

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA
Amendments to Appendices I and II of CITES

Eleventh Meeting of the Conference of the Parties
Nairobi (Kenya), April 2000

A. PROPOSAL

Transfer of *Guaiacum sanctum* from Appendix II to Appendix I

B. PROPONENT

The United States of America.

C. SUPPORTING STATEMENT

1. Taxonomy

- 1.0 Division: Magnoliophyta (angiosperms; flowering plants)
 1.1 Class: Magnoliopsida (dicotyledons)
 1.2 Order: Sapindales
 1.3 Family: Zygophyllaceae
 1.4 Species: *Guaiacum sanctum* Linnaeus 1753 (see Section 7 for natural hybrids)
 1.5 Scientific synonyms: [syn.= *Guajacum* L.]
G. verticale Gómez Ortega 1798
G. guatemalense (Standley & Steyermark 1946, Little & Wadsworth 1964, Chickering 1973)

1.6 Common Names:

- English: Brazil wood, guaiacum, gum guaiacum, lignum-vitae, commoner lignum-vitae, pockwood, wood of life, tree of life
 Spanish: guayacán, guajacum, leno de guayaco, palosanto
 French: bois de gaïac, bois de vie, bois saint, gaïac, gayac,
 Portuguese: guaiaco, pau santo, lenha di guaiaco

(For others, see Record & Hess 1943, Little & Wadsworth 1964, Schippmann 1999. Occasionally “lignum-vitae” is used with other timber species; see Section 5.2. “Guayacán” is used regularly for *Tabebuia* timber species (Bignoniaceae), *Caesalpinia melanocarpa* Grisebach (Fabaceae), and *Andropogon angustatus* (Presl) Steudel (Poaceae) (Mabberley 1989, Beekman 1964, Schnee 1973).)

1.7 Code Number:

2. Biological Parameters

Guaiacum sanctum grows up to 10 meters in height. It has leaves about 4-10 cm, leaflets oblong to obovate to lanceolate, 2-5 pairs. Flowers are solitary or in clusters, blue or purple (Griffiths

1994). Its heartwood is greenish brown, heavier than water, with an aromatic and irritating taste (Schippmann 1999).

Guaiacum spp. are very slow-growing, in dry forests to scrub. A *Guaiacum sanctum* tree living in Florida (USA) was estimated to be over 1000 years old (Wilson & Eisner 1968). In an experimental regime, nevertheless, *G. officinale* was found easy to propagate, the seeds germinating readily (yet able to remain dormant), with plants attaining 30-50 cm in two years (Fors 1936). If not overexploited, *Guaiacum* plants tend to be plentiful in an area (Shelford 1963, Storer 1958, Marie-Victorin & Léon 1942, Liogier 1985, García-Molinari 1952, Watts 1966, Pertchik & Pertchik 1951, Stoffers 1984).

2.1 Distribution: *Guaiacum sanctum* is distributed along a western arc in the wider Caribbean region. The species is described ranging from southern Central America, northward and eastward through the Greater Antilles and further northeast from Costa Rica to Mexico (Quintana Roo), Bahamas, Hispaniola, Puerto Rico, Cuba, and southern Florida (USA). WCMC (1998) also includes Belize, although the Chief Forest Officer of Belize stated that *G. sanctum* has not been recorded in Belize to date (Ministry of Natural Resources and Environment of Belize, *in litt.*, 1999). D'Arcy (1987) and Porter (1969, 1972) do not include Panama within its natural distribution, while Record & Hess (1943) had mapped *G. uaiacum* into southwest Panama. The Netherlands Antilles seems to be treated as part of its native range by Stoffers (1984). [also see the following for further discussion on natural occurrence of this species: Bisse 1988, Correll & Correll 1982, Elias 1980, Holdridge & Poveda 1975, León & Alain 1951, Liogier 1985, Liogier 1978, Little 1978, Little & Wadsworth 1964, Patterson & Stevenson 1977, Standley 1923, Standley & Steyermark 1946, Téllez Valdés & Sousa Sánchez 1982, and West & Arnold 1956.]

2.2 Habitat Availability: The species of *Guaiacum* occur in lowland tropical to subtropical dry forest to scrub (Ewel & Whitmore 1973). *Guaiacum sanctum* grows near the coast and at lower elevations inland, in woodlands, thickets and pastures, on hillsides and plains. Associated species are *Astronium graveolens*, *Tabebuia ochracea*, and *Sideroxylon capiri* (Jiménez-Madrigal 1993, WCMC 1998).

2.3 Population Status: Most populations of *G. sanctum* have diminished from collection for approximately 400-500 years, for use of the wood itself or a medicinal decoction from it (see Section 3.2). To a considerable extent, it does not appear that collectors have been selective between this species and *G. officinale* (although readily told apart), but actually have cut either or both to satisfy the same trade demands. However, with increase of experience and awareness, *G. officinale* has been regarded as having the superior wood (Record & Hess 1943). A few centuries ago, *G. sanctum* may have been preferred for medicinal use (Munger 1949, Kimber 1988, Lewis & Elvin-Lewis 1977). In the past century, both appear to have been satisfactory (Wren & Wren 1956, Standley 1923). With a decline of *G. officinale* and *G. sanctum*, collection of *G. coulteri* may be expanding.

Guaiacum sanctum is assessed as “Endangered” in the World List of Threatened Trees, because it is “extinct or extremely rare on most of the Caribbean islands” (Oldfield *et al.* 1998). In Central America and Florida (Costa Rica, El Salvador, and the Florida Keys), remaining populations are confined to restricted areas and continue to be threatened with habitat loss or exploitation (Oldfield *et al.* 1998). This species is included in a list of threatened timber trees in Costa Rica (Jiménez-Madrigal 1993, WCMC 1998). It is known to be threatened in 11 other countries of its distribution range (D'Arcy 1987, Hartshorn *et al.*

1981). However, the species is not included in the 1997 IUCN Red List of threatened plants (Walter & Gillett 1998).

Guaiacum sanctum is not considered threatened in Cuba, where populations are relatively abundant, especially along the southern coast of the island of Cuba and the Isla de la Juventud (Isla de Pinos)(CITES Management Authority of Cuba, *in litt.*, 1999). Cuba considers the World Conservation Monitoring Center estimate of less than 2,500 mature *Guaiacum sanctum* individuals to be too conservative, as the population in Cuba alone is believed to be greater than 2,500 (CITES Management Authority of Cuba, *in litt.*, 1999).

2.4 Population Trends: Though large specimens are almost completely absent from most of the species' range, small bushy trees can be found (WCMC 1998). Many of the Caribbean populations were decimated in the 17th and 18th centuries (WCMC 1998). *Guaiacum sanctum* populations are not decreasing in Cuba (CITES Management Authority of Cuba, *in litt.*, 1999).

2.5 Geographic Trends: Some sources suggest that, if it was native to El Salvador, *Guaiacum sanctum* is now extinct there (SSC/TPC 1981, WCMC 1998). However, the Management Authority of El Salvador states that this species has a very restricted distribution in El Salvador and can still be found in very rare instances (CITES Management Authority of El Salvador 1999). *Guaiacum sanctum* habitat is not decreasing in Cuba (CITES Management Authority of Cuba, *in litt.*, 1999).

2.6 Role of the Species in its Ecosystem: No information.

2.7 Threats: The primary threat to this species is overexploitation (WCMC 1998). Those populations of *Guaiacum sanctum* that have escaped exploitation in Florida are threatened with habitat conversion for retirement homes (Ward 1979). Habitat loss and over exploitation for commercial use are the main factors threatening *Guaiacum sanctum* in Central America (CITES Management Authority of El Salvador, *in litt.*, 1999).

