

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



Twelfth meeting of the Plants Committee
Leiden (The Netherlands), 13-17 May 2002

Species proposals for the 12th meeting of the Conference of the Parties

INCLUSION OF *GUAIAECUM* SPP. IN APPENDIX III

1. This document has been prepared by the Scientific Authority of Germany.

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

Other proposals

A. Proposal

Inclusion of *Guaiaacum* spp. in Appendix II in accordance with Article II, paragraph 2(b).

or

Inclusion of *Guaiaacum coulteri* in Appendix II in accordance with Article II, paragraph 2(b).

B. Proponent

Germany

C. Supporting Statement

Taxonomy

- | | |
|--------------------------|---|
| 1.0 Division: | Magnoliophyta (angiosperms; flowering plants) |
| 1.1 Class: | Magnoliopsida (dicotyledons) |
| 1.2 Order: | Sapindales |
| 1.3 Family: | Zygophyllaceae |
| 1.4 Genus: | <i>Guaiaacum</i> Linnaeus |
| 1.5 Species: | <i>Guaiaacum coulteri</i> A. Gray 1855 |
| Subspecies: | <i>G. coulteri</i> var. <i>coulteri</i> and
<i>G. coulteri</i> var. <i>palmeri</i> (Vail) I.M. Johnston 1924 |
| 1.6 Scientific synonyms: | <i>Guaiaacum planchonii</i> A. Gray ex Rydberg
<i>Guaiaacum palmeri</i> Vail |
| 1.7 Common names: | English: Sonora guaiacum, lignum-vitae, pockwood, wood of life, tree of life
French: bois de gaiac, bois de vie, bois saint, gaiac, gayac
Spanish: guayacán, guajacum, leño de guayaco, palosanto, trimarindillo
Aztec: matlalquauitl
German: Pockholz, Guaiaacum
Portuguese: guaiaco, pau santo, lenha di guaiaco |
| 1.8 Code number: | - |

2. Biological Parameters

Guaiacum coulteri is a small, neotropical, evergreen, and slow-growing tree or shrub and grows – under optimal conditions – up to about 4 meters in height. The age-size relationship in *G. coulteri* is unknown (MARYLAND-REPORT 2000). It may also trail along the ground, under certain conditions (MARYLAND-REPORT 2000). *G. coulteri* prefers a fully sun-exposed or lightly shaded environment in dry forests to scrub. Blossoms usually appear between April and September, are deep blue-violet and grow in clusters or solitary (MIELKE 1993). Its heartwood is yellowish or light coloured, very hard, and heavier than water (MARYLAND-REPORT 2000).

The following features can be used to identify *G. sanctum* and *G. coulteri* in the field (MARYLAND-REPORT 2000):

Characteristic	<i>G. coulteri</i>	<i>G. sanctum</i>
Flower colour and shape	deep violet-blue; distinctly clawed petals	purple (can be lighter than <i>G. coulteri</i>)
Ovary	glabrous (smooth)	pubescent (hairy)
Leaflet shape	narrow, elliptical	oblong, ovate or lanceolate

It is known from cultivation of *G. coulteri* that the plants need protection from the cold. Branches and leaves can be damaged by temperatures below -4°C (M. TODD *in litt.*, February 1999). Although *G. coulteri* lives in a semi-dry climate, it needs a well drained soil for the seeds to germinate. Heavier flowering is spurred by rain or irrigation (M. TODD *in litt.*, February 1999).

Guaiacum spp. contains a number of substances which are or were used for medicinal purposes. Among these are α - and β -guaiaconic acids, guaiaretic acid, guaiacic acid, vanillin, guaiaca saponin and guaiaguttin (higher terpenoid) (HEALTHLINK, no date).

2.1 Distribution

G. coulteri is most likely endemic to **Mexico** (GROW & SCHWARTZMAN 2001). Its native distribution ranges from the states of Oaxaca to Sonora, Western Mexico (MIELKE 1993; GROW & SCHWARTZMAN 2001). *G. coulteri* populations predominantly occur between the coast and the foothills of the Sierra Madre Occidental (MARYLAND-REPORT 2000). The species is found in the states of Sonora (MIRANDA & ALCALÁ, 1989), Sinaloa (INSTITUTO NACIONAL DE ESTADISTICA, GEOGRAFIA E INFORMATICA, no date), Jalisco (CPD: MIDDLE AMERICA, no date) and Oaxaca (Huatalco Parque Nacional, INSTITUTO NACIONAL DE ECOLOGÍA, no date; SEMARNAT, no date), but populations are also reported from Yucatan (A. REUTER *in litt.* to TRAFFIC Europe-Germany, February 2002).

