

Neotropical Ecosystems



WAVES

Water Availability, Vulnerability
of Ecosystems and Society
in the Northeast of Brazil

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Water Relations of Secondary Vegetation under Fallow in Eastern Amazonia de Carvalho, C. J. R.¹, Sá, T. D. de A.¹ and Sousa, N. C.²

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Secondary vegetation under fallow (capoeira) is one of the most frequent land cover found in eastern Pará state, and has been recently focused by scientific research toward improving its management.

Aiming contributing to the understanding of water transfer phenomena in the soil-plant-atmosphere continuum and to support this vegetation management, the hydro-physical characterization of leaf tissues of five species abundant in this ecosystem is presented. The species *Banara guianensis*, Aubl; *Davilla rugosa*, Poir; *Lacistema pubescens*, Mart; *Myrcia bracteata*, (Rich) DC and *Vismia guianensis*, Aubl were studied using the pressure-volume curve technique, which allows estimating the different components of leaf water potential (Ψ_l) in leaf tissues. The leaves or branches were saturated during a night, still attached to the own plant, being later cut and submitted to natural drying in the laboratory, where the total leaf tissue water potential and the respective values of relative water content (RWC%) were continuously measured. The water potential was measured with a pressure bomb and, before each measurement, the dry weight of the leaf or branch was determined in a precision balance (0.001g), and in average sixteen (16) pairs of measurements were performed (n=4). The initial saturated weight was estimated by regression and, finally, the dry weight was obtained after drying the leaves or

branches with leaves in an oven at 70°C for 48 hours. RWC was estimated using the fresh weight, the saturated weight and the dry weight.

It was observed that the leaf tissues of *B. guianensis*, are able to stand lower Ψ_l values before turgor reaches zero ($\tau_{p=0}$), and similar behavior was found in *L. pubescens* and *M. bracteata*. In the species *D. rugosa* and *V. guianensis*, the null turgor potential was reached in values of respectively -1.6 MPa (± 0.1 ; n = 4) and -1.5 MPa (± 0.1 ; n = 4) thus, higher than those found in the other studied species, where the turgor loss point was reached between -1.8 and -2.3 Mpa. Osmotic potential values in these two species were also higher. The species

V. guianensis, apparently, exhibits osmotic adjustment, because of its relatively high Ψ_l (-1.45 MPa) in the null turgor point. *M. bracteata* was a species exhibiting the largest variation amplitude (-0.53 MPa) between the maximum turgor point (τ_{100}) and the null turgor point ($\tau_{p=0}$), and lower RWC in the $\tau_{p=0}$ point, being also the most sensitive species to water availability conditions. The obtained results also suggest differences in the elastic properties of the leaf tissues which, in turn, will influence responses to growth, leaf area maintenance and stomatal behavior in the studied species.