

## X Mineral Element Supply of Plantation Grown Tropical Tree Species in Central Amazonia\*

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Since January 1995, investigations on tree growth and wood formation of native tropical tree species of Central Amazonia are carried out within a Brazilian-German research cooperation. The aim of these investigations is to select tree species for high quality timber production within mixed plantation systems on degraded land areas in the Manaus region, Brazil. Due to the restricted mineral element supply of degraded land areas the investigations are carried out with special reference to the demand of the selected native tree species for mineral elements and the influence of mineral elements on tree growth and wood formation of the plantation grown trees.

The mineral element supply of 8 native tree species (*Swietenia macrophylla*, *Carapa guianensis*, *Cedrela odorata*, *Dipteryx odorata*, *Hymenaea courbaril*, *Ceiba pentandra*, *Virola surinamensis*, *Tabebuia heptaphylla*) of Central Amazonia is investigated in 3 different plant systems (monoculture system, mixed culture system, enrichment of a 25 years old secondary forest) established in 1992/1993 at the CPAA/EMBRAPA, Manaus. The mineral element supply of the trees is studied in terms of quantified input (wet deposition, leaching from leaves and stem, litterfall, litter decomposition) and output data (leaching of the soil, uptake of the vegetation) within the plant systems. Sinks for mineral elements within the trees are studied by bulk-analysis (ICP-OES) of small tissue samples and by subcellular element analysis (TEM-EDXS). As to study the significance of mineral elements for tree growth and wood formation, the biomass production of the trees is quantified annually. The intraannual dynamics in wood formation is dated in one month intervals by pin-marker technique and is quantified histometrically.

After a 2-year-experimental period the investigations indicate that especially a restricted K- and P-supply of degraded land areas limit tree growth and wood formation (element losses of the soil caused by element leaching and a reduced recycling rate for mineral elements) in younger plantations. The mineral element supply of the plantation is strongly influenced by the tree species and the management of the plant system. *Ceiba e. g.* showed a high demand for mineral elements, whereas the demand for mineral elements, especially for K, of *Dipteryx* was fairly low. The mineral element recycling was improved in mixed plantation systems compared to monoculture systems. Tree species with a low specific demand for mineral elements (*Dipteryx*, *Carapa*) often showed a lower sensitivity to a reduced mineral element supply of the soil, as compared to tree species with a high demand for mineral elements (*Swietenia*, *Cedrela*).

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