MANAGEMENT PLAN FOR THE CONSERVATION OF PALOROSA (Aniba rosaeodora)

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The extinction of the Palorosa 'Aniba rosaeodora Ducke' is imminent. He is found only in three locations in the Amazon and nationwide is listed in the Red Book of Endangered Species as Critically Endangered. Although, it exists in three countries (Peru, Colombia and Brazil). The BOSQUE COLOMBIANO ORG has designed the 'MANAGEMENT PLAN FOR THE CONSERVATION OF PALOROSA (Aniba rosaeodora). This plan presents the steps and processes to be carried out to achieve the conservation of the Palorosa, through the establishment of favorable policies for its conservation and recovery, the realization of the conservation programs "in situ" or natural habitat and the establishment of a program "ex situ" reproduction, for which the species was incorporated into the botanical gardens of the Ticuna indigenous community (beneficiary and ally of the plan). The main threats of this tree are 3: (i) illegal traffic (Appendix II of CITES). (ii) Illegal mining and agricultural activities. (iii) Forest fires.

1. GENERAL ASPECTS OF PALOROSA

1.1.Palorosa Taxonomy and Common Names

Kingdom: Plantae

Filum: Magnoliophyta

Class: Magnoliopsida

Order: Laurales

Family: Lauraceae

Scientific name: Aniba rosaeodora Ducke

1.2.Synonyms and / or taxonomic considerations

The genus Aniba belongs to the Lauraceae family and has 41 species of which Kubitzki & Renner (1982) reported 8 in Colombia, However, at present in the Colombian National Herbarium COL, 23 species of Aniba in the Colombian territory. A recognized synonym for the species is Aniba duckei.

Common names: Pau rosa (Brazil), Palorosa, Rosewood (Colombia), Face-face (Guyana) and Palo de rose (Peru).

1.3.Botanical Description of Palorosa

Tree up to 30 m high and 2 m in diameter (Santos et al. 2008a). His cup is narrow and oval; It is aromatic in all its parts; dead brown-yellow or medium red bark that Easily detaches on large plates. Simple, alternate, leathery leaves between 6 and 25 cm long by 2.5 to 8 cm wide; glabrous, dark green by the beam, pale yellow by reverse and pubescent microscopically; central rib slightly printed by beam and prominent by underside, robust and ribbed petioles. Inflorescences in sub-terminal panicles, hermaphrodites, densely ferruginous-tomentose, 4 to 17 cm long with multiple small flowers. Berry fruits, with a conical dome; rough brown-green outer surface turning red dark at maturity; they contain only one ovoid-shaped seed, thin, smooth and opaque tegument, light brown with dark brown longitudinal striations; It contains two large cotyledons, convex, hard and smooth cream colored (Figure 39) (Sampaio et al. 2003).

1.4. Characteristics of Palorosa Wood

The wood is heavy (0.80-0.90 gr / cm3), the heartwood has pink reflections, while the sapwood is yellowish (Pedroso 1986 cited by Chacón et al. 2006); both have regular grain, medium texture, smooth to the touch and easy to work (Figure 40). The strong aromatic smell is more Intense freshly cut (CITES 2010d).

1.5.Natural Distribution and Habitat of Palorosa

It is distributed throughout the north and west of the Amazon, in Brazil, Colombia, Ecuador, Guyana, French Guiana, Peru, Suriname and Venezuela (UNEP 2008). In Colombia it has only been registered in the department of Amazonas (Cárdenas & Salinas 2007).

In Brazil, the Palorosa has been found in the most remote areas of the state of Amapá, in the proximity of the border with Guyana, which are still preserved due to the difficult access (IEA 1993); Palorosa's highest concentration belt is located from the headwaters from the Curua-Una river to the borders with Peru, in the southern part, and from the Trombetas river to Colombia from the northern side (IEA 1993).

It grows mainly in Amazonian forests of mainland; It has also been registered in low white sand forests (Leite & Lleras 1993). It is preferably inside of the dense primary forest of high and medium altitude terrain, where the soil is deep and well drained (Lorenzi 1998). The areas that marginalize the Upper and Middle Amazon are considered as the suitable habitat for the Palorosa (IEA 1993).

The habitat of the population evaluated in the department of Amazonas, corresponds to forests mature from the mainland, lomerío area with slopes between 10 and 45%. The forest has height 28 meters average with emerging trees up to 40 meters; It has a high presence of lianas and high epiphytism. The undergrowth is semi-dense and the litter is about 5 cm of thickness. Among the associated species, the Astrocaryum ferrugineum palm stands out. The soils They are very well drained, the sandy fraction predominates. In these forests the species grows preferably on the tops of the terraces.