3. International and National Trade Data

3.1 National Utilization: International and national trade and utilization in *Guaiacum* species chiefly involve their wood (Walker 1989, Lewington 1990, Bramwell 1976, Edlin *et al.* 1978, Linnell & Arnoult *n.d.*, Whitmore 1980, Constantine 1959, Coleman 1966, Titmuss 1965, Bond 1950, FPRL 1956, Chudnoff 1984). *Guaiacum sanctum* is among the heaviest woods. Its high density, content of oily resin, and fine texture suit it for products such as bushings and bearings for ship propeller-shafts, pulley sheaves, thrust blocks and bearings, caster wheels, rollers, guides, and washers (used in a broad medley of machinery), and in die cutting. The wood also continues to be sought for turnery (e.g. mallet-heads, goblets, bowls). A new technology upgrading the production of rubber bearings may be decreasing the need for *G. sanctum* bearings (Yeaple 1988). The wood of *G. sanctum* is less valuable than *G. officinale*, but the two are rarely distinguished (Oldfield *et al.* 1998), as indicated by the fact that the trade names for the two species are essentially the same (Schippmann 1999).

Guaiacum sanctum was originally exploited as a cure for syphilis (CITES proposal 1992, WCMC 1998). Minimal medicinal attention continues, in local remedies (Morton 1981, Ayensu 1981, Honychurch 1980, Martínez 1969) and internationally (Bossard 1978, Tierra *et al.* 1988, Crété 1965). The medicinal material may be termed gum guaiac, guaiac resin, guaiacum, lignum vitae, or lignum sanctum. The medicinal uses of *G. sanctum*, similar to those of *G. officinale*, is mainly to treat rheumatic pain, but also as an antiinflammatory,

diuretic, diaphoretic, and mild laxative (Schippmann 1999).

Guaiacum sanctum is also sold and planted as an ornamental tree or tub plant (WCMC 1998).

3.2 Legal International Trade: An intensive international trade began nearly five centuries ago with exploitation of *Guaiacum* for medicinal use in Europe, when it became known (ca.1508) that the Amerindians (e.g, the Arawaks) made a decoction from it to treat the venereal disease syphilis (Harris 1965, Milne & Milne 1975, Standley 1923). For over two centuries, there was strong demand for heartwood to prepare the extract, which was generally deemed as one of the two major remedies for syphilis (Crosby 1972, Record & Hess 1943, Porter 1972). Until 1909, some administration of this treatment may have continued (Milne & Milne 1975).

The status of the *Guaiacum* populations before 1492, and the severity and effects of the persistent collection on the species, can be inferred somewhat from the fervor of early attention and chronic trade demand (Munger 1949, Castiglioni 1943, Pertchik & Pertchik 1951, Harris 1965, Kimber 1988). In the 1520s-1530s, the belief that the cure for syphilis (and the alleviation of other ailments) came from lignum-vitae created a craze (repeated a few generations later) that “drove its price to dizzy heights”, as much as 7 gold crowns per pound (lb.) of this very heavy wood (Crosby 1972, Record & Hess 1943, Swabey 1946, Lewis & Elvin-Lewis 1977).

Current trade was summarized by Schippmann (1999) for the years 1978-1997 (the last year for which CITES trade data are available). Countries that exported or re-exported *G. sanctum* included Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Italy, Japan, Mexico, Trinidad and Tobago, and the United States. The earliest trade record of trade in *G. sanctum* in the CITES trade data is an export of 101 m³ timber from Costa Rica in 1978. Regular trade records exist from 1982 onwards. Timber is currently the dominant commodity in trade, reported mainly in ‘kg’ or ‘m³’.

Table 1 (from Schippman 1999) provides a summary of recorded *G. sanctum* timber exports (1978-1997). *Guaiacum sanctum* has been exported mainly from Mexico, and trade reporting by this country is substantial. For 1982-1997, a total of 203 tons plus 1515 m³ were exported. Also, the exports from Japan and the U.S. originally came from Mexico. Other timber exporters (reporting in kg, m³, or without unit, i.e. number of specimens) are Costa Rica and Honduras (Schippmann 1999).

The main importer of the Mexican ‘timber’ exports was Japan (totals of 129 tons plus 853 m³). Other important destinations were Germany (total of 199 m³), the People’s Republic of China (200 m³), and the United States (67 tons). The rest went to Asian destinations (Hong Kong, Indonesia, the Republic of Korea, the Philippines, Singapore, and Taiwan) or to Europe (Spain, France, the United Kingdom, and Yugoslavia)(CITES trade data, Schippmann 1999). The trade is not constant over the years, but undergoing drastic fluctuations. There is a remarkable gap in trade records between 1988 and 1991, with no ‘timber’ records at all (Schippmann 1999). Schippmann (1999) notes that, assuming constant demand in *G. sanctum* products on the world market, the strong fluctuations observed in Mexican Annual Report data in many years may be interpreted as lack of reporting.

The exports reported by Mexico are poorly matched by the reporting of importing countries. One reason for this may be the fact that in its Annual Reports, Mexico reports on permits issued rather than on permits used and by doing so overestimates the actual trade (Schippmann

1999). Only Japan and the United States have a number of import records over the years. All other countries listed above have no import records in their Annual Reports (Schippmann 1999).

Table 1. Gross Exports of *Guaiacum sanctum* 'timber' (1978-1997)

Ex- porter	Unit	1978	1979- 1981	1982	1983	1984	1985	1986	1987	1988- 1991	1992	1993	1994	1995	1996	1997	Total
CR	M ³	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101
IT	T	0	0	0	0	0	3.0	0	0	0	0	0	0	0	0	0	3.0
JP	T	0	0	0.2	0	0	0	0	0	0	0	0	15.0	0	0	0	15.2
MX	T	0	0	48.9	0	58.0	0	10.0	0	0	35.4	0.6	0.02	50.0	0	0	202.9
MX	M ³	0	0	0	0	0	0	316	49	0	0	328	274	199	219	130	1515
US	T	0	0	0	0	0	0	0	0	0	0	0	0	0	8.4	0	8.4

Source: CITES Trade Data, Schippmann (1999)

Only one consignment is obviously related to medicinal trade. In 1985, Japan exported 150 kg of ‘derivatives’ that originated in Mexico to the Republic of Korea. The Republic of Korea did not document this import, and it is not clear whether it relates to resin (Schippmann 1999). Additional trade in ‘dried plants’ (Purpose ‘scientific,’ probably herbarium specimens), ‘flowers,’ ‘specimens,’ and ‘unspecified,’ is negligible (CITES trade data, Schippmann 1999).

No trade in artificially propagated material (“A”) has been reported. From 1993 onwards, all reported trade was declared as wild-collected. In 1994, one consignment of 15 tons of sawn wood exported from Japan to the People’s Republic of China (originally from Mexico), was declared as Pre-Convention material, 19 years after the listing of the species (CITES trade data, Schippmann 1999). Schippmann (1999) suggests this shipment was most likely an erroneous reporting for *G. officinale*.

Additional sources of trade data include Oldfield 1988, TPC 1982, Record 1921b, Harris 1965, and Kimber 1988.

- 3.3 Illegal Trade: The amount of illegal trade in *G. sanctum* is quite speculative. Presumably since July 1975, there has been a significant amount of *G. sanctum* commerce undetected. Individual sales and transport of “lignum-vitae” from Mexico to USA are heard anecdotally; the species probably is *G. coulteri*, but could be *G. sanctum*. This commerce probably was not authorized under Mexican law, particularly since a new law went into effect in 1988. Nationally, larger trees of *G. sanctum* have been illegally cut in USA (Florida), and smaller plants removed for ornamental use (CITES proposal 1992, WCMC 1998).

Schippmann (1999) cited reports that *G. sanctum* was once quite abundant in several regions of Guatemala, but has become so scarce that it is no longer subject to commerce. However, illegal harvesters from Mexico are extracting remaining stocks in the areas of Peten, Izabal, and, probably, Sierra de las Minas.

- 3.4 Actual or Potential Trade Impacts: *Guaiacum sanctum* has been assessed as threatened in parts of its range, yet all material reported in trade is collected from the wild. Schippmann (1999) notes that more information is required to determine whether international trade in *G. sanctum* adds to this threat.

- 3.5 Artificial Propagation for Commercial Purposes (outside country of origin): *Guaiacum sanctum* is widely cultivated as an ornamental in the tropics for its globose growth and myriads of blue or purple flowers (Woodson and Schery 1969). It is cultivated much less frequently than *G. officinale*, and mainly for amenity (e.g. Neal 1965, Porter 1969, Ward 1979, WCMC 1998). It is cultivated as an ornamental plant in parks (Everett 1981-1982). Regeneration is good, but growth is very slow (Americas Regional Workshop 1996, WCMC 1998).

4. Conservation and Management

4.1 Legal Status:

- 4.1.1 National: In Costa Rica, this species is classified as endangered (Jiménez-Madrigrál 1993, WCMC 1998, CITES Management Authority of Costa Rica, *in litt.*, 1999).

Guaiacum sanctum is also listed as endangered in El Salvador (CITES Management Authority of El Salvador, *in litt.*, 1999; CITES Scientific Authority, *in litt.*, 1999) and by the state of Florida.

- 4.1.2 International: Three countries include populations of *G. sanctum* in the Annex to the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere [CNWH] (OEA 1967, USDS 1942, Coolidge 1945, Coolidge 1949, Orejas-Miranda 1976):

Costa Rica 22/10/65: *G. sanctum* [as “*G. officinale* guayacán” which is not native]

El Salvador 22/10/65: *G. guatemalense* [probably a synonym of *G. sanctum*]

Nicaragua 23/04/41: *G. sanctum*

USA 22/10/65: *G. sanctum* [non-official informative list]

Guaiacum sanctum timber was included in CITES Appendix II on 3 February 1973 (effective 7 January 1975). Most parts and derivatives of this species have been regulated by CITES since 1985.

- 4.2 Species Management: *Guaiacum sanctum* is protected in the Santa Rosa and Palo Verde National Parks in Costa Rica (CITES Management Authority of Costa Rica, *in litt.*, 1999).

4.3 Control Measures:

- 4.3.1 International Trade: No information.

- 4.3.2 Domestic Measures: *Guaiacum sanctum* is protected by the Forestry Law of Costa Rica and regulation #7174 of May 1990, which prohibits the export of timber of this species (CITES Management Authority of Costa Rica, *in litt.*, 1999). In the Dominican Republic, all timber felling is generally restricted (CITES Proposal 1992). *Guaiacum sanctum* habitat is protected in Cuba under Article 20 of the Forestry Law of 1998 (CITES Management Authority of Cuba, *in litt.*, 1999).

5. Information on Similar Species

“Lignum-vitae” wood from *Guaiacum* spp. is well known and generally readily recognizable (Walker 1989, Bramwell 1976, Linnell & Arnoult *n.d.*, Titmuss 1965, Bond 1950, Coleman 1966). However, international trade data is typically recorded either as “lignum-vitae” or less precisely. Usually, the genus can be surmised from the place of export.

An essential oil marketed as guaiac oil or oil of guaiac wood (e.g. used in perfume and soap) is derived from the heartwood of *Bulnesia sarmientoi* (Mabberley 1989; Bramwell 1980; Duke 1983; Record & Hess 1943; see below). The woods of three other species are marketed indicating their similarity to the true lignum-vitae (*Guaiacum*) (Mabberley 1989, Howes 1975, FPRL 1956, Record & Hess 1943): *Premna lignum-vitae* (Schauer) Pieper (Queensland lignum-vitae), NE Australia; *Bulnesia arborea* (Jacquin) Engler (verawood or Maracaibo lignum-vitae), Colombia and Venezuela (Hoyos 1976; Lasser 1971); and *Bulnesia sarmientoi* Lorentz ex Grisebach (Paraguay lignum-vitae), Paraguay and Argentina (Tortorelli 1956; Descole *et al.* 1943). Wood and general keys to *Bulnesia* and *Guaiacum* are in Record (1943) and Hutchinson (1967).

