shipments to China referred to are not guaranteed to be *P. tinctorius*, the Zambian and Chinese customs data presented by Cerutti et al., (2018) is for sawn wood and logs, which are not reported to species level using data from FAOSTAT. It is inferred that the majority of these shipments consist of “mukula”, but this is based on stakeholder opinions. This data are then extrapolated to suggest an annual estimation of production of mukula of 110,000 m³, which is the equivalent of between 450,000 and 800,000 logs.

In 2017 the going price for mukula in Zhang Jiagang was between RMB17,000 and 22,000 per tonne (USD 2,500 and USD 3,200). Greenpeace estimates that as much as 15,000 t of mukula are sold each month from just the four biggest mukula markets. In Tanzania, one of the few countries where species-specific official data are available, export permits for *Pterocarpus tinctorius* increased almost seven times between 2012 and 2014 alone (830 to 5,600 m³), according to Tanzania Forest Service data. To clarify, it is not the number of permits that increased seven-fold between 2012 and 2014 in Tanzania, it was the volume of *P. tinctorius* that increased from 831 m³ to 5,578 m³ (Lukumbuzya & Sianga, 2017).

Range State governments have struggled to improve governance over this resource. For example, Zambia has imposed and lifted moratoriums on harvest and/or export of mukula three times since 2014, and an export ban on all logs is currently in place, although the Minister and Director of Forests may still issue export permits for timber if “deemed necessary in the interest of the Republic”. Malawi banned export of all roundwood in 2008 but has faced many legal battles to enforce the ban for *Pterocarpus tinctorius* which is apparently transported to China originating from neighbouring countries.

Parts and derivatives in trade

The products in international trade are primarily round and rough squared logs (HS code 44.03) and rough sawn timber (HS code 44.07). The majority of the trade is destined for China, although Viet Nam also imports significant volumes. In importing markets, the main usage is for decorative furniture consumed in China. There is no species-specific information available on re-exports of furniture or secondary processed products from China.

Illegal trade

Illegal mukula export trade is fundamentally a regional issue, in part because the most significant extraction appears to be occurring in the landlocked forests of south-eastern Congo (Katanga Plateau), Zambia and north-east Angola. Trucking routes are documented towards ports on both the Atlantic (Angola, Namibia, even South Africa) and Pacific (Tanzania, Mozambique), though the key routes change as range States have attempted to control trade in this and other precious wood species through log export bans. When Mozambique and Angola banned log exports in 2017, exports surged in Namibia. While not a range State itself, Namibia exports an estimated 250 to 300 containers of mukula (*species not specified*) logs monthly to China from Walvis Bay port—a trade worth some USD 9 to 16 million monthly.

As with other timber species, the mukula trade is connected to illegal trade in other species. In 2016, Chinese customs officials seized a 2.9 t shipment of pangolin scales hidden in a container of mukula timber. In Namibia, the Chinese national identified as owner of the key exports logistics company for Angolan and Zambian clients has also been repeatedly linked to trafficking in rhino horn and animal skins.

Angola: In response to growing concern over harvest and export of mukula, in January 2018 the Ministry of Agriculture suspended “all activities related to the exploitation of forest resources such as felling, movement and transportation of logs” and created a multisectoral commission to inventory seized timber. Immediately thereafter officials seized 540 m³ (1,880 logs) of wood that police investigators stated had been harvested illegally in Cuando Cubango province and was being prepared for export without proper documentation. Sources describe *Pterocarpus tinctorius* logs being harvested in South-eastern Angola, Zambia and DRC, then transported to Namibia to avoid the export ban.

Burundi: Almost all natural forest and woodland areas in Burundi where *Pterocarpus tinctorius* might be present have been set aside as protected areas where logging is not permitted. Illegal timber from DRC forests and, to a lesser extent, Tanzania’s miombo woodlands, is known to be brought across the border and sold locally, but specific reports of mukula logging or trade are not currently available.

Democratic Republic of the Congo: Lubumbashi, the provincial capital of Haut-Katanga, is the hub for trade in *Pterocarpus tinctorius*, with at least 10 Chinese-owned mukula trading companies. A field study by local civil society showed that the volume of trees cut down in five months of 2016 totalled almost 3,300 m³, approximately five times the number given by the Ministry of Environment, suggesting widespread corruption and illegality. In 2016 the new head of the Ministry’s Nature Conservation and Sustainable Development division, addressing the surge in *P. tinctorius* smuggling, determined that logging activities “far exceeded” the limits allowed by government issued permits for artisanal logging. In April 2017, officials in Haut-Katanga arrested 14 Chinese people with tourist visas “suspected of illegally exporting red wood [mukula]”. The acting governor stated that 17,000 t of mukula had been illegally exported to China through Zambia over four months, with Zambian officials seizing hundreds of vehicles. An ITTO-sponsored study of regional timber flows conducted surveys of cross-border timber movements at three of the main checkpoints in 2015 between DRC and Zambia. They found 90% of the wood moving across the border from DRC was mukula, 90% of it in debarked logs or cants; the primary crossing was Kasumbalesa. The study extrapolates that 49,804 m³ of timber were being traded annually through these three checkpoints, of which 44,824 m³ was mukula. All this timber was recorded as destined for China, via ports in Tanzania, Namibia, Zimbabwe and Botswana.

The extrapolation of 49,804 m³ of annual cross border trade mukula between DRC and Zambia should be treated with some caution as it is based on nine days of data collection over a three month period (CIFOR, 2016).

Malawi: Reports state that there has been “recent large-scale expansion of mukula harvesting and trade into Zambia’s neighbouring countries such as Malawi, Mozambique and the DRC.” Increases in illegal harvest of mukula and two other species, as well as trafficking of mukula smuggled from Zambia, caused the government to ban exports of native hardwood logs in 2008.

Mozambique: Mozambique is China’s biggest supplier of African logs. Species-specific export data are not available for *Pterocarpus tinctorius* on either end of this trade flow. However, reports suggest a “recent large-scale expansion of mukula harvesting and trade into Zambia’s neighbouring countries such as Malawi, Mozambique and the DRC.” Field investigations have found evidence of largescale illegal harvest and trafficking of Precious and Class 1 timber species from Mozambique into Tanzania. Chinese buyers often go directly to individuals in the countryside to avoid the costs of obtaining logging licences, obligations to replant etc. Trade data discrepancy analysis between Chinese import data and Mozambique export data shows significant export underreporting. Likewise, almost none of the logs and sawn wood reported as imports by Tanzania (in the order of tens of thousands m³ yearly) are reported by Mozambique, suggesting the bulk this trade is illegal. Nearly 90% of logs are exported to China, the majority consisting of only five species: *Azelia quanzensis* (chanfuta), *Millettia stuhlmannii* (jambirre or panga-panga), *Combretum imberbe*, *Swartzia madagascariensis*, and *Pterocarpus angolensis* (umbila). Mozambique implemented regulations to ban log exports of Class 1 timber species in 2007, although roughly sawn timber is considered to be processed. A new log ban was put in place in 2017.

Tanzania: While Tanzanian Forest Service (TFS) data show a sharp increase in export permits for *Pterocarpus tinctorius* (almost 7 times between 2012 and 2014 alone (831.4 to 5,578.4 m³), TFS reports that this is primarily logs from Zambia that are transited through Tanzania to the Dar es Salaam port for export to China. They typically enter already in containers—as many as 60 containers a month pass through—and have in some cases been subject to confiscations by Tanzanian authorities due to insufficient documentation.

Zambia: Zambia is “currently facing immense pressure due to widespread illegal harvesting accelerated by its high international demand”. Pressure on mukula seems to have begun since at least 2010 in Zambia, with increased presence of Chinese traders. A series of harvest moratoriums and export bans have been imposed and lifted in attempts to control a trade that nevertheless continues to grow. As of June 2017, export of sawn logs not only of mukula but any species is banned, although the Minister of Lands, Natural Resources and Environmental Protection, in consultation with the Director of Forests, “may issue export permits for any timber if that is deemed necessary in the interest of the Republic”. Chinese syndicates are reported to be financing harvest in Zambia, south-east Angola and DRC, exporting 250–300 containers of logs monthly via Namibia. Other reports, meanwhile, estimated that national annual production of mukula in Zambia alone was 110,000 m³—between 1,500 and 2,000 containers of logs, affecting a forest area between 90,000–150,000 ha (assuming 7 stems/ha in high stocked forests and 3–4 in low-stocked). Most of this is technically illegal and transported with bribes corresponding to USD 16–27/log. Chinese customs data indicate a rapid increase in import of logs from Zambia, research indicates that the vast majority of those are mukula logs. Imports went from just over 35,000 m³ in 2015 to 65,000 m³ in the first half of 2017 alone. A large portion of this is falsely declared as sawn wood in export documents: in 2016, Zambia declared only 3000 m³ of log exports (approximate value USD 900,000) while China declared log imports of about 61,000 m³ (approximate value USD 87 million).

Inclusion in Appendix II to improve control of other listed species

B) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP17) Annex 2 a or listed in Appendix I

Pterocarpus erinaceus was listed in Appendix II following CoP17. There are no overlaps in range States between this species and *P. tinctorius* (native to West and Central Africa (UNEP-WCMC, 2019)). The structural features of *P. erinaceus* are largely identical with those of other *Pterocarpus* species and also with some of the genus *Dalbergia*; the wood, however, can be distinguished from those with a similar structure due to the light base colour of the heartwood with regular brown colour streaks (Richter et al., 2014). While undertaking a non-detriment finding for *Pterocarpus tinctorius* (Mukula), Belgium noted that identification is only reliable at genus level (PC24 Doc. 30.4). It was previously recommended that genus level regulation is needed as accurate/affordable species recognition systems are not yet available and if species level regulation was implemented, traders would simply relabel timber under a non-regulated species name (Winfield et al., 2016).

Additional Information

Threats

The primary threat to *Pterocarpus tinctorius* is over-harvesting, including both legal and widespread illegal extraction, for the international trade. The threat represented by this trade is compounded by deforestation from forest conversion and aridification due to climate change and more severe fires.

Conservation, management and legislation

National legislation: See table below. Note that this table is focused on national laws and regulatory measures. However, in many of the range States, traditional chiefs have significant authority over harvest rights in their villages or territories. Their decisions may not always be in line with the national government’s policies.

Country	Special measures for protection and management of the species	Export-related regulation
Angola	None	Partial log export ban since 2017. Wood can only be exported upon presentation of “proof of deposit of the corresponding value in one of the country’s banks or a credit note”.
Burundi	None	None
DRC	One news article reports that the government in Kinshasa has restricted harvesting of mukula, but unconfirmed.	DRC has a Voluntary Partnership Agreement with the European Union
Malawi	The Forest Regulations under the Malawi Forest Act lists indigenous fine hardwood species, including closely related <i>Pterocarpus angolensis</i> as protected tree species.	Native hardwood log exports banned since 2008.
Mozambique	None	Ban on export of unprocessed logs of precious and Class 1 species since 2007. Additional ban since 2017.

Tanzania	None	2002 Forest Act regulations require that sawn wood be issued a Grading Certificate and Export Licence from TFS. Log export ban since 2004.
Zambia	Forest Act No. 4 of 2015. A series of bans on commercial harvesting and trade since 2013. Moratorium on harvest and movement in place since 2017. The legal limit to harvest mukula is set (since 2013) at 30 cm top diameter over-bark (it was 40 cm previously).	Log export ban (since 2017). However, Ministry of Lands, Natural Resources, and Environmental Protection, in consultation with Director of Forestry, can issue export permits for timber "deemed necessary in the interest of the Republic".

International legislation: There are no international controls specifically related to *Pterocarpus tinctorius* in place. Imports to the USA, European Union and Australia are subject to national legislation in those jurisdictions prohibiting the import and/or sale of wood which was illegally sourced in the country of origin. However, little or no African rosewood is traded to these countries. Chinese companies may choose to operate under Voluntary Guidelines called the Guide on Sustainable Overseas Forest Management and Utilization by Chinese Enterprises.

Management measures are defined by each range State's forest legislation, which define aspects including minimum cutting diameters and areas off-limits from harvest activity such as parks and other protected areas, riparian corridors, steep slopes etc. In practice these measures are unevenly enforced and monitoring of timber harvesting is not routinely undertaken.

Artificial propagation/captive breeding

Pterocarpus tinctorius can be propagated by either seed or cuttings, and wild seedlings can also be collected for planting. However, there is little to no information available regarding artificial propagation for commercial purposes. Genetic exploration using tissue culture has not been done. At present, almost all harvest of this slow-growing species appears to be from wild sources.

There has also been very little success with artificial propagation in similar species such as Pterocarpus angolensis. Reasons for these failures are listed as low germination rates, slow tree growth and high levels of competition for sunlight (Mojeremane & Lumbile, 2016).

Implementation challenges (including similar species)

There exists some confusion as to whether the common name used by traders in Zambia, mukula, refers specifically to *Pterocarpus tinctorius* or to a rosewood species complex. The same may be the case in other range States. These look-alike issues are a complexity of the rosewood trade in general and were the key factor in listing of the entire *Dalbergia* genus in Appendix II in 2016. *Pterocarpus angolensis* (common names: muka, kiaat, African teak) is a species of the miombo woodland savannas of Eastern and Southern Africa with similar morphological and timber characteristics to *P. tinctorius*. This species is a keystone of domestic timber markets. IUCN Red List has assessed *P. angolensis* as Near Threatened. *Pterocarpus soyauxii* (common names: Padauk d'Afrique) is another highly sought-after timber with rosewood properties.

It has been reported that Pterocarpus angolensis and P. tinctorius are regularly mixed and traded together as one species in areas where their ranges overlap in Zambia and Tanzania (Cunningham, 2016).

Identification of timber species is known to be very difficult for genera such as Pterocarpus and Dalbergia. A lot of more technologically advanced methods such as DNA analysis, chemical analysis and isotope analysis are still in their infancy and are thought to be some years off being available at the local level for timber identification (Winfield et al., 2016).

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Inclusion of all species of the genus *Cedrela* in Appendix II

Proponent: Ecuador

Summary: *Cedrela* is a genus of tree with 17 species occurring in Mexico and the Caribbean islands south to Argentina. *Cedrela odorata* is the most widespread species and appears to be the most highly traded species internationally, although other species are also used for their valuable timber.

Cedrela odorata has been listed in Appendix III by Colombia and Peru since 2001, by Guatemala since 2008, by Bolivia since 2010, and by Brazil since 2011. Two other species in the genus, *C. fissilis* and *C. lilloi*, have been listed in Appendix III by Bolivia and Brazil since 2010 and 2016 respectively. All listed populations are covered by annotation #5 (logs, sawn wood and veneer sheets).

Cedrela odorata was assessed as globally Vulnerable with a decreasing population trend on the IUCN Red List in 2017, with the unsustainable harvest of timber cited as the main threat. Many populations appear to have been severely depleted by targeted over-exploitation, are categorised as nationally endangered or vulnerable, and are subject to laws and other measures to regulate harvest. Illegal trade has been reported. Extensive loss of habitat also threatens the species; deforestation data indicate that the range has decreased by 29% in the last 100 years, and is estimated to decline by 40% in the next 100 years.

The wood of *C. odorata* is used extensively for furniture making and other purposes. According to the CITES Trade Database, large quantities of sawn wood have been exported by Peru, Bolivia and Brazil (noting that data reported to CITES primarily reflect exports from range States with Appendix III-listed populations), as well as non-range States where plantations have been established. The principal importers were the USA and Mexico (43% and 33% of total reported imports from 2007-2016, respectively). Available data for the principal range State exporters indicate that domestic trade exceeds international trade (annual average of 72,000 m³ relative to 46,000 m³ for Bolivia, Brazil and Peru combined over the period 2004-2008).

There was a substantial increase in exports and prices of *C. odorata* timber following the 2003 listing of Big-leaf Mahogany *Swietenia macrophylla* in Appendix II. Reported exports of *C. odorata* timber peaked at over 60,000 m³ in 2007 but subsequently declined to under 10,000 m³ in 2010. Exports then increased slightly with the listing of the Bolivian and Brazilian populations in 2010/2011, and remained relatively stable at around 14,000 m³ per year from 2014 to 2016.

Cedrela odorata has been planted widely in parts of the region and introduced to many countries elsewhere. Although monospecific plantations have not generally been successful in the tropical Americas due to vulnerability to the Shoot Borer *Hypsipyla grandella*, in other regions monospecific plantations are well established. The vast majority of reported exports from plantations (“artificially propagated”) were from non-range States (Côte d’Ivoire and Ghana). Although exports from plantations exceeded exports from the wild in every year since 2013, there was an overall decline in exports from plantations from 2013 (over 12,000 m³) to 2016 (ca. 8,000 m³).

Other species

Both *C. fissilis* and *C. lilloi* are also widely distributed and categorised as globally threatened (Vulnerable and Endangered respectively), with certain national populations also categorised as threatened. Over-exploitation for timber has been reported to be a threat, in addition to habitat loss.

While *C. fissilis* timber is considered inferior to that of *C. odorata*, timber of the two species is reportedly marketed interchangeably. In Ecuador, it was reported in 2018 that most wild populations of *C. fissilis* had been destroyed and the remaining large trees were being felled for export to Colombia. Total exports of *C. fissilis* reported in the CITES Trade Database primarily comprised 1,650 m³ wild-sourced sawn wood and 6,400 m² source “I” veneer (the majority exported from Brazil); no trade was reported from 2014 onwards. ITTO reports include exports of *C. fissilis* totaling ca. 83,000 m³ sawn wood (60% from Bolivia and the remainder from Brazil) in the period 2002-2016; exports showed a marked overall decrease from 17,000 m³ in 2002 to 2,000 m³ in 2015 (no exports were reported in 2016).

No exports of *C. lilloi* have been reported. Many of the remaining species in the genus are reported to be threatened in all or part of their range due to a combination of deforestation and targeted over-exploitation, although demand for timber of these species appears to be primarily domestic.

The USA, which appears to be one of the principal importers of *Cedrela*, reported imports of sawn/chipped wood (HS code 4407) of unspecified *Cedrela* species totaling 144,663 m³ from 2007-2018. The principal exporters were Peru (21%), Côte d'Ivoire (18%), Ghana (15%), Bolivia (15%) and China (10%). It is not clear if exports from non-range States are re-exports or originate from plantations in those countries.

Although identification manuals have been developed to differentiate the woods of certain *Cedrela* species, several range States have reported identification difficulties and according to one expert it is not possible to distinguish between species in the genus based on either macroscopic or microscopic characters of the wood.

Analysis: *Cedrela* is a genus of New World trees of which *C. odorata* is the most widespread species. *Cedrela odorata* has been intensively exploited for its timber, for both domestic and international trade. Based on available data, the principal exporters of *C. odorata* appear to be Bolivia, Brazil, Peru, Côte d'Ivoire and Ghana. Although the timber of certain other species is also reported to be valuable and can be marketed interchangeably with *C. odorata*, it is not clear whether there is significant international demand for other species. Some populations of *C. odorata* and several other species are known to have been substantially reduced by the combined effects of deforestation and targeted over-exploitation. Given the estimated historic and future declines for *C. odorata*, and significant historic impact of international trade, the species may meet the criteria for inclusion in Appendix II set out in Annex 2a of *Res. Conf. 9.24 (Rev. CoP 17)*. Given the reported identification difficulties, the remaining species in the genus would appear to meet the criteria for inclusion in Annex 2b.

Other Considerations: The proposal does not include an annotation. However, the scope could be restricted using an annotation that covers the main products in trade (all populations currently included in Appendix III are covered by annotation #5). Sawn wood has been the most common product in reported international trade.

