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)

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

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 km^2 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).*

	kg		Number of items (no unit specified)	
Trade Term	**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 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 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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