1.6.Palorosa Phenology

According to Spironello et al. (2004), the fruiting of Palorosa is irregular in its natural state. In addition Magalahes & Alencar (1979) affirm that in the central Amazon, fruiting has higher frequency in rainy periods with a maximum peak in the month of March. Alencar & Fernández (1978) cites that the flowering months in the Ducke Reserve in Brazil range from October to February and fruiting, between November and March; also report that in the Station Experimental of Curuá-Una (Pará, Brazil), flowering occurs between October and November and fruiting between December and June. According to Magalahes & Alencar (1979) in the Amazon central flowering of the species increases from the month of October, with a peak in times of rains (January). According to Leite et al. (2001), the different types of soil, rainfall regimes, relief, altitude and latitude explain the variation of flowering and fruiting times, and mention that flowering is irregular and can be annual or supra-annual, although always in the period rainy; Foliage loss occurs annually, during the dry period. Kubitzki & Renner (1982) mention that it blooms throughout the year in the central Amazon. In Colombia it found in bloom in the month of October (population found in Caño Toro) which agrees with what was reported by Cárdenas & Salinas (2007) who indicated that it occurred in the month from December.

Pollination occurs mainly by bees (Sá 1987). In document ITTO - PD 31/99 it is mentioned that the species has a synchronization mechanism to complement the poly Highly evolved niceization. A variation has been found in Palorosa trees, naming them as "type A" and "type B", where the former has receptive stigma only during the morning and dehiscence of the anthers occurs only in the afternoon; the second is the process reverse, thus ensuring cross pollination (Kubitzki & Kurz 1984).

1.7.Palorosa Natural Regeneration Dynamics

The Palorosa has typical characteristics of the Scythite species, of late secondary forests and climax, slow growth, tolerance to the gloomy in the juvenile phase, average size of seeds and abundant regeneration with high mortality (CITES 2010d). Conversely, Useche et al. (2011) state that the availability of light is the main limiting factor for the regeneration and that the opening of the canopy improves its performance, for which SUDAM (1972, cited by Useche et al. 2011) classifies it as a heliophyte species. Also useche et al. (2011), mention that this species has the ability to regenerate itself under canopy closed; nevertheless, to reach the upper stratum of the forest, it requires the continuous formation of natural clearings, since it presents a greater volumetric increase at full opening, That under shade.

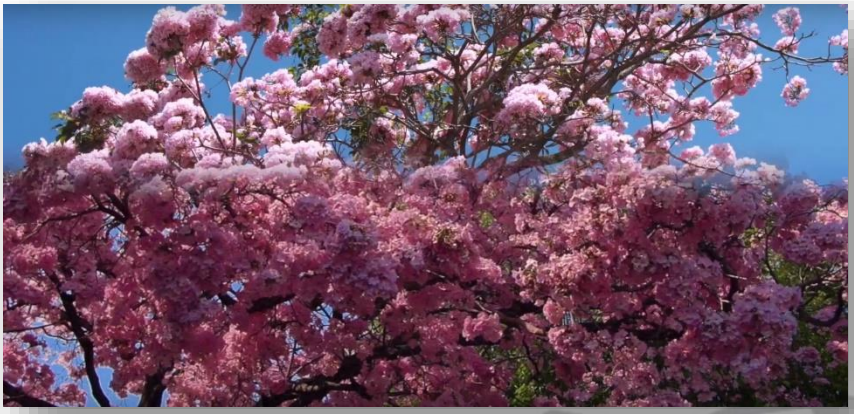
The fruits are food for birds, specifically psittacids and birds of the Ramphastidae family (toucans), which promote seed dispersal at short and long distances from the tree mother (CITES 2010d).