Summary of Available Information

Text in non-italics is based on information in the Proposal and Supporting Statement (SS); text in italics is based on additional information and/or assessment of information in the SS.

Taxonomy

The proposal recognises 17 species in the genus. *C. odorata* has a large number of synonyms included in Annex 2 of the proposal.

Range

C. balansae: Argentina, Bolivia, Paraguay

C. discolor: Mexico

C. dugesii: Mexico

C. fissilis: Argentina, Bolivia, Brazil, Colombia, Ecuador, El Salvador, Guyana, Paraguay, Peru, Venezuela; *Costa Rica, Panama (Barstow, 2018)*

C. kuelapensis: Peru, Ecuador

C. lilloi: Argentina, Bolivia, Ecuador, Peru; *Brazil, Paraguay (Llamozas, 1998)*

C. longipetiolulata: Peru

C. molinensis: Peru

C. monroensis: El Salvador

C. montana: Colombia, Ecuador, Peru, Venezuela

C. nebulosa: Colombia, Ecuador, Peru

C. oaxacensis: Mexico

C. odorata: *Antigua and Barbuda, Argentina, Barbados, Belize, Bolivia, Plurinational States of, Brazil, Cayman Islands, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guiana,*

Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Montserrat, Nicaragua, Panama, Peru, Saint Kitts and Nevis, Saint Lucia, Suriname, Venezuela (Mark & Rivers, 2017)

C. saltensis: Argentina, Bolivia, Peru

C. salvadorensis: Costa Rica, El Salvador, Guatemala, Honduras, Mexico

C. tonduzii: Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama

C. weberbaueri: Peru

IUCN Global Category

C. odorata: Vulnerable A3bcd+4bcd (Assessed 2017, Criteria version 3.1)

C. fissilis: Vulnerable A2cd+3cd (Assessed 2017, Criteria version 3.1)

C. lilloi: Endangered A1a+2cd (Assessed 1998, Criteria version 2.3)

The remaining species in the genus have not yet been assessed by IUCN.

Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP 17) Annex 2a)

Cedrela odorata

Cedrela odorata is one of the most widely used tropical hardwoods in Central and South America, used for furniture and cabinet-making, panelling and joinery in general (Pennington & Muellner, 2010). In 2011 it was reported to be the second most valuable species in Latin America and the Caribbean after Big-leaf Mahogany *Swietenia macrophylla* (Pérez Contreras, 2011).

Although estimates of the current total population of *C. odorata* are not available, populations of this species have been reduced by selective logging for at least 250 years, especially of the largest individuals, and are now in decline (Mark & Rivers, 2017). Cintron (1990) reported that although widespread, *C. odorata* was not common in moist tropical American forests and its numbers continued to be reduced by exploitation without successful regeneration. In Central America, although the greatest threat to natural forests is conversion of land to other uses, selective harvesting of timber was reported to particularly threaten native species including *C. odorata* (UNEP, 2003). Cavers et al. (2004) reported that genetic erosion of this species had already occurred throughout its natural distribution due to significant over-exploitation, and trees of good form were rarely found except in isolated areas. Pennington & Muellner (2010) report that across the species' range it was difficult to find large trees (1m DBH or more) in natural forest, except in protected areas, because of the species' long history of logging.

The species' habitat is highly fragmented by deforestation (Mark & Rivers, 2017). The total distribution range of *C. odorata* was reported to have decreased by 29% in the last 100 years (approximately three generations), and it was estimated that it will be reduced by a further 40% in the next 100 years (Mark, 2017).

Available data on population sizes/trends for specific areas is summarised below:

- Amazon: Reported to be scarce in sample units across the Amazon.
- Argentina: Range reported to have declined in 2004 (Zapater et al., 2004).
- Barbados: Formerly common and widespread, but had become rare by 1965 (Gooding et al., 1965).
- Bolivia: In 2011 it was reported that no distribution/density studies had been conducted in Bolivia.
- Brazil: In 2011 it was reported that no distribution/density studies had been conducted in Brazil. Nationally assessed as vulnerable.
- Cayman Islands: Nationally assessed as critically endangered.
- Colombia: Average density reported to be 0.39 individuals / ha in 2015. The selective extraction that this species had suffered for years was reported to have affected the presence of large trees and the availability of seed; the density of trees with DBH > 80 cm (proposed minimum cutting diameter) was reportedly zero or close to zero, suggesting a clear depletion of harvestable trees in natural forests nationwide. Nationally assessed as endangered.
- Costa Rica: The species was reported in 1999 to be threatened due to heavy exploitation, and in 2006 was reported to be in a vulnerable condition due to timber extraction and a 57% reduction in its habitat, but a study by Rivera et al. (2010) concluded that the population in Costa Rica was increasing. The number of individuals of *C. odorata* was estimated at 12,110 in its natural distribution area in 2010, equivalent to a population density of 0.96 individuals / km.
- Dominican Republic: Nationally assessed as critically endangered.
- Ecuador: A 2013 study reported that small, fragmented populations of *C. odorata* made up mostly of young individuals were observed in areas where forest extraction had been more intensive in the country, while in areas where there had been no extraction, a greater density of individuals and predominance of the major diameter classes was found. *C. odorata* has lost 34% of its habitat in the country and is assessed nationally as vulnerable.

- *El Salvador*: Included in an official list of species threatened with extinction in the country in 1997 (Anon., 1997).
- *Guatemala*: Numbers reported to have been greatly reduced by intensive logging by 1946 (Standley & Steyermark, 1946). Nationally assessed as vulnerable.
- *Mexico*: A 2017 study estimated 1.40 ± 0.93 million trees of *C. odorata* in the Pacific region, 4.52 ± 1.75 million trees in the South-Southeast region and 9.01 ± 2.85 million trees in the Gulf of Mexico, totalling ca. 14.98 million trees (the SS indicates that these figures do not differentiate between wild trees or plantations, but the study specifies natural forests). It was estimated that the population was stable.
- *Panama*: Reported to be rare but previously common in certain areas, and most trees less than 50cm in diameter; large individuals likely to have been harvested (Condit & Pérez, 2002).
- *Peru*: A 2011 study estimated the total population at 1.1 million trees with a commercial population between 261,159 and 300,743 trees and densities of up to 1.15 individuals / ha. Nationally assessed as vulnerable.
- *Puerto Rico*: Native trees reported to have been reduced to scattered remote areas by 1964 (Little & Wadsworth, 1964). Nationally assessed as critically endangered.

There was a substantial increase in exports and prices of *C. odorata* sawn wood coinciding with the listing of *Swietenia macrophylla* in CITES Appendix II in 2003 (which led to a marked decrease in exports of mahogany, and increase in price of the latter, from 2000-2008).

Cedrela odorata has been listed in Appendix III by Colombia and Peru since 2001, by Guatemala since 2008, by Bolivia since 2010, and by Brazil since 2011. The CITES Trade Database primarily reflects exports from the latter countries since the reporting of trade from non-listed populations is not required.

According to data included in the CITES Trade Database, exporting countries reported total direct exports of 236,779 m³ and 409,180 m² of *C. odorata* wood and wood products over the 10-year period 2007-2016. Of the trade reported in m³:

- The vast majority of trade was reported as “sawn wood” (95%) and “timber” (4.5%), with much smaller quantities reported as logs, veneer and plywood;
- 75% was reported as source “W” (176,555 m³) and 25% reported as source “A”;
- Of the source “A” exports reported by exporters, 99% were from non-range States (Cote d’Ivoire and Ghana);
- The top source “W” exporters were Peru (50%), Bolivia (37%) and Brazil (7%).

Importing countries reported total imports (in m³) around 30% lower than reported exports; according to importer-reported data, the top importers over the period 2007-2016 overall were the USA (43%) and Mexico (33%), with a similar pattern for wild-sourced imports only (USA 41%, Mexico 38%).

Figure 1 below shows exporter-reported trade in source “A” and “W” *Cedrela odorata* recorded in the CITES Trade Database from 2001-2016:

- Total source “W” exports reported by exporters peaked in 2007 at 61,378 m³ and subsequently declined to 4,731 m³ in 2014, with small increases in both 2015 and 2016 (Figure 1), mainly reflecting increases in exports from Bolivia and Brazil in these years;
- Total source “A” exports reported by exporters peaked in 2013 at 12,774 m³ and subsequently declined to 8,086 m³ in 2016.

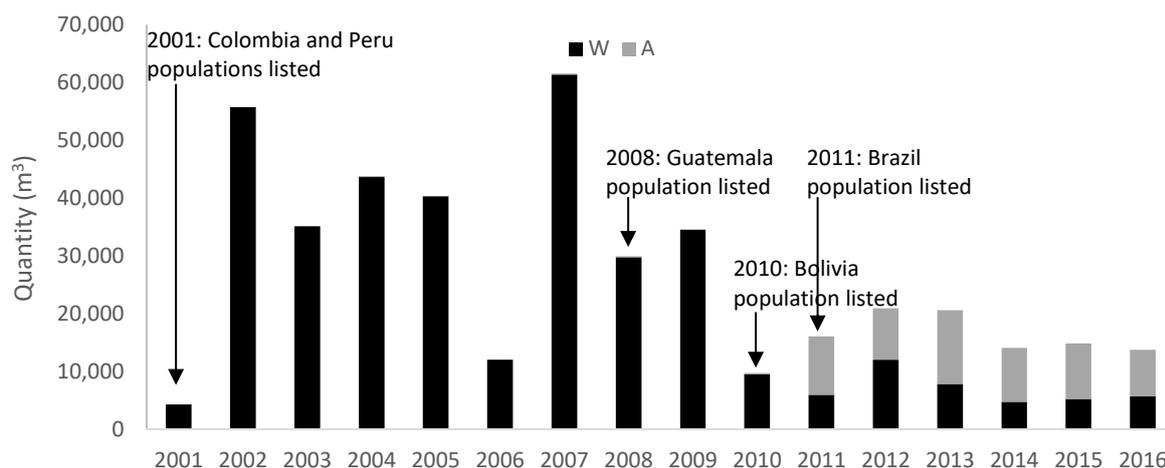


Figure 1 Exporter-reported trade in source “A” and “W” *Cedrela odorata* recorded in the CITES Trade Database.

ITTO reports (ITTO, 2005-2017) include the following trade in *C. odorata* involving ITTO member countries over the period 2002-2016 (trading partner countries were not specified):

- Total exports of ca. 14,000 m³ sawn wood (15,000 m³ from Ghana (non-range State) in the period 2011-2015 only, and the remainder from Guyana in 2006 only) and ca. 2,000 m³ logs (all from Mexico in 2002 only);
- Total imports of ca. 6,000 m³ logs (all to Mexico in the period 2002-2005 only).

Trade was also reported as “*Cedrela* spp.” (species unspecified) in both the CITES Trade Database and ITTO reports; see next section for details.

Data on domestic consumption of *C. odorata* versus exports for top producing countries is detailed below:

- Bolivia: Exports between 2004-2008 averaged 10 thousand m³ / year (a maximum of 16 thousand m³ in 2004 decreasing to 7 thousand m³ in 2008). Domestic consumption was estimated at 4 thousand m³ / year from 2004-2008 (Pérez Contreras, 2011).
- Brazil: Exports between 2007-2009 averaged 14 thousand m³ / year. Domestic consumption data not available for the country as a whole but was at least 24.8 thousand m³ / year on average from 2007-2009 (Pérez Contreras, 2011).
- Peru: Exports between 2000-2008 averaged 22 thousand m³ / year (1.5 thousand m³ in 2000, increasing progressively - and parallel to the decrease in exports of mahogany to the USA - up to a maximum of 55 thousand m³ in 2007). Domestic consumption 2000-2008 averaged 43 thousand m³ / year (maximum of 62 thousand m³ in 2004, decreasing to 10 thousand m³ at the end of the period) (Pérez Contreras, 2011).

Rivera et al. (2010) report that exports of *C. odorata* from Costa Rica were primarily of manufactured products (e.g. furniture) rather than raw timber, and that the raw timber primarily originated in Nicaragua and Panama, the majority of which appeared to be moving into Costa Rica illegally. CoP14 Prop. 33 includes multiple reports of illegal logging of *C. odorata* in several range States.

Cedrela fissilis

The species is very widespread but the population is experiencing significant decline as a result of large scale forest clearance across its range (Barstow, 2018). The species is also exploited for its valuable and desirable timber; the timber is considered inferior to that of *C. odorata* (Pennington & Muellner, 2010; Barstow, 2018) but can be sold interchangeably (Barstow, 2018). Although the species has been reported to be widely protected and cultivated for its timber (Pennington & Muellner, 2010), logging has led to many subpopulations of the species becoming extinct (CNCFlora, 2012) and has caused a decline in genetic diversity (Nunes et al., 2007). It is estimated that across the species range there has been at least a 30% population decline over the last three generations (150–300 years), and is predicted to decline at least 30% further over the coming century as a result of continued illegal logging and forest clearance (Barstow, 2018). Available data on population sizes/trends for specific areas are summarised below:

- Argentina: Subpopulations are restricted to the north, partly within sub-Andean piedmont forest, a habitat which is under severe threat (Barstow, 2018).
- Bolivia: The species has become rare and has been lost from some sectors, though it is mostly harvested opportunistically and is considered to have high germination and good success in populating

new areas. Assessed nationally as vulnerable due to historical and projected population decline (Arrázola et al., 2018).

- *Brazil*: Although reported as a common and widespread species in central and eastern Brazil, much of its former range within the southeast of the country had been cleared for agro-industry (Pennington & Muellner, 2010). Subpopulations were estimated to have declined by 30% as a result of logging and habitat loss, which have led to the extinction of some subpopulations over time; the species no longer forms dense stands although individual trees may be frequent across the fragmented landscape (CNCFlora 2012). Assessed nationally as vulnerable (CNCFlora 2012).
- *Colombia*: Overexploitation has resulted in the species becoming threatened (Barstow, 2018).
- *Costa Rica*: There are very few individuals in Costa Rica, if any at all (Barstow, 2018).
- *Ecuador*: Most natural subpopulations have been destroyed; some large trees remain but they are reportedly being felled for export to Colombia (Barstow, 2018).
- *El Salvador*: Threatened with extinction (Anon., 1997).
- *Panama*: Few individuals (Barstow, 2018).
- *Paraguay*: Apparently still abundant in the Región Oriental, especially along the Paraná valley (Barstow, 2018).
- *Peru*: Overexploitation has resulted in the species becoming threatened in Amazonian Peru (Barstow, 2018). Assessed nationally as vulnerable.
- *Suriname*: The species is still reasonably common (Barstow, 2018).

The Bolivian and Brazilian populations were included in Appendix III in 2010 and 2016 respectively, and were included in Annex D of the EU Wildlife Trade Regulations in 2008 (the Bolivian and Brazilian populations were transferred to Annex C in 2012 and 2016, respectively). According to data included in the CITES Trade Database, the only trade in *C. fissilis* reported by exporting countries was 267 m³ wild-sourced sawn wood exported by Bolivia for commercial purposes over the period 2012-2014. Importers reported 1,381 m³ sawn wood and 4 m³ veneer (all wild-sourced and for commercial purposes) from Brazil (98%), Bolivia (2%) and Peru (<1%) over the period 2008-2014; the main importer was Germany. The USA also reported the import of 6,428 m² source "I" veneer from Brazil in 2013.

ITTO reports (ITTO, 2005-2017) include the following trade in *C. fissilis* involving ITTO member countries over the period 2002-2016 (trading partner countries were not specified):

- Total exports of ca. 83,000 m³ sawn wood (50,000 m³ from Bolivia in the period 2002-2005 only, and the remainder from Brazil in the period 2008-2015 only) and ca. 2,000 m³ veneer (all from Brazil in 2008-2009 only). Exports decreased over this period overall from 17,000 m³ in 2002 to 2,000 m³ in 2015; no trade was reported in 2006, 2007 or 2016 (see Figure 2 below).

Total imports of ca. 1,000 m³ veneer (all to Brazil in 2008 only).

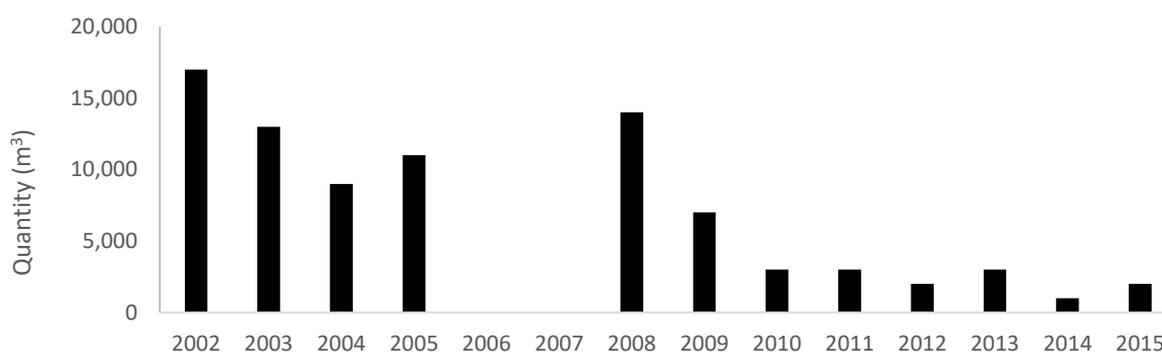


Figure 2 Exporter-reported trade in *Cedrela fissilis* recorded in ITTO reports (ITTO, 2005-2017)

***Cedrela* spp.**

Trade was reported in the CITES Trade Database as *Cedrela* spp. (species unspecified) in the period 2009-2013 from Guatemala (32 m³ timber reported without a source or purpose), Nicaragua (20 m³ wild-sourced timber for commercial purposes) and Suriname (21,140 wild-sourced sawn wood, reported without units, for commercial purposes). ITTO reports (ITTO, 2015 & 2017) include the following trade reported as *Cedrela* spp. involving ITTO member countries over the period 2003-2016: ca. 6,000 m³ sawn wood imported by Japan in the period 2003-2011, and ca. 1,000 m³ logs imported by Egypt in 2003 (further imports were also reported but lumped with other non-*Cedrela* species so the quantities of *Cedrela* species are not known).

The USA reported trade in *Cedrela* spp. (species unspecified) under four HS codes between 2000–2018 (USTIC DataWeb, 2019):

- HS4407.29.01.60 (Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm)
- HS4412.31.26.10 (Plywood, veneered panels and similar laminated wood)
- HS4412.34.26.00 (Plywood, veneered panels and similar laminated wood: Other plywood consisting solely of sheets of wood (other than bamboo), each ply not exceeding 6 mm in thickness: Other, with at least one outer ply of non-coniferous wood not specified under subheading 4412.33: 4412.34 Not surface covered, or surface covered with a clear or transparent material which does not obscure the grain texture or markings of the face ply)
- HS4412.94.31.11 (Blockboard, laminboard and battenboard: With at least one outer ply of non-coniferous wood: Plywood: Not surface covered, or surface covered with a clear or transparent material which does not obscure the grain, texture or markings of the face ply).

The main *Cedrela* spp. commodity in trade was sawn/chipped wood (HS4407.29.01.60); a total of 144,663 m³ was imported into the USA between 2007–2018 (no trade was reported using this HS code prior to 2007). Imports were at their highest in 2007 (ca. 35,000 m³) and subsequently declined in 2008 and 2009, but has since remained at a fairly constant level (between ca. 6,000 – 10,800 m³) (Figure 3). The main exporters of sawn/chipped wood (HS4407.29.01.60) into the USA are listed in Table 1 below; top exporters were Peru (21%), Côte d'Ivoire (18%), Ghana (15%), Bolivia (15%) and China (10%).

Other commodities were not traded in such high volumes or as regularly, but trade reported for each of the other HS codes was:

- HS4412.31.26.10 – Trade was only reported in 2017 and 2018; a total of ca. 7,000 m³ was imported into the USA from Brazil, mainland China, Paraguay, Viet Nam and Taiwan POC.
- HS4412.34.26.00 – A total of 4 m³ was imported into the USA from Canada in 2018.
- HS4412.94.31.11 – Trade was only reported in 2008 (ca. 14,000 m³ imported from China) and 2012 (ca. 8,000 m³ imported from Paraguay).

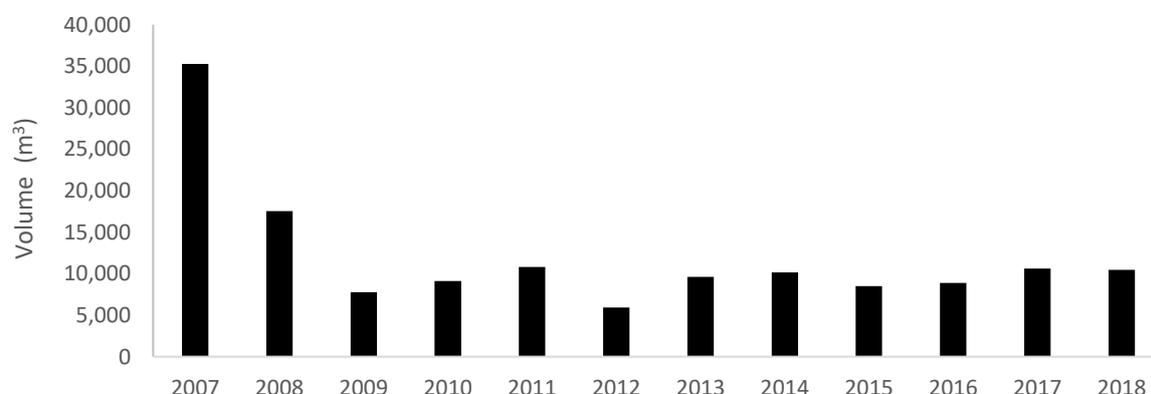


Figure 3 USA imports of *Cedrela* spp. sawn/chipped wood (HS4407: Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm) between 2007 – 2018 (Data recorded to November 2018) (USTIC DataWeb, 2019).

Table 1 Top exporters of *Cedrela* spp. sawn/chipped wood (HS4407: Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm) to the USA between 2007 – 2018 (Data recorded to November 2018) (UST IC DataWeb, 2019).

Importer	Volume (m ³)
Peru	29,841
Côte d'Ivoire	25,795
Ghana	22,396
Bolivia	21,916
China	14,773
Congo (ROC)	9,400
Brazil	6,800
Guatemala	4,238
Cameroon	3,250
Others combined	6,254

A total of 236.8 m³ of *Cedrela* spp. wood was seized in Ecuador from 2014-2017 (domestically rather than at border points).

Other species

C. balansae: Much of its habitat is heavily disturbed. In Paraguay, the timber is valued for furniture making and the species is planted in urban areas (Pennington & Muellner, 2010).

C. discolor: In 2010 the species was reported to be known from only a single type specimen collected in 1906; the type locality was not reported to be within a protected area and there were no protected areas in the vicinity (Pennington & Muellner, 2010).

C. dugesii: Habitat threatened by urban expansion in central Mexico, where the species is endemic. Used locally for firewood (Pennington & Muellner, 2010).

C. kuelapensis: Reported in 2010 that the entire extent of its range in Peru had been subject to deforestation by subsistence farmers and very little pristine forest remained; the population in Peru was estimated to have declined by at least 80% and the total area of occupancy was estimated at 48 km², and the species was not reported to be present in any protected area (Pennington & Muellner, 2010). Assessed nationally as endangered in Ecuador (where it has lost 54% of its habitat).

C. lilloi: Assessed nationally as endangered in Ecuador (where it has lost 56% of its habitat) and Peru. The species was reported to be widely cultivated including outside its natural range due to the value of its timber, and also frequently grown as an ornamental tree in urban areas. The timber was formerly widely used for construction of doors, windows and furniture, but large trees are now scarce and only found in reserved and inaccessible areas (Pennington & Muellner, 2010). Logging has been reported as a threat (Llamozas, 1998). The Bolivian and Brazilian populations were included in Appendix III in 2010 and 2016 respectively, and were included in Annex D of the EU Wildlife Trade Regulations in 2008 (the Bolivian and Brazilian populations were transferred to Annex C in 2012 and 2016, respectively). Although listed in Appendix III by Bolivia and Brazil since 2010 and 2016 no trade in *C. lilloi* has been recorded in the CITES Trade Database.

C. molinensis: Mature trees were reported to be steadily being cut down for fuelwood and timber, which is used locally for making furniture, and much of the species range was unprotected and threatened by grazing which prevents regeneration (Pennington & Muellner, 2010).

C. monoensis: Reported in 2010 that only a small percentage of the original population was likely to remain and the range continued to reduce due to habitat loss (Pennington & Muellner, 2010).

C. montana: Assessed nationally as endangered in Ecuador (where it has lost 52% of its habitat) and vulnerable in Peru. Reported in 2010 that the timber was widely used for furniture, and the species was often protected in pasture for its timber and as a shade tree. Some populations on Andean slopes were protected due to the inaccessible nature of the habitat (Pennington & Muellner, 2010). Listed in Annex D of the EU Wildlife Trade Regulations since 2008, but no trade is reported in the CITES Trade Database.

C. nebulosa: The timber is used locally in construction, and there were reported to be small plantations in northern Peru (Pennington & Muellner, 2010). Assessed nationally as endangered in Ecuador (where it has lost

31% of its habitat). However, Pennington and Muellner (2010) reported that there were vast areas of undisturbed habitat within its range.

C. oaxacensis: Habitat reported to be threatened by urban expansion in southern Mexico, where the species is endemic (Pennington & Muellner, 2010). Listed in Annex D of the EU Wildlife Trade Regulations since 2008, but no trade is reported in the CITES Trade Database.

C. saltensis: Valued locally for its timber (Pennington & Muellner, 2010).

C. salvadorensis: Slash and burn reported to cause a continuous decline in suitable habitat. The timber is used locally in Mexico (Pennington & Muellner, 2010). Threatened with extinction in El Salvador (Anon., 1997). Listed in Annex D of the EU Wildlife Trade Regulations since 2008, but no trade is reported in the CITES Trade Database.

