A. PROPOSAL

Include in Appendix II neotropical populations of *Swietenia macrophylla* and its natural hybrids with *S. humilis*, and change the listing in Appendix II into *Swietenia* spp.

B. PROPONENT

The Kingdom of the Netherlands.

C. SUPPORTING STATEMENT

1. Taxonomy

10. Division: Magnoliophyta (angiosperms; flowering plants)

11. Class: Magnoliopsida (dicotyledons)

12. Order: Sapindales

13. Family: Meliaceae

14. Genus: *Swietenia* Jacquin (3 spp.) (Styles 1981, Miller 1990)

141. Species: *Swietenia macrophylla* King 1886
[*e.g.* syn. = *S. candollei* Pittier]

142. Hybrids (see Whitmore & Hinojosa 1977, Styles 1981):
Natural hybrids occur between the two species with proximity in their native ranges. Artificial hybrids can occur between native and non-native (introduced or naturalized) species, either: (1) spontaneously, from crosses unaided by people; or (2) artificially, from human-aided crosses (*e.g.* in research for forestry or horticulture).

1421. Natural: only *S. macrophylla* × *S. humilis*.
Drier areas, NW **Costa Rica** (Whitmore 1983, Holdridge & Poveda 1975). Also potentially in **Mexico** (Tehuantepec); and **Guatemala** (yet in the appropriate area, none found) (Styles 1981).

1422. Artificial, sometimes spontaneous: *S. macrophylla* × *S. mahagoni* (probable syn. = *S.* × *aubrevilleana* Stehlé & Cusin).
Several Caribbean islands; also Far East (Whitmore & Hinojosa 1977, Styles 1981, Howard 1988, Schubert 1979). (See Resol. Conf. 2.13.)

15. Common Names (many others: *e.g.* Constantine 1959, Lamb 1966)

English:	American mahogany, New World mahogany bigleaf mahogany, Honduras mahogany
French:	acajou américain
Spanish:	caoba, mara
Portuguese:	mogno

"Mahogany" in the trade has expanded to include other genera (Knees & Gardner 1983a). "True or genuine mahogany" is generally accepted to refer to the genus *Swietenia*, American mahoganies.

16. Code Numbers:

2. Biological Data

Aspects of the biology of *Swietenia* species are provided by, *e.g.*, Snook 1993, Hartshorn 1992, Miller 1990, Betancourt 1987, Whitmore 1983, Styles 1981, and Record & Hess 1943. Considerable information on the ecology of *Swietenia*, as well as its history, trade, and silviculture, is in Lamb 1966; see also Betancourt 1987 and Snook 1993, the latter with a focus on Mexican and Central American populations of *S. macrophylla*. Overall conservation concerns are presented by Lamb 1966; Knees & Gardner 1983a, 1983b; Read 1990; Oldfield 1988; Huxley 1984; Whitmore 1981; Bramwell 1980; Mabberley 1983; Rodan *et al.* 1992; FAO 1984; and NRC 1991.

21. Distribution (maps in appendices below; Edlin *et al.* 1973): The natural distribution of *S. macrophylla* is from southern **Mexico** southward, ordinarily on the Atlantic slope, through **Costa Rica, Panama**, NW South America and peripheral upper Amazonia to **Bolivia** and southern Amazonia into **Brazil**. Lamb (1966) maps the distribution of *S. macrophylla* (along with *S. mahagoni* and *S. humilis*) in Mexico, Central America and South America (Appendix A). Barros *et al.* (1992) indicate a smaller, but still extensive mahogany belt in **Brazil** (Appendix B), totalling ca. 800,000 km², more equatorial than had been estimated by Lamb (1966). Within **Brazil**, *S. macrophylla* is most concentrated in an area of ca. 250,000 km² in southern Pará state (Veríssimo *et al.* 1992). *Swietenia macrophylla* has also been introduced extensively elsewhere for forestry, also horticulture and as an ornamental tree (Styles 1981, Newman 1990, Schubert 1979, Prance & Silva 1975); sometimes naturalized (*e.g.* Howard 1988).

22. Population

221. Population Trends: *Swietenia macrophylla* populations are undergoing exploitation nearly throughout the species' natural range (Pennington 1990 com. to NRDC), resulting in substantial depletion of extant populations (Lamb 1966, Foster 1990, Smith 1965, Correa 1990, Betancourt 1987). Populations of *Swietenia* spp. have also been reduced from the general deforestation accompanying human development (Bevan 1945, Lamb 1966). Lamb (1966, p. ix) reported that:

> "the inherent characteristics of the tree in relation to the highly competitive environment of the tropical forest have resulted, after 250 years of heavy cutting, in serious depletion of mahogany growing stock. The remaining, accessible, unmanaged reserves have been reduced until they are no longer capable of supporting continuous production sufficient to supply the potential demand for the wood. Mature and over-mature stands have been liquidated without maintenance of adequate reserve growing stock. Over the years only an

insignificant part of the income derived from the liquidation of this forest capital has been reinvested to maintain the source of income."

The susceptibility of *S. macrophylla* to logging pressure is discussed in Martini *et al.* (1994, in press), where the authors perform a first attempt to predict Amazon tree species threatened by logging. *S. macrophylla* is considered a species susceptible to population reductions in the face of intensive logging due to its irregular fruit production; poor regeneration in natural forest; inability to sprout from cut stumps; and high insect predation on seeds. On the converse, they also note the good regenerative capacity of mahogany in well-lit areas and its wide geographic range (Veríssimo *et al.* 1992).

The conservation status of *S. macrophylla* populations in selected Latin American nations was provided in the U.S. 1992 CITES proposal, and varies from abundant to nearly extirpated, depending upon the locale and information source (Rodan *et al.* 1992). Updated and additional information is provided in Hartshorn (1992), which collates reports from Central and South America presented to the Mahogany Workshop in Washington D.C. in February 1992.

2211. Central America: The historical pattern and relationship between logging and mahogany populations in the Yucatán Peninsula of **Mexico**, **Belize** and **Guatemala** is detailed in Snook (1993). Indigenous human populations of the Yucatan (the Maya) had in preceding centuries hollowed out enormous mahogany canoes for long-distance trading expeditions (Hammond, 1982). Early European explorers also utilized mahogany for canoes and ship repairs, and had begun harvesting *S. macrophylla* in Central America as early as the year 1683 (Record, 1924). Mahogany logging in this period was originally severely constrained logistically by the size of the tree and paucity and inadequacy of transportation mechanisms. Logging was initially only of specimens occurring near rivers, but with the successive introduction of oxen, railroads, and then roads, these restrictions were negated. Purchaser requirements also acted in the past to protect selected *S. macrophylla* populations, and only sound, straight logs at least 14 feet long by 16 inches at the top were desired for export. More recent restrictions have limited the selective cutting of *S. macrophylla* to only those specimens of 55-60 cm diameter at breast height (dbh). Concession foresters are now proposing a reduction in the diameter limit from 60 cm to 40 cm dbh, as communities switch from selling logs for veneer to feeding their own sawmills and as a result of overestimates of the natural growth rate of mahogany (Snook 1993, 1992). Most of the areas logged in the past have been converted to other uses, leading to a ca. 80% reduction in the extent of mahogany-containing forests in **Mexico** (de la Garza 1991 in Snook 1992).

In **Guatemala**, Salazar (1992) reported that:

> "The mahogany found in the biologically rich lowlands of northern Guatemala ... is naturally found only in hidden recesses protected by natural barriers such as flooded zones, steep slopes and rivers. In general, the species is undergoing extensive exploitation throughout nearly all of its natural range in northern Guatemala. Severe social and economic problems have contributed to species exploitation. Until recently (the last 8 to 10 years) there were no programs to conserve or to manage the species. ...

Unless concrete actions are taken immediately, the future for mahogany in the Petén is bleak."

In **Honduras**, mahogany and cedar are reported as the most heavily exploited species. In response to overharvesting, Honduras banned the export of rough lumber of these species, along with the cutting of mahogany and cedar during fruiting (Ussach 1992).

2212. Bolivia: In **Bolivia** and **Brazil**, currently the primary sources of the international trade in *S. macrophylla*, regional commercial extinctions (extirpations) are increasing (Collins 1990, Veríssimo *et al.* 1992). In a report on Bolivian forestry commissioned by the International Tropical Timber Organization (ITTO), Synnott and Cassells (1991) state that:

> "[T]he rate of harvesting of Mara is recognized by all parties as being too high to ensure that commercial logging can continue uninterrupted. There are major uncertainties about the volumes of Mara and other timbers ... There are also uncertainties about the areas of forest effectively available for logging after taking into account considerations of inaccessibility and environmental protection requirements within timber production areas. ... [T]he 1989-91 logging areas are now scattered widely in separate blocks, presumably selecting the richest areas first.
>
> The managers of logging companies told the Review Team that they did not expect to maintain their present rates of logging for more than a few years, before exhausting the best areas. Indeed, they seemed to prefer to remove the large Mara quickly and perhaps return in the future when markets for other species improve. ..."

These sentiments are echoed by Gullison and Hubbell (1992), where they conclude that:

> "Mahogany logging elsewhere in Bolivia is largely unsupervised from a sustainable forestry viewpoint. ... In actual practice, logging has occurred at a much greater rate and over a larger area than originally planned (Synnott & Cassells, 1991), and current commercial supplies of mahogany are likely to be exhausted much sooner than twenty years."

According to Richard Rice, director of economic policy at Conservation International:

> "All the commercially usable mahogany is going to be gone in Bolivia in five years. ... What we are looking at is timber mining." (Nash, 1993)

Bascope (1992) reviews many of the biological, historical and industrial aspects of mahogany logging in **Bolivia**, noting that:

> "Due to the overcutting of mahogany timber, these firms are diversifying to other species, and trying to interest their clients and other overseas firms in these. Meanwhile, mahogany lumber remains the number one products export business, although in the most

accessible forests its supply is diminishing at an alarming rate" (Bascope 1992).

2213. Brazil: In **Brazil** natural populations of *S. macrophylla* are increasingly affected by illegal as well as legal logging, and by illegal as well as planned deforestation. The Instituto Brasileiro do Medio Ambiente e dos Recursos Naturais Renováveis (IBAMA) in 1992 included *S. macrophylla* on a list of 108 Brazilian species of flora considered to be in danger of extinction (15 January 1992; Proclamation No. 006/92 N), and the Brazilian Botanical Society has included *S. macrophylla* in a list of species at risk of extinction (Sociedade Brasileira de Botânica 1992). Greenpeace Brazil, in concert with 70 other Brazilian non-government organizations, has also expressed concern about the predatory nature of mahogany logging in **Brazil** and about the adverse social and biological consequences of this trade (Greenpeace Brazil, 1992).

A review estimating the extent of mahogany populations in **Brazil** was conducted in 1992 by a consortium of forestry academics, consultants and agencies of the Brazilian government (Barros *et al*, 1992). This study utilized biological information from the RADAMBRASIL project of the 1970s, in conjunction with field surveys and professional judgements, to estimate the extent of the mahogany containing forest in **Brazil** and to predict the length of time until these resources are exhausted. In addition to revising the mahogany distribution maps of Lamb (1966), Barros *et al.* (1992) estimated that, at the current rate of exploitation of 500,000 m^3 (137,773 trees) per year, from a conservative point of view mahogany stocks would persist in legally obtainable areas for a minimum of just 32 years. They recommended an urgent rationalization of the use of this species under a regime of sustainable management.

Veríssimo *et al.* (1992) expressed general reservations about the accuracy of *S. macrophylla* estimates in the Amazon, noting that:

> "Mahogany trees tend to occur in small clumps in the forest. Several or even tens of kilometres may separate the mahogany clumps. Mahogany clumps tend to occur in low-lying areas. Because of this clumped distribution, it is extremely difficult to estimate the regional stock of mahogany and all such estimates should be regarded with scepticism at the present time" (Veríssimo *et al.* 1992).

In regard to the conclusions of Barros *et al.* (1992), the RADAMBRASIL studies that form the basis for these conclusions are from the 1970s, and pre-date much of the mahogany logging and agricultural expansion that has occurred in southern Amazonia. Of the 552 one-hectare sampling units of RADAMBRASIL that occur within the predicted mahogany belt, only 55 units actually revealed the presence of mahogany. Figure 4 of Barros *et al.* (1992) indicates that these 55 units were located in regions of Pará, Rondônia and Acre where mahogany is known to occur and has been logged (see Lamb 1966). It is uncertain whether the absence of mahogany on the remaining 497 RADAM units within the purported mahogany belt was a statistical aberration caused by the scattered distribution of mahogany (see Verissimo *et al.* 1992), a result of diameter requirements in the counting of trees during the RADAMBRASIL study, or whether there was in fact no mahogany in these regions. As a result, the occurrence and density of mahogany over considerable portions of the region estimated by Barros *et al.* (1992) remains

unconfirmed, leading to uncertainty regarding the extrapolated mahogany population levels estimated by the authors. Greenpeace Brasil (1992) also notes that in estimating the extent of legal mahogany containing forest, Barros *et al.* (1992) overlooked existing biological conservation reserves, and may have underestimated the extent of areas already occupied and logged by human settlers. (Barros *et al.* (1992) estimated anthropic action to have removed 40%, 30% and 20% of the estimated low, regular and high density mahogany regions, respectively.)

With funding from the International Tropical Timber Organization (ITTO), FUNATURA (Fundação Pró-Natureza) also studied the occurrence and distribution of mahogany in the Brazilian Amazon (FUNATURA 1993, draft). FUNATURA highlighted the large number of indigenous human reserves (140 officially recognized, ca. 30 autonomous territories, encompassing ca. 350,000 km²), national parks, biological reserves and ecological stations (totalling 34,929 km²) within the mahogany zone of **Brazil**. The extent of illegal logging of *S. macrophylla* from these areas had not been assessed or incorporated in the study by Barros *et al.* (1992). FUNATURA (1993, draft) concluded:

> "Without going into the merits of the methodology employed by Barros *et al.* (1992) in obtaining their results, and considering the acceptance of their estimate of 32 years as the minimum time of persistence of mahogany stocks, one is able to conclude that this species is quite threatened ... This form of empirical and predatorial forest exploitation, suggests that without any urgently adopted measures to ensure the conservation of the species and a more rational utilization, mahogany will have a future similar to the parana pine (*Araucaria angustifolia*), practically exhausted, hardly remaining in some areas without becoming reserves, or similar to species of the Amazon region like pau-rosa (*Aniba duckei*) and virola (*Virola surinamensis*)."

The extent of human encroachment on the estimated mahogany containing region in **Brazil** is evident from satellite images taken in 1988, which were analyzed and aggregated by Skole and Tucker (1993) (see Appendix C). Overlaying the results of this satellite analysis on the estimated mahogany region identified by Barros *et al.* (1992) indicates the presence of human activity over much of this region, leading to varying degrees of deforestation and habitat fragmentation (see Appendix D). Those regions in the satellite composites where human activity is not evident generally correspond to indigenous peoples' (Amerindian) reserves and biological conservation units, as illustrated by Veríssimo *et al.* (1992) (Appendix D). In particular, the expanse of untouched forest in southern Pará state (8°S, 53°W), overlying a region of relatively dense mahogany-containing forest, indicates the site of the Kayapó Indian Reserve.

To the extent that human activity in regions of the Amazon can be correlated with mahogany extraction, these satellite composites indicate the need for caution when extrapolating mahogany resources based upon the assumption of primary forest. The presence of unlogged forests in Amerindian reserves and conservation regions, with a relative abundance of mahogany and located close to existing timber industry infrastructure, also highlights the incentives

present to extract mahogany from this source, rather than to expend resources on searching for the presumed mahogany reserves in more distant and isolated regions of Amazonia.

The satellite composites published by Skole and Tucker (1993) were based on satellite images taken in 1988. In the intervening 6 years, considerable further road construction has been undertaken to facilitate the extraction of mahogany, often in what were apparently areas of primary forest in 1988. For instance, the 1988 satellite composites reveal an untouched area of presumed (Barros *et al.* 1992) high-yield mahogany forest located north of the main Kayapó Indian Reserve (6°S, 53°W). Since this time, road construction by mahogany timber companies, as illustrated in Veríssimo *et al.* 1992, 1994a in press (Appendix E), has continued to open this area. In Pará, "[t]he distance between the extraction areas and sawmills has grown from only a few kilometres in the early 80's to 300-500 kilometres at present", and there are now more than 3,000 km of logging roads in southern Pará that have been used by colonists, ranchers and loggers (Veríssimo *et al.* 1992).

In the Brazilian state of Rondônia, stands of mahogany and other species that were once relatively close to industry are now found only after travelling hundreds of kilometres. Approximately 90% of Rondônia's production of mahogany in 1991 and 1992 originated from indigenous or conservation areas (Matricardi & Abdala 1993, draft).

222. Densities: *Swietenia macrophylla* is a deciduous tree frequently more that 30 m tall and with a dbh of 1.5 m (Whitmore 1992), to over 2.5 m. Specimens generally are widely dispersed, although the concentration varies markedly with location and the rate and type of natural forest disturbance (Lamb 1966; Snook 1992, 1993; Rodan *et al.* 1992). In **Central America**, *S. macrophylla* was found to occur more plentifully on sites that were disturbed hundreds of years ago, such as from Maya agricultural practices, than on undisturbed sites. Across the range as a whole in **Central America**, the average density in mahogany containing forests is approximately one commercial-size *S. macrophylla* tree per hectare (Snook 1993, citing Pennington & Sarukhán 1968 and Medina *et al.* 1968).

In undisturbed forests containing mahogany in **Brazil** and **Bolivia**, harvestable specimens occur at an average density of less than 1 to 2 trees per hectare. Accurate data on stocks are difficult to collect as the mahoganies occur in scattered groups in inaccessible locations, with just a few mature trees per hectare or km² of undisturbed forest (Quevedo 1986, Veríssimo *et al.* 1992, Whitmore 1983, Betancourt 1987, Edlin *et al.* 1973, Sanderson & Loth 1965, Barros *et al.* 1992). Barros *et al.* (1992) collated Brazilian data sources and calculated an average occurrence of 1.022 mahoganies (s = 0.947) per ha of mahogany-containing forest, with an average of 5.009 cubic meters of timber per tree (s = 1.709, s_x = .604, LL = 3.61 m^3/tree; for calculating purposes, the authors used a figure of 3.6302 m^3/tree, derived from Queiroz' 1984 volume equation). Barros *et al.* (1992) noted that density estimates would constitute an upper bound, as most mahogany population studies had been performed in areas considered for logging, thus the regions of highest concentration. Taking these factors into account, Barros *et al.* (1992) estimated an average density of mahogany over the range of estimated low, normal, and high density areas respectively of 0.2 m^3/ha (1 tree/18 ha), 0.4 m^3/ha (1 tree/9 ha) and 0.6 m^3/ha (1 tree/6 ha) over the range of estimated low, normal and high density areas respectively.

223. Regeneration

2231. Natural Regeneration: Mature mahoganies are generally said to seed well and disperse the seeds over a wide area (Lamb 1966). The trees grow rather robustly (Lamb 1966, Snook 1992). Nevertheless, the mature, often canopy-emergent trees may be one to several centuries old (Terborgh 1990, Betancourt 1987, Mabberley 1983). Mahoganies are shade intolerant, and cannot regenerate to maturity beneath a closed or closing forest canopy. They require the combined presence of a major forest disturbance and residual seed trees in order to regenerate. As a result, *S. macrophylla* tends to occur in even-aged clumps of mature trees, lacking the age stratification necessary for continued harvest rotations. (The relationship of these factors and others to mahogany silviculture is discussed in § 3.2.1.)

These findings were confirmed, and expanded upon by Snook (1993), who studied the natural regeneration of *S. macrophylla* on the Yucatán Peninsula of **Mexico**. Snook (1993) found that:

1. *Swietenia macrophylla* survives both fire and hurricanes as an adult.

2. *Swietenia macrophylla* regenerates in essentially even-aged mixed-species stands, becoming established at the highest densities on areas formerly cleared or burned, and less abundantly after hurricanes. Particularly favourable conditions occur after the combination of hurricane damage followed by fire.

3. The highest density of *S. macrophylla* regeneration was found on loosened, disturbed, exposed soil.

4. Where conditions are favourable (*e.g.* the roadside) and seed trees are available, *S. macrophylla* can become established at higher densities than any other species.

5. Light fire stimulates sprouting by several species, suppressing *S. macrophylla* seedlings.

The sensitivity of *S. macrophylla* regeneration to a variety of perturbation is evident from Snook's (1993) data. Regeneration requires the presence of seed trees. The funnel-shaped seed shadow of a mahogany 23 m tall in Quintana Roo was found to extend 200 m downwind (westward) of the tree, covering an area of approximately 3 ha (Rodrigues *et al.* 1992 in Snook, 1993). The absence of seed trees, as occurs following unregulated logging, removes the potential for natural regeneration, and isolated trees can only re-populate an area of 3-4 hectares downwind (water and animal conveyance of seed is also possible). Bees and moths have been noted as pollinators of *S. macrophylla* flowers (Styles & Khosla 1976), although it is not known what species pollinate *S. macrophylla* flowers in Quintana Roo, and what other species these creatures may require to survive (Snook, 1993).

S. macrophylla regeneration was also highly sensitive to shade and to competition from already established species. For instance, while a strong fire removes competitor species and presents an ideal opportunity for *S. macrophylla* regeneration, a light fire suppresses regeneration by stimulating the sprouting of other species. The preference for loosened, disturbed,

exposed soil (Snook, 1993) should also be noted when assessing the regeneration potential on pasture land.

Research by Gullison and Hubbell (1992) indicated that a primary mode of natural mahogany regeneration in the Bolivian Amazon is following river meanders or watercourse changes. The resulting expanses of light-exposed soil can be quite extensive, such as in the Peruvian Amazon where up to 12% of the forest is in early succession.

The natural growth rate of mahogany was determined by Snook (1993) using measurements of trees on a chronosequence of post-fire stands 15-75 years old. Mahogany growth was found to follow a sigmoid curve (Appendix F). Extrapolating from this curve, Snook (1993) calculated that *S. macrophylla* requires, on average, 120 years to attain the current 55 cm commercial diameter limit in Quintana Roo. A corollary is that the specimens of *S. macrophylla* currently being cut, with girths greater than 100 cm, are at least one to several centuries old, and current timber harvest rotations are based upon overestimates of the growth rate of mahogany. Simulations by Gullison and Hubbell (1992) estimate that 105 years are required to reach the current Bolivian cutting diameter of 80 cm dbh.

2232. Lack of Regeneration after Selective Logging: *Swietenia macrophylla* has been found to regenerate poorly, if at all, following logging operations using current management practices in closed forests (Quevedo 1986, Veríssimo *et al.* 1992, Snook 1992, Stevenson 1927, Lamb 1966, Johnson & Chaffey 1973, Finol 1971). Quevedo (1986) studied the Guarayos Forest Reserve in **Bolivia**, and reported that while *S. macrophylla* regeneration was found in forest harvested 3 years previously, in forest harvested 9 years previously the mahogany seedlings had disappeared and regrowth was dominated by other species.

Veríssimo *et al.* (1992) studied mahogany logging in southern Pará, **Brazil** and recorded an average of 2.9 plants of all species per m^2 in regeneration study plots. (Ninety-five percent of these species were without wood value in current markets.) *Swietenia macrophylla* was "quite scarce" in the regeneration plots, and was found on transects in only one of three study areas, and then at extremely low densities. As a result of this finding, research was extended to visiting four sites from which mahogany had been extracted in the past. Searching plots of 5 m × 15 m at the base of old mahogany stumps, the authors found *S. macrophylla* seedlings/saplings in only 31% of the 70 gaps located, at an average number of 0.59 per plot (Veríssimo *et al.* 1992). The continuing presence of seed trees was noted as an important predictive variable in the finding of seedlings. At 89% of clearings without *S. macrophylla* regeneration, not a single mature specimen was nearby, whereas in half of the 22 clearings with mahogany seedlings, at least one older mahogany was found nearby (Veríssimo *et al.* 1992).

Snook (1992) noted that selective logging impedes *S. macrophylla* regeneration in the following ways: (1) selective logging removes mahoganies but leaves other species behind to take over their space; (2) the openings created by a single tree-fall do not provide conditions suitable for *S. macrophylla* regeneration, such as the provision of adequate light and disturbed mineral soil; and (3) logging removes seed sources.

2233. Minimal Prospects for a Second Cut: As a result of its mode of regeneration, *S. macrophylla* tends to occur in even-aged groups in Amazonia, lacking age stratification within individual populations (Quevedo 1986, Gullison & Hubbell 1992, Veríssimo *et al.* 1992). Logging to a diameter limit has the potential to remove all mature mahoganies within a region, particularly those with good seed production and dispersal potential, resulting in a loss of seed production and curtailing regenerative options (Veríssimo *et al.* 1992, Gullison & Hubbell 1992). The relative absence of intermediate-sized mahoganies, and the limited potential for regeneration after selective logging, combine to provide little option for a future second cut:

> "The prospects of a second mahogany harvest in the near future are dim. The stock of mahogany trees between 10 and 45 cm dbh ... is only 0.3 trees/ha ... Considering natural mortality, it is unlikely that this stock could produce a second harvest" (Veríssimo *et al.* 1992).

The possibilities and constraints pertinent to human assistance of natural mahogany regeneration following logging or deforestation are addressed by Snook (1993) and Veríssimo *et al.* (1992). In addition to modifying the current practice of cutting to a diameter limit, these recommendations include the instituting of silvicultural policies that: (1) encourage the early removal and use of other species; (2) the appropriate spacing of *S. macrophylla* seed trees; (3) the opening of regeneration areas; (4) awaiting seed dispersal before harvesting; and (5) the intermittent removal of seedlings and other vegetation that is competing with mahogany regrowth.

224. Genetic Concerns

2241. Genetic Loss and Dysgenic Selection Over Range: Genetic loss within and of populations from exploitation and reduction by land-use change is of critical importance in assessing the conservation status of *S. macrophylla* populations (FAO 1984, Mabberley 1983, Oldfield 1984). One of the key goals of CITES regulation of *S. macrophylla* would be to prevent this species suffering genetic erosion such as has afflicted *S. mahagoni*, reducing this once prized timber tree to its current state as a multi-branched or stunted species (Styles 1981). The *in situ* conservation of *S. macrophylla* was accorded highest priority by the FAO (1989), and the U.S. National Academy of Sciences (NRC 1991) report on plant genetic resources identified *S. macrophylla* as Vulnerable. The ITTO (1991a) cited Brazilian mahogany as a species where long-term measures were becoming necessary to conserve the genetic variability of populations.

The wide variation in *S. macrophylla* leaves, flowers, fruits, and wood structure was noted by Lamb (1966), raising the possibility that this species exhibits high genetic plasticity over its large geographic range and among the many separate breeding populations. In particular, there are indications that tree form and resistance to shoot-borer attack are heritable characteristics, emphasizing the importance of genetic conservation, as logging tends to deplete the population of individuals with these desirable genetic characteristics (Newton *et al.* 1993b).

> "Selective logging acts as a source of dysgenic selection, whereby the best genotypes (in terms of growth or form) are selectively removed during the course of forestry operations. This results in a population

depleted in its most favoured genotypes (genetic erosion). ... Genetic erosion of other *Swietenia* and *Cedrela* species has already occurred in Central and South America, where trees of good form are now rarely encountered except in isolated areas (Styles & Khosla 1976)" (Newton *et al.* 1992, 1993b).

Few investigations of the genetic variation in *Swietenia* species have been undertaken, by either forestry companies or research institutes (NRC 1991, Newton *et al.* 1993b, Liu 1970), despite the apparent amenability of *Swietenia* species to breeding techniques (Styles & Khosla 1976).

> "... little attention has been paid to the extent of genetic variation that exists within the natural distribution of these species. Categorizing this variation is of importance for defining both *in-* and *ex situ* conservation of particular populations, for the development of afforestation and tree improvement programmes, and for the overall process of domestication." (Newton *et al.* 1992).

2242. Genetics and Resistance to Shoot-Borer Attack: It has been established that some species of the genus *Swietenia* are less susceptible to attack by the mahogany shoot borer than others. In plots in Puerto Rico, *S. mahagoni* is less attacked than *S. macrophylla*, and the artificial hybrid *S. mahagoni* × *S. macrophylla* is intermediate (Whitmore & Hinojosa 1977). Grijpma (1976) noted that there is a strong possibility that mahoganies not preferred by shoot borers may exist, which could be exploited in a selection program to heighten shoot-borer resistance. However, few studies have been made of intraspecific variation in susceptibility to attack (Newton *et al.* 1993a, 1993b).

Three forms of resistance to shoot-borer attacks have been postulated in various Meliaceae species (Grijpma, 1976, Newton *et al.* 1992): 1) non-preference, the insect is not attracted or is actively repelled; 2) antibiosis, the insect is killed or prevented from completing its life cycle on the tree; and 3) tolerance, the tree recovers in an acceptable fashion/level. In the early 1970s, the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) employed 100 researchers in **Costa Rica** in an attempt to solve the shoot-borer problem through various planting techniques and pesticides, but with no positive results. Additional *Swietenia* trials are currently in progress at CATIE and the International Institute of Biological Control. Small-scale tree improvement programs have recently been initiated in **Trinidad**, **Costa Rica** and **Honduras**, based on clonal selection and *ex situ* conservation (Newton 1990, Newton *et al.* 1993b). The principal species are *Cedrela odorata* and *S. macrophylla*, but also *S. humilis* and *S. mahagoni* (Newton *et al.* 1993b).

> "The potential loss of genotypes resistant to pest attack is perhaps one of the strongest arguments in favour of greater protection for remaining stands of mahogany. As described above, selection for pest resistance has great potential as a method of reducing the damage to commercial plantations caused by the mahogany shoot borer. The exploration and testing of *Swietenia* genotypes is therefore an urgent priority. If resistant genotypes and populations are identified, their *in situ* and *ex situ* conservation and utilization should become immediate objectives, on economic as well as biological grounds" (Newton *et al.* 1992, 1993b).

23. Habitat

231. Preferred Ecotypes: *Swietenia macrophylla* occurs in moist (or even wet) to dry, evergreen to deciduous tropical to subtropical forests, with typically (800-) 1000-2500 mm of annual rainfall, and at altitudes from 0 m to 1400 m (Lamb 1966, Whitmore 1983, Betancourt 1987, Rzedowski 1978, Toledo 1982, Pennington & Sarukhán 1968). It reaches optimum development under tropical dry forest life-zone conditions (Holdridge 1947), namely a mean annual temperature of 24°C or higher, mean annual precipitation (*map*) of 1000-2000 mm, and potential evapotranspiration (*pet*) between 1.00 to 2.00. It also extends into the tropical moist forest life zone (24°C or above, *map* 2000-4000 mm and *pet* 0.50-1.00), as well as into the subtropical dry and subtropical moist forest life zones (ca. 18°-24°C for both, with respectively 1.00-2.00 *pet*/500-1000 mm precipitation and 0.50-1.00 *pet*/1000-2000mm). Ideal precipitation conditions reportedly are 1200-2000 mm (Bascope *et al.* 1957). Mahogany grows naturally on alluvial, volcanic, limestone, granitic, andesitic, and other sedimentary, igneous, and metamorphic-based soils (Whitmore 1992).

In **Bolivia**, woodsmen recognize four distinct races of *S. macrophylla*, based upon the habitat in which it occurs. "Mara acedretada" grows "very rapidly", and the wood resembles Spanish cedar. "Mara acuchisada" grows slowly in dry forests, producing a very dense wood. "Mara peluda" grows in flooded areas and poorly drained soil, producing timber with a "woolly" grain that is worthless. "Mara grano de oro" grows in well-drained soils with a superficial water table, and is considered to produce the best wood. Unfortunately, the land and habitat in which mara grano de oro occurs is highly suitable for slash-and-burn agriculture, and so cleared (Bascope 1992).

232. Logging, Road Construction, Habitat Loss: In regions where *S. macrophylla* occurs, there is a complex interrelationship between logging, road construction, human settlement, and deforestation/habitat loss. The adverse effects of the interrelationship directly impact mahogany populations, both in generating the impetus for logging and by altering the potential for mahogany regrowth (Rodan *et al.* 1992). Road construction, often to facilitate the extraction of commercially valuable timber such as mahogany, opens the forest to colonization and land-clearing (Nations 1987, Veríssimo *et al.* 1992), especially in frontier areas that previously had limited forest disturbance (TFW 1989). For example, in southern Pará, **Brazil**:

> "the immense area bounded by Para Highway 150 on the east, the TransAmazon forest to the north, and the Cuiaba Santarem Highway to the west is rapidly being opened up by logging roads [Appendix D]. On official maps this region appears as a sea of green forest dotted with Indian reserves" (Veríssimo *et al.* 1992).

The principal logging road in the Moradoa do Sol region, north of the city of Tucumá, Pará, is 400 km long and was begun by mahogany loggers in 1985. Since then, the road has grown ca. 60 km/yr over 7 years. Colonists were concentrated along the first 70 km of this road, and 42% of the area occupied had been deforested in the 7 years of occupation. Seven landowners (five of whom operate sawmills) controlled the remaining 330 km of road, an area of perhaps 5000 km² total, and after the mahogany is extracted from these holdings, cattle pastures are being established (Veríssimo *et al.* 1992).

> "In 1985 the region cut by this road was almost completely covered by forest. ... But over the past seven years, loggers, colonists and ranchers have used this

logging road to gain access to the land, converting the logged forest into agricultural fields and pastures for cattle. ... The migration route of these agriculturists coincides with the movement of loggers in search of virgin mahogany forests" (Veríssimo *et al.* 1992).

Human settlement may also precipitate, and be dependent upon, logging of the commercially valuable timbers present on a property. In certain instances, it is the presence of valuable commercial species on subsistence plots that makes them economically viable in the short term. In reviewing the economics of a non-mahogany forestry operation in **Brazil**, Uhl *et al.* (1991) noted that the security provided by timber resources allowed colonists to persist for longer periods than otherwise, while continuing to clear the forest each year for farmland on which to produce food for home consumption and sale. When the land was exhausted, settlement moved elsewhere (Uhl *et al.* 1991).

The United Nations Food and Agriculture Organization (FAO 1988, Lanly 1982) has estimated that "logging directly causes 10 percent of tropical deforestation — and facilitates tropical forest losses stemming primarily from other causes. In most humid tropical forest areas, logging practices today are typically 'mining' operations that deplete or eventually eradicate tropical forests. While logging in tropical forests more generally tends to be selective, it can be very destructive if poorly planned and inadequately regulated" (Johnson & Cabarle 1993).

233. Deforestation Rates in Central and South America: Deforestation rates over Latin America provide partial information on the habitat loss of *Swietenia macrophylla*. Myers (1989) compiled estimated deforestation levels and rates based upon an extensive survey of the professional literature, including papers, reports and other publications dealing with deforestation in the countries concerned.

In **Central America** at the time of Columbus' voyage, tropical moist forests covered an area of ca. 500,000 km². By the mid-1980s, remaining forest was estimated at 90,000 km², of which only 55,000 km² could be considered to be primary forest. Deforestation continues in Central America at 3.7% annually (Myers 1989). In the Petén region of **Guatemala**, which is the principal habitat for *S. macrophylla* in that country, tropical forests constituted 36,000 km² in 1960, but since that time at least one third has been eliminated (Myers 1989). Human population in the Petén is growing at 9.5% per year, leading to agricultural encroachment, fuelwood consumption and consequent forest loss (Salazar 1992).

Myers (1989) estimated that the deforestation rate in **Brazil** was 2.3%. Data from the Instituto Nacional de Pesquisas Especiais in 1991 (INPE, in FUNATURA 1993) indicated the following estimated deforestation levels in Brazilian states within the mahogany belt: Rondônia 14.24%, Pará 11.86%, Mato Grosso 19.6%, and Acre 7%. The estimated deforestation rate in **Brazil** has been reappraised by Skole & Tucker (1993) using composite satellite images taken in 1988, which could distinguish between primary and regrowth forest. Skole and Tucker (1993) calculated "that 6% of closed-canopy forest had been cleared as of 1988 and ca. 15% of the forested Amazon was affected by deforestation-caused habitat destruction, habitat isolation, and edge effects." As illustrated in the accompanying Appendix C, a considerable amount of this deforestation has occurred in the mahogany belt, with the primary remaining untouched regions being located in Amerindian reserves and biological reserves (see Appendix D). Road construction for timber extraction in what had been untouched areas is illustrated in Appendix E.

In **Bolivia**, Myers (1989) estimated that tropical forest originally covered 90,000 km² in **Bolivia**, of which primary forest cover has been at least halved to 45,000 km². Tropical moist forest, including degraded forests, was estimated at 70,000 km² in 1989, with a continuing rate of decline of 2.1% annually (Myers 1989). Researchers for the Inter-American Development Bank have estimated that more than 11% of Bolivian forests have been either cleared or damaged by logging and agriculture. Clearing of native forest continues at a rate of up to 600,000 acres per year (Nash 1993) — a figure only 20% higher than López' (1993) ca. 200,000 ha per year (based on MACA/FAO/PNUD 1990). Virtually no development or utilization of the Bolivian Amazon had occurred until 40 years ago when the government built a highway to Santa Cruz (1952) that resulted in waves of immigrants, urban growth and industrialization based on agriculture and logging. This development and forest encroachment jumped ahead of the government regional development program (Bascope 1992). Forest degradation has been increasing because of: the selective logging of mahogany; lack of coordination among government forest management agencies (Forest Service, National Colonization Institute, and National Agrarian Reform Council); destruction by colonists under plans drawn up by the National Colonization Institute and National Agrarian Reform Council; a weak forest service; the building of logging roads by logging companies and rural roads by public institutions (opening the forest to settlers); agrarian development projects financed by the Inter-American Development Bank, World Bank, and USAID without consideration for the natural resources; selective logging of mahogany; and increasing numbers of illegal loggers using chain saws.

3. International and National Trade Data

31. National Utilization and ± Legal International Trade: National and international utilization and trade in *Swietenia* chiefly involve their timber. Properties of mahogany woods including easy workability, durability, and above all beauty (grain, colour and finish) have made mahogany perhaps the most valuable timber of the neotropics (*e.g.* see Bramwell 1976, Walker 1989, Constantine 1959, Lewington 1990, Whitmore 1981, Fosberg 1945, Lamb 1966, Styles 1981, FPRL 1956, Chudnoff 1984). Mahogany is particularly desired for high-class cabinets, chairs, joinery, panelling and pianos, and is used as solid wood or veneer (Walker 1989, Bramwell 1976, Samba Murty & Subrahmanyam 1989). Increasing costs, with supplies diminishing, have resulted in greater usage in commerce of the veneer only.

311. International Trade: International mahogany commerce began nearly 5 centuries ago in the Caribbean with the extraction of *S. mahagony.* The severe depletion in *S. mahagoni* populations by about the 1850s caused a commercial shift to *S. macrophylla* (Samba Murty & Subrahmanyam 1989), despite its wood being coarser grained and thus considered inferior (Styles 1981, Bramwell 1976). *Swietenia macrophylla* remains the main source for the mahogany market (when it is not supplied by similar woods from Southeast Asia or Africa; Knees & Gardner 1982, 1983a). Readily accessible populations in Central America have been diminished considerably (*e.g.* Boucher *et al.* 1983, Walker 1989). *Swietenia macrophylla* was discovered in the Amazon ca. 1923 (Little & Wadsworth 1964); intensive extraction there began rather recently, with the opening and development of that region (*e.g.* White 1978 for **Peru**). Representative is the 1977-1987 sixfold increase in mahogany extraction with Bolivia's northeastern road construction (Dept. Beni) (Collins 1990).

Extensive data on volumes of mahogany traded internationally are available from import/export figures collated by customs agencies. Updated information from the 1992 U.S. CITES proposal is attached in Appendix H of this proposal (Jimerson 1993, Bishop 1993; see also Lamb 1966 and Knees & Gardner 1982, 1983a, 1983b). It

should be noted that the country listed on customs data is not necessarily the initial source (originating country) for the timber shipment. Tariff-schedule listings also vary, complicating direct correlations between the export and import data, and preventing species identification in certain circumstances.

Subcontract reports to FUNATURA, **Brazil**, provided detailed data on the commerce of mahogany in the **United States** (Jimerson 1993) and **United Kingdom** (Bishop 1993). The FUNATURA study was, in turn, commissioned by the International Tropical Timber Organization as part of their project entitled: "Development work to phase out trade on unsustainably produced timber." Included in Jimerson (1993) and Bishop (1993) are current details on the volumes of trade and the prices paid for various forms of mahogany, whether sawnwood, veneer, or plywood (logs are now rarely exported due to government regulations in the originating countries). Jimerson (1993) calculated that imports of mahogany into the **United States** had, since 1980, averaged 108,000 m^3 for rough lumber, 15,000 m^3 for dressed lumber, between 2,250 m^3 and 7,500 m^3 for veneer, and 1,125 m^3 for plywood, totalling ca. 131,625 m^3 annually. In 1992, 86,486 m^3 of rough and 11,714 m^3 of dressed mahogany lumber were imported into the **United States** (U.S. Bureau of Census 1993).

Current prices for rough mahogany off the dock in the **United States** vary around USD 700 per m^3, depending on the grade of timber. Veneer prices were noted to have doubled since 1984 to USD 2,200 per m^3 for A-grade imported veneer and USD 5,000 per m^3 for domestic veneer (Jimerson 1993). Similar information is available on the mahogany trade into the **United Kingdom** (Bishop 1993), although volumes are less than in the **United States** (ca. 90,000 m^3 of lumber imports annually to the UK in the 1980s), and have declined considerably from 1990 (70,000 m^3 and 55,000 m^3 of mahogany lumber in respectively 1990 and 1991).

Rodan *et al.* (1992) calculated the value of an average mahogany tree in Pará, **Brazil**, to be USD 324 in log form (5.4 m^3 per tree, USD 60 per m^3), and USD 1,500 on import to the **United States** (5.4 m^3 per tree, 50% processing loss, USD 545 average declared customs value). Noting the price structures outlined by Jimerson (1993), the use of USD 545 per m^3 should be considered conservative in estimating the value of individual *S. macrophylla* specimens.

Domestic utilization of mahogany in **Brazil** was estimated by Barros *et al.* (1993) to account for roughly one third of the timber extracted, the remaining two thirds being exported. The extent of this export market, and the influence and aberrations engendered by government export enhancement policies, were analyzed by Browder (1986, 1987, 1989). In **Bolivia** in 1985, approximately 73% of mahogany production was exported, representing 88% of the total Bolivian timber exports. The exported mahogany generally consists of the higher grades, with domestic usage being concentrated on lower grades of timber. Logging in the Chimanes region of **Bolivia** began in 1987, and volumes of wood cut rose each year through at least 1990, as companies' capacities increased (Synnott & Cassells 1991). In the year 1990, imports of mahogany from **Bolivia** to the **United States** exceeded those from **Brasil**.

A major contemporary initiative in international trade is the use of timber certification procedures to distinguish sustainably harvested mahoganies from unsustainably logged timber originating from primary forests. Considerable detail on a variety of these proposed certification programs is provided by Johnson and Cabarle (1993). Particular emphasis is placed upon the Smart Wood program of the Rainforest Alliance and the proposed certification program by the Forest Stewardship Council. The Smart Wood program has certified five sources of tropical timber, four of which are in Latin

America. Although four of these sources harvest mahogany, only two had been certified for mahogany by the time of publication. These sources are New River Enterprises Ltd., in **Belize**, and the Indonesian State Forestry Corporation, Perum Perhutani, on Java (Ussach 1992). Ussach (1992), reporting on the Smart Wood program, concluded that including mahogany in CITES Appendix II would not be incompatible with certification:

> "on the contrary, such listing would probably lead to a much clearer elaboration of whatever forest management activities were actually being conducted, as well as act as a spur for the development of such management activities."

321. Artificial Propagation Considerations: Cultivation: Most large-scale planting efforts of *S. macrophylla* for timber production have failed (Whitmore 1983, 1992). There are few, if any, examples of mahogany being managed on a sustained-yield basis, either in natural forest or in plantations of various types (Lamb 1966; Whitmore 1992, 1983; Newton 1993; Rodan *et al.* 1992; Ussach 1992). In light of these failures, all current plantings of *S. macrophylla*, particularly within its native range, must be regarded as experimental. Their success is by no means assured, as most continue to attempt to apply, in different settings, methods that have not proven effective in overcoming the many biological, technical, sociopolitical and economic barriers that have prevented success thus far. As a result, virtually all the mahogany currently traded on international markets comes from specimens of *S. macrophylla* extracted from primary forests. In 1991, 97% of mahogany lumber imported into the **United States** came from countries with native mahogany populations (U.S. Bureau of Census 1992). Now and for the foreseeable future, plantation-grown mahoganies do not compensate for the loss of naturally occurring populations (particularly where plantation mahoganies are hybrids or are grown in non-native regions).

Countries in which mahogany plantations have been reported include, *e.g.*, **Mexico** (also reforestation), **Belize, Honduras, Cuba, Puerto Rico, Martinique** (also reforestation), **Trinidad and Tobago, Venezuela, Brazil, USA** (Hawaii), **Fiji, Indonesia, Philippines, Malaysia, Myanmar, Bangladesh, Sri Lanka, India** and **Nigeria**. In the few instances where *S. macrophylla* plantations have been successful on biological grounds, concerns remain regarding the quality of the timber and the economic viability of the venture (see Rodan *et al.* 1992).

3211. Shoot Borer: The mahogany shoot borer is the main limitation to the artificial establishment of mahogany throughout Central America and South America (see Martorell 1943, Strong 1940. For example, between 1935 - 1943 shoot borers destroyed 835,000 *Swietenia* and 1,000,000 *Cedrela* trees in **Puerto Rico** (Newton, 1992). Damage is caused by larvae of shoot-boring moths — principally *Hypsipyla grandella* (Zeller), Lep. Pyralidae — which burrow inside the terminal part of the stem, destroying the shoot apex and causing branching, forking or deformation of the bole. Virtually all terminal shoots can be attacked within a year, and the resulting multiple-branched stems "seriously reduce the stand value and utility at maturity" (Liegel & Venator 1987). Although an enormous amount of effort has been put into researching mahogany plantations and shoot borers over the last 100 years, no practical control methods have been developed (Whitmore 1992, 1976a, 1976b; Grijpma 1974, 1976; Betancourt 1987; Lamb 1966; Newton 1993). Application of insecticides has proven to be expensive and ineffective (Grijpma, 1974, Liegel & Venator 1987), although slow release systemic insecticides have shown some promise (Allen *et al.* 1976). An extensive

programme of biological control undertaken in **Trinidad** was largely unsuccessful (Cock 1985).

Snook (1993) compiled data on the natural incidence of shoot-borer attack on naturally regenerating *S. macrophylla* populations in **Mexico** was found to be between 17% and 40% of mahoganies on stands between 8 and 15 years of age; some specimens appeared to be attacked preferentially (Snook 1993). A similar attack rate of 11-58% was noted in line plantings of mahogany by the U.S. Forest Service in **Puerto Rico** (Weaver & Bauer 1986). Adult mahoganies with borer-deformed stems like those common in plantations were never seen in the forests of Quintana Roo, **Mexico**, presumably due to the death of those individuals damaged as a result of shoot-borer attack and unable to compete for scarce light resources (Snook 1993).

Other insects can also attack mahogany seedlings (the sugarcane stalk borer *Diaprepes abbreviatus* — Liegel & Venator 1987) and semimature plantations (an *Ambrosia* beetle — Whitmore 1992, Bramwell 1980).

3212. Review of Experimental Plantations: Examples of relative biological successes in the silviculture of mahogany have been reported from **Puerto Rico** (where *Swietenia* is not native) and **Brazil**. In the Luquillo mountains of **Puerto Rico**, ca. 1275 ha of *Swietenia* spp. were planted up till 1981, under the auspices of the U.S. Forest Service (Weaver 1987, Weaver & Bauer 1986). In the early plantings, seeds were spaced at 3 m × 3 m intervals under the canopy of a secondary forest (which was gradually poisoned). Later plantings were established as lines, the trees being placed 2 m apart within rows and 11 m apart between rows. Heavy maintenance schedules were applied, with growth averaging 0.09 m/yr to 0.65 m/yr during the first 8 years. Although this was considered to be slow growth, "the plantation is considered to be a success in light of the innumerable failures listed in the mahogany literature" (Whitmore 1992). Shoot-borer damage was found on 58%, 11% and 18% of the trees planted respectively in 1974, 1979 and 1980 (Weaver & Bauer 1986).

In Brazilian trials, Yared and Carpenezzi (1981) reported that shoot-borer damage was virtually absent in the line enrichment system employed. This was attributed to low initial planting densities, the presence of lateral shade, and the maintenance of some of the ecological conditions of the original forest (such as floristic diversity and microclimate). At 48 months, 87.2% of *S. macrophylla* specimens were surviving and exhibited a median dbh of 5.04 cm and height of 5.45 m.

Similar efforts to enrich forests through line planting have failed in Quintana Roo (Miranda 1958; Snook 1992, 1993). Although the U.S. Forest Service could appreciate the "slow" growth rates of 9-65 cm per year in heavily tended experimental plantations, similar growth rates (63 cm annual height increase) were considered unsatisfactory when viewed as an investment intended to produce income for landholders in Rondônia, **Brazil** (Matricardi & Abdala 1993, draft). For *S. macrophylla* silviculture to be viable, both biological and economic criteria will have to be satisfied.

3213. Time to Plantation Maturity: The U.S. Forest Service projects rotations of 40-60 years for mahogany in the Luquillo Experimental Forest in **Puerto Rico** (Whitmore 1992). Other research has estimated that a minimum of 40 years

is required for mahogany plantations to reach maturity (Vega 1976, Bascope *et al.* 1957). Individual specimens may reach the designated cutting diameter more rapidly, in accord with the Gaussian or bell-shaped distribution curve of tree diameters over a single-age population (Snook 1993; see Appendix G). Indonesian mahogany plantations require 50 years to reach maturity (Perum Perhutani 1991). Indonesian plantations report an average annual production of mahogany of 49,000 m^3 from clear cut and thinning. However, analysis of the data provided by Perum Perhutani (1991) indicates that it will take a further 25 years before even 11% of the current Perum Perhutani plantations can attain the designated level of commercial maturity (Rodan *et al.* 1992). Only 1,618 m^3 of sawn mahogany was imported from **Indonesia** into the **United States** in 1991.

3214. Current Efforts at Silviculture:

Additional plantations of *S. macrophylla* have been commenced in **Brazil** and **Bolivia**, as a result of encouragement by national legislation mandating compulsory reforestation operations and in response to national and international efforts toward timber sustainability. Other *S. macrophylla* planting projects, such as the Johnny Mahoganyseed project sponsored by the International Wood Products Association (IHPA), have also been initiated recently.

Barros *et al.* (1992; Table 25) tabulate a list of companies associated with AIMEX (the Association of Timber Exporting Industries of Pará and Amapa) that have forest replacement projects, and include the number of mahogany seedlings planted and the area covered in these projects. Preliminary status reports on the success and viability of these projects, both biological and economic, are currently underway. Sullivan (1991) visited several companies and government research and management stations in Pará in October-November 1991. All the mahogany seedlings were young, the oldest being estimated at 9 years (Sullivan 1991). Growth of saplings was reported as good at some sites, but Sullivan (1991) reported the occurrence of shoot-borer damage, and that "at present no-one seems to have an idea about how long it will take these seedlings to mature." Veríssimo *et al.* (1992) reported similar preliminary findings on the mahogany plantings by the five biggest sawmills in southern Pará, noting reasonable growth but frequent problems with the shoot borer.

In Rondônia, **Brazil**, a study of mahogany silviculture and reforestation revealed that only 13 of 25 sites reviewed were planting mahogany (not all sites were registered with IBAMA/RO), and even then only to a limited extent — ca. 800 ha (Matricardi & Abdala 1993, draft). Preliminary results from this study indicate varying results from different mahogany silvicultural strategies. Planting in grass used as pasture resulted in excessive shoot-borer attack (unless chemical pesticides were used), with additional adverse effects from soil compaction and competition for nutrients. Where *S. macrophylla* was planted with cultivated perennial crops, the site was abandoned with the demise of the cacao and coffee trees. The enrichment of logged forests with *S. macrophylla*, in combination with the elimination of competing vegetation, was noted to result in a diminished growth in diameter and height, considered to be a result of deficient levels of light. The enrichment of secondary forests ("capoeira"), combined with the elimination of secondary vegetation, produced the best results, with an average annual height increment of 1.186 m and

diameter of 1.2 cm (Matricardi & Abdala 1993, draft). Numerous farmers in Rondônia have also been encouraged to plant timber species on their properties, of which ca. 400 ha were planted with mahogany, mostly in combination with other agricultural crops. Practically all the mahogany plantings by small property owners were done with the support of IEF/Rondônia (State Institute for Forestry Studies; from 1988-1991) and SEDAM (1992 and later). This support included the provision of free technical assistance, seeds and seedlings (Matricardi & Abdala 1993, draft).

