

## **Biomass production and mineral element content of *Swietenia macrophylla* King in the juvenile phase\***

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This investigation (1992-1997) is part of a cooperative and interdisciplinary project of the Centro de Pesquisa Agroflorestral da Amazonia Ocidental (CPAA/EMBRAPA) in Manaus/Brasil, the Hamburg University/Germany, and Bayreuth University/Germany entitled „Recultivation of degraded and abandoned monocultures in sustainable mixed cultures with special reference to soil biological factors“, which is embedded in the SHIFT-programme.

Within this project, the biomass production and mineral element supply of several selected economic important tropical wood species were determined. At the same time the availability of nutrient elements in the soil was analysed. These experiments allow an evaluation, in which way a sustainable growth of the examined plant systems under the prevailing site conditions is possible. These fundamental data also contribute for a calculation of element fluxes within the plant. In a first step 20 plants (age 27 months) of *Swietenia macrophylla* King were harvested and separated up to 30 fractions of leaves, wood, bark etc. The fractions allow a high differentiation of element content (Ca, Mg, K, P, S, N, Fe and Al) and reveal physiological sinks within the plant. The element content was determined by Optical Emission Spectrometry (ICP-OES), except N (Kjeldahl) and for selected tissues on a subcellular level with X-ray dispersive analysis (EDXS).

Already after 27 months the average plant height was about 2 m and the total weight was 3630g with the preferred part for biomass production in the shoot (trunk) with 61%, which means major wood production. For example *Swietenia* revealed a very intensive internal exchange of K from old to young leaves (internal recycling), whereas Ca extremely accumulates in the old leaves. 8.4% biomass contains 53% of the total Ca-content of the plant and can be reused after litterfall (external recycling). Considering wood producing plant in the long run fertilization will be an urgent need.

\*Financial support by the CNPq/IBAMA, Brasilia and the BMBF Bonn within the Brazilian-German cooperation program „SHIFT“ (ENV 23/0339457A and ENV 42/0339638).