It is still not finally determined if the range of *G. coulteri* var. *coulteri* extends southward into **Guatemala** (CITES COP 8, 1992; MARYLAND-REPORT 2000). If so, PORTER's (1972) interpretation may be still valid considering *G. guatemalense* a hybrid form of *G. coulteri* and *G. sanctum* (ref. 5). The distribution of *G. coulteri* var. *palmeri* is most probably restricted to Northwest Mexico (Northwest Sonora to North Sinaloa) (WIGGINS 1964).

Outside of its native distribution, *G. coulteri* has naturalized in some southern states of the USA, where it is mainly used as an ornamental or horticultural plant (MARYLAND-REPORT 2000). *G. coulteri* is reported from the Phoenix area (DESERT TROPICALS, no date), from the University of Arizona campus (MARYLAND-REPORT, 2000) and from the Arizona part of the Sonoran desert in Southern Arizona (HONCOOP, 1997). No detailed information is available on individual, naturalized US-populations of *G. coulteri*, nor on their status and size.

Besides its occurrence in the wild, *G. coulteri* is also cultivated in Mexico (M. TODD *in litt.*, February 1999).

2.2 Habitat availability

The natural habitat of *G. coulteri* in Mexico has been reduced by land clearing and deforestation for agricultural purposes and by the introduction of non-native species like buffelgrass (*Pennisetum ciliare*). As *G. coulteri* is a slow-growing, endemic species with no apparent tendency to migrate, its available habitat decreases. Competition by faster growing tree species are reported to be a natural threat to populations of *G. coulteri* (MARYLAND-REPORT 2000). Therefore, protection and restoration of the potential habitat of *G. coulteri* is essential for an effective management (MARYLAND-REPORT 2000).

2.3 Population status

The information on both the size and the status of the population of *G. coulteri* in Mexico is incomplete. The species is reported to be widely distributed throughout its native range but not common. It may be locally abundant, but occurring at low densities (MARYLAND-REPORT, 2000). *G. coulteri* is exploited for local use and under pressure from land-uses that threaten the status and survival of wild populations (GROW & SCHWARTZMAN, 2001).

2.4 Population trends

There is no detailed information available, but populations in the wild are likely to decrease (see also 2.7): wild populations of the related species *G. sanctum* and *G. officinale* have declined due to collection of wild plants and the removal of the natural vegetation for agricultural purposes or developments for the tourism industry. With the documented decline in wild populations and existing CITES trade controls for both *G. sanctum* and *G. officinale*, collection and export of *G. coulteri* may be expanding and thus its population decreasing.

2.5 Geographic trends

No information available.

2.6 Role of the species in its ecosystem

Little is known about the role of *G. coulteri* in the ecosystem. The species is not dominant and wild populations consist of isolated individuals rather than concentrated stands of trees (MARYLAND-REPORT 2000). *G. coulteri* is an important food plant for various insects and their larvae in dry deciduous scrub forests (MARYLAND-REPORT 2000). The females of the lyside sulphur butterfly *Kricogonia lyside* prefer to deposit their eggs on the leaves of *G. coulteri*, the butterfly's common foodplant in Sonora (HONCOOP 1997). Additionally, plants provide shelter for invertebrates during the dry season (MARYLAND-REPORT 2000).

Birds may play an important role in the reproduction and distribution of *G. coulteri* by pollinating plants and dispersing seeds.

2.7 Threats

SEDESOL (1994) lists and defines *G. coulteri* as "speciesin danger of extinction, vulnerable species, rare species and species under special protection".

Preparing the land through habitat-conversion by burning or cutting down the natural vegetation, development of hotels and resorts, and logging pose a threat to *G. sanctum* and *G. coulteri* (GROW & SCHWARTZMAN 2001; CPD: MIDDLE AMERICA, no date). The introduction of non-native species contributes to these threats (MARYLAND-REPORT 2000; GROW & SCHWARTZMAN 2001). Populations of *G. coulteri* are reported to be especially affected by planting buffelgrass (*Pennisetum ciliare*) as cattle fodder after land-clearing: the grass changes the fire dynamics in the ecosystem exposing native species like *G. coulteri* to an increased threat from fire (MARYLAND-REPORT 2000). The most serious threat is deforestation, although it is unknown to what extent the wild populations of *G. sanctum* or *G. coulteri* in Mexico are affected (GROW & SCHWARTZMAN 2001).