In **Bolivia**, instead of reforesting cut areas themselves, most companies pay a fee to the Camaras Forestales (Forest Industry Chamber) of each department, which is supposed to pay for reforestation. In the Chimanes Project, the fees have been "used for staff salaries, pending the arrival of full expected Government of **Bolivia** (GOB) funding" (Synnott & Cassells 1991). Some *S. macrophylla* plantations have been established in **Bolivia**, such as under the auspices of the Universidad Autonoma Gabriel Rene Moreno, Santa Cruz, which initiated a project to develop a model sustainable-management plan using Meneses Experimental Forest in Chore Forest Reserve (Bascope 1992). However, the Inter-American Development Bank recently withdrew its funding for this project (Synnott, pers. com.).

In Bolivia's Bosque Chimanes, Gullison and Hubbell (1992) note that "despite planting a considerable number of seedlings each year, seedling growth and survival have been poor." In the study period 1989-1990, *S. macrophylla* plantings had been done on skidding trails, where they lacked sufficient light. In 1991, experimental plantings were begun along major roads and in abandoned logyards, but results are not yet available on seedling survival at these sites. Gullison and Hubbell (1992) concluded that:

> "... with proper management, mahogany can continue to be produced in the Bosque Chimanes, although with a hiatus of 70-100 years while current seedling banks grow to merchantable size."

33. Illegal International Trade: Illegal logging of natural populations of *S. macrophylla* has been widely reported from national parks, forest reserves, and Amerindian lands in many Central American and South American nations. Estimates of the extent of this illegal trade are difficult, however, as illegal timber may be admixed with legally extracted timber. The continuing high demand for this valuable wood, combined with impediments to law enforcement from fiscal constraints, corruption and/or logistical problems, have resulted in inadequate control over the logging of *S. macrophylla* in many regions (ITTO 1988; Plowden & Kusuda 1989; Lutzenberger 1992; Rodan *et al.* 1992; Szwagrzak & López 1993, draft; Whitman, pers. com. to NRDC 1994). Despite the presence of considerable domestic legislation, much of the mahogany trade from Central America and Amazonia is from illegal sources (IEWPN 1990; Paz Juárez 1990; Monbiot 1991; Terborgh 1990; Correa 1990; Greenpeace Brasil 1992, *cf.* 21/3/1994 press release).

In **Brazil**, lands reserved for indigenous populations comprise ca. 22.5% of the mahogany-containing region (Barros *et al.* 1992), and the logging of *S. macrophylla* is increasing in these areas (Veríssimo *et al.* 1992, Greenpeace Brasil 1992). In 1987, 69% of the mahogany exported from **Brazil** came from the Kayapó reserve in the eastern Amazon (CEDI 1992; *cf.* Posey 1992). Concern about the adverse effects of illegal mahogany logging have been expressed by Dr Sydney Possuelo, president of the Brazilian Indian agency FUNAI, and by José Lutzenberger, previous Brazilian Minister for the Environment. In an open letter to British mahogany consumers, Lutzenberger (1992) stated:

> "The trade in Brazilian mahogany and other tropical timbers is out of control. In 1992, most of the timber leaving this country for Britain will come, illegally, from Indian and Biological reserves. ... The cutters are not only ransacking the forests in these protected areas to supply you with kitchens and lavatory seats: in many places they are also killing the Indians."

In the Brazilian state of Rondônia, FUNATURA (1993), in a study commissioned by ITTO, noted the manipulation of forest inventories by timber cutters to obtain mahogany logging permits, which are then used to legalize timber extracted illegally. Matricardi and Abdala (1993, draft) estimate that ca. 90% of production in Rondônia in 1991 and 1992 originated from indigenous reserves or conservation areas.

In **Bolivia**, forestry officials have been unable to control the numbers of trees cut even in the intensively managed Chimanes project area.

> "... In other cases, the felling contractors exceeded their approved volume [for 1990] and cut unmarked trees, which could not be extracted in 1990 but are to be extracted in 1991. In other cases, logging was apparently intentionally concentrated in areas proposed for allocation to indigenous people ..., before the deadline ... " (Synnott & Cassells 1991).

Szwagrzak and López (1993, draft) studied forest exploitation in Iturralde Province of the Dept. of La Paz, **Bolivia**. Iturralde Province was considered to be of particular importance as it is one of the last forest reserves in La Paz, and in **Bolivia** as a whole. Due to lack of infrastructure, the province had remained primarily intact until 1990. In 1990, opening a road to Ixiamas lead to an influx of colonists, both legal and illegal, and to logging firms, whose activities primarily focused on *S. macrophylla*. Logging concessions in Iturralde were also used to compensate loggers for the reversion of some concessions in Chimanes that resulted from the mandates of the 1990 Historic Ecologic Pause. A major portion of the subsequent logging in Iturralde was performed by "chain-saw loggers", operating illegally outside government controls, and in national parks and other protected areas. Each chain-saw logging operation usually has between two and five workers. Although large logging firms criticize the activities of the chain-saw loggers, Szwagrzak and López (1993, draft) report that logging firms actually collaborate with chain-saw loggers, buying high-value wood and financing equipment. Chain-saw loggers are particularly useful in the extraction of *S. macrophylla*, as this species is sparsely distributed.

Although Szwagrzak and López (1993, draft) were unable to quantify the extent of chain-saw logging operations due to the clandestine and illegal nature of these activities, it appeared that 10 such chain-saw teams were active in Ixiamas and ca. 300 in that region of **Bolivia**. Each team can process ca. 1000 trees per year. Szwagrzak and López (1993, draft) calculate that clandestine wood accounts for ca. 40-50% of reported exports. From **Bolivia** as a whole, 50% of contraband wood goes to **Brazil**, 30% to **Argentina**, 10% to **Chile**, 5% to **Peru**, and 5% to **Paraguay**.

The issue of whether logging taking place in indigenous reserves is legal or not is a complex and contentious issue, and subject to the legislation and constitutions of the relevant range State. Boas (1993) stated that in **Brazil**:

> "... [T]he institutionalization of logging activities by FUNAI [the Government Indian Agency] was far from being, as it first appeared, a provisional solution to the shortage of funds. ... [W]hat actually happened was that approval of logging was linked to the interests of groups of employees [of FUNAI (the government Indian agency)] acting as go-betweens with the companies. As a result, the leadership of FUNAI, ...

authorized, regulated and centralized the negotiation of logging indigenous areas. In 1987 countless contracts were signed between FUNAI's headquarters and the logging companies, ... even in areas where the Indians did not agree with this way of exploiting their natural resources."

In **Bolivia**:

"[t]here is some uncertainty about the long-term future ownership and management of the forest. The Decree No. 22611 of September 1991 states that the Commercial Harvesting Zones form part of the Chimanes Indigenous Area, and that these areas will ultimately revert to the indigenous people (unspecified) at the end of their long-term contracts (unspecified). It is not clear whether the proposed long-term logging contracts will, in fact, be renewable or whether the whole logging area will be handed over for direct management by indigenous groups" (Synnott & Cassells 1991).

In **Peru**, considerable illegal extraction of *S. macrophylla* is reported from parks and reserves, to the extent that the only populations still sufficiently protected are those in the remote Manú National Park (Chávez 1990, Terborgh 1990).

In **Guatemala**, illegal chain-saw logging is a considerable problem, with loggers taking advantage of newly created roads to gain access to previously remote regions. UNEPET has estimated that over 1,500 illegal chain saws are presently in use in the region (Salazar 1992). Juarez (1990) reported illicit trafficking in logs of cedar and mahogany from the Petén National Reserves of **Guatemala** to **Mexico**. Modern industrial saw mills process the wood in Quintana Roo, ten kilometres from the border. Lack of international control and law enforcement cooperation between **Guatemala**, **Belize** and **Mexico** are considered to be contributing to this problem (Salazar, 1992). Threatened by this illegal trade are mahogany trees over 200 years old, surrounding the Maya ruins at Tikal.

4. Protection Status

41. National: Included are general and/or specific logging regulations, and the establishment of timber reserves, nature reserves, and Amerindian lands. Many countries of origin have more or less economic regulation of the trade in *S. macrophylla*, particularly restricting the export of unprocessed logs. In some instances, regulations also ban export of the wood if not processed beyond the first stage of transformation (*e.g.* more than simply cut slabs or blocks).

Brazil has instituted harvest quotas for mahogany, which were set at 130,000 m^3 for 1992 (IBAMA Ordinance No. 110/91-N). Decrees have also been enacted to enhance the "value added" from mahogany extraction, such as by banning the export of mahogany logs and by restricting the export of timber greater than 3 inches in diameter. At least 50% of all forest areas opened to new agriculture in **Brazil** are to be kept in natural forest (Forestry Code Decree Law 4771). Unfortunately, as discussed under illegal logging, continuing impediments to law enforcement from fiscal constraints, corruption and/or logistical problems, have resulted in inadequate control over the logging of *S. macrophylla* in many regions.

In **Bolivia**, the severity of declines in mahogany forests stimulated the issuance of a Presidential Decree (11 January 1990) declaring a "Historic Ecologic Pause". There is a 5-year freeze on approving new logging concessions, maximum cutting sizes are set, and companies are required to begin executing sustainable management plans within 1 year (Bascope 1992). Just such a plan was developed for the Bosque Chimanes, but it failed to take into consideration the indigenous people and is now under evaluation (Bascope 1992).

At the instigation of the International Tropical Timber Organization (ITTO), Synnott and Cassells (1991) reviewed the prevailing standards of forest management and protection in **Bolivia** as these pertained to the Bosque Chimanes. Their conclusions provide a contrast between regulatory intent and field implementation (the applicability of which unfortunately also extends beyond Bolivia):

> "... [I]n reality, no Bolivian forests are at present subject to professional management for sustained yield of commercial timber. In all forests, essential elements of management are either incomplete or absent. In particular, neither the legally permitted activities such as timber harvesting, nor unauthorized activities, such as forest clearance and settlement and log-stealing, are adequately controlled. ...
>
> It is widely acknowledged that government staff are unable to evaluate the accuracy of timber inventories presented to them by the timber companies or to supervise the implementation of Management Plans or the actual volumes of logs harvested. ...
>
> The principal weaknesses, which make existing operations unsustainable, are the lack of adequate controls over rates and intensities of timber harvesting (by both licensed and unlicensed loggers), and the lack of adequate controls over forest settlement and clearance by colonists, farmers, and other land-owners. ...
>
> Tree marking and log measurements [*sic*] activities are important elements of forest management, and, to our knowledge, are unique to Chimanes and being carried out nowhere else in Bolivia" (Synnott & Cassells 1991).

Even in the Bosque Chimanes, where intensive management has been introduced with at least USD 400,000 of assistance from the ITTO:

> "[t]he operational control of logging is also poorly developed. ... [W]hen logging licenses were first issued by CDF, the permitted annual volumes of Mara far exceeded what was allowed in these [Management] Plans. Since then, the annual permitted volumes have been reduced steadily each year, ... in spite of protests from the logging companies. This reduction ... has occurred only on paper, and the reality in the forest is different. ...
>
> Every year, the annual permitted harvest of Mara (and the volumes actually cut in 1990) greatly exceeded the volumes prescribed in the Management Plans, and the volumes which could be sustained for a full 20-30 year cutting cycle. Furthermore, the report presented in Quito (Goitea 1991a), showed a recommended permitted volume for 1991 that was even higher than the volumes actually harvested in 1990 in five of the six active areas. ...
>
> The 1988 Management Plans, the consultancy report by Dance and many other reports including Goitea (1991a), all describe the necessity of defining blocks and compartments for regulating harvesting. However, such simple management categories have not even been drawn on maps, nor decided in principle by Project staff, in spite of two years of operation and over $400,000 of funding" (Synnott & Cassells 1991).

411. Protected Reserves: *Swietenia macrophylla* is found in many national parks, nature reserves, and forestry reserves. However, they are not considered sufficient for assuring conservation of adequate biological populations of the species and its genetic variability and thus for avoiding ecological extinction, in part because of the illegal logging (*e.g.* Monbiot 1991, Correa 1990). The species is (*e.g.*) in the Montes Azules

Biosphere Reserve in Chiapas (ca. 3310 km²) and Calakmul BR in Campeche (ca. 7000 km²) in **S Mexico** (Hernández 1964, Snook 1992), and Río Platano BR in NE **Honduras**, but illegally exploited (IUCN 1982, NYZS 1990, CI 1991). Twelve new protected areas are under study for the southern Petén in **Guatemala**, and in the northern Petén *S. macrophylla* is established in the 1.5 million ha Maya Biosphere Reserve, where illegal logging is widely practised (Salazar 1992). Numerous national parks, biological reserves and ecological parks are present within the mahogany zone of **Brazil**, totalling 34,929 km². Again, illegal extraction of *S. macrophylla* is a major problem (FUNATURA 1993, draft).

42. International: Four countries include their *Swietenia macrophylla* populations in the Annex to the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere [CNWH] (OEA 1967; USDS 1942; Coolidge 1945, 1949; Orejas-Miranda 1976):

Brazil	22/10/65	*S. macrophylla*
Venezuela	03/02/42	*S. macrophylla* [as *S. candollei*]
Costa Rica	22/10/65	*S. macrophylla*
Nicaragua	23/04/41	*S. macrophylla* [as "caoba *S. mahagoni*" (not native, and misused in past — Standley & Steyermark 1946); listed with comparable spp.]

43. Additional Protection Needs: The risk of genetic deterioration in *S. macrophylla*, similar to that already experienced by *S. mahagoni*, is a major biological factor indicating the need to regulate the international trade. As selective logging continues to remove the best mature trees and genotypes, the long-term survival, ecological role and value of the species will continue to be affected in adverse ways (Styles 1981, FAO 1984, NRC 1991). Furthermore, the intensifying deforestation in many areas effectively precludes re-establishment of those populations of *S. macrophylla*. Conservation is urgently needed for adequate representative natural populations over the range of the species. Effective conservation of base-line natural populations might assist in the development of sustainable extractive reserves, and the provision of genotypes resistant to shoot-borer damage and more conducive to plantation silviculture (UNESCO/UNEP/FAO 1978).

5. Information on Similar Species

Mahogany wood from *Swietenia* is well known and generally readily recognizable (Bramwell 1976, Edlin 1969, Bond 1950, Koehler 1922, Miller 1990). Particular trade in the other two species in the genus, *S. mahagoni* (Caribbean mahogany) and *S. humilis* (Pacific Coast mahogany), is regulated under CITES (U.S. CITES COP8 proposal, 1991).

Within the Meliaceae, *Khaya* and *Entandrophragma* species sometimes are referred to as African mahoganies. They and *Swietenia* produce similar timbers, but are considered distinct in commerce (Bramwell 1976, Walker 1989, Knees & Gardner 1982, 1983a). The neotropical *Carapa guianensis* Aublet (andiroba, crabwood or royal mahogany) sometimes is mixed with *S. macrophylla* in trade; its wood is known to be inferior (Record & Hess 1943, Knees & Gardner 1982).

6. Comments from Countries of Origin

At the time the **United States** and **Costa Rica** proposed inclusion of the genus *Swietenia* in Appendix II, **Mexico** informed the United States that its *S. macrophylla* population would benefit from Appendix III controls. **Costa Rica** informed the United States that *Swietenia* ought to be included in Appendix II. **Colombia** advised a U.S. NGO that inclusion of *Swietenia* in Appendix II seemed appropriate. Prior to its withdrawal before voting at COP8 (Kyoto, March 1992), the U.S. CITES proposal was preliminarily supported by all but three of the range States, and was also supported by the CITES Secretariat, the World Conservation Union (IUCN 1992), and TRAFFIC (Turner 1992). Particulars regarding the previous proposals by the **United States** and **Costa Rica**, and tropical timber issues dealt with at COP8, are reported in Campbell (1992).

7. Additional Remarks

There is considerable variation and local adaptation in *Swietenia macrophylla*, suggesting that conserving the genetic variability of the species must include populations from throughout its range. Additional species infrequently are recognized (Styles 1981). There has been limited speculation whether to taxonomically reduce the three species usually recognized in the genus *Swietenia* to one species for the genus (Styles 1981, Whitmore & Hinojosa 1977).

Emphasis is needed on developing sufficient long-term silvicultural ventures to supply the world demand for mahogany, for the maintenance of the mahogany industry and to reduce the pressures on wild *S. macrophylla* populations. However, even if the biological problems with mahogany silviculture are overcome and large-scale *S. macrophylla* plantings are commenced now, it will take another half century for the seedlings to reach the earliest levels of maturity. In the interval, pressures to extract valuable *S. macrophylla* specimens from reserves and parks will no doubt continue.

Appendix II of CITES has a suitable mandate and infrastructure to facilitate international cooperation in regulating the mahogany trade, *e.g.* obliging importing nations to ensure that the timber they obtain is in accordance with the laws of the country of origin (Rodan *et al.* 1992). CITES Appendix II listing is compatible with fledgling but rapidly evolving timber certification schemes, and the sustainable timber objectives — Target 2000 — pledged by the International Tropical Timber Organization (ITTO 1991b, 1992). As noted by John Turner (1992), Director of the U.S. Fish and Wildlife Service during the Bush Administration, Appendix II listing of Swietenia is "an option of considerable greater merit than a blanket boycott of trade".

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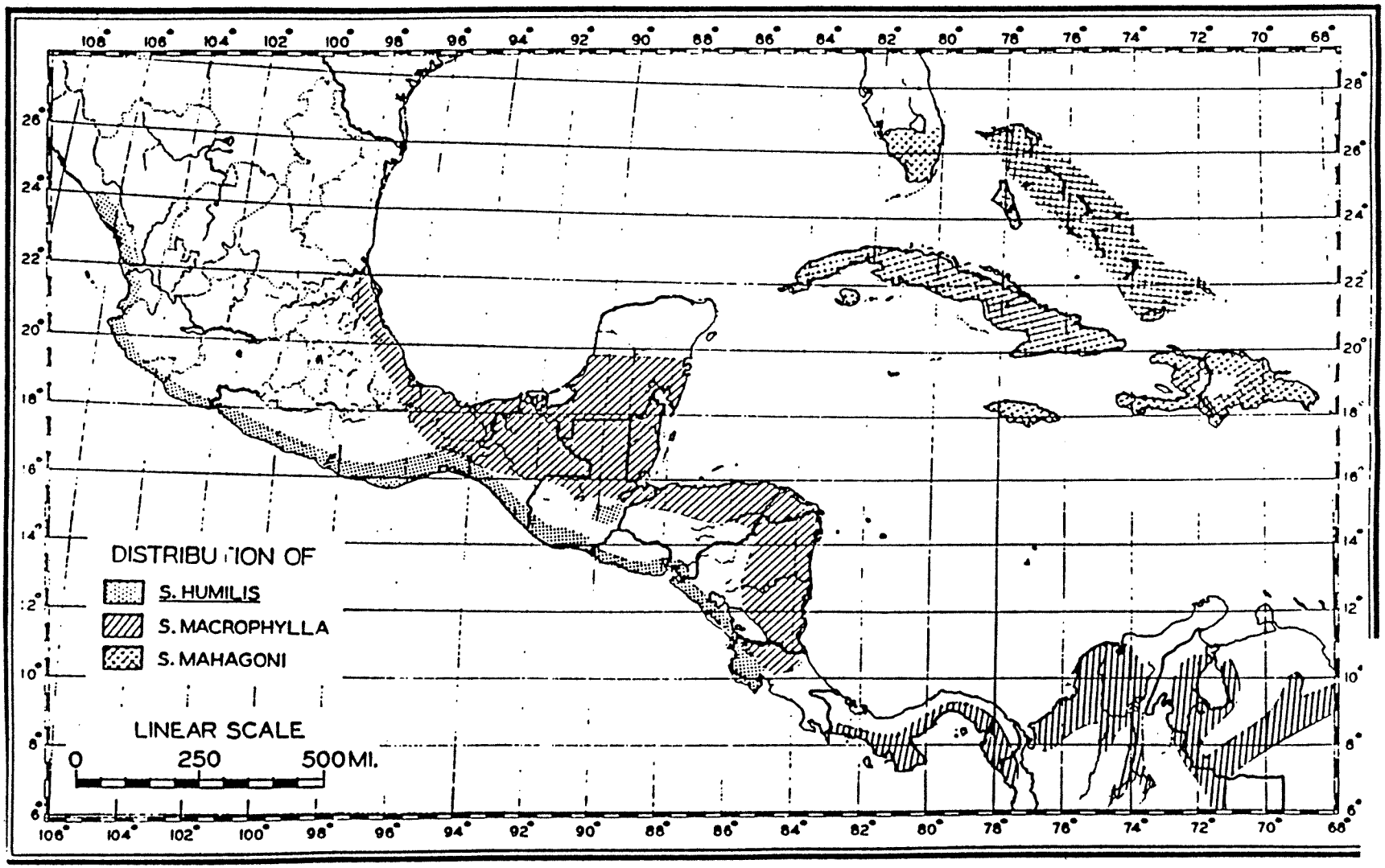


Figure 5. Distribution map of mahogany in Central America and Caribbean area.

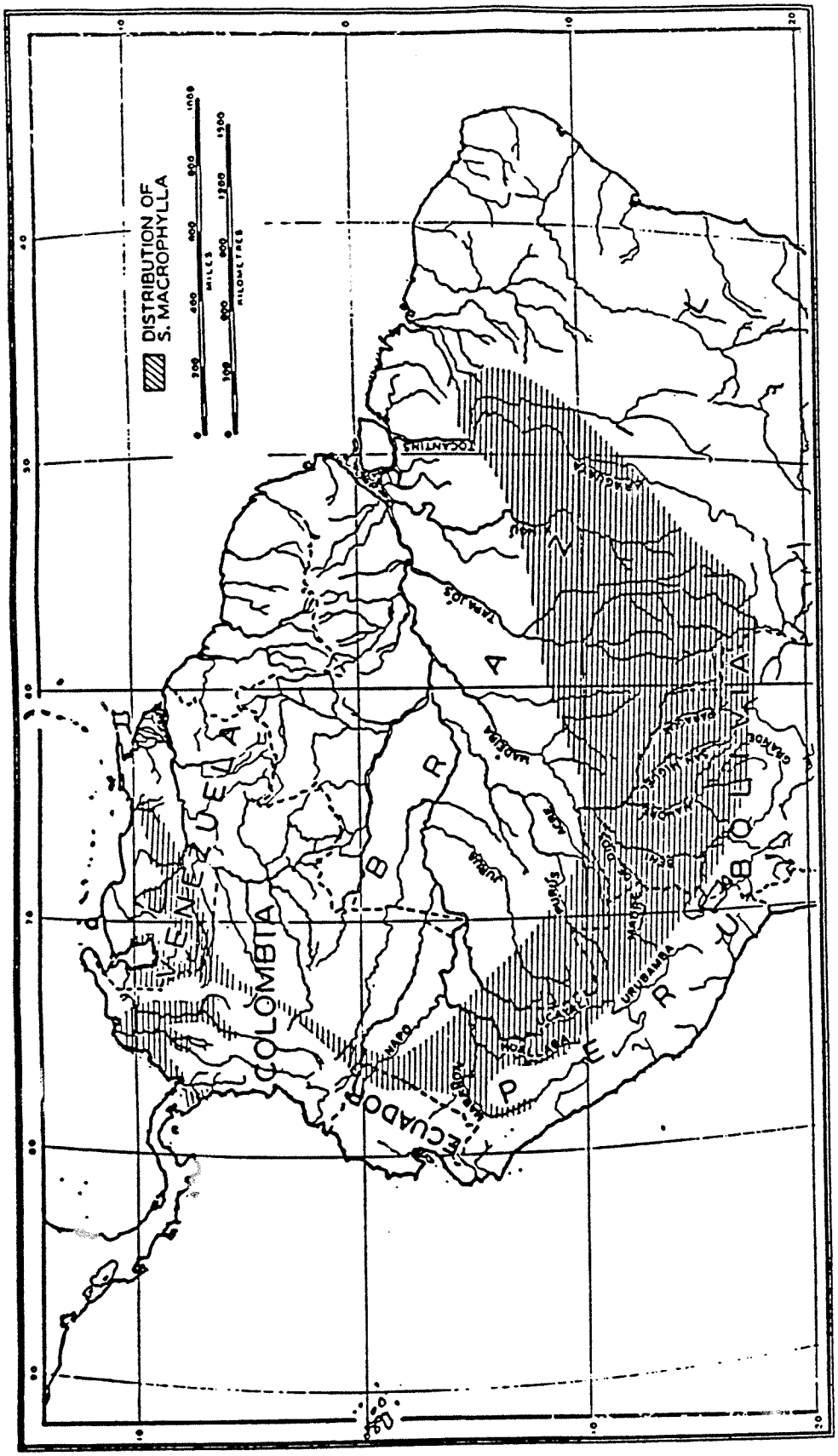


Figure 6. Distribution map of mahogany in South America.

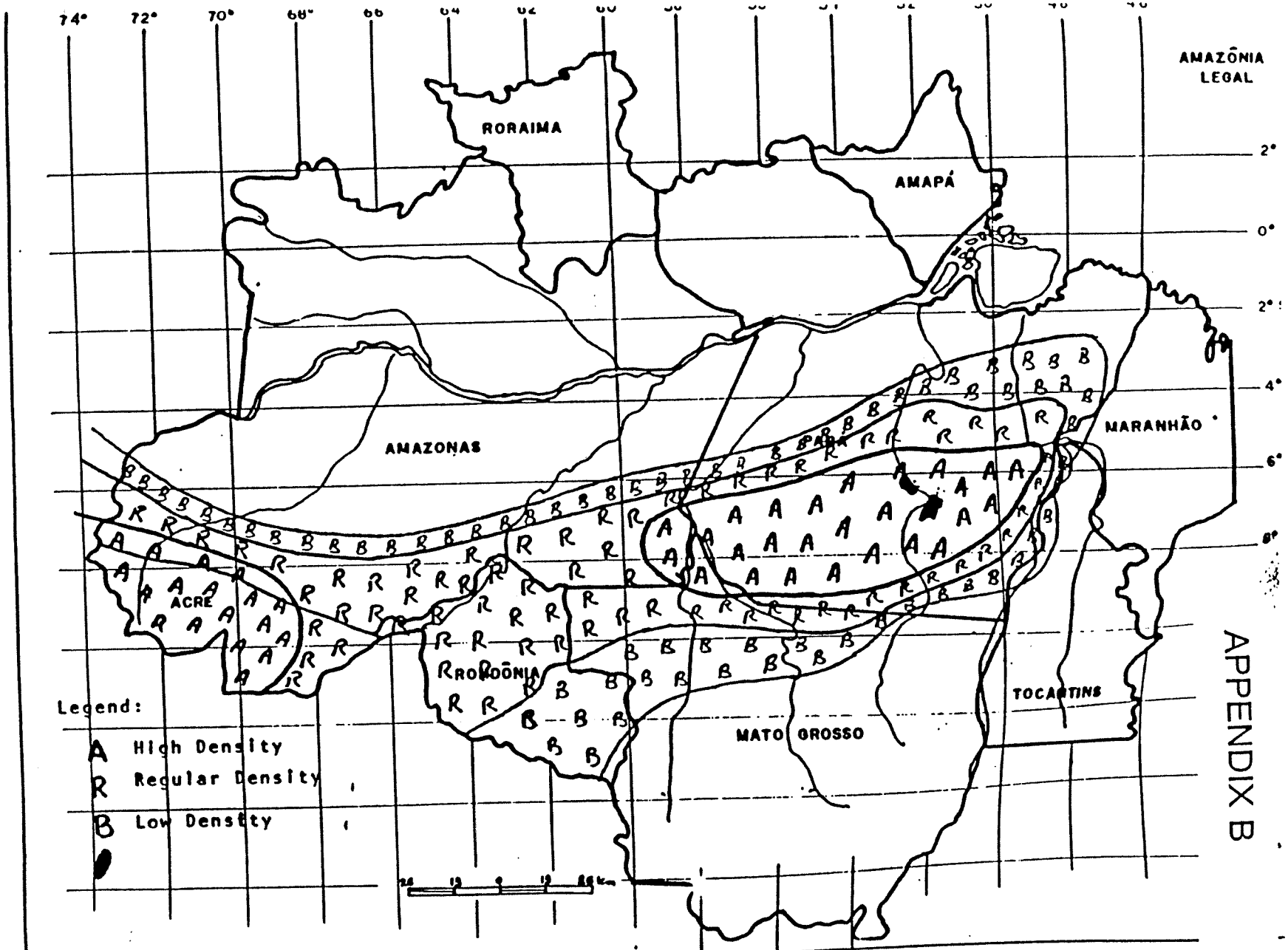
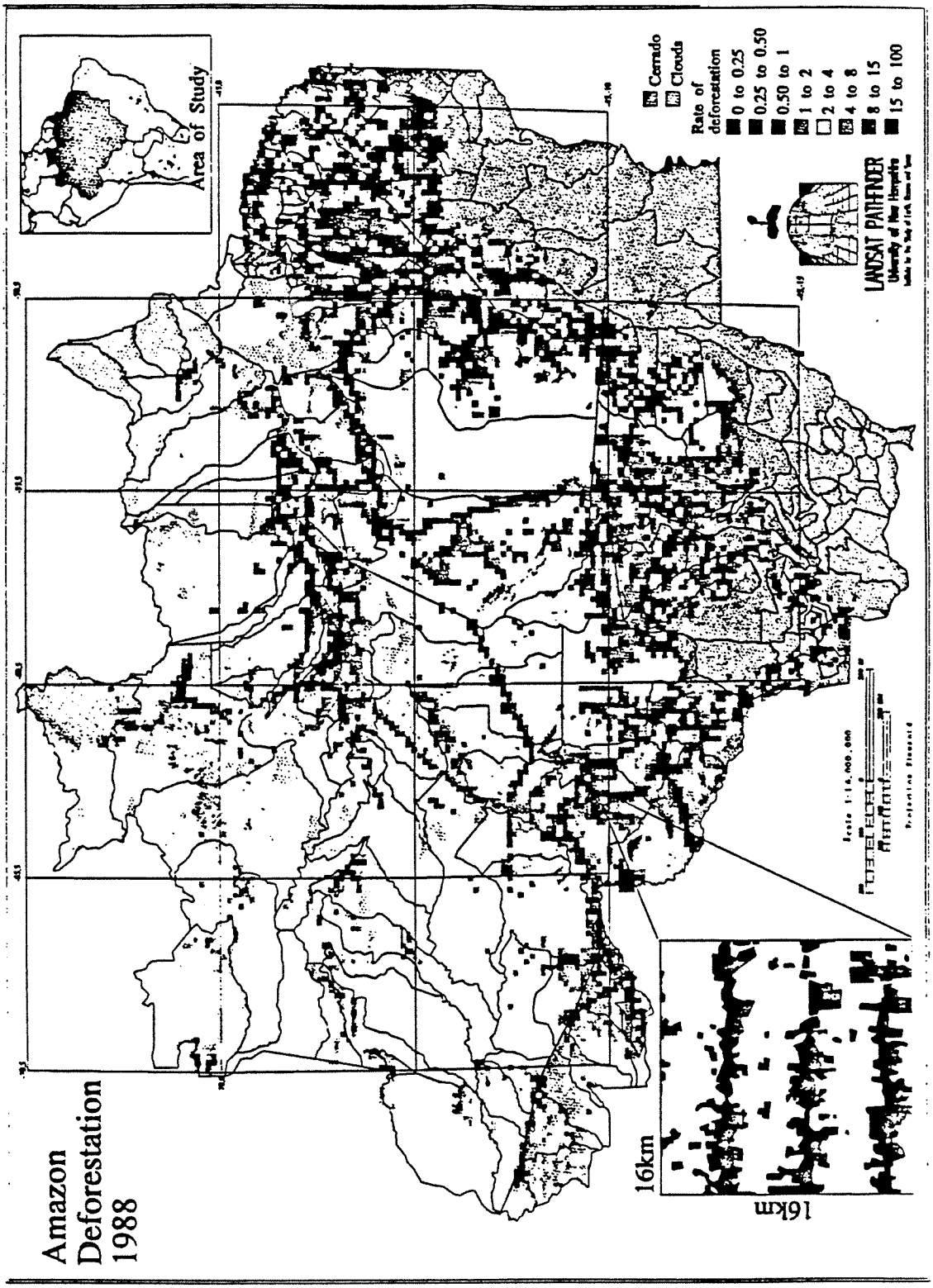
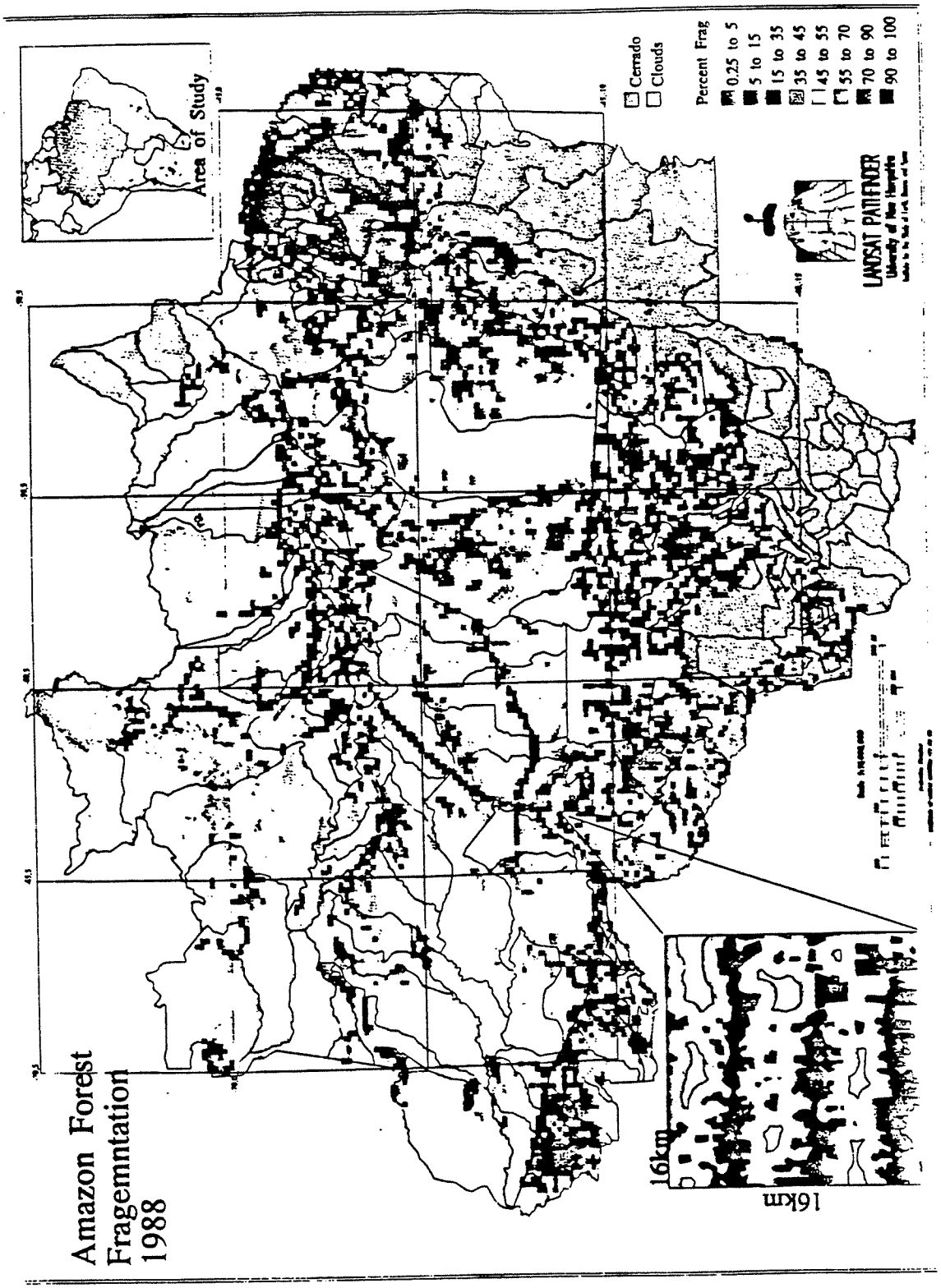
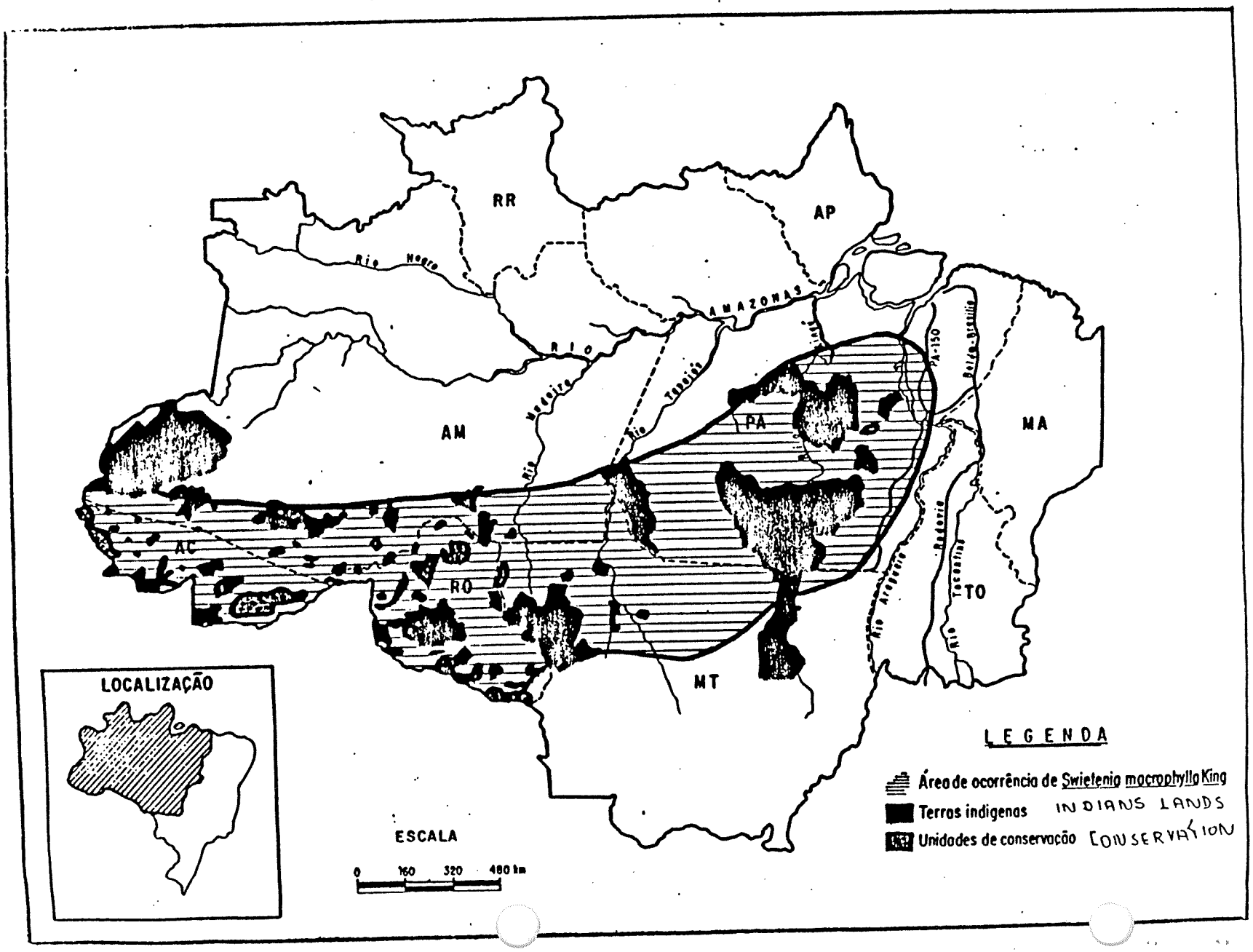


Figure 7 Zoning, according to density, of the natural area of Mahogany - S.macrophylla, King occurre in Brazilian Amazon


Amazon
Deforestation
1988
Area of Study
Cerrado
Clouds
Rate of deforestation
0 to 0.25
0.25 to 0.50
0.50 to 1
1 to 2
2 to 4
4 to 8
8 to 15
15 to 100
LANDSAT PATHFINDER
16km
16km


Amazon Forest
Fragemntation
1988
Area of Study
Cerrado
Clouds
Percent Frag
0.25 to 5
5 to 15
15 to 35
35 to 45
45 to 55
55 to 70
70 to 90
90 to 100
LANDSAT PATHFINDER
16km
16km


RR
AP
Rio Negro
AMAZONAS
Rio Madeira
Rio Tapajós
PA-150
Belém-Brasília
AM
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MA
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RO
TO
Rio Araguaia
Rio Tocantins
MT
LOCALIZAÇÃO
ESCALA
0 160 320 480 km
LEGENDA
Área de ocorrência de Swietenia macrophylla King
Terras indígenas INDIANS LANDS
Unidades de conservação CONSERVATION

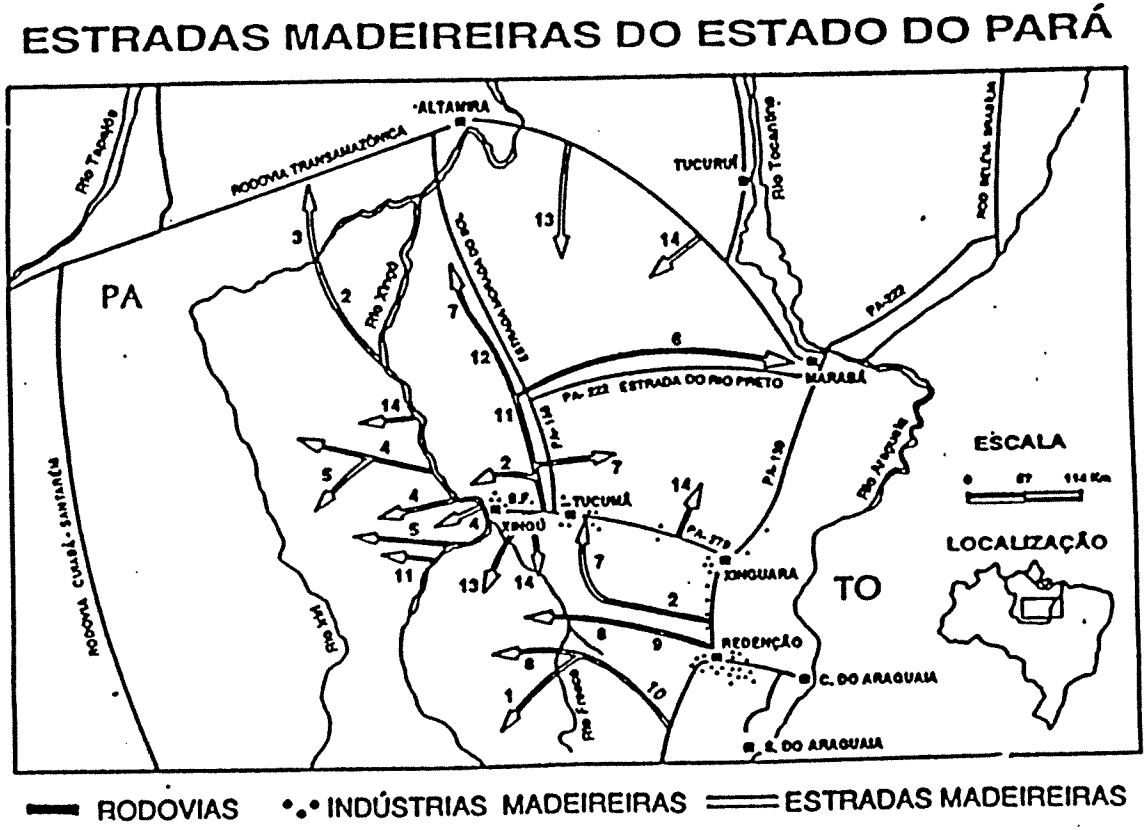


figura 4: Sobreposição dos mapas do DER-PA (1987) e Veríssimo et al. 1992.

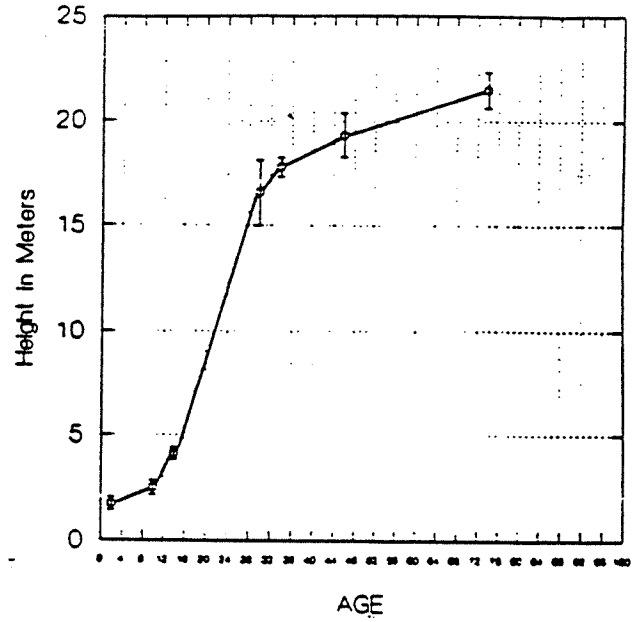


Figure 7-G. Heights of mahogany trees in mixed-species stands of known age. N = 161.

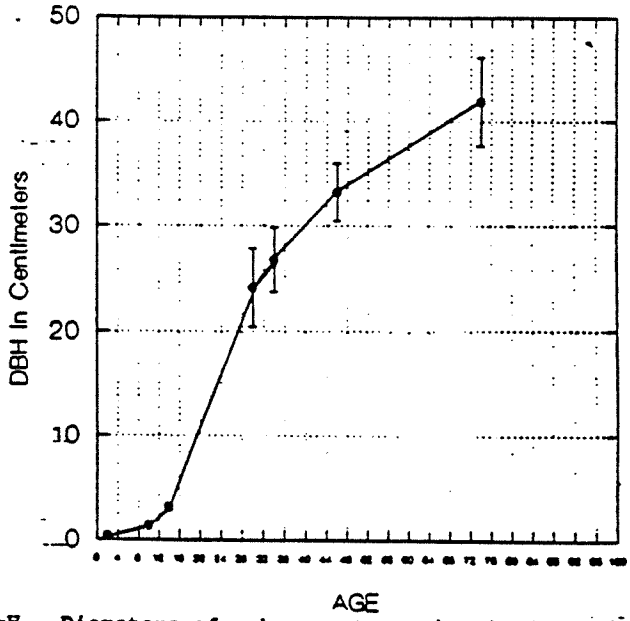


Figure 7-H. Diameters of mahogany trees in mixed-species stands of known age. N = 161

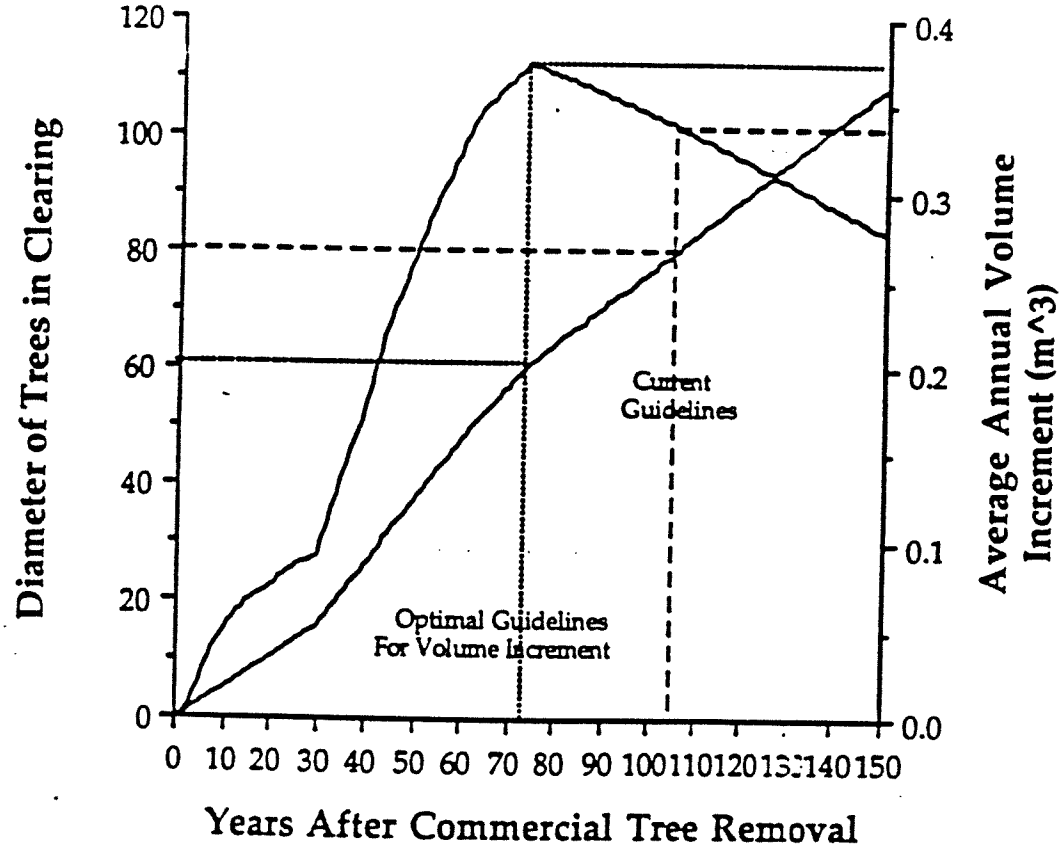
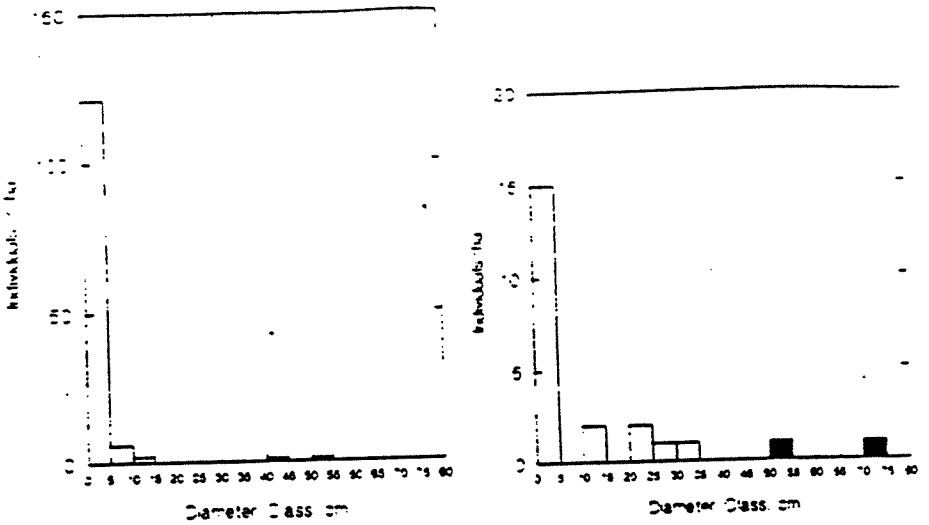
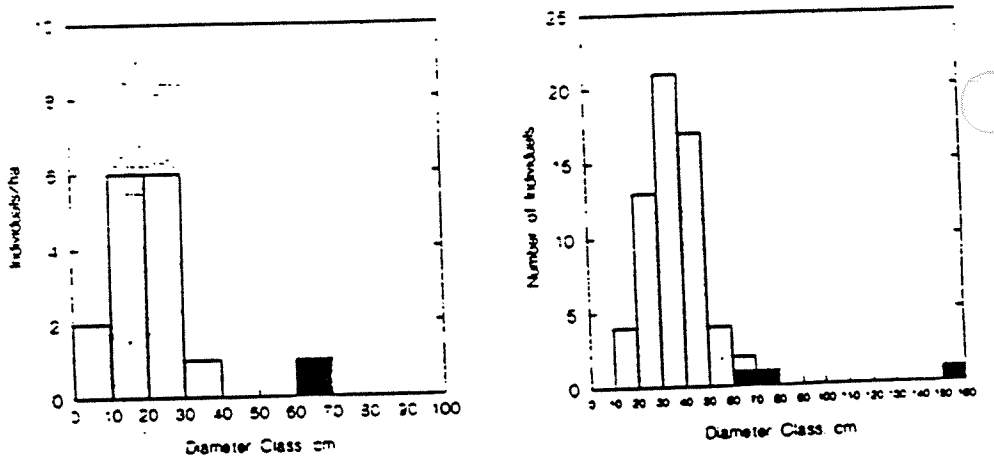


Figure 5: Predicted mean diameter of new trees surviving in a gap created by removing a single adult, and the average annual volume increment per tree of trees surviving in the gap. Growth rates are taken from growth ring data from the Bosque Chimanes, which agree closely with estimates provided by Lamb (1966). Average annual volume increment is calculated assuming a survivorship curve starting with annual values of 0.90 for seedlings (a value obtained from our plots) increasing to 0.99 (unpubl. data from Hubbell and Foster, BCI). The volume increment is calculated by assuming a commercial bole of 10 meters. Our simulation shows that 105 years are required to reach the current cutting diameter limit of 0.80 m dbh. Average annual volume increment is maximized by harvesting the trees at 73 years of age, or at a diameter of 62 cm.



Figures 6-C (left) and 6-D (right). Diameter distributions of mahoganies on one hectare transects on a 15 year old post-fire stand (left) and a 30 year old post-fire stand (right). Residual trees that survived the fire are indicated in black. Gaps in the diameter distribution on the 30 year-old stand probably reveal past mortality due to a second fire 15 years previously.



Figures 6-E (left) and 6-F (right). Diameter distributions of mahogany on a one hectare transect in a 45 year old post-fire stand (left) and a 3 hectare transect in a 75 year old post-fire stand (right). Residual trees are indicated in black. Two of the residual trees were old stumps that would have grown to larger diameter classes if they had not been cut.

UNITED STATES IMPORTS - MAHOGANY ROUGH

Table 1.B Mahogany Imports to the US 1978 to 1991: Rough Lumber, Cubic Meters (Thousands)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Total	Percent
Algeria							57								57	0.00
Argentina	592	706	35					42	7			24			1,409	0.00
Australia						47	24		57	14					142	0.00
Bahamas										66					66	0.00
Belgium and Luxem								87		64					151	0.00
Belize	540	42	76	9	276	392	139	708	135	4,175	267	400	169	164	6,992	0.00
Benin											191				191	0.00
Bolivia	24,440	14,115	21,301	15,538	979	1,385	2,211	52	349	7,266	24,870	22,561	38,705	46,438	220,212	0.16
Brazil	23,376	33,068	54,660	65,157	35,256	75,397	96,099	105,806	82,204	267,364	78,923	50,788	33,476	40,116	1,041,691	0.74
Burma						5									5	0.00
Cameroon		50	59				47	26		80		56	46		364	0.00
Canada	243	2	267	92	309	54	135	132	111	864	170	119	8	5	2,461	0.00
Cayman Islands											1,473			101	1,574	0.00
Chile		99	909	363	28		260	1,575	458	319	165	12,693	370	1,646	18,834	0.01
Colombia										5					5	0.00
Costa Rica			78	144	144								19		385	0.00
Ecuador										90					90	0.00
Fiji						5	21								26	0.00
Finland								5							5	0.00
France					24	24	722	302	17	156					1,246	0.00
Gambia									38						38	0.00
Germany, West			76		5		295	19	92	111				8	605	0.00
Ghana	1,598	694					80	231	1,116	5,013	2,582	2,018	2,457	1,062	16,851	0.01
Greenland											238				238	0.00
Guatemala	1,371	411	680	1,097	557	1,326	1,067	1,784	3,330	11,177	12,845	8,630	4,106	4,814	53,195	0.04
Honduras	569	85		80	57	71	14	24	59	54	2		34		1,049	0.00
Hong Kong						90									90	0.00
Indonesia			149						106	1,055	892			19	2,221	0.00
Israel								295	101						396	0.00
Italy							19								19	0.00
Ivory Coast	1,876	368	562	87	871	281	951	923	666	4,151	333	50		162	11,283	0.01
Jamaica									2						2	0.00
Kenya		42													42	0.00
Kiribati (Gilbert Isl)								149							149	0.00
Liberia				76	94										170	0.00
Libya				19											19	0.00
Malaysia					368	194	61		694	24	26	33		19	1,416	0.00
Mali								54	57						111	0.00
Mauritius										40					40	0.00
Mexico						87		19		465	54			81	706	0.00
Netherlands			156				101	635							892	0.00
New Zealand							47								47	0.00
Nicaragua	68	354				146							12	78	659	0.00
Nigeria								35			286				321	0.00
Pakistan							26								26	0.00
Panama			24					36							61	0.00
Paraguay	142									118					260	0.00
Peru	1,149	727	1,617	290	156	533	460	1,517	186	1,555	47	356	778	1,709	11,082	0.01
Philippines	165	52	101				73			78	19				489	0.00
Pitcairn Island										80					80	0.00
Portugal								3,549			31				3,580	0.00
Republic of South A	28	394	241	45		54	47		31	78					918	0.00
Singapore								538					95	35	668	0.00
Switzerland									189	170					359	0.00
Taiwan	71	19	26		28		28	94							267	0.00
Thailand						19							30		49	0.00
Trinidad and Tobag		47													47	0.00
United Kingdom			2				132	215	432						781	0.00
Venezuela								158				265			423	0.00
Western Samoa						12									12	0.00
Yugoslavia (former)							123								123	0.00
Zaire	2,844	3,509	720	1,069	219		73	142		172	35				8,784	0.01
Zambia									675						675	0.00
World	59,073	54,787	81,736	84,068	39,372	80,122	103,314	118,604	91,063	304,806	123,400	98,745	80,399	97,187	1,416,676	1.00

USDA Forest Service; US Department of Commerce

UNITED STATES IMPORTS - MAHOGANY DRESSED

Table 2 A Mahogany imports to the US 1978 to 1991: Dressed Lumber, US Dollars (Thousands)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Total	Percent
Argentina		36	13										150		199	0.00
Australia				6				16	13	40					75	0.00
Bahamas										5					5	0.00
Barbados									3						3	0.00
Belize					42	75	8	82	9	44	46		100	53	459	0.01
Bolivia	130	54	60	409	43	64	176	137		25		1,573	2,025	247	4,943	0.06
Brazil	1,503	3,961	4,895	5,844	8,621	4,921	2,330	6,872	7,956	4,358	4,518	3,462	1,307	5,556	66,106	0.77
Cameroon		1	11												12	0.00
Canada	83	91	157	100	61	125	78	166	221	39	217	37	9	4	1,408	0.02
Cayman Islands								2							2	0.00
Chile			81		32	98		51	40	8	226	253	468	884	2,141	0.02
Colombia	74	5		25	36										160	0.00
Congo										13					13	0.00
Costa Rica						13					36			16	65	0.00
Ecuador	57									16					73	0.00
France						11		43			6				60	0.00
French West Indies						4							16		20	0.00
Germany, West			10			3	3	18		85	98				217	0.00
Ghana	8	9	15					34	198	478	40		30	422	1,234	0.01
Guatemala	15		10		29		8	404	187	615	85	122	143	35	1,653	0.02
Honduras	20	8	199	9	39	85		4	43	197	187	86	15	219	1,111	0.01
Hong Kong								25							25	0.00
India			7				1		16		12				36	0.00
Indonesia								28	20	38	615	193	338	721	1,953	0.02
Israel									127						127	0.00
Italy								11		55		3			69	0.00
Ivory Coast			13			15	87	22	52	100	20				309	0.00
Jamaica			7		28										35	0.00
Kenya		1				30									31	0.00
Liberia								7							7	0.00
Malaysia		74	10	12	14	2	3	87	59	96	190	77	41	35	700	0.01
Mexico							1	16		10					27	0.00
Netherlands						23									23	0.00
New Zealand						12									12	0.00
Nicaragua	1		18											64	83	0.00
Panama							45			38					83	0.00
Paraguay		1													1	0.00
Peru		5	12	255	190	110	95	193	7	81		80		155	1,183	0.01
Philippines			11		17		55			7	34		21		145	0.00
Poland									76						76	0.00
Republic of South A					2	2	6							244	10	0.00
Singapore	8		3			17									272	0.00
Spain		13													13	0.00
Suriname	3														3	
Switzerland										13			30		43	
Taiwan	71					25		6	23	48	71	29			273	
United Arab Emirate							40								40	
United Kingdom						3			1	6	7	6			23	0.00
Uruguay			21				3	6					79	38	21	0.00
Venezuela									25	24					176	0.00
Zaire	1	11	14			39									114	0.00
World	1,975	4,270	5,568	6,660	9,175	5,678	2,938	8,251	9,077	6,439	6,409	5,973	4,787	8,959	86,159	1.00

USDA Forest Service; US Department of Commerce

Figure 1. Total Latin American sawn lumber imports 1980 – 1991, m3.

	m3
1980	64300
1981	92500
1982	73300
1983	102600
1984	94000
1985	91000
1986	91800
1987	112000
1988	101500
1989	100000
1990	75400
1991	60000

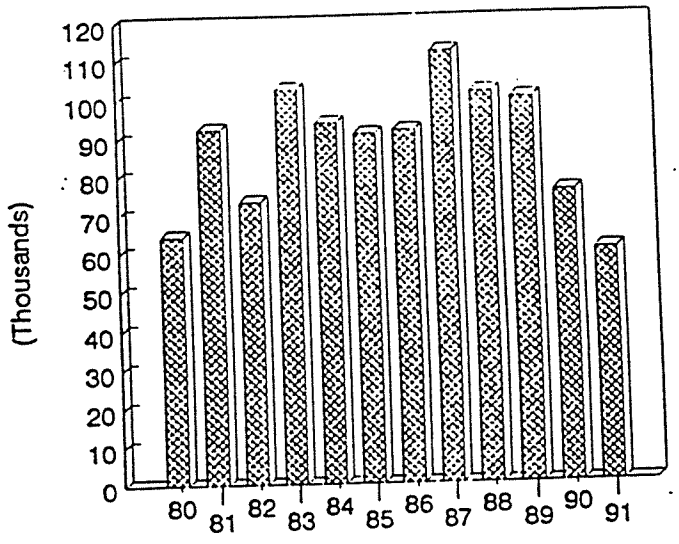
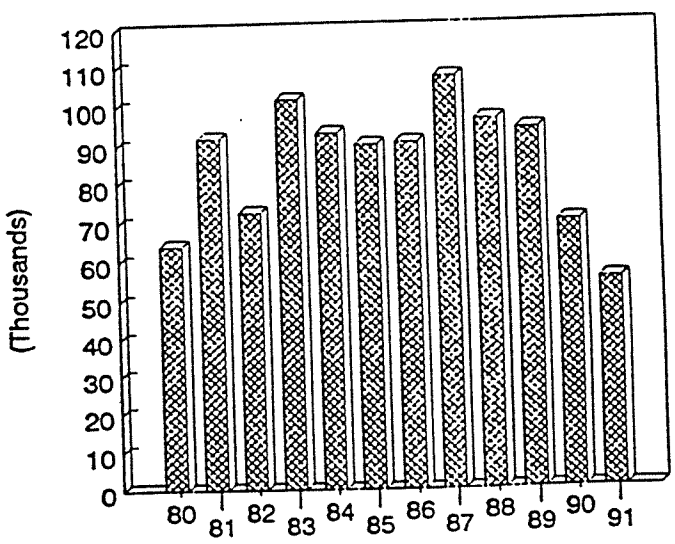


Figure 2. Total L.A. Mahogany lumber imports 1980 – 1991, m3.

	m3
1980	64000
1981	92000
1982	72500
1983	101700
1984	93100
1985	90100
1986	90800
1987	107500
1988	96500
1989	94000
1990	70000
1991	55000



3.1A.2.1. IMPORT TO EUROPEAN COMMUNITY [EC]: MAHOGANY (& other species)

m^3	+ other spp. SAWN WOOD			+ rosewood & other spp. VENEER + PLYWOOD SHEETING			PLYWOOD		
Tariff Schedule	4407.23-10, 4407.23-50 + 4407.23-30, 4407.23-90			4408.20-10, 4408.20-50, 4408.20-30, 4408.20-91 + 4408.20-99			4412.11-00		
ORIGINATING COUNTRY (selection) (EXPORTER)	1988	1989	1990	1988	1989	1990	1988	1989	1990
S. macrophylla p.p.:									
Chile	100		550		19	22	1788	327	406
Argentina		25				7			
Paraguay	40	523	2727	26			44	184	307
Bolivia	78	1305	1316	115	76			1	
Brazil	78340	70555	57989	2166	1941	1340	10705	17754	16766
Perú	104	84	30					103	11
Ecuador	760	796	1512				322	313	292
Colombia		1							
Venezuela		14	512			1			
Trinidad & Tobago								16	
Guyana	294	1322	980						
Surinam								193	
Fr Guiana			26		20				
Panamá		437							
Costa Rica			5				22		1
Nicaragua			47						
Honduras	21	53	60						
Guatemala	3	24	31						
Belize		14	6						
? *S. mahagoni*:									
Antigua & Barbuda							97		
Jamaica					4				
Bahamas				9					
Total	79740	75169	65771	2315	2060	1370	12978	18891	17783

In 1966, 79,000 m^3 of various "mahoganies" at £38/m^3 were imported by British traders; by 1979, 196,000 m^3 were imported but at £230/m^3. From the Jamaican *S. mahagoni* population in 1770, 230 m^3 of mahogany valued at £210/m^3 were imported to England (Huxley 1984; Knees & Gardner 1982, 1983a).

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Doctor:
OBDULIO MENGHI
Coordinador Científico
Secretaría CITES
Ginebra - Suiza

634241-
Caracas 17 MAR. 1994

Me dirijo a usted, en la oportunidad de informarle que esta Dirección General ha recibido la propuesta de Estados Unidos para incluir la especie Swietenia macrophylla en el Apendice II de CITES.

En los actuales momentos esta Dirección General analiza dicha propuesta sin embargo, consideramos que esta especie no debe ser incluida en los Apendices CITES, al contrario, debería promocionarse a nivel internacional un programa de plantación de esta especie que cubra su área de distribución geográfica. La Swietenia macrophylla es una especie heliófita y exigente en cuanto a fertilidad y humedad de los suelos, ofreciendo excelentes beneficios económicos a largo plazo por las propiedades y calidad de su madera.

Cualquier especie forestal aunque protegida, que no esté acompañada de un programa de plantación no garantiza su permanencia en el tiempo, motivo por el cual esta Dirección General manifiesta su interes en promover un programa de éste tipo, junto con otros paises de la región central y sur.

Por lo antes señalado, solicitamos asesoramiento de esa Secretaría CITES respecto a las posibles oportunidades de financiamiento internacional o la forma de lograr el mismo para la ejecución del programa antes mencionado.

Nuestro país, en coordinación, elaboraría un programa de plantación forestal de la Swietenia macrophylla a los fines de ser presentado en la IX conferencia de las partes.

Atentamente,

Original firmado por
OMAR CARRERO N
Director General Sectorial del
Servicio Forestal Venezolano

DOC.SRM.og
15.3.94
C.C. DIR.ADM. FORESTAL
C.C. DIV. ADM. RECURSO FLORA

IUCN.

19.89 *Swietenia macrophylla* - CITES Criteria Listing

RECOGNIZING that the new criteria for listing species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) could embrace endangered tree species;

RECALLING that, at the last meeting of CITES in March 1992, the United States and Costa Rican Governments proposed that the mahogany genus *Swietenia* be listed on Appendix II of the Convention;

NOTING that such a listing would require monitoring - not a ban - of the trade in this species;

REGRETTING that *Swietenia macrophylla* was withdrawn from the proposal and only *Swietenia* mahogany was placed on Appendix II;

RECALLING that, in the recent publication, "Mahogany Conservation: Status and Policy Initiatives", leading experts from Brazil, US and UK strongly supported the listing of *Swietenia macrophylla* on Appendix II;

ACKNOWLEDGING that *Swietenia macrophylla* is being endangered by unsustainable logging;

NOTING that international trade in *Swietenia macrophylla* is a contribution to loss of this species;

The General Assembly of IUCN — The World Conservation Union, at its 19th Session in Buenos Aires, Argentina, 17-26 January 1994:

CALLS upon the member governments of IUCN to support the listing of *Swietenia macrophylla* on Appendix II at the next meeting of CITES Parties.

Proposer: Greenpeace International (International)

AUSTRALIA.

Note No: LG340

The Department of Foreign Affairs and Trade presents its compliments to the Royal Netherlands Embassy and has the honour to refer to Note ASI/01-94 of the Embassy concerning the Convention on International Trade in Endangered Species of Wild Flora and Fauna and the Netherlands proposals for the inclusion of species of Gonystylus Bancanus and Swietenia Macrophylla in Appendix II under the Convention.

The Australian Government offers the following comments on these proposals.

The proposal relating to Swietenia appears to be comprehensive, presenting a significant body of evidence indicating erosion of the species' conservation status, and linking this to uncontrolled logging. The link between logging and international trade might however be better documented.

The proposal relating to Gonystylus Bancanus, though stronger than the proposal raised at the Eighth Conference of the Parties to the Convention, could be strengthened further in a number of areas.

Also, more generally, the Australian Government considers that the parties to the Convention need to give more detailed consideration to the effectiveness of listing timber species under the Convention, in terms of achieving its objectives. Practical problems of implementing the requirements of any listing need to be carefully considered prior to further listing of timber species. A question which requires consideration is whether personnel usually involved in implementing the Convention have the necessary knowledge and experience of the international timber trade to effectively implement a CITES listing.

The Australian Government is not yet in a position to say whether it would support listing of these species. The Australian Government would be grateful for any further information the Government of the Netherlands may wish to communicate on this issue. Advice in relation to

responses the Netherlands has received from other governments, particularly the range states concerned, would be appreciated. We would also be interested to learn whether the Netherlands has given consideration to ways range states might be assisted to implement such listings.

The Department of Foreign Affairs and Trade avails itself of this opportunity to renew to the Royal Netherlands Embassy, the assurances of its highest consideration.

CANBERRA, A.C.T.
1 June 1994

STATEMENT OF THE BRAZILIAN DELEGATION

The Brazilian Government has taken or intends to take the following actions in order to promote a rational exploitation of natural renewable resources in the country as well as the effective control of timber traded species, including mahogany (*Swietenia macrophylla):*

a. The Brazilian Institute for Environmental and Natural Renewable Resources (IBAMA) has enacted Administrative Order # 138-91 of 28 December 1993 in order to establish better control mechanism concerning the origin of tropical and semi-tropical timber for export, specially mahogany;

b. IBAMA has also strengthened its control system at the three main timber export ports in BRAZIL, which are Belem, in the state of PARÁ, Santos in the state of SÃO PAULO and Paranaguá in the state of PARANÁ, so as to double check the origin, the species, the volume and the documentation of all timber that will be exported;

c. With the set up of a computerized foreign trade system called SISCOMEX, IBAMA can now exert a much more efficient control of all timber, prior to being shipped abroad:

d. Priority was given to the Amazon Region through an increase of IBAMA's budget in order to enhance its role in the monitoring and controlling of the origin of all timber coming from that area;

e. The Ministry of Environment has held a workshop last April in order to debate proposals to list mahogany in CITES Appendix II, which was attended by governmental officials, NGOs and representatives of the private sector. NGOs were in favor for listing while the private sector was against it. From the scientific point of view, it is relevant to mention that EMBRAPA - a Brazilian Government Research Agency - has firmly opposed that listing because of lack of scientific evidence that could prove that mahogany is in danger of extinction;

f. With a view to try to attain sustainable forest management by the year 2000, a Presidential Decree will soon be enacted to regulate articles 15, 19, 20 and 21 of Law # 4.771 (Forest Code) dealing with the rational exploitation of forests and the use of forest resources. This new legislation will enforce the plan of sustainable management as the only source of origin of timber;

g. Prepare a set of projects to make a forest inventory of the Brazilian Amazon Region in order to gather scientific reliable data on the country's stocks of mahogany and other timber species.

Taking into account that there are not reliable scientific data to support any claim that *Swietenia macrophylla* stocks have been exhausted to the point that the survival of this species is presently threatened with extinction, the Brazilian Government is opposed to listing mahogany in CITES Appendix II. Any attempt to list such a species without the necessary reliable scientific data will not only undermine Government's efforts to combat deforestation and promote sustainable forest management (according also to the attached information sheet), but will also expose to criticism the very credibility of CITES. The Brazilian Government is fully committed to make as soon as possible a full forest inventory of that area, provided that it could count on the cooperation of donor countries to finance such a huge project.

Cartagena de Indias, 19 May 1994

BOLIVIA.

EMBAJADA DE BOLIVIA
WASHINGTON, D. C. 20008

March 24, 1994
EMBO-139-94

Dr. Charles W. Dane
Chief, Office of Scientific Authority
U.S. Fish & Wildlife Service
1849 C Street, N.W.
Arlington Square Building, Room 725
Washington, D.C. 20240

RE: Mahogany and CITES

Dear Dr. Dane,

It has come to our attention that the U.S. Fish & Wildlife Service is considering a proposal from an American non-governmental organization to list mahogany (Swietenia Macrophylla) on Appendix II of CITES. As you know, a similar proposal was submitted during the Kyoto, Japan, meeting held in 1992. Such proposal was not approved due to the lack of sufficient technical evidence to support the same.

As a result of the Kyoto meeting, the government of Bolivia, in collaboration with the International Tropical Timber Organization, is executing a comprehensive study on mahogany which will be extensive to Brazil. Said study assesses qualitative and quantitative aspects related to the Swietenia Macrophylla.

At this time we would like to share with the U.S. Fish & Wildlife Service some of the profound initiatives and important legislative measures Bolivia has implemented to comply with international agreements and recommendations on tropical forests and woods, bearing in mind that the protection of the environment is a top priority:

- In December 1990, the Fund for the Development of the Environment was created to finance projects related to sustainable development of forests.
- In April 1992, the Environmental Law was passed.
- Financed by the Government of Sweden, Bolivia is carrying out a forest inventory, especially of the tropical areas of the country.

→

- In August 1993, the Bolivian government created the Ministry of Sustainable Development and the Environment, which has three fundamental responsibilities: long-term planning of socioeconomic strategies, the preservation of renewable natural resources, and the conservation of the environment.

- At present the Bolivian Congress is considering the proposed Forest Law, which, in essence, reasserts the concept of sustainable development and the rational use of forests.

- Several projects dealing with rational management and conservation of forests are currently been implemented, such as the "Proyecto Juan Sembrador de Mara". This is the Bolivian equivalent of "Johnny Appleseed" - which specifically promotes the natural regeneration and continuous reforestation of mahogany (Swietenia Macrophylla).

As you can see, Bolivia is not only implementing measures to protect the Swietenia Mcrophylla, but also the environment in general. Therefore, we believe that the proposal to list mahogany on Appendix II of CITES is neither reasonable nor advisable.

When considering this issue, it is important to assess the economic and social impacts that the possible listing of mahogany will cause. At the present time, with a very depressed demand for our minerals, mahogany is one of Bolivia's main exports. Consequently, any limitations imposed on mahogany exports would gravely harm our economy with serious consequences for its people.

Because of the negative effects that the possible listing of mahogany in CITES' Appendix II would have, my government is firmly opposed to the NGO's proposal and considers it an unnecessary action.

In view of the above, I would respectfully urge you to carefully consider each aspect of this highly sensitive matter.

Most cordially,

Javier Loayza B.
Chargé d'Affaires, a.i.

JLB:FBG:MPS

FACSIMILE

Ambassade van het Koninkrijk der Nederlanden
Postbus 10509
La Paz
Bolivia
Tel. : 09-59.12.39.20.64
Faxnr. : 09-59.12.39.10.27

Van :PL/LAPAZ AB 11/5

Aan : CITES- Drs C.L.Schürmann

Faxnr. : 31-70-3478228

cc : DES/AM BUZA

Datum : 11 mei 1994

Kenmerk : LAP/AB-201/94

Onderwerp : Cites-voorstellen

Aantal pag.'s: 2
(incl. voorblad):

- Het document met het voorstel om de specie Swietenia macrophylla in apendix II op te nemen is de Boliviaanse overheid ter beschikking gesteld.

- De ministeriele authoriteiten voor duurzame ontwikkeling en milieu zijn tegen het voorstel en bereiden op het ogenblik een document ter rechtvaardiging voor.

- De milieubeweging van Bolivia zijn voor het voorstel en bereiden een publiciteitscampagne voor om de specie alsnog in Cites opgenomen te krijgen.

COLOMBIA

INDERENA

REPUBLICA DE COLOMBIA
MINISTERIO DE AGRICULTURA

Santafé de Bogotá, D.C. 9 de Mayo de 1994

Dr. Charles W. Dane
Chief, Office of Scientific Authority
Arlington Square Building, Room 725
U.S. Fish and Wildlife, Room 725
Washington, D.C., 20240
FAX: 703 358-2276

Dear doctor Dane.

According to your communication of April 13. sent to the Embassy of Colombia in Washington, D.C., we are pleased for considering to list of Swietenia macrophylla (big-leaf mahogany) on Appendix II of the Convention on International Trade in Endangered Species (CITES)

As you see in the annex document, the Swietenia Macrophylla is in reduced physical spaces due to the excessive exploitation that it was submitted in the past, reason which since 1976 its use was reduced.

Sincerely yours.

CARLOS CASTAÑO URIBE
Director of Forests, Water
and Soils

copy to: Dr. Eduardo Muñoz, Subdirector de Negociaciones Bilaterales, Ministry of Foreign Trade

INSTITUTO NACIONAL DE LOS RECURSOS NATURALES RENOVABLES Y DEL AMBIENTE.
Apartado Aéreo 13458 - Telex, 44428 INDE.CO - Teléfonos 2865988 - Bogotá- Colombia

REPUBLICA DE COLOMBIA

SUBGERENCIA DE BOSQUES, AGUAS Y SUELOS

DIVISION ADMINISTRACION BOSQUES

ASPECTOS GENERALES SOBRE LA CAOBA EN COLOMBIA

Nombres comunes:	Caoba; Palo santo
Nombre científico:	Switenia macrophylla. King
Familia:	Meliaceae

DISTRIBUCION GEOGRAFICA

La información confiable que se tiene, según manifestaciones verbales de algunos expertos, (Araujo y Sucre, 1994), el área más representativa de la Caoba está localizada en el Municipio de Juradó, Departamento del Chocó, en límites con la frontera de la República de Panamá, región que hasta finalizar la década del 60, presentó cantidades considerables de esta especie en cuanto a individuos y volúmenes (véase mapa anexo).

Un estudio realizado por INDERENA en 1989, en el Municipio de Juradó, determinó la existencia de Caoba sobre una superficie aproximada de 55.000 hectáreas. Sinembargo, se tiene conocimiento que debido a la acción antrópica, especialmente de personas dedicadas a la explotación y comercio de maderas, algunos sitios de ésta área han sido intervenidos ilegalmente, de tal manera que los árboles mejor conformados se encuentran localizados en dos resguardos indígenas que están al interior del área mencionada, denominados Juradó y Guyabal de Partadó, los cuales tienen una extensión de 18.700 y 4.376 hectáreas respectivamente, en los que habitan indígenas de los grupos étnicos Katios y Emberá.

Colindante con esta zona, en el área denominada Cabeceras del Chintadó, que corresponde al nacimiento del Río Chintadó, jurisdicción del Municipio de Riosucio (Departamento del Chocó), se menciona que puede existir algunos árboles de Caoba, sinembargo, no se tiene información reciente sobre el particular. En el pasado, esta área fue muy rica en Caoba, la cual fue intensamente

aprovechada, hasta llegar a la sobre-explotación. (Araujo, 1994).

Así mismo, se informa que al sur de la Serría de San Lucas, en la zona denominada El Arenal, jurisdicción del Municipio de Moralos, Departamento de Bolívar, existan algunos ejemplares de la Caoba, pero se desconoce su alinderación. Igualmente, puede ser probable que en esta misma zona, en el área de Ojos Claros, Municipio de Ramadios, Departamento de Antioquia, se encuentren árboles de Caoba, pero no existe confiabilidad de su extensión (Cardozo, 1994).

CARACTERIZACION BIOFISICA

El área de Juradó se halla en el piso térmico cálido, correspondiente a un bosque muy húmedo tropical (bmh-T), con altura media de 400 metros sobre el nivel del mar, una temperatura de 26ºC y precipitación promedio anual de 4.000 mm. La humedad relativa permanece durante casi constante durante todo el año en alrededor del 95% (INDERENA, 1989)

El área donde se encuentra la Caoba, fisiográficamente corresponde a una zona de Serranía, la que a su vez hace parte de la denominada Serranía del Baudó. Se caracteriza por una topografía que va desde ondulada a escarpada, con pendientes fuertes (que superan el 50%) y prolongadas.

Los suelos son derivados de arcillolitas, areniscas y rocas calcáreas, superficiales, bien drenados, con variaciones en la profundidad efectiva y baja fertilidad.

USOS

Por su aceptable apariencia visual, debido a su color rojo-marrón oscuro en estado seco al aire, a su peso liviano de aproximadamente 0.5 grs/cm^3, se ha utilizado especialmente para mueblería. (PROEXPO, 1971).

RESTRICCION DEL APROVECHAMIENTO

Debido a que en el pasado la Caoba fue intensamente explotada, hasta llegar casi a su extinción, el INDERENA mediante Acuerdo 029 del 2 de septiembre de 1976, reguló el aprovechamiento forestal de la Caoba y en la actualidad no se otorgan licencias para su aprovechamiento

INVESTIGACION Y PLANTACIONES

A pesar de que la Caoba en Colombia está en peligro de extinción, prácticamente no se ha investigado sobre la silvicultura de esta especie. Algunas investigaciones se han iniciado por la Corporación Nacional de Investigaciones (CONIF) en la Región de Urabá (Departamento de Antioquia), pero aún no se conocen sus resultados. (Vargas, 1994).

En el Corregimiento de Yarima, Municipio de San Vicente, Departamento de Santander, existe una plantación de 1 hac. igualmente en el Km 9 de la vía que de Cimitarra conduce a la India, Departamento del Santander, se plantó en una extension de 20 hectáreas, algunos individuos de Caoba junto con cedro (Cedrela odorata) y móncoro (Cordia sp). En ambos casos, se desconoce el comportamiento silvicultural. (Cardozo, 1994)

Preparó: Edgar Otavo Rodríguez
Santafé de Bogotá, enero de 1994

wp51\ocaoba

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PERU

INSTITUTO NACIONAL DE RECURSOS NATURALES
-INRENA-

"Año de la Modernización Educativa y del Deporte"

Lima, 05 de Abril de 1994

CARTA Nº 187 -94-INRENA-DGF

Señor
Dr. A.N. VAN DER ZANDE
The Deputy Director for Nature, Forests,
Landscape and Wildlife

Ref.: NBLF-93-12033c
NBLF-93-12033d

De mi mayor consideración:

Es sumamente grato dirigirme a usted, en atención a sus comunicaciones de la referencia, para manifestarle que hace un tiempo atrás fue hecho de nuestro conocimiento, que a solicitud de algunas ONGs estadounidenses, el Servicio de Pesca y Vida Silvestre de los Estados Unidos, podría estar sometiendo a consideración de la próxima Convención de las Partes, la propuesta de incluir a la caoba (Swietenia macrophylla) en el Apéndice II de la CITES.

Al respecto, este Instituto como Autoridad Administrativa y Científica CITES-Perú, efectuó consultas con diversas entidades nacionales, relacionadas al quehacer forestal y la conservación de los recursos naturales, en razón de lo cual considera que la caoba no debe ser incluida en el Apéndice II de la CITES, basado en los siguientes argumentos:

1.- La caoba en el Perú no se encuentra en peligro de extinción, puesto que si bien es explotada en varias de sus áreas de distribución natural, quedan otras áreas en donde la especie por razones de inaccesibilidad o distancia de los centros de transformación, se encuentra naturalmente protegida.

La especie adicionalmente cuenta con protección dentro del Sistema Nacional de Areas Naturales Protegidas por el Estado (SINANPE), principalmente en el Parque Nacional del Manu, cuya extensión superficial es de 1'532,806 Ha. El

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SINANPE se ha fortalecido últimamente, con la creación del Fondo Nacional para las Areas Naturales Protegidas (FONANPE).

2.- La caoba posee buena regeneración natural y es posible su propagación si se tiene cuidado en la aplicación de técnicas silviculturales adecuadas.

3.- Se está promoviendo, mediante esfuerzos conjuntos entre los sectores estatal y privado, contando con el apoyo de la Cooperación Técnica Internacional, la implementación de planes de manejo forestal que permitan asegurar el aprovechamiento sostenible de los recursos forestales y, que incluyen a la caoba entre las especies manejadas. Particularmente, es importante en este respecto, el Proyecto de Manejo Forestal del Bosque Nacional Alexander Von Humboldt, que ejecuta el INRENA sobre una superficie de 105,000 Ha. de bosques naturales, con la cooperación técnica y financiera de la Organización Internacional de Maderas Tropicales (ITTO).

Dentro de esta perspectiva, consideramos que para el logro de la conservación de la especie, mejores resultados proporciona asegurar el manejo de los bosques que medidas de carácter meramente restrictivas y de control.

4. La legislación nacional actual, se viene adecuando paulatinamente con fines de generalizar la obligatoriedad de realizar prácticas de manejo en todos los contratos de extracción forestal, cualquiera sea la extensión en que ellos se otorguen. Este planteamiento, viene siendo recogido a plenitud en el nuevo proyecto de Ley Forestal que se tiene en preparación.

5. En el país se está promoviendo además, la diversificación del aprovechamiento de las especies forestales y, la introducción de éstas en los mercados nacional y externo. Actualmente el volumen de caoba exportada, es poco significativa.

Por otro lado debo comunicarle, que en la Agenda del 16º Período de Sesiones del Consejo Internacional de Maderas Tropicales (CIMT) a realizarse en Cartagena, Colombia, del 16 al 23 de Mayo del presente año, se ha incluido el análisis de la citada propuesta a nivel de todos los países miembros. En tal sentido, el Perú llevará su opinión técnica sobre este aspecto a dicho

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foro, en vista que el acuerdo al que se arribe, muy posiblemente sería la posición de los países tropicales que cuentan con esta especie.

Es propicia la oportunidad para expresarle los sentimientos de mi especial consideración.

Atentamente,

ING. MIGUEL VENTURA NAPA
Jefe del INRENA
Autoridad Administrativa y Científica
CITES-Perú

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PERU

INSTITUTO NACIONAL DE RECURSOS NATURALES
-INRENA-

"Año de la Modernización Educativa y del Deporte"

Lima, 05 de Abril de 1994

CARTA Nº 186 -94-INRENA-DGF

Señor
Servicio de Pesca y Vida Silvestre de los Estados Unidos
USFWS

De mi mayor consideración:

Es sumamente grato dirigirme a usted, para manifestarle que es de nuestro conocimiento que a solicitud de algunas ONGs estadounidenses, el Servicio de Pesca y Vida Silvestre de los Estados Unidos, pueda estar sometiendo a consideración de la próxima Convención de las Partes, la propuesta de incluir a la caoba (Swietenia macrophylla) en el Apéndice II de la CITES.

Al respecto, debemos informarle que este Instituto como Autoridad Administrativa y Científica CITES-Perú, ha efectuado consultas con diversas entidades nacionales, relacionadas al quehacer forestal y la conservación de los recursos naturales, en razón de lo cual considera que la caoba no debe ser incluida en el Apéndice II de la CITES, basado en los siguientes argumentos:

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