1.8.Forestry and Management of Palorosa

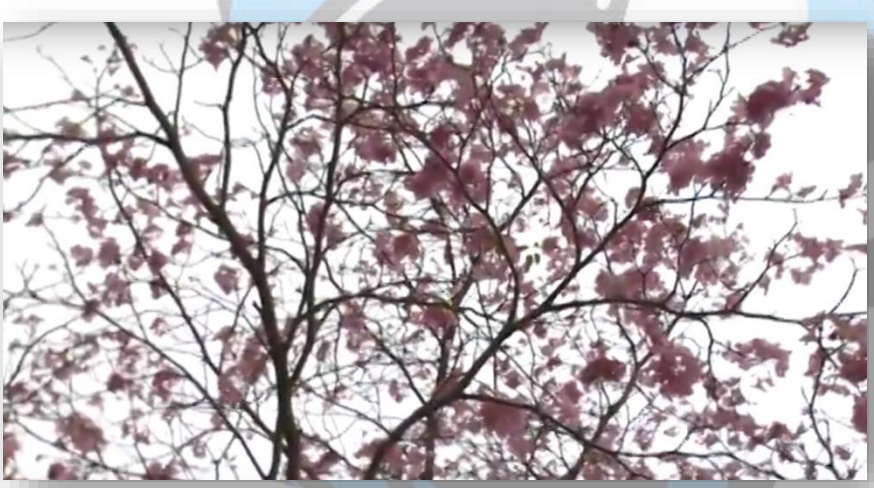
According to Leite et al. (2001), dense plantations of the species are recommended for sustainable farms of short duration or especially for the selection of the most individual productive. For sowing in clearings in natural forest, a reserve of 10% must be maintained at 15% of the seedlings in good condition so that, 3 to 4 weeks after planting, of if necessary, replanting is carried out. During the first three years of establishment, land cleaning should be done 2 to 3 times a year to reduce competition with others species (Leite et al. 2001).

Some research has sought new techniques for handling oil exploitation of Palorosa that do not result in the tomb of the whole tree, which is how it has been done till the date. The results of these investigations are very promising because they show that successive pruning can be done to adult canopy individuals and cultivated juveniles without affecting the vitality of the tree; on the contrary, pruning stimulates greater biomass production (Leite et to the. 2001, Sampaio et al. 2005, Sampaio et al. 2007). In this case the oil is not extracted from the trunk main and roots, but of the branches and leaves.

The collection time is approximately 5 years after sowing, mainly cutting the apical meristem, which stimulates the formation of branches and low cups (Revilla 2001, cited in ITTO 1999). Due to the low survival of Palorosa's regeneration (Useche et al. 2011), scientists have been given the task of developing tools to increase survival and production of the species; however the results have not been satisfactory due to the slow growth presenting (Valencia et al. 2010). Palorosa



seedlings have a good response to in vitro treatments but have low growth (Freitas et al. 2011). The number of sheets and the Leaf area of Palorosa plants can be affected in soils with low availability of macronutrients It has been shown that omission of elements such as N, P, K, Ca, Mg affect the number of leaves and the leaf area (Valencia et al. 2010).



Palorosa is propagated by seeds and stakes (Souza et al. 1999, cited in ITTO 1999). For the propagation by seeds the collection of fruits must be directly from the tree when they begin to fall spontaneously or pick them up from the ground. Subsequently they must be piled up for a few days in a dark place until the partial decomposition of the pulp to facilitate the removal of the seeds, avoiding desiccation because they are recalcitrant seeds. The seeds must germinate in semi-shaded sites (Sampaio et al. 2003), individually arranged in Polyethylene bags 1 to 2 cm deep. When the seedlings reach between 20 and 30 cm of height, must be selected for definitive field planting (Leite et al. 2001).

According to Leite et al. (2001), for the plantation sites with good drainage should be chosen, and it is advisable to use abandoned or stubble areas, previously used for pastures or crops, but they must be made clean once a year to eliminate competition for competing weeds. The Field planting should be done in the rainy period with 10 x 15 meter spacings since this gives the highest green weight in the cup. In the youth phases the Palorosa does not tolerate open environments, being more adapted to semi-shaded environments, therefore it must be planted with gloomy using other species (Leite et al. 2001).

The propagation by stakes presents problems by attack of plagues and a better development is obtained under conditions of high luminosity and with the application of roots; the transplant in Rainy times generates good results. The stakes should be 12 cm long and2 to 8 mm thick (Leite et al. 2001). In addition, there are several in vitro propagation works that they are essential when making propagation protocols (Freitas 2005, Handa et al. 2005, Jardim et al. 2010, Freitas et al. 2011).

1.9.Uses and Commercial Importance of Palorosa

This species is the source of "Palorosa oil" which is usually extracted from wood. It contains large concentrations of linálоe and has been widely used in the preparation of perfumes and soaps. Although Peru, Colombia, Guyana, Suriname and French Guiana were exporters of Palorosa oil, Brazil is the only exporter today (CITES 2010d). This species it was highly exploited until the synthesis of its compounds was achieved, however, compared to the new trend of consuming products from natural sources has again increased the demand (Chacón et al. 2006).

Typically trees are cut with DAP> 30 cm because the industry argues the higher aroma quality in older trees (May & Barata 2004). Wood also has commercial value in furniture manufacturing, boat or canoe construction, carpentry, floors, plywood, veneers and the manufacture of agricultural implements and handles for tools (UNEP 2008).