G. coulteri is traded internationally (e.g., BARSCH *et al.* 2002; see 3.2) and may thus be subject to current and future increasingly intensive harvest as a substitute for *G. sanctum*, whose wild populations may be decreasing as a result of potential over-harvest for the trade (GROW & SCHWARTZMAN, 2001).

3. International and National Trade Data

3.1 National utilization

G. coulteri is harvested and marketed locally (reported from Jalisco, CPD MIDDLE AMERICA, no date), for firewood collection and as a speciality wood for handicrafts or ornamental purposes. This is believed to have a negligible impact on wild populations (MARYLAND-REPORT 2000). *G. coulteri* has been used locally as an expectorant and blood purifying medicine (GROW & SCHWARTZMAN 2001), as a mild laxative and diuretic or to treat rheumatoid arthritis (MARYLAND-REPORT 2000). The local and national medicinal markets for *Guaiaicum spp.*, however, are nearly non-existent today.

The blossoms of *G. coulteri* have been used to produce an intensive, organic blue colouring agent for painting (matlali) by the Aztecs (HAUDE 1998). Until recently, the Seri of Sonora used a mixture of the green, organic resin from *G. coulteri*, clay and water to produce the colouring agent antezj kóil (Seri blue) (HAUDE 1998). There are no reports about a possible current use of the flowers or the resin of *G. coulteri* as a colouring agent.

3.2 Legal international trade

Trade data do not usually distinguish among *Guaiaicum* species (MARYLAND-REPORT 2000). Exports from the Mexican west coast are most likely *G. coulteri*, although it remains unknown how much is exported, because precise trade statistics are not available and it is not possible to distinguish the wood of the different *Guaiaicum* species. The largest exporter of *Guaiaicum* from Mexico is Transforesta, which claims responsibility for about 60% of all CITES authorized *Guaiaicum* exports from Mexico between 1993 and 1998 (MARYLAND-REPORT 2000). The main markets for these exports are Asia and Europe. Only a relatively small portion is reported to be exported to the USA (MARYLAND-REPORT 2000).

G. coulteri has been exported to North America and Europe for medicinal use for centuries. There is, however, little clinical evidence of efficacy regarding the medicinal properties of *Guaiaicum spp.* (GROW & SCHWARTZMAN 2001). Inconclusive evidence of the taxon's medicinal potential may have resulted in declining demand and trade as a medicinal. Only one shipment of *Guaiaicum* has reportedly entered international medicinal trade within the last 20 years (GROW & SCHWARTZMAN 2001; SCHIPPMANN 2001).

Today, *Guaiaicum* species are mainly used for timber. *Guaiaicum* residual products used for other purposes are usually by-products of timber production (GROW & SCHWARTZMAN 2001). The genus is considered one of the heaviest commercial woods in trade. Guayacán timber is primarily used for mechanical devices in bearings and marine propeller shafts, but also in pulley sheaves, casters, bowling balls (GROW & SCHWARTZMAN 2001), handles and sheaths (WOODDEX 2002). *Guaiaicum* exports from Mexico have significantly declined in recent years due to a decreasing demand of *Guaiaicum* timber for which substitutes are now available and increasingly used (MARYLAND-REPORT 2000).

According to companies which import *Guaiaicum* timber, Germany annually imports about 50 tons of *G. coulteri* for industrial hardwood applications (BARSCH *et al.* 2002).

These companies estimate an additional annual amount of 20 to 40 tons of imported *Guaiaicum* heart-wood resin and *Guaiaicum* wooden chips that may exclusively be used as a natural aromatic substance by the liqueur industry. These imports consist largely or entirely of *G. coulteri* (BARSCH *et al.* 2002).

G. coulteri is also exported from Mexico to be used in ready-made diagnostic sets for detecting occult gastrointestinal bleeding. These sets contain the resin of the heart-wood of *G. coulteri*. Processed in the USA, which regularly imports batches of 1.5 tonnes from Mexico, a few

kilogrammes of *G. coulteri* per year are contained in US re-exports of the aforementioned sets to Germany (BARSCH *et al.* 2002).

The annual demand of *Guaiacum coulteri* in Germany is therefore estimated at between 50 and 90 tons in total (BARSCH *et al.* 2002).

