

Heartwood Formation and Durability of the Wood of Plantation Grown Tree Species of the Central Amazon

Dünisch, O.¹, Schwarz, T.², Gasparotto, L.³, Correia, A. A.³ and Montóia, V.³

¹ Universität Hamburg, Hamburg, Germany.

² Bundesforschungsanstalt für Forst- und Holzwirtschaft, Hamburg, Germany.

³ EMBRAPA Amazonia Ocidental, Manaus, Brazil

With regard to wood quality and economic aspects heartwood formation and durability of the wood are of main importance. In this study the heartwood formation and the durability of seven years old plantation grown *Swietenia macrophylla*, *Carapa guianensis*, *Cedrela odorata*, *Dipteryx odorata*, and *Hymenaea courbaril* was compared with wood from primary growth.

Heartwood formation was studied macroscopically in terms of heartwood percentage measured on stem discs and xylem samples collected by increment borers. The age for the induction of heartwood formation was estimated from increment measurements of juvenile and adult trees carried out from 1995 until 1999 in monthly intervals. Along the radius of the discs the water content, the mineral element content, the content of reserve carbohydrates (glucose,

fructose, sucrose, stachyose, and raffinose) and the content of non-carbohydrate accessory compounds was studied continuously from cambium to pith.

The durability expressed in terms of mass loss and the attack of fungi and insects was studied in the field during an one year experimental period. 1080 wood samples (5 cm x 2 cm x 2 cm) were installed in a secondary and a primary forest (2.5 cm below and 2.5 cm above the soil level). Sample collection was carried out in two months intervals. The fungi and the insects observed in the wood samples were isolated in the laboratory and taxonomically identified.

The results are discussed with special regard to wood quality of plantation grown trees compared to primary growth.

Influence of the Water Supply on the Cambial Growth Dynamics of *Swietenia macrophylla* King under Controlled Conditions

Morais, R.¹, Dünisch, O.² and Gasparotto, L.¹

¹ Embrapa Amazônia Ocidental, Manaus, AM, Brazil

² Universität Hamburg, Hamburg, Germany

This investigation makes part of the SHIFT project ENV 42 studying the relationship of site factors (light, water, nutrient supply) of degraded areas on the growth dynamics and wood formation of native tree species of the Central Amazon.

In our study the relationship of the water supply and the cambial growth dynamics of four years old *Swietenia macrophylla* King was investigated under greenhouse conditions. The water supply and the growth dynamics were studied under five different soil water conditions: (1) wet soil, (2) reduced soil water content, (3) dry soil, (4) re-irrigated soil, (5) wet soil.

During these periods the suction force of the soil was monitored by tensiometer measurements. The water uptake of the plants was determined gravimetrically. The water potential of young and old leaves was studied by means of

a Scholander pressure chamber. In addition the water content and the mass of the leaves were quantified. The cambial growth dynamics of the plants was studied by means of increment measurements carried out with a high sensitive laser (spot size 0.01 mm, accuracy 0.001 mm, measure interval 1 min.).

In old leaves a higher leaf water potential was found compared to younger leaves. A reduction of the leaf water potential and the water uptake of the plants was found during the dry period. A higher rate of cambial cell divisions was found during the wet period than in periods with a reduced water supply of the soil. Cambial cell divisions preferably were detected during the night.

These results indicate the strong dependency of the cambial growth of *Swietenia* on a sufficient soil water supply.