Due to the absence of fine perfume industries in the Amazon region, all the oil essential is exported by 15% to the southern states of Brazil and an remaining 85% abroad (Alencar & Fernández 1978). Domestic consumption was estimated by FAO (1995) among 20 and 30 tons per year; However, these figures are currently hardly reached by when the majority is exported and does not exceed 39 tons since 2000 (CITES 2010d).

In addition to the consumption by the perfume industry, there is a small market that uses pieces of shell and wood of Palorosa to serve a small and popular market of “bathrooms and smells ”in the northern region of Brazil (CITES 2010d).

In the Amazon region of Colombia, corregimiento of Tarapacá - Santa Clara sector, existed a Palorosa harvesting plant for oil extraction that worked for several years (personal conversation with inhabitants of the area) and which is currently only possible find the lags of abandoned machinery out of service.

1.10.Current Situation of Palorosa in Colombia

Worldwide the species is considered Endangered (EN A1 + 2d) (Varty 1996), while which is cataloged nationally in the Red Book of Endangered and Endangered Species Critical (CR A2cd) (Cárdenas & Salinas 2007). Natural populations have seriously declined due to oil extraction in the past. The few still existing individuals are found in remote areas, with significant signs of absence of regeneration. In Brazil, the cutting of individuals with DAP is prohibited less than 20 cm (May & Barata 2004). In Colombia, the Ministry of Environment and Development Sustainable, declared this species as threatened at national level through Resolution 192 of 2014 (MAVDT 2014).

1.11. Identification of Natural Populations from Palorosa

Palorosa Historical Distribution Map In the gathering of information in the Herbariums consulted, 15 individuals were registered of Aniba rosaeodora located in three locations on forest cover, as shown in the Historical distribution map (Figure 1).

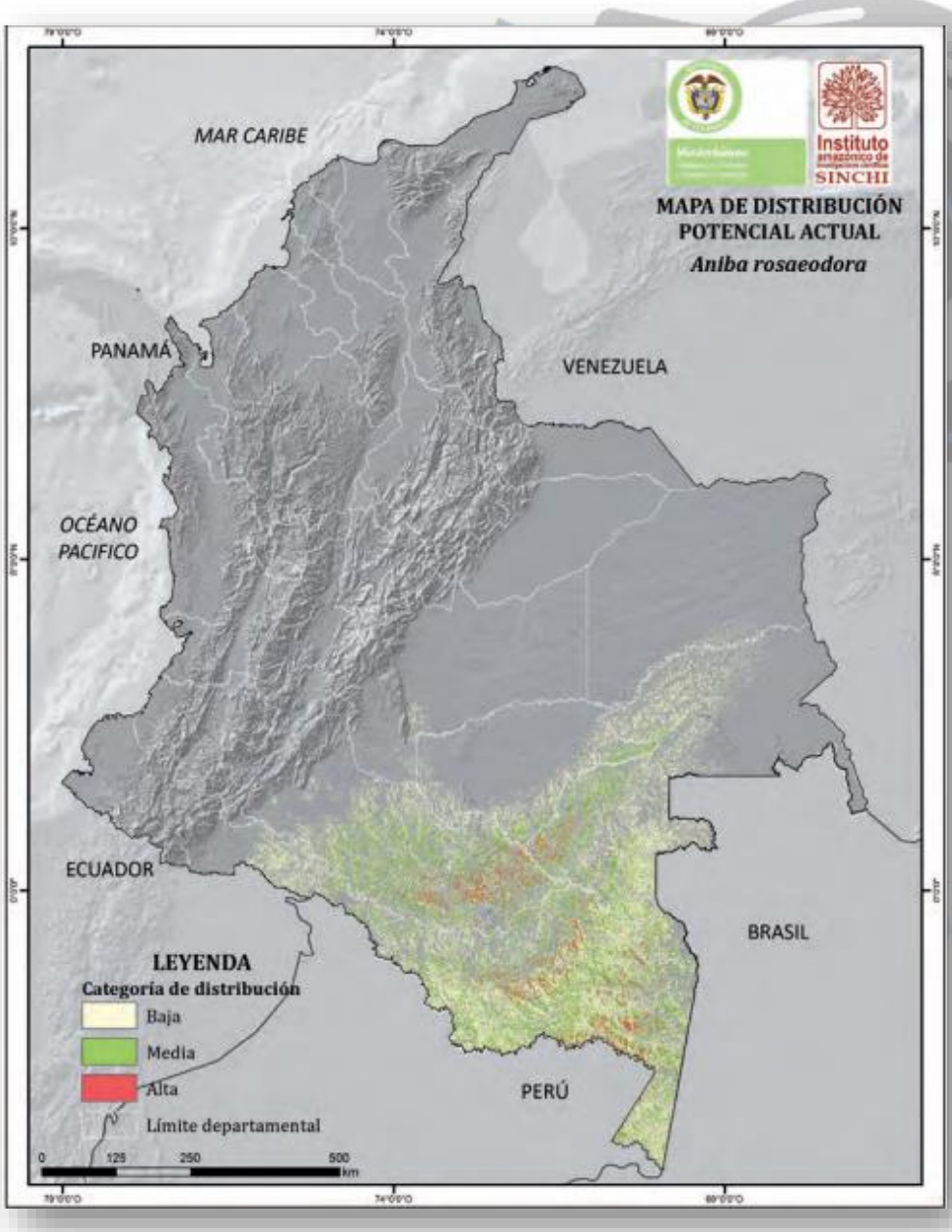
1.12. Potential Distribution Map of Palorosa