3.3 Illegal trade

As *G. coulteri* is under special legal protection in Mexico (ref. 4.1), an approval by a competent government authority to harvest, use, possess or export this species is required (SEDESOL, 1994). One can assume that some of the traded *Guaiacum*-shippings are not authorised and thus illegal (MARYLAND-REPORT 2000). The amount of illegal trade is very difficult to determine. Despite insufficient identification of *Guaiacum* species exported from Mexico, most exports from Mexico to the USA may be *G. coulteri* or *G. sanctum* (CITES COP 8, 1992).

International trade data are usually only listed as 'lignum-vitae' (CITES COP 8, 1992) without disclosing the exact species traded. The port of export may often be the only reasonable indication as to which species is traded based on the proximity of the port to the harvest location of the exported specimen(s). The likelihood of *G. sanctum* or *G. coulteri* traded under their scientific names is low, due in part to a lack of knowledge among traders of these species and because of an established market for *G. officinale* (CITES COP 8, 1992).

Significant demand for *Guaiacum* in Germany and comparatively few imports of *Guaiacum* into Germany during the past several years suggest a discrepancy between reported and actual imports: only one import of *G. officinale* (in 1999: one piece of 1.3 meters) and *G. sanctum* (in 1994: 19.74 kilogrammes) have been recorded. Several explanations or a combination of these may account for the discrepancy between low import volumes and the actual annual demand of 50-90 tons of *Guaiacum* in Germany (BARSCH *et al.* 2002):

- Stock material of *Guaiacum sanctum* and *G. officinale* is used.
- The demand is primarily satisfied by imports of unreported *G. coulteri*
- Erroneous false declaration of traded *Guaiacum sanctum* and *G. officinale* as *G. coulteri*, misidentified due to similarity of the different *Guaiacum* species.
- Illegal, undocumented imports of the CITES-listed species *G. officinale* and / or *G. sanctum*.

In 2000, Canada imported 1,450 kilogrammes of *G. coulteri*. Reports, however, indicate that the respective shipment had been exported as *G. sanctum* from Mexico (GROW & SCHWARTZMAN 2001). Apparently, trade data may reflect a number of different *Guaiacum* species, which undermines efforts to effectively monitor and regulate the trade in CITES-listed species *G. officinale* and *G. sanctum*.

3.4 Actual or potential trade impacts

Populations of both *G. officinale* and *G. sanctum* have heavily declined due to over-exploitation and are threatened by or close to extinction throughout much of their natural range in the Caribbean. Therefore, the current trade of *Guaiacum* concentrates on the Mexican stock of *G. sanctum* (SCHIPPMANN 2001; GROW & SCHWARTZMAN 2001). *G. coulteri* is officially only traded in small amounts (GROW & SCHWARTZMAN 2001). One can expect, however, that as a consequence of the reduced availability of *G. sanctum* (IUCN Red List category EN C2a, according to WCMC 2000), future *Guaiacum* trade may lead to a potentially increased trade in *G. coulteri*. Both species look very similar in the wild and cannot be readily and clearly distinguished by non-experts, suggesting that *G. coulteri* or *G. sanctum* may be subject to accidental harvest by appearing as the other to harvesters (MARYLAND-REPORT 2000). Timber and wood of both species also look very similar.

3.5 Artificial propagation for commercial purposes (outside country of origin)

G. sanctum is cultivated in the USA. There is no information available as to whether *G. coulteri* is also cultivated for commercial purposes elsewhere.

4. Conservation and Management

4.1 Legal status

4.1.1 National

G. coulteri and *G. sanctum* are protected under Mexican law. They are listed as 'Pr' (subject to special protection) in the NOM-059-ECOL-1994 (SEDESOL 1994). An approval by a competent government authority is required prior to the harvest, use, possession or export of this species (SEDESOL, 1994).

4.1.2 International

International legal trade regulations and restrictions apply to the CITES-listed species *G. officinale* and *G. sanctum* but not to *G. coulteri*.

4.2 Species management

In some parts of its native distribution, *G. coulteri* occurs in protected areas. This is the case for the Cumbres de Cuixmala Reserve in Jalisco, which was first protected by the Mexican government in 1987 and subsequently established as the Chamela-Cuixmala Biosphere Reserve in 1993 (CPD: MIDDLE AMERICA, no date). *G. coulteri* is also protected in the Lagunas de Chacahua Parque Nacional (SEMARNAT, no date) and in the Huatulco Parque Nacional in Oaxaca (INSTITUTO NACIONAL DE ECOLOGÍA, no date), among other national parks.