Other *Guaiacum* species:

- *Guaiacum coulteri* occurs mostly on the Pacific slope, from NW Mexico southward to Central America (Porter 1972, Record & Hess 1943, Standley 1923, Wiggins 1964, Mason & Mason 1987, and Miranda 1952, 1953). *Guaiacum coulteri* var. *coulteri* has the range of the species, but how far south into Central America it grows is unclear (Porter 1963, 1972). *Guaiacum coulteri* var. *palmeri* occurs only in northwest Mexico, from northwest Sonora into northern Sinaloa (Wiggins 1964, Porter 1963, Standley 1923).
- *Guaiacum guatemalense* Planchon ex Rydberg may represent hybrids of *G. coulteri* x *G. sanctum* (Porter 1972). If *Guaiacum guatemalense* is treated as a synonym of *G. sanctum*, it would assist in controlling *G. sanctum* trade.
- *Guaiacum unijugum* is endemic to Mexico, in SE Baja California (Wiggins 1964, 1980; Porter 1963, 1972).
- For areas with several native *Guaiacum* taxa, information on the wood's origin or identification is needed to regulate their populations (*G. sanctum*, *G. guatemalense*, and *G. officinale*) (FPRL 1956, Record 1921a) and/or to evaluate data. For example, writing on Chiapas (in southern Mexico), Miranda (1952, 1953) used "*G. sanctum*" in error for *G. coulteri* (Porter 1972). Font Quer (1958) disseminated the mistake (from Miranda).

6. Other Comments

The United States notified the Plants Committee of the prospect of this proposal at the ninth Plants Committee meeting in Darwin, Australia in June 1999. The Plants Committee advised the United States to consider the conclusions of WCMC (1998) with respect to this species, which suggest that it fails to qualify for Appendix I. However, upon further investigation, the primary author of the report acknowledged that WCMC (1998) is in error regarding *Guaiacum sanctum*, and that Appendix I listing is appropriate for this species (Oldfield, *in litt.*, 1999).

El Salvador has expressed support for this proposal (CITES Management Authority of El Salvador, *in litt.*, 1999; CITES Scientific Authority of El Salvador, *in litt.*, 1999).

Cuba has stated that it does not believe *Guaiacum sanctum* satisfies the biological criteria for listing in Appendix I (CITES Management Authority of Cuba, *in litt.*, 1999). The Dominican Republic has stated that the inclusion of this species in Appendix I is not justified because commercial trade in this species is limited and the status of *Guaiacum sanctum* is fairly stable in the Dominican Republic (Peña, *in litt.*, 1999).

7. Additional Remarks

Guaiacum coulteri ranges southward from southern Mexico into western Central America to an unknown extent, thus occurring where *G. sanctum* is native. Porter (1972) surmised that rather than a synonym, *G. guatemalense* may represent extensive hybridization occurring between *G. coulteri* and *G. sanctum* where both occur. His view was based on morphological evidence (including lower seed-set) from the limited number of available herbarium specimens. Porter (1991) suggested that *G. guatemalense* be treated as a synonym of *G. sanctum*, until research determines the southern range of *G. coulteri*, and confirms (or refutes) hybridization in *G. guatemalense* and finds out its general geographical extent and biological characteristics.

Either as a synonym or hybrid, the specimens of *Guaiacum guatemalense* are regulated. If *G. guatemalense* is treated as representing plants of hybrid origin, it is subject to the provisions of the convention in accordance with Resol. Conf. 2.13(b), with no protection for hybrids themselves, in accordance with Resol. Conf. 2.13(d).

Note: *Guaiacum coulteri* is widespread and sometimes has been reported as plentiful (Mason & Mason 1987, Rzedowski 1978, Shelford 1963) and its full range into western Central America is unclear (Porter 1972). Probably significant quantities of the “lignum-vitae” in commerce now originate from this species (see Section 5). The distribution, population dynamics, and use of *G. coulteri* require evaluation to see if it may need to be included in CITES Appendix II, under the similar-appearance provision of CITES Article II, paragraph 2(b), to diminish inappropriate export of regulated taxa of *Guaiacum*, or perhaps in its own right.

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