C. tonduzii: The timber is valued for construction, panelling and furniture, though it is considered to be inferior to *C. odorata*. Its habitat was reported to be heavily disturbed for coffee cultivation and cattle ranching. However, because of the value of its timber the species was often found protected in pasture after the forest had been felled (Pennington & Muellner, 2010). Threatened with extinction in El Salvador (Anon., 1997). Listed in Annex D of the EU Wildlife Trade Regulations since 2008, but no trade is reported in the CITES Trade Database.

C. weberbaueri: Reported in 2010 to be seriously threatened due to its limited range (estimated extent of occurrence of 1700 km² in the Mantaro Valley in Central Peru) and forest clearance; not reported to be present in any protected area (Pennington & Muellner, 2010).

Inclusion in Appendix II to improve control of other listed species (Res. Conf. 9.24 (Rev. CoP 17) Annex 2b)

C) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP17) Annex 2a or listed in Appendix I

Brazil reported that mahogany wood (three species of *Swietenia* are listed in Appendix II) is similar to that of *Cedrela* but that they have technical material for the identification of mahogany and have the capacity to apply an identification methodology "using near infrared"; no further detail provided (PC24 Doc. 22 (Rev. 1)). It has been reported that a differentiation between *Cedrela* and *Swietenia* timbers should be possible in practice based on distinctive macroscopic and microscopic characters recorded in the CITESwoodID database (Richter et al., 2014 and subsequent updates), and from experience of training courses for enforcement personnel (G. Koch, in litt., 2019).

Additional Information

Threats

The main threat to *C. odorata* is unsustainable harvest of timber; deforestation and the associated habitat loss also threaten the species (Mark & Rivers 2017). See above for details.

Conservation, management and legislation

- Brazil, Colombia, Guatemala and Peru have carried out population studies of the *Cedrela* species, in order to understand the current status of these species and adopt measures to promote their forest management. Peru also has a very detailed national forest inventory where management units have been defined, and carried out a population study of the genus *Cedrela* in its natural range from April 2008 to March 2009 in order to evaluate the commercial stocks and consider a sustainable management strategy (PC24 Doc. 22 (Rev. 1)).
- Mexico, Guyana and Cuba have estimated coverage and density of populations.
- Argentina, Brazil, Colombia, Jamaica, Mexico and Peru require verified management plans to regulate harvest of *Cedrela* species.
- In Colombia, some Regional Autonomous Corporations have prohibited use of *C. odorata*.
- There are broad bans/restrictions on timber logging/export in several range States (only the three top exporters of *C. odorata* mentioned here): In Brazil, the export of unfinished timber of native species (i.e. destined to be processed abroad) is prohibited according to Normative Instruction 15/2011 (IBAMA, 2011), amended by Normative Instruction 13/2018 (IBAMA, 2018). In Bolivia, export of unprocessed forestry products is subject to restrictions and highly regulated, mainly through forest certification (from 1996 onwards, last updated 2016; Forest Legality Initiative, 2016). In Peru, there is an export ban on logs and forest products "in their natural state" except when they originate from nurseries or forest plantations, and if they do not require processing for final consumption (from 1972 onwards, last updated 2016; Forest Legality Initiative, 2016).

Occurrence of *C. odorata* in protected areas: Tikal National Park in Guatemala (57,400 ha), Corcovado NP (54,568 ha) and La Amistad Biosphere Reserve (584,592 ha) in Costa Rica; elsewhere in South America it is present in many reserved areas throughout its range (Pennington & Muellner, 2010).

Artificial Propagation

Cedrela odorata plantations in tropical America have not been successful due mainly to attack by the Shoot Borer *Hypsipyla grandella*. However, planting at low densities in a matrix of other species appears to confer some protection (Pennington & Muellner, 2010). For this reason, it is sown mainly within agroforestry plantations in its natural distribution area. In areas without Shoot Borer (Africa, Asia and the Pacific) it establishes well in plantations and even has the potential to become an invasive weed, forming dense monospecific stands which can shade out less aggressive native species (Pennington & Muellner, 2010). Poor selection of plantation sites is also cited as a factor in the lack of success of plantations, by not meeting with the specific requirements of the species, such as having well-drained, deep and humid soils.

As detailed above, around 25% of global exports reported over the period 2007-2016 were recorded as artificially propagated, the proportion of artificially propagated exports increased over this period from <1% in 2007 to 59% in 2016.

In the period 2010–2018, Ecuador harvested a volume of standing timber of 3,911.94 m³, of which 86% came from cultivated forests (plantations) and the remaining 14% from relict tree cutting programs. In Mexico there has been an increase in commercial forest plantations. Mexico reported 37,176 ha of plantations with a yield of 160 m³/ha, with its commercial purpose being roundwood, while Colombia reported that it has registered 8,021 ha of plantations of this species (PC24 Doc. 22 (Rev. 1)). A 2011 report noted that plantations in Bolivia, Brazil and Peru were not yet of harvestable age (Pérez Contreras, 2011). It is not clear whether there is an ongoing reliance on wild seeds/saplings to establish or supplement plantations.

Implementation challenges (including similar species)

Taxonomic, genetic, physical, mechanical and anatomical knowledge to differentiate the woods of *Cedrela* species is limited, and the woods of different species may be marketed interchangeably. Several countries have expressed difficulties in differentiating between *Cedrela* species (Brazil, Ecuador, El Salvador and Peru). Guatemala, Jamaica and Peru reported that they have developed identification tools to differentiate *Cedrela* species; the only further details provided were that Peru has developed manuals for the dendrological and anatomical identification of the main commercial *Cedrela* species which will be published online in the near future. However, based on the CITESwoodID database (Richter et al., 2014 and subsequent updates), it is not reported to be possible to distinguish the individual species within the genus *Cedrela* using macroscopic or microscopic wood anatomical methods (G. Koch, in litt., 2019). Furthermore, the timbers of *Cedrela* and *Toona* (the latter naturally distributed in Asia and not listed in the CITES Appendices) are virtually indistinguishable in practice given their similar colour, structure and odour, hence an annotation to restrict the listing to the native range of *Cedrela* (Americas) could be considered (G. Koch, in litt., 2019).

Potential risk(s) of a listing

In the case of Brazil, the prohibition of trade in mahogany coincided with substantial export increases of "other tropical species", including cedar, with signs of illegal trade (Pérez Contreras, 2011).

Potential benefit(s) of listing for trade regulation

The commitment assumed by Peru from 2001 onwards to transparently provide up-to-date information on export permits for cedar and mahogany to current and potential consumers has contributed to improve the image and value of Peruvian cedar sawn wood, of which the FOB price is 45% higher than that of Brazil and 40% higher than that of Bolivia (and a similar difference for mahogany) (Pérez Contreras, 2011).

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