G. coulteri is reportedly cultivated in a nursery in Sonora with 5,000 seedlings being raised (MARYLAND-REPORT 2000).

4.3 Control measures

4.3.1 Domestic measures

The trade of both *G. coulteri* and *G. sanctum* is controlled by the Mexican law NOM-059-ECOL-1994 (SEDESOL 1994). They are listed as 'subject to special protection' (Pr). NOM-059-ECOL-1994 defines species in this category as 'species and subspecies of wood-land, terrestrial, and aquatic flora and fauna in danger of extinction, vulnerable species, rare species and species under special protection'. The law specifies that these species, parts or products from the listed species may be used or collected for scientific purposes and for purposes of obtaining mother plants or seeds for cultivation but not for commercial purposes. Prior government approval is required to harvest specimens for commercial use or to modify the habitat where listed species occur (SEDESOL 1994).

4.3.2 International trade

Control of international trade is difficult to establish, due to the above mentioned reasons (ref. 3.3 and 3.4).

In order to identify the origin of *Guaiaacum* timber and resin in trade or to distinguish between naturally or plantation-grown trees, tools like chemical or molecular-biological "finger-printing" would have to be developed (RICHTER 2001).

5. Information on Similar Species

The genus *Guaiaacum* consists of 4-6 different species (MARYLAND-REPORT 2000; GROW & SCHWARTZMAN 2001). The current taxonomy of the different *Guaiaacum* species is still not unanimously accepted. Two of these species are listed in CITES appendices:

- *G. sanctum* (timber only) has first been listed in CITES, Appendix II in 1975. In 1985, an annotation (#1) was added to the listing of *G. sanctum*. In 2000, the species was proposed to be transferred from Appendix II to Appendix I in 2000 (CITES COP 11, 2000). This proposal was withdrawn.

- *G. officinale* has been listed in CITES, Appendix II (also with annotation #1), in 1992.
- Apart from *G. sanctum* and *G. officinale*, four other *Guaiaacum* species are described:
- *G. coulteri*: for details ref. 1-4.
- *G. guatemalense*: is discussed as (1) a synonym of *G. sanctum*; (2) a hybrid of *G. sanctum* and *G. coulteri* or (3) a distinct species (CITES COP 8, 1992; CITES COP 11, 2000; GROW & SCHWARTZMAN 2001).
- *G. unijugum*: endemic to SE Baja California (Mexico) (CITES COP 11, 2000); its wood is used in Mexico (MARYLAND-REPORT 2000).
- *G. angustifolium*: Native to the Southern Plains and Edwards Plateau (Texas, USA) and to northern Mexico (RESEARCH & EXTENSION CENTER VIRTUAL HERBARIUM, no date; GROW & SCHWARTZMAN 2001). Its taxonomy is still unclear (GROW & SCHWARTZMAN 2001) and it may be a synonym for *G. coulteri* (MARYLAND-REPORT 2000). *G. angustifolium* is known as 'soap-bush', because the bark of the roots can be used for producing soap. *G. angustifolium* is also regarded as a medicinal plant. Root extracts are used to treat rheumatism and syphilis (venereal disease) (RESEARCH & EXTENSION CENTER VIRTUAL HERBARIUM, no date).

According to most research, all traded commodities of *Guaiaacum* species are difficult to distinguish from each other (MARYLAND-REPORT 2000). In the form of wood, *G. coulteri* and *G. sanctum* are particularly similar in appearance (MARYLAND-REPORT 2000; GROW & SCHWARTZMAN 2001; ref. 3.4). RICHTER (2001) considers *Guaiaacum* among those timber species which can - by means of wood anatomy (based on structural and physical parameters) - only be differentiated to the genus level. Only new chemical or molecular biology methods would allow an identification on the species level.

Misidentification of timber has therefore in the past led to inaccurate reporting of species in trade. Some of these cases were detected by the customs offices (ref. 3.4). The number of undetected cases is difficult to estimate.

For these reasons, *G. sanctum* cannot be adequately protected as long as the trade of *G. coulteri* is not equally controlled.

6. Other Comments

The MARYLAND-REPORT (2000) suggests the listing of all other *Guaiaacum* species in CITES Appendix II, on the provision of further research on the taxonomic status of *G. angustifolium* and *G. guatemalense*.

7. Additional Remarks

The proposal to list *G. officinale* in CITES Appendix II (CITES COP 8, 1992) stated that listing *G. coulteri* in CITES Appendix II would be justified under the look-alike provision (CITES II, 2(b)).

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8.1 Personal or *in litt.* communications:

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