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Allometric relations of the sub-canopy tree Bathysa australis (A.St.-Hil.) & Hook. in an Atlantic Tropical Rain Forest of SE Brazil

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Allometric relations between trunk diameter and tree height can be defined by plant growth and its interaction with environmental factors. This study evaluated allometric relationships of stem diameter with tree height in populations of *Bathysa australis* (Rubiaceae) at two altitudes. We expect that these contrasting environments, with different light availability and wind exposure, will influence *B. australