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

Fifteenth meeting of the Conference of the Parties
Doha (Qatar), 13-25 March 2010

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of *Bulnesia sarmientoi* in Appendix II, in compliance with the provisions of Article II, paragraph 2 (a), of the text of the Convention, and Resolution Conf. 9.24 (Rev. CoP14), Annex 2 a, paragraph A.

Annotation

#11 Designates logs, sawn wood, veneer sheets, plywood, powders and extracts.

B. Proponent

The Argentine Republic*

C. Supporting statement

1. Taxonomy

1.1 Class:	Magnoliopsida
1.2 Order:	Sapindales
1.3 Family:	Zygophyllaceae
1.4 Genus, species:	*Bulnesia sarmientoi* Lorentz ex Griseb
1.5 Scientific synonyms:	*Bulnesia gancedoi* Rojas Acosta
1.6 Common names:	Spanish: Palo santo, guayacán Aboriginal languages: ibiocaí, hok (mataco), meemong (Lengua-Maskoy) English: Holy wood Portuguese: Pau santo Trade names: Vera. Verawood, lignum vitae, Paraguay lignum vitae, Argentine lignum vitae, guaiac

2. Overview

Bulnesia sarmientoi is a species of great cultural and economic value that has yielded multiple benefits to humans for many years. It the past, the harvest of the species by various indigenous peoples of the region and its use by other local populations did not pose a threat to its conservation. However, as shown in the sections on *Trade* of the present proposal, export levels have significantly increased in recent years. In addition to this, the loss of entire forests due to the deforestation associated to the expanding agricultural frontier has generated the need for greater conservation efforts so that the resource may be used sustainably.

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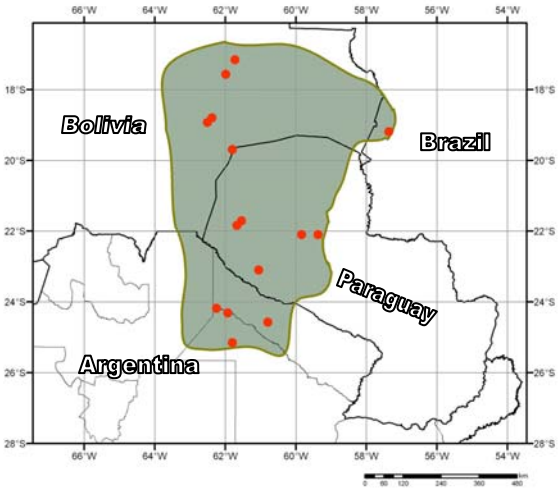
3. Species characteristics

3.1 Distribution

The species is endemic to the Gran Chaco region, which extends from south-eastern Bolivia (17°S) through western Paraguay and adjoining sectors of Brazil to northern Argentina, where it reaches its southernmost limit at about 25°S (Tortorelli, 1956; Castiglioni, 1979; UNA/GTZ, 1991; Missouri Botanical Garden -MOBOT- database):

- Argentina: north and north-west (Provinces of Chaco, Salta and Formosa, and marginally Santiago del Estero).
- Bolivia: south-east (Departments of Oruro, Santa Cruz and Tarija).
- Paraguay: west (Departments of Alto Paraguay, Boquerón and Presidente Hayes).
- Brazil: south-west (isolated reports in the State of Mato Grosso do Sul).

Map 1: Distribution of *B. sarmientoi*
The dots represent data from scientific collections of Missouri Botanical Garden (MOBOT)



3.2 Habitat

The species only occurs in the Gran Chaco (or *Región Chaqueña*), a biogeographical region that covers 1,066,000 km^2 in the centre of the South-American continent. This ecosystem is shared among Argentina, Bolivia, Paraguay, and a small sector of south-western Brazil. It is one of the regions with the richest environmental and biological diversity in the world and contains the largest forest area of the continent after the Amazon (FVSA/TNC, 2005).

Map 2: Gran Chaco Americano

Map of the Region. Source: http://www.ambiente.gov.ar/?idseccion=117

The Gran Chaco extends from tropical latitudes (17°S) to subtropical ones (31°S). It has strong climatic gradients, with high mean annual temperatures between 18°C and 28°C; potential evapotranspiration ranges from 900 mm in the south to 1,600 mm on the border between Paraguay and Bolivia. This diversity of climate and relief has led to a great variety of environments: from seasonally flooded grasslands, swamps, and savannas in the wettest areas to dry scrubland and forests in the driest ones. In general terms, the region is divided into four subregions, which mainly reflect the aridity gradient from east to west: Chaco Húmedo (Humid Chaco), Chaco Semiárido (Semi-arid Chaco), Chaco Árido (Dry Chaco) and Chaco Serrano (Mountain Chaco).

Bulnesia sarmientoi is found in isolation or forming continuous stands in the Chaco Semiárido, although scattered specimens are also found in other subregions. The typical vegetation of this subregion includes dry forests, some palm groves, salt steppes, edaphic savannas and open areas generated by fires or vegetation clearing. In Argentina and a great part of Paraguay and Bolivia, the climax vegetation is red quebracho (*Schinopsis quebracho-colorado*) and white quebracho (*Aspidosperma quebracho-blanco*) woodland. Other trees include *Prosopis kuntzei*, *Prosopis nigra*, *Ziziphus mistol*, *Caesalpinia paraguariensis*, *Cercidium praecox, Ceiba insignis* and *Acacia praecox*, among others. A lower layer includes the species *Bulnesia bonariensis*, *Maytenus* sp., *Capparis tweediana*, *Capparis atamisquea*, *Prosopis ruscifolia*, *Acacia aroma*, *Acacia caven*, cacti such as *Opuntia quimilo*, *Cereus coryne*, and *Cereus validus*, and the species of palm tree *Trithrinax biflabellata*. Many weeds, grasses and bromeliads grow on the soil (Atlas de los Bosques Nativos Argentinos, 2003).

The Chaco Semiárido is home to numerous edaphic communities, one of which is formed by relatively continuous stands of *Bulnesia sarmientoi* known as 'palosantales'. The species thrives on soils that are loamy, well-structured, hard when dry and sticky when wet, brackish to salty, and with a brackish to salty water table located less than 6 m deep. In Paraguay, it is associated with *Tabebuia nodosa* in these areas and dominates the canopy (UNA/GTZ, 1991; Mereles and Pérez de Molas, 2008).

3.3 Biological characteristics

Bulnesia sarmientoi is typically xerophilous and grows in isolation or in small groves in well-drained sites, where it plays the role of an emergent tree among the thorny scrub layer. It is heliophilous and robust (Tortorelli, 1956).

Bulnesia sarmientoi flowers between October and November and fruits between December and February (Giménez and Moglia, 2003). The dispersal mechanism of the species is discharge dispersal; its dehiscent fruit is a capsule, and its dispersal unit is a seed (Abraham de Noir *et al.*, 2002). The species has the ability to produce new shoots by means of gemmiferous roots and to sprout from stumps, which contributes to the maintenance of the population in harvested areas. It is common to find isolated or clustered areas of regrowth in the forest, which form islets ensuring the continuity of the species (Di Lella and Rique, 1955).

Bulnesia sarmientoi is a slow-growing species, with small growth rings (2.077 mm) and an estimated age of 100 years at 45 cm of BD (basal diameter) (Giménez *et al.*, 2007).

According to past assessments (Mutarelli, 1979), the productivity of the species in the centre of its range in the Province of Formosa (site of Las Lomitas) was 0.77 m^3 of timber/ha and an additional 1.75 m^3 of firewood/ha, with a mean growth of 0.025 m^3/ha/year. Similar assessments in the Province of Salta, Department of Las Antas, (24° 10' S - 63° 50' W) yielded similar values: 0.75 m^3 of timber/ha and 1.10 m^3 of firewood/ha, with a mean growth of 0.022 m^3/ha/year.

3.4 Morphological characteristics (Tortorelli, 1956; Castiglioni, 1979)

Large tree, 10-20 m tall and 30-80 cm in diameter; trunk long and straight, 3-5 m long; characteristic ash-coloured bark. Leaves opposite, bifoliate, 2 oblique-rhomboid-ovate leaflets, margin entire, apex round; paper-like uniform green leaves on both sides, 4-7 inconspicuous veins, gathering at the insertion with the petiole; leaves 1.3-2 cm long and 7-13 mm wide; common petiole 3-6 mm long; apex caducous and mucronate, base inserted at tip of abortive branch; abortive branches thickened, 1-5 mm. Flowers yellowish-white. Capsule fruit orbicular, hanging, slightly stipitate, apex emarginate, mericarps with flattened foliaceous wings, 3-5 cm long and 3.5-5 cm wide. Seeds solitary, reniform, green to greenish-brown, shiny, 10-15 mm by 5-8 mm.

Aesthetic characteristics: Sapwood yellowish-white; characteristic heartwood, yellowish-brown to greenish-brown; beautiful and fairly marked streaks, striping and feather-like, darker and with a sheen. Characteristic pleasant aroma due to the resins and essential oils it contains. Texture smooth and heterogeneous, grain interlocked; wood rays partly highly twisted, which makes carving difficult.

Physical characteristics: Very heavy timber, with a density ranging from 0.990 to 1.280 kg/dm³; also very hard, 16.11 Brinell units in the radial section and 14.48 Brinell units in the transverse section.

Macroscopic description: Vessels clustered in dendritic or flame-like pattern, especially in late wood, and full of resin. Wood rays not very distinct and sinuous. In the longitudinal tangential section, only a close look reveals fully stratified woody elements. On the tangential surface, vessels are full of resin and arranged in an oblique or sinuous pattern, in the shape of chevrons.

Microscopic description:

Vessels: arranged irregularly on the tissue, elliptic, oval and circular in lower numbers; generally clustered or in chains but without altering their respective shapes, since they only touch on one point; some bi-tripartite vessels are deformed by mutual pressure. Thick walls with many stripes. Pores very numerous, 35-115/mm², and small to medium-sized, with an average diameter of 60 µ and a minimum diameter of 45 µ.

Fibres: arranged irregularly, with a polygonal section, very densely packed and thick-walled. Bordered pits not very clear, although in dissociated cells it is clear that they are fibre-tracheids with well-demarcated bordered pits. Average fibre length short, 500-900 µ.

Rays: lenticular; rectilinear to slightly sinuous, numerous, 8-20/mm, with a somewhat diagonal stratified arrangement. Biseriate rays predominate, especially in portions in contact with the vertical parenchyma; also many uniseriate portions, especially among the fibrous tissue; rays formed by horizontal or procumbent ray cells; some are heterogeneous. Rays very short, with a height up to 8 cells or 40-80 µ.

Axial parenchyma: scarcely paratracheal and partly confluent in short and uninterrupted fine bands 1-4 cells wide. The longitudinal tangential section shows series of equal height with a stratified arrangement.

Growth rings: not marked.

Cell contents: the transverse section shows rhomboid crystals of calcium oxalate deposited in crystal-containing cells, which are arranged among the fibres; the tangential longitudinal section shows crystals arranged in vertical rows of up to 25 crystals. Although resin is very abundant in the vessels, tracheids, fibres and fibre-tracheids, it disappears during the preparation process of the sections.

4. Status and trends

In Paraguay, the subregion known as 'palosantal y labonal' (containing stands of *Bulnesia sarmientoi and Tabebuia nodosa*) covered approximately 37,000 km^2 in 1987 (UNA/GTZ, 1991); in Argentina, stands of *Bulnesia sarmientoi* have been roughly estimated to occupy a smaller area of about 25,000 km^2 (Waller, 2009). No information is available about Bolivia.

There are no current quantitative population data. Over the last five years, the rate of habitat modification through changes in land use as well as the growing harvest of the species have exceeded the rate of natural regeneration of the species, therefore, a population decline is expected to have occurred (see *Threats*).

It would be important to carry out population studies to obtain greater knowledge of the species' status. Indirect evidence of the decline of populations raises concern about the conservation of the species, although updated population data about the whole range of *B. sarmientoi* would be desirable to manage the species more adequately.

5. Threats

The Chaco region has undergone the impact of humans from the first records of their presence only 10,000 years ago until today, often with irreversible environmental consequences. In dry forests, which are often in extreme conditions due to water stress, any human intervention has doubly negative results (Hueck, 1978, quoted by Giménez *et al*., 2003).

In Argentina, throughout most of last century, forestry focused on the production of sleepers, posts, logs, firewood and charcoal, mainly from the Chaco native forest (Ministry of the Environment and Sustainable Development - SAyDS, 2007; Giménez *et al*., 2003). Until recently, this activity and the extensive livestock farming of goats and cattle were the main impacts that affected the Gran Chaco region, mainly altering the structure and regeneration

of the original forest, but allowing it to survive as a landscape. In Paraguay, the species was seriously affected by the expansion of the agricultural frontier (Mereles and Pérez de Molas, 2009).

In the 1990s, Argentina and Paraguay started to undergo the large-scale loss of the remaining Chaco area as a result of the expansion of the agricultural frontier. Surviving forests are highly degraded and fragmented as a consequence of decades of extensive livestock farming and selective logging. The recently recorded deforestation shows that this is one of the largest transformation processes of native forests in the history of Argentina, mainly caused by the expansion of the agricultural frontier. It is estimated that at least 2 million hectares of Chaco forest were cleared in Argentina between 1998 and 2006 (UMSEF, 2007). The same process is happening in Paraguay. In the Parque Chaqueño region of Argentina, for example, forests cleared for agriculture are mainly devoted to soybean monoculture, often using farming techniques that degrade the soil and cause desertification (UMSEF, 2008). Indeed, 20 % of producing cropland in Argentina is located in the Chaco region (SAyDS, 2007), in what used to be woodland. Moreover, extensive livestock farming with a strong tendency to overgraze is becoming decreasingly productive in semi-arid regions, leading to a slow and continuous degradation of the native forest, of which 15 million ha have lost its regeneration potential (SAyDS, 2007). Livestock farming in the Chaco region is experiencing a strong trend towards the clearing of the forest for pasture.

The main causes of biodiversity loss in the Gran Chaco region are conversion of woodland to agriculture and forest fires. Fire is used as a cheap way of clearing the forest and also as a method to improve the forage density of pastures. In the Dry Chaco, livestock farming is of great economic importance, and fire is an essential element of pasture management. In some regions, the combined action of fires and forest overexploitation has caused significant habitat fragmentation. Fires not only cause environmental degradation in the region but also serious damage to the raw wood generated by the forest. They particularly affect the growth of trees and the production and quality of the timber (Giménez *et al*., 2003).

6. Utilization and trade

6.1 National utilization

Uses of *Bulnesia sarmientoi* throughout history have been based on its aromatic properties and the texture of its wood. Historically, the harvest of the species for its timber had a traditional character: handicrafts, wood-turned items, posts, tools and so on. It was little used in furniture manufacturing until recently because of its great hardness.

However, the various uses of the species over time can be classified as follows (Di Lella and Rique, 1955; Mereles and Pérez de Molas, 2008; BPDFNM, 2009):

Essential oil: The essential oil, known as ‘guayacol’, ‘guajol’, or ‘guayaco’, is obtained by distillation. It is widely used in the perfume industry because of its mild and pleasant fragrance, which is similar to the rose and, to a lesser extent, to the violet. For this reason, its ethyl acetate is used as a natural fixative in rose aromatic compositions. It can also be used to perfume luxury soap by masking the unpleasant smell of synthetic components and as an excipient in the manufacturing of cosmetics. It is also mixed with pyrethrum to make mosquito coils. Residual sawdust, a by-product, is treated with solvents to produce ‘palo santo’ resin, which can be used to manufacture varnish and dark paints.

Timber:

Furniture: one of the most profitable uses, as the fine furniture fetches very good prices internationally.

Flooring: a recent use in high international demand.

Wood-turning: a historical use, as this wood is appropriate for turning on the lathe; it produces numerous items that are highly valued because of their attractive colours and the delicate aroma of the wood. Some of these items are walking sticks, cigar boxes, ashtrays, fine pens, vessels for drinking *mate*, napkin rings, cigarette cases, fans, chests, candy boxes, sewing boxes, flower holders, sculpture pedestals, and many other regional and decorative objects.

Posts: a local use; the timber does not rot when buried because of its high resin content, which has also led to the use of young trees to make fence posts (Palacios and Hunziker; 1984).

Charcoal: although the species is not widely used in charcoal production, this use has been recorded in recent years.

Ship parts: the species was historically used to make propeller shaft bearings for ships.

Medicinal: The term 'Ibiocaí' (According to Tortorelli: referring to the properties of the leaves) confirms the many curative properties attributed by the northern Indians to *B. sarmientoi*: it is known to be a strong blood cleanser, sudorific and diuretic, among other properties. Moreover, it has been used since ancestral times to treat syphilis, leprosy, gout, rheumatism, arthritis, lumbago and skin diseases. An infusion of its leaves is recommended in alternative medicine to eliminate impurities, relieve stress and depression, control blood pressure, and prevent atherosclerosis and colds.

Traditional uses: The indigenous peoples of the region (Wichi and Toba tribes) traditionally used and, in some cases, still use *B. sarmientoi* in a variety of ways:

In cooking: instruments for stirring or grinding. Wood used for lighting and to repel insects.

Water sources: the cavities of the trunk usually collect a certain amount of water.

Tools: pitchforks, clubs or spades used to dig out bromeliads or underground beehives, perform agricultural tasks, hunt, or dig graves, among other purposes.

Melliferous plant: it was visited by the indigenous peoples of the region, who also used the smoke given off by the burning plant to repel aggressive insects.

Pest control: smoke was used to repel viscachas (*Lagostomus maximus*, a rodent of the Chinchillidae family) when they raided crops.

Hunting: spades were used to dig out animal burrows; other tools such as clubs and knives were used as weapons against fierce animals. Clubs, spears and bolas were used for hunting and, even more, as weapons.

Fishing: clubs were used to finish off the fish. A wooden needle and string was used to string the fish, and a knife was essential, since most fish were gutted (Arenas, 1983).

Marriage rituals: apart from its other uses, *B. sarmientoi* is linked to marriage rituals of the indigenous peoples of the region.

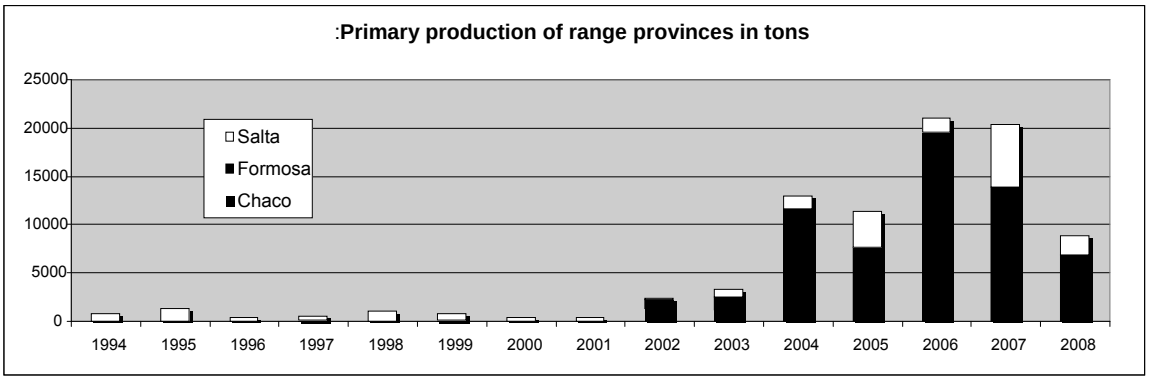
Current use: the species is mainly used to manufacture handicrafts for sale and to make fence posts.

6.2 Legal trade

6.2.1 Argentina

Reports provided (1994-2008) by the range provinces of the species (Salta, Formosa and Chaco) and based on primary timber production including logs, posts, firewood and plant tutors show an increase in harvests since 2004.

Chart 1: Primary production of the range provinces in Argentina
Provisional data for 2008

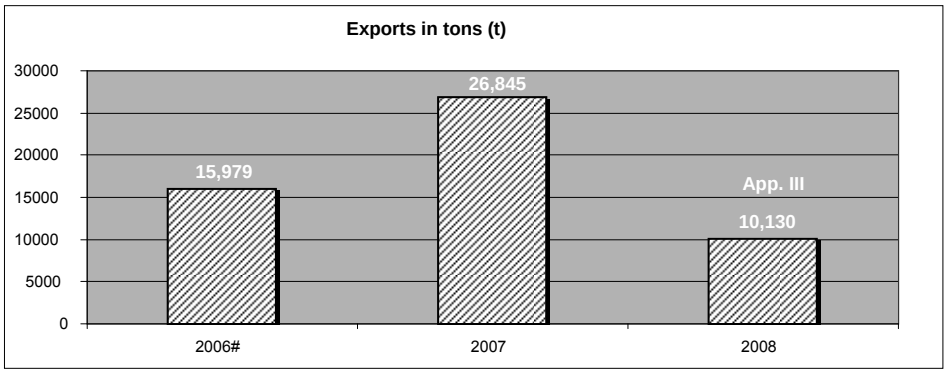


Source: PNEF-DB-SAyDS

Since 2006, the CITES Management Authority of Argentina has collected data on exports. This has shown a close link between the increase in the primary production of the provinces and the volumes exported for international trade.

Since 2008, when the species was listed in CITES Appendix III, a regularization and a significant decrease of exports have been observed.

Chart 2: Exports of *B. sarmientoi* from 2006 to 2008
(2006#: An estimate was made for the period between January and May since data collection started in June)



Source: A.A. - SAyDS

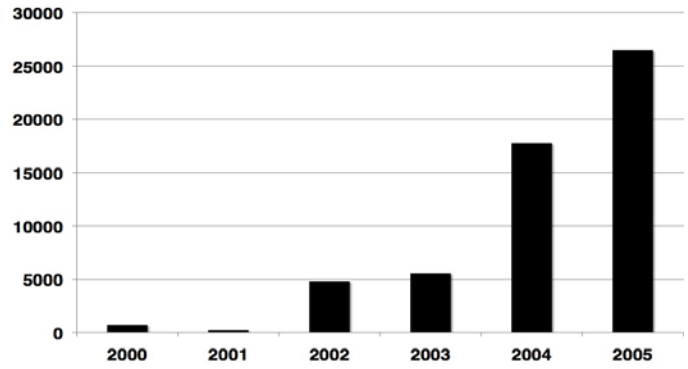
In all cases, the purpose of the transactions was commercial (code "T").

6.2.2. Other countries

According to the data available, Paraguay was a major exporter of timber of *B. sarmientoi* until 2006, like Argentina.

As a matter of fact, according to a report prepared by the national authority of Paraguay in charge of natural resources and the environment [*Dirección General de Control de los Recursos Naturales y el Medio Ambiente (DGCRNMA) de la Contraloría General de la República (CGR)*], based on the records of the Central Bank of Paraguay and the Ministry of Agriculture, the exploitation patterns of *Bulnesia sarmientoi* in Paraguay between 2000 and 2006 were similar to those in Argentina.

Chart 3: Primary production of *B. sarmientoi* in Paraguay from 2000 to 2005



Source: DGCRNMA, 2006

Primary production of the species significantly increased from 2002 (Chart 3) in parallel with a strong increase in exports. The report recommended that Paraguay list the species in Appendix III (DGCRNMA, 2006).

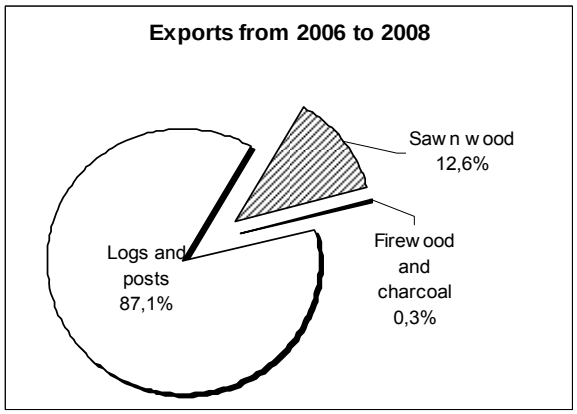
No information is available about Bolivia and Brazil.

6.3 Parts and derivatives in trade

6.3.1 Argentina

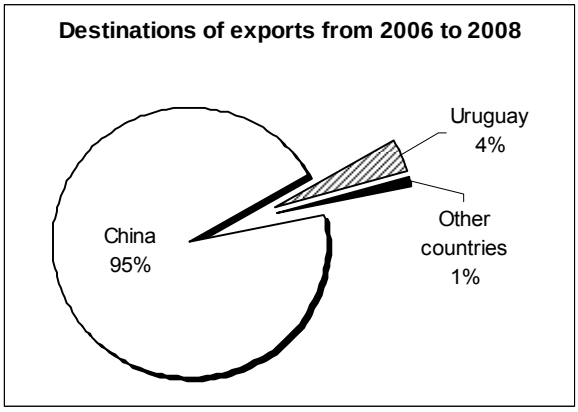
In the years under review (2006 to 2008), the statistics that the CITES Management Authority was able to obtain show that the species *B. sarmientoi* was mostly traded as logs, according to the definition provided in Resolution Conf. 10.13 (Rev. CoP14). China was the main importing country.

Chart 3: Products



Source: A.A. - SAyDS

Chart 4: Destinations



Source: A.A. - SAyDS

Although the data have not been processed quantitatively yet, new importing countries have appeared in 2009, such as Viet Nam, Bulgaria, the Russian Federation, Canada, and the United States of America, among others.

There is also trade in handicrafts and objects generally used in the home such as trays, knife handles, picture frames, decorative boxes, mirror frames, and other objects made with this species. Such trade is not considered in the present proposal (see Section 6.1).

6.3.2 Other countries

No information is available for Bolivia and Brazil. Paraguay has used the timber similarly to Argentina and exported it to similar destinations, which suggests a shared pattern between both countries in the trade in the species. Between 2000 and 2006, 33 % of exports involved sawn wood, 66 % involved logs and posts, and less than 1 % was aimed at extract production or other items. Based on data for 2000-2004, the main importing country was China (90 %) (DGCRNMA, 2006). According to Mereles and Pérez de Molas (2008), the species has also been used for several decades to produce essential oil or guayacol for use in perfumery, with France and Spain as main destinations.

6.4 Illegal trade

Since 2006, the CITES Management Authority of Argentina has been implementing tighter controls of exports of wild plants. This has made it possible to detect attempts to export *B. sarmientoi* illegally using a variety of methods: expired provincial harvest permits, falsified or duplicated documentation on possession (provincial timber transport permits), and falsification of amounts after authorization.

Since the listing of *B. sarmientoi* in CITES Appendix III became effective, a number of irregularities have been detected, such as falsification of documents or false declarations, which have led to the following actions:

- February 2008 – Seizure of a shipment of 17 tons of sawn wood that was about to be exported to the United States. The goods did not have the necessary documentation for the export to be approved.
- March 2008 – Seizure of a shipment of 1.85 tons (20 logs) that was about to be exported to Germany. The timber has been falsely declared as a non-CITES-listed species in the application for the export certificate.
- April 2008 – Seizure of a shipment of 199.6 m^2 of boards for flooring that was about to be exported to Sri Lanka. The timber has been falsely declared as a non-CITES-listed species in the application for the export certificate.

- August 2008 – Seizure of a shipment of 401 logs that was about to be exported to China. The goods did not have the necessary documentation for the export to be approved.
- August 2008 – Seizure of a shipment of 329 logs that was about to be exported to China. The goods did not have the necessary documentation for the export to be approved.
- June 2009 – Seizure of a shipment of 200 logs that was about to be exported to China. The goods did not have the necessary documentation for the export to be approved.

In all these cases, the timber was seized and held by the Customs Department of Legal Proceedings to take appropriate legal action.

The inclusion of the species in Appendix III has also increased provincial controls, leading to the detection of illegal timber shipments. In the Province of Salta, for example, the National Police seized over 1,000 logs in September 2008 (source: http://leydebosques.org.ar).

All these detections were made possible thanks to the cooperation between the CITES Management Authority, the provincial Departments of Forests of the species range, and the Customs Administration.

7. Legal instruments

7.1 National

7.1.1 Argentina

Given that Argentina is a federal country, some regulations on the management and conservation of natural resources are set at the national level, while others are set by the provinces, according to their respective powers:

National:

- Act No.13.273 on the Defence of Forests.
- Act No. 22.344, which approved CITES.
- Decree No. 522, which regulates the CITES legislation.
- Resolution No. 460 of the Ministry of Natural Resources and Sustainable Development, which approved the National Programme for the Management of Plants and created the National Nursery Register (1999).
- Act No. 26.331 on the Minimum Requirements for the Environmental Protection of Native Forests.

Provincial:

Salta:

- Act No. 7070 on the Protection of the Environment.
- Decree No. 6982 of Salta Province, which prohibits logging of *B. sarmientoi* on public land and authorizes logging of the species on private land and sale of its timber.
- Resolution No. 006/2001 of the Ministry of Natural Resources and Sustainable Development of the Salta Province, which created a new system of timber transport permits.

Formosa:

- Act No. 488 of the Formosa Province on the Defence of Forests.
- Act No. 1496, which establishes that any timber, whatever its diameter or type, can only leave the province if it has previously been industrially processed.
- Provision No. 355/1989, which authorizes logging of *B. sarmientoi* under strict controls and sets a minimum cutting diameter of 0.35 m to ensure the continuity of the species.
- Provision No. 79/2006, which sets special rules for the harvest of this species.

Chaco:

- Resolution No. 0314/2002 of the Ministry of Production aimed at the selective harvest of the species *Bulnesia sarmientoi*.

Santiago del Estero:

- Act No. 6.841. Conservation and multiple use of forest areas of the Santiago del Estero Province. Article 104: no forest products are authorized to leave the province unless they have been processed.

7.1.2 Other countries

No information is available for Bolivia and Brazil. The information available for Paraguay is incomplete. The species is included in the list of endangered species and is protected from harvests in principle (Ministerial Resolution 2534/06). However, the fact that changes in land use from forest to agriculture are allowed authorizes the clearing and harvest of the species and is believed to be the source of the timber in international trade.

7.2 International

In 2007, the CITES Management Authority of Argentina asked the CITES Secretariat to include the species *Bulnesia sarmientoi* in Appendix III of the Convention, with the following annotation: "Logs, sawn wood, veneer sheets, plywood, powder and extracts" (currently annotation #11). The listing entered into force on 12 February 2008.

8. Species management

8.1 Management measures

With the listing of the species in CITES Appendix II, there are projects to begin population studies in the range provinces of the species in Argentina. Although some data are currently available, they need to be updated and organized properly. Another project is to begin standardizing the units of measure and the nomenclature of the various cuts so that they are the same in all the provinces and match what is established at the national level.

8.2 Control measures

8.2.1 International

The CITES Management Authority of Argentina is carrying out intense joint work with the CITES Management Authority of China, the main importing country for the species, to implement more effective controls. This is done through the exchange of e-mails, confirmation of permits and monthly reports on the export permits issued by Argentina. Thanks to the great support provided by China, this activity has led to better control of operations, both in Argentina and in China.

8.2.2 National

The following control measures are applied by the range provinces of the species in Argentina:

Formosa: This province only authorizes industrially processed timber to leave the province, protecting the local resource and also local labour and industry. It has special rules for the harvest of the species, requiring technical supervision and a minimum cutting diameter. It is compulsory to leave 20 % of trees of logging size standing per surface unit as seed trees. Logs must be marked by the logger and the forest ranger. The forestry plan must consider aspects regarding natural regeneration, the possibility of enrichment of the native forest in bands or patches, thinning, etc.

Salta: It prohibits logging of *B. sarmientoi* on public land and authorizes logging of the species and sale of its timber on private land that is going to be cleared for agriculture.

Chaco: A selective harvest of the species *B. sarmientoi* is implemented.

Santiago del Estero: No forest products are authorized to leave the province unless they have been processed.

At the national level: In view of the significant increase in the exports of the species, the CITES Management Authority requested the inclusion of *B. sarmientoi* in CITES Appendix III.

The recent adoption of the Act on the Minimum Requirements for the Environmental Protection of Native Forests indirectly protects the species. According to this Act, provinces in Argentina cannot issue new permits to clear the forest until they establish regulations on land use for their forest areas following ten ecological criteria and conservation categories, with the aim of avoiding the fragmentation and degradation of native forests, and of preserving the land used by indigenous and peasant communities. Moreover, before clearing can be authorized, it is obligatory to carry out an environmental impact assessment and a public consultation.

8.3 Artificial propagation

There is no artificial propagation of the species.

8.4 Habitat conservation

The protected area "Reserva Natural Formosa" was created in 1968. It has a surface of 10,000 ha and is located in the west of the Formosa Province, Argentina, between the municipalities of El Yacaré and La Florencia, on the northern banks of the Teuco river. It belongs to the Chaco Seco (Dry Chaco) eco-region. This is the only protected forest of *B. sarmientoi* that falls within the National Park system in Argentina. It occupies a large surface in the low watershed. In this area, the species occurs in formations in which it is dominant, with a sparse understory where large cacti such as *Cereus validus* and *Cereus coryne* are abundant.

There are also populations of the species in at least two other large protected areas of the Gran Chaco region: Defensores del Chaco National Park (780,000 ha) in Paraguay and Kaa-Iyá National Park (3,441,115 ha) in Bolivia.

9. Information on similar species

In 1956, Tortorelli said, "The technological characteristics of 'palo santo' timber are very similar to those of 'lignum vitae' (*Guaiacum officinale* L.) .... 'Lignum vitae' is widely used in North America and Europe to make propeller shaft bearings for planes and ships, pulley wheels, screws and other similar purposes. According to these technical verifications, our 'palo santo' could be tested for the uses mentioned, with great chances of success" (Tortorelli, 1956). Years later his predictions proved true.

Some species of the genus *Guaiacum* and *B. sarmientoi*, which belong to the family Zygophyllaceae, are used to extract oil and share the common names of 'palo santo' and 'guayacán' as well as some of their trade names, such as 'lignum vitae' and 'guaiac'. For this reason, as well as the complexity of distinguishing these species in Customs controls, species of the genus *Guaiacum* are considered to be similar species.

10. Consultations

Consultations were sent to the other range States Bolivia, Brazil, and Paraguay, which confirmed receipt. Within the established time-frame, by the time the proposal had to be submitted to the CITES Secretariat, only Brazil had replied. Brazil reported that the species *Bulnesia sarmientoi* has a small area of distribution in Brazil, is not included in the list of threatened species, and is not commercially exploited according to its records. Brazil added that the proposal met the requirements of Resolution Conf. 9.24, and therefore that it had no reason to oppose the proposal, and congratulated the Government of Argentina for the listing proposal.

11. Additional remarks

At the 16th meeting of the CITES Plants Committee held in Lima, Peru (July 2006), Paraguay submitted the document "Status of the genus *Bulnesia spp*. with a view to its inclusion in CITES Appendix II" [document PC16 Doc. 21.2 (Rev. 1), Annex].

At the 18th meeting of the CITES Plants Committee held in Buenos Aires (March 2009), Argentina submitted a draft proposal for the inclusion of *Bulnesia sarmientoi* in CITES Appendix II (document PC18 Doc. 16.1.4) and was congratulated by the Committee [executive summary PC18 Sum. 2 (Rev. 1)].

12. References

ABRAHAM DE NOIR, F.; BRAVO, S.; ABDALA, R. (2002). *Mecanismos de dispersión de algunas especies de leñosas nativas del Chaco Occidental y Serrano.* Revista Quebracho. Facultad de Ciencias Forestales, Universidad Nacional de Santiago del Estero, Argentina. N° 9: 140-150.

ARENAS, P. (1983). Nombres y usos de las plantas por los indígenas Maka del Chaco Boreal. Parodiana 2(2):131-229.

ATLAS DE LOS BOSQUES NATIVOS ARGENTINOS 2003. Proyecto Bosques Nativos y Áreas Protegidas BIRF 4085-AR, Dirección de Bosques, Secretaría de Ambiente y Desarrollo Sustentable, Argentina.

AUTORIDAD ADMINISTRATIVA CITES - ARGENTINA. Dirección Nacional de de Ordenamiento Ambiental y Conservación de la Biodiversidad. Grupo de Trabajo sobre Conservación de la Biodiversidad. Secretaría de Ambiente y Desarrollo Sustentable. Julio 2009, Buenos Aires, Argentina.

AUTORIDAD ADMINISTRATIVA CITES – ARGENTINA. Dirección Nacional de Ordenamiento Ambiental y Conservación de la Biodiversidad. Coordinación de Conservación de la Biodiversidad (CCB). 2008. Buenos Aires, Argentina.

BASE DE DATOS DE PRODUCTOS FORESTALES NO MADEREROS (BDPFNM**)**. (Julio 2009) Programa Nacional Productos Forestales No Madereros, Dirección de Bosques (DB), Secretaría de Ambiente y Desarrollo Sustentable (SAyDS), Argentina.

CAMARGOS, J. A. A.; CORADIN, V. T; CZARNESKI, C. M.; DE OLIVEIRA, D.; MEGUIERDITCHIAN, I. (2001). *Catálogo de Árvores do Brasil*, 2º Edição. IBAMA. Brasília, Brasil. 896 pp.

CASTIGLIONI, J. A. 1979. Descripción botánica, forestal y tecnológica de las principales especies indígenas de la Argentina. Pp 38-60. En: D. Cozzo (Ed.), Arboles forestales, maderas y silvicultura de la Argentina, Enciclopedia Argentina de Agricultura y Jardinería, Segunda Edición, Tomo II, Fascículo 16-1. Editorial ACME. Buenos Aires.

DGCRNMA. 2006. Exportación de Palo Santo. Años 2000-2006. Informe inédito de la Dirección General de Control de los Recursos Naturales y el Medio Ambiente de la Contraloría General de la República (CGR) del Paraguay. 20pp.

DI LELLA, EDUARDO Y RIQUE, TOMÁS. 1955. *El palo santo: su industrialización*. Publicación Técnica N° 20. Administración Nacional de Bosques.

FUNDACIÓN HABITAT & DESARROLLO (2003). *El Gran Chaco Americano*. Santa Fe, Argentina.127pp.

FVSA/TNC. 2005. Evaluación ecoregional del Gran Chaco Americano. Fundación Vida Silvestre Argentina (FVSA) y The Nature Conservancy (TNC). Buenos Aires. 24pp.

GIMÉNEZ, A. M Y MOGLIA, J. G. (2003). *Árboles del Chaco Argentino. Guía para el reconocimiento dendrológico.* 310 pp. Facultad de Ciencias Forestales, UNSE y Secretaría de Ambiente y Desarrollo Sustentable del Ministerio de Desarrollo Social. Editorial El Liberal, Argentina.

GIMÉNEZ, A. M; HERNÁNDEZ, P; GEREZ, R; SPAGARINO, C. (2007). *Anatomía de leño y anillos de crecimiento de Palo Santo* (*Bulnesia sarmientoi* Lorenz ex. Griseb Zigophyllaceae*)*. Revista Quebracho. Facultad de Ciencias Forestales, Universidad Nacional de Santiago del Estero, Argentina. N° 14: 23-35.

GIMÉNEZ, A. M; MOGLIA, J. G.; HERNÁNDEZ, P; GEREZ, R. (2008). *La factibilidad de incrementar el valor de los bosques del Chaco mediante el aprovechamiento de la corteza forestal*. Revista Quebracho. Facultad de Ciencias Forestales, Universidad Nacional de Santiago del Estero, Argentina. N° 14: 9-14.

LOPEZ, J. A.; LITTLE JUNIOR, E.L.; RITZ, J.G.F.; ROMBOLD, J.S.; HAHN, W. (1987). *Árboles Comunes del Paraguay*. Ñande yvyra mata kuera. Cuerpo de Paz. Colección e Intercambio de Información. 386 p.

MERELES, F. Y L. PEREZ DE MOLAS (2008). *Bulnesia sarmientoi* Lorentz ex Griseb., (Zygophyllaceae): estudio de base para su inclusión en el Apéndice II de la Convención CITES. Informe inédito. 15pp.

MUTARELLI, E. J. (1979). Riqueza de los bosques espontáneos. Pp 18-33. En: D. Cozzo (Ed.), Arboles forestales, maderas y silvicultura de la Argentina, Enciclopedia Argentina de Agricultura y Jardinería, Segunda Edición, Tomo II, Fascículo 16-1. Editorial ACME. Buenos Aires.

NAUMANN M. (2006): *Atlas del Gran Chaco Sudamericano*. Sociedad Alemana de Cooperación Técnica (GTZ). 96 pp. Hereje & Asoc. Buenos Aires.

PALACIOS, R. Y J. HUNZIKER (1984). *Revisión taxonómica del género Bulnesia (Zigophyllaceae).* Darwiniana 25: 299-320.

PNEF-DB-SAyDS (2009): Datos suministrados por el Programa Nacional de Estadística Forestal (PNEF), Dirección de Bosques (DB), Secretaría de Ambiente y Desarrollo Sustentable (SAyDS), Argentina.

SAyDS. 2007. Primer Inventario Nacional de Bosques Nativos. Informe Regional Parque Chaqueño. Secretaría de Ambiente y Desarrollo Sustentable de la Nación, Buenos Aires. 114 pp.

SALDÍAS URZAGASTE, G. E. (2005): *Repunte apícola en la ecorregión chaco boliviano*. Subprefectura de la Provincia Gran Chaco, Yacuiba, Bolivia. [Revisado el 20 julio de 2009]. http://www.equatorinitiative.org/images/stories/2008winners/AART_Bolivia/82_ecoregion_chaco_boliviano_paraguayo.pdf

TORTORELLI, L. A. (1956). *Maderas y Bosques argentinos*. Buenos Aires, Argentina, ACME. 910 p.

UNA/GTZ. 1991. Vegetación y uso de la tierra de la Región Occidental del Paraguay (Chaco). Años 1986 - 1987. Universidad Nacional de Asunción (UNA) y Misión Forestal Alemana (GTZ). San Lorenzo, Paraguay. 22pp.

UNIDAD DE MANEJO DEL SISTEMA DE EVALUACIÓN FORESTAL (UMSEF) (2007). Monitoreo de Bosque Nativo. Período 1998-2002. Período 2002-2006 (Datos Preliminares). Dirección de Bosques (DB), Secretaría de Ambiente y Desarrollo Sustentable (SAyDS), Argentina. 11 pp.

UNIDAD DE MANEJO DEL SISTEMA DE EVALUACIÓN FORESTAL (UMSEF) (2008). Dirección de Bosques (DB), Secretaría de Ambiente y Desarrollo Sustentable (SAyDS), Argentina.

WALLER, T (2009). Palo Santo (*Bulnesia sarmientoi*): Situación y tendencias en su explotación. Informe inédito presentado durante la 18ª Reunión del Comité de Flora de la CITES. 17 al 21 de marzo de 2009. Buenos Aires. 20pp.