Aniba rosaeodora (Palorosa) has a restricted distribution range in the territory national, being only in three locations in the Colombian Amazon (Figure 1). Although it is not recommended to run algorithms with less than 15 records (GBIF-ES 2012), at run openModeller over the area of the Amazon region, only one model complied with the evaluation characteristics; In addition, the probability of finding a new record is very low due to the wide extension of territory with environmental characteristics Similar. So rare or scarce is this species, that during the last twenty years and after Of many floristic surveys in the region, only one population has been registered. The selected model is illustrated in the potential distribution map of Palorosa over forest cover (Figure 1).

2. EVALUATION OF NATURAL POPULATIONS OF PALOROSA

Based on the potential distribution map, field verification was carried out, where a thorough search was carried out to identify populations of this species in the Colombian Amazon. It was only possible to find a natural population of Palorosa in the Arica district (Amazonas), sector of Caño

Figure 1. Palorosa's current potential distribution map.



Toro; although the historical distribution registers other locations. TO Below are the main population parameters evaluated for this species.

2.1. Palorosa Density in Natural Forest

A total area of 266 ha of forest in the sector known as Caño Toro, in the corregimiento from Arica (department of Amazonas), 12 individuals were found for a density of 0.045 Ind./ha. Most individuals were found located on the tops of the hills, which agrees with what has been reported for other Amazonian localities regarding this variable (Kubitski & Renner 1982). The density found in this population is much lower than densities reported in Brazil of 0.12 - 1 Ind./ha (for individuals> 10 cm of DAP) (Alencar & Fernandes 1978, Mitja & Lesenre 1996, May & Barata 2004, Homma 2005). It is common for the distribution spatial of the species to be grouped, with groups formed between 5 to 8 individuals spaced 50 to 100 m apart and an average distance between clusters of 300 to 400 m, with the possibility of finding some isolated trees (Alencar & Fernandes 1978). After completing the search of other natural populations along the Caquetá River (between Puerto Santander and Puerto Remanso, department of the Amazon) without having found any individual, it is concluded that This species not only occurs at very low densities, but also its populations may be Very distant from each other. These low densities can be attributed to the effect of selective logging happened in the Amazon region in the last century, where many individuals were shot down and used for the extraction of Palorosa oil, to the point of its economic extinction, even reaching the limit of its biological extinction (IIAP 2006).

2.2.Distribution by Palorosa Diameter Classes in Natural Forest

An erratic distribution of individuals was found in the different diametric classes of the population. The number of trees ≥ 10 cm of DAP is nine (9), which corresponds to 75% of the total population and a very low natural regeneration of only 3 individuals (25%) was observed (Figure 43). The distribution by diametric classes of the individuals suggests a serious exhaustion of usable trees, even after having spent more than 30 years in which it was exercised Strong pressure on the resource.

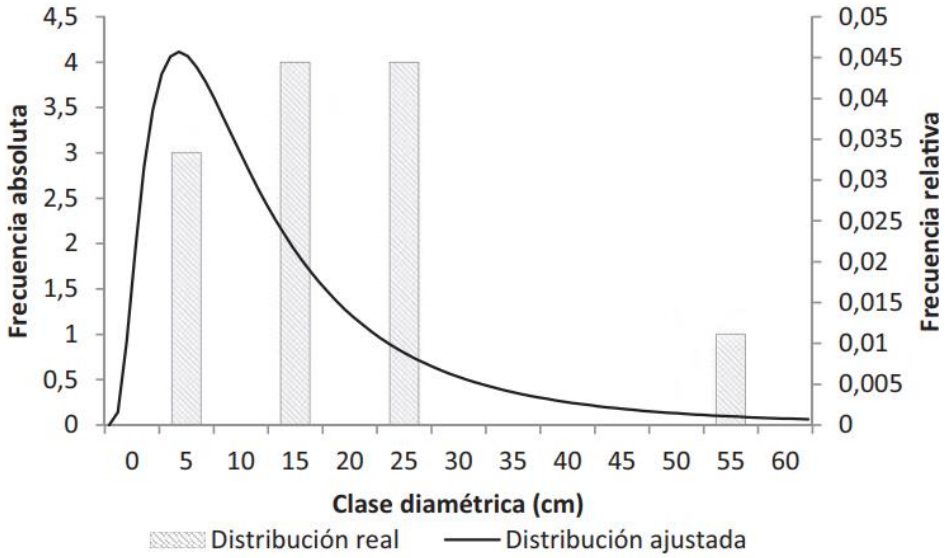


Figure 2. Actual diametric distribution adjusted to the theoretical function LogNormal (n = 12; p = 0.99) for a population of Palorosa in the Colombian Amazon.

Undoubtedly, the strong elimination of trees in the last century generated drastic damage. to populations which have not yet recovered; sample of it besides the casualties Adult densities, is the scarce natural regeneration found. According to Homma (2003), it estimates that a minimum of 825,000 trees were cut down for the use of their oil, which which corresponds to more than 4 million hectares of exploited forests. Another serious situation to the that the population conflicts still existing in the Amazon are exposed, is the advance of the agricultural frontier so protection of this species is considered urgent and necessary in order to avoid further genetic erosion and population decline (CITES 2010d). Bliss protection must be supported in different inventories specific to the species, which allow its location, study and protection. CITES (2010d) reported up to the date of that publication, the absence of forest inventories of the remaining populations of this species.

2.3.Considerations on the Population Assessments of Palorosa

• In Colombia Palorosa populations are extremely scarce, and the existing ones, they are mostly grouped in small relics, which in turn happen at a very low frequency.
• The use of Palorosa in the last century, generated a local extinction in the majority of harvested areas, which limited the availability of viable seed sources that they will guarantee, at least in part, the subsequent processes of natural regeneration.

3. DNA BAR AND GENETIC FOOTPRINT CODES FROM PALOROSA

3.1.Palorosa DNA Bar Codes

For the generation of Palorosa barcodes, sequences from 10 were generated copies from the department of Amazonas. The barcode generation of MatK region DNA was based on the analysis of 9 sequences, whose consensus sequence was of 787 bp. For the rbcL region, ten sequences were obtained that allowed obtaining a sequence 458 bp consensus.
Two methods were used to estimate the reliability of the candidate code sequence of bars. The first by comparing the result obtained with the database of the Genbank, which is a collection of public DNA sequences that currently contains more than 160’000,000 sequences and the second by estimating the genetic distance between sequences of species of the same genus and species, when there were sequences available. These methods at the same time, offered a way to validate taxonomic identification.
For Palorosa there are no sequences of the matK and rbcL genes in the Genbank and BOLD databases. However, comparisons were made on these bases and obtained successes with sequences of the same genre; in the case of matK with Aniba affinis and in rbcL with Aniba guianensis.
In the case of genetic distances, from its estimation a phylogenetic tree was made with the matk and rbcL sequences reported in the Genbank and BOLD for this genus and the sequences of these two genes obtained from the analyzed specimens. As mentioned earlier, no matK and rbcL sequences of Aniba rosaeodora were found.

4. GUIDELINES FOR THE CONSERVATION AND MANAGEMENT OF PINK STICK

The definition of guidelines for the conservation of threatened species is based in the assessment of the current situation of populations and in the analysis of threat levels (Kattan et al. 2005, García

et al. 2010). El Palorosa has been included in Appendix II of CITES and designated nationally as Critically Endangered (CR) (Cárdenas & Salinas 2006), due to the strong exploitation he had in the past. Restricted natural distribution, low frequency and abundance of adult individuals and a low natural regeneration argue such designation.

The intensive extraction process for obtaining oils during the first half of the century Lastly, it led the species to the threshold of extinction in the Colombian Amazon (FAO 1995, 2000 steel). Despite the decrease in the demand for natural oil, due to the replacement by artificially synthesized compounds, one of the main threats to the remnants in natural forest is the resurgence of a growing demand for "organic" oil or of natural origin (Chacón et al. 2006, CITES 2010d).

This panorama implies the generation of priority actions at the local, regional and national that contribute to conserve and / or restore the natural populations of Palorosa in their natural habitat, in addition to tending towards ex situ conservation strategies. Then you present the actions grouped into five strategies or lines of action (as proposed by Kattan et al. 2005): 1. Policy and Management Instruments; 2. In situ conservation; 3. Ex situ conservation; 4. Research and monitoring; and 5. Education and dissemination. For implementation short (1 to 5 years), medium (5 to 10 years) and long term (10 or more) activities have been considered years). The lines of action presented should be updated as progress is made in the achievement of the proposed goals.

The lines of action are presented and described below, which must be updated as progress is made in achieving the proposed goals.

4.1.Threats

Palorosa's main threats are:

1. Illegal traffic: El Palorosa is registered in CITES for being a victim of illegal traffic, with two objectives:

(i) Extraction of aromatic oils for the preparation of essences for soaps, perfumes and scents.

(ii) Use of roots for santeria activities: magical rituals to achieve true love, performed by indigenous Shamans Ticuna.

These criminal structures are initiated by Ticuna indigenous peasants, who are responsible for tracking specimens of this species in Amazonian forests. Then, the wood and roots will be sold to dealers in the black market.

2. Illegal agricultural and mining activities: The presence of precious minerals and the low presence of military forces generate illegal mining in the area, with large amounts of forests cleared. The Ticuna Indians deforest 2 hectares of forests per month, for agricultural activities.

3. Forest fires

Forest fires in the Amazon forests of the Ticuna indigenous territory consume large amounts of forests, with the presence of Palorosa.

4.2.Policy and Management Instruments for the Conservation of Palorosa

Ensuring the conservation and management of threatened wild flora implies participation joint State, civil society and productive sectors. Although Colombia counts with environmental policies and regulatory instruments, its applicability against the protection of Threatened species still suffer from effectiveness. A series of actions based on the Political Constitution of Colombia are proposed, in order to contribute to the objective of conservation and management of Palorosa in the national territory.

PROBLEM: In the context of the present study, a very low density of individuals from Palorosa was recorded and other widely dispersed populations in the Colombian Amazon have historical records. Therefore, it is pertinent to identify other natural populations, especially in the Parks Natural Nationals located in the Amazon region where there are indications of their presence; further

It is a priority to monitor the only population identified in this study, which is Very affected in its structure. The growing demand for Palorosa essential oil for the industry Cosmetics at international level, could encourage the intensive use of remnants in natural forest Finally it is evident that in Colombia, little is known about the species.

GOAL 1: Have favorable policy and management tools for the implementation of the Palorosa conservation plan, in its natural habitat.

OBJECTIVE 1: Establish a temporary ban at the regional level that prohibits exploitation of individuals from Palorosa in their natural habitat.

Actions	Term	Results expected	Indicators	Responsible
Establish a temporary ban on use of natural populations of Palorosa in the Amazon Colombian	Short term.	Declaration of temporary closure to the use of Palorosa by Resolution at the level of the Colombian Amazon region	Document Resolution of temporary closure.	CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG

4.3.In Situ Conservation Strategy for Palorosa

In situ conservation of threatened flora species must include the conservation of their natural habitat (Primack et al. 2001); Therefore, the Palorosa in situ conservation guidelines must be advanced in their natural area of distribution, in such a way that variability is guaranteed genetics and effective conservation within protected areas.

PROBLEM: In the present work the existence of a very small number of individuals of Palorosa was demonstrated in natural forest conditions. This situation has been attributed to historical processes of selective extraction. The decline in adult trees has generated a reduction of seed trees per unit area and little or almost no natural regeneration. TO all this adds up to the great information gaps about the existence of the species in the interior of the National System of Protected Areas SINAP.

GOAL: Implement actions for the conservation and recovery of the natural population identified from Palorosa.

OBJECTIVE 1: Establish a Palorosa seed tree conservation program in Natural forests with benefits for local communities.

Actions	Term	Results expected	Indicators	Responsible
Advance the selection and management of seed trees and establish sustainable marketing mechanisms for Palorosa seeds. .	Short term	Canned seed trees and families benefiting from management sustainable trade of seeds of Palorosa.	Number of protected Palorosa trees and families benefited	CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG

OBJECTIVE 2: Establish a Palorosa enrichment program for the recovery of the natural population identified

Actions	Term	Results expected	Indicators	Responsible
Propagation and monitoring of Palorosa seedlings in the natural distribution zones of the species.	Medium term.	Established latizales of the species that guarantee the recovery of the population.	Number of established latizales.	CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG

OBJECTIVE 3: Identify Palorosa natural populations in areas of the National System of Protected Areas of the Amazon region.

Actions	Term	Results expected	Indicators	Responsible
Identify natural populations of Palorosa in SINAP.	Short term.	Natural populations of Palorosa identified in SINAP.	Number of natural populations of Palorosa identified	CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG

4.4.Ex-Situ Conservation Strategy for Palorosa

Palorosa field evaluations show that in wild conditions there is a Very low number of individuals. When a remaining population is too small, the sustainability of population viability is uncertain (Primack et al. 2002), just as This is the case of Palorosa in Colombia. Therefore, the in situ conservation strategy itself alone it is not enough and it is necessary to adopt ex situ conservation strategies that guarantee on the one hand the maintenance of the genetic variability of the populations and allow it incorporation of the species into productive systems that discourage the use of individuals in natural forest.

PROBLEM: The current genetic integrity of Palorosa is not represented in strategic sites to ensure its conservation. Nor are there programs for the production of plant material for its establishment in the Botanical Garden of the CEA (Amazon Experimental Center), arborets or any other conservation system in public rural areas and / or private, outside their natural habitat.

GOAL: Ensure the supply of material for in situ conservation programs and include specimens in experimental centers to ensure ex situ conservation.

OBJECTIVE 1: Establish a Palorosa ex situ reproduction program and incorporate the species in the Botanical Garden of the CARSUCRE.

Actions	Term	Results expected	Indicators	Responsible
Massively propagate the Palorosa for the program In situ conservation.	Short term.	Seedlings available for enrichment in distribution areas of the species.	Number of linked nurseries and Number of propagules produced and distributed.	CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG
Establish the species in the CEA Botanical Garden to guarantee ex situ conservation.	Short term.	The species is conserved permanently in the Botanical Gardens of the Ticuna indigenous community.	Number of trees conserved	

4.5.Research and Monitoring Guidelines for Palorosa

The research and monitoring line groups all the activities and projects that can be develop in order to generate knowledge about priority aspects for the conservation of the species (biology, ecology, genetics, population dynamics). It also includes actions for develop monitoring programs, which should be based on periodic activities that allow to keep updated information on the state of the populations and trends in the habitat availability. The generation of knowledge, information and technology transfer will be aimed at stimulating the national scientific capacity to conduct research appropriate to generate necessary and non-repetitive information for the improvement of proposals for conservation and sustainable use of the species. It must also include monitoring aspects social and economic effects that affect populations (Kattan et al. 2005) and tend to rescue and revaluation of traditional knowledge. Brazil has many years of research on issues of ecology, multiplication, chemistry, cultivation, productive processes among others for Aniba rosaeodora. In particular, the INPA (National Institute of Fisheries of Amazonia) has carried out many research on the conservation and sustainable use of this valuable resource, which is why which is very important to be able to count on your cooperation and support in the conservation processes that are carried out in Colombia.

PROBLEM: The growth and survival of the species in different microclimatic conditions of the forest is unknown. Usually initiatives nationwide with native species they do not usually incorporate the research component strategically and monitoring for the generation of information that allows the future to modify and / or replicate the successful experiences These types of field experiences make them a laboratory for the generation of knowledge on a more real scale, in addition to becoming a process inclusive with local communities for generation, appropriation and feedback of knowledge.

GOAL: Generate knowledge about the biological and ecological processes of Palorosa, for the generation of information about the natural history of the species.

OBJECTIVE 1: Obtain biological and ecological information from Palorosa for the generation of conservation and / or restoration strategies.

Actions	Term	Results expected	Indicators	Responsible
Establishment of permanent plots for monitoring natural populations. Population demography studies.	Medium and long term.	Knowledge of the natural history of the species. Information on the natural dynamics of the species. Number of investigations		CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG

4.6.Education and Communication Strategy for Palorosa

The conservation of this species depends to a large extent on the value and importance that the different actors attach to it and its habitat. This is why it is necessary to develop actions of education and communication aimed at raising concrete actions about the benefits Ecological, economic and social conservation and sustainable management of promising species (Bodero et al. 2007).

PROBLEM: The local inhabitants of the areas where the Palorosa is located, are unaware of some aspects related to the natural history of the species and its extraction process to which it was subjected in the past. There is also no sense of belonging to this forest resource and the potentialities that can bring the conservation of natural populations and their eventual incorporation into sustainable productive systems in the region.

GOAL: Communication and training of the main actors that contribute to the development of Palorosa's conservation strategy.

OBJECTIVE 1: Establish a communication and training program aimed at the academic, scientific community, public officials and local people, on the current situation of Palorosa and conservation strategies.

Actions	Term	Results expected	Indicators	Responsible
Generation of at least one informative and informative material related to conservation strategies. Realization of at least one training workshop at the local level, on the implementation of the Palorosa conservation and management plan.	Short term.	Information material (booklets, posters, flyers, videos, games teaching, among others) about various conservation strategies. Communities technically trained to participate in the implementation of the Palorosa conservation and management plan.	Number of dissemination materials distributed. Number of training workshops and communities trained.	CARSUCRE, Ticuna indigenous community. Universidad de Sucre. BOSQUE COLOMBIANO ORG

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