Wood anatomical studies on the xylem water conductance of four secondary forest species (*Miconia spp.*, Melastomataceae) of the Central Amazon*

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This study concerns an area of secondary forest which has regenerated over a period of approximately 11 years following the abandonment of rubber cultivation (1-ha plot). Of the families represented, the *Melastomataceae* were selected for this study because of their important place in the floristic composition of the vegetation. The genus *Miconia* was chosen because of its very varied habitus. The species studied were *Miconia alata, Miconia phanerostila, Miconia pyrifolia* and *Miconia tomentosa*. The individuals selected were felled as to study the significance of wood anatomical characteristcs for the xylem water conductance of the tree, especially in dry periods. Transverse, radial and tangential sections of the xylem were prepared for two radii of each stem with the help of a microtome. The diameter of the vessels, the thickness of the vessel wall, the number of vessels per mm^2 and the density of the ray parenchyma were measured in the transverse section, while the length of the vessels, the number of pits per vessel and the height of the rays were measured in the longitudinal sections. The water conductivity rate in the xylem was obtained by means of calibrated Granier-sensors with an accurracy of +/-10%. The xylem sap flow measuremennts were carried out during the dry season from November 10 until November 24, 1997 (soil water potential less than -300 hPa) for at least two trees of each species. The examination of the transverse section showed that vessel diameter and wall thickness were greatest in *Miconia phanerostila* and *Miconia pyrifolia* and smallest in *Miconia alata*. *Miconia alata* had the greatest number of vessels per mm^2 and *Miconia phanerostila* the smallest. Highest vessel length was detected in the xylem of *Miconia tomentosa* (3.97mm), *Miconia phanerostila* (3.38mm) and *Miconia pyrifolia* (3.48), whereas the mean vessel length of *Miconia alata* was only 2.68mm. During the dry season *Miconia tomentosa* showed the highest conductivity rate of the xylem (0.289 l/cm^2d), whereas the xylem sap flow of *Miconia pyrifolia* and *Miconia phanerostila* was strongly reduced during the dry season (0.022 l/cm^2d and 0.088 l/cm^2d). From these data we conclude, that *Miconia phanerostila* and *Miconia pyrifolia* have effective xylem conducting systems. However, water uptake and water transport are strongly influenced by dry periods. The xylem water conducting system of *Miconia alata* is less effective, but drought periods seem to have only a small impact on the xylem water conductance, indicating that *Miconia alata* is well adapted to drier sites.

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