

# Investigations on tree species suitable for the recultivation of degraded land areas in Central Amazonia

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Institute of Wood Biology, Hamburg University and Institute of Wood Biology and Wood Preservation, Federal Research Center for Forestry and Forest Products, Hamburg: Prof. Dr. J. Bauch, Dr. O. Dünisch  
Centro de Pesquisa Agroflorestal da Amazonia Ocidental/Empresa Brasileira da Pesquisa Agropecuária (CPAA/EMBRAPA), Manaus: Dr. L. Gasparotto, C. de Azevedo, R. de Lima, R. de Morais

Cooperation: University of Paraná, Curitiba: Prof. Dr. Reissmann, E. Neves

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## 2.2. Cambial growth dynamics of plantation grown *Swietenia macrophylla* and *Carapa guianensis*

(M. Sack, M. Müller, O. Dünisch, J. Bauch)

Cooperation: Dr. L. Gasparotto, CPAA/EMBRAPA, Manaus

For high quality timber production in mixed culture systems informations on the intraannual growth dynamics of the trees are necessary as to elucidate the significance of exogenous factors for the wood formation of the trees.

Wood formation of *Swietenia macrophylla* and *Carapa guianensis* planted in 1992/1993 in three different plantation systems (monoculture system, mixed culture system, enrichment of a 25 years old secondary vegetation) at the experimental site of the CPAA/EMBRAPA, Manaus was studied from March 1995 until December 1997 expressed in terms of cambial cell division and the structural variation of the xylem. The anatomical structure and the width of the increment zones was studied for three trees of each plot. Cambial cell divisions were dated by pin-marker technique in one month intervals for two trees of each plot. The accuracy of the method was investigated by anatomical studies of the wound reaction. These investigations indicated that the formation of resin bands within the barrier zone of the wounding of *Swietenia* and *Carapa* trees is an adequate tool for dating the cambial cell divisions of the trees. Without the use of appropriate anatomical characteristics for the dating of cambial cell divisions by the pinning method the error might increase up to 0.88mm.

From October 1997 until December 1997 the anatomical structure of the trees was studied in different parts of the tree (roots, stem, branches) by repeated sample collection in three days intervals as to get informations on the significance of the seasonal variation of precipitation on wood formation.

No correlation was found between the number of increment zones of the trees and the tree age. Two types of increment zones were found within the xylem of *Swietenia* and *Carapa* as well (distribution of vessels, parenchyma bands). Studies on the intraannual wood formation of *Swietenia* and *Carapa* indicated a strong relationship between the seasonal variation of precipitation at the experimental site and the formation of increment zones as well as the rate of periclinal cell divisions, which was more pronounced in *Swietenia* compared to *Carapa*. Nevertheless a dendroecological study showed that the formation of increment zones is also caused by other exogenous factors (e.g. insect attack, wounding). Wood formation of *Swietenia* was strongly reduced in mixed culture systems compared to monoculture systems, which was mainly caused by a reduced period of cambial cell divisions. A reduced water and mineral element supply of *Swietenia* was correlated with a strong decrease of cambial cell divisions, whereas wood formation of *Carapa* was only slightly reduced in plantation systems with a reduced water and nutrient supply.

From these data it was concluded that wood formation of *Swietenia* is strongly influenced by competition and the seasonal variation of water and nutrient supply, whereas wood formation of *Carapa* reacts less sensitive to changing site conditions.

(The study will be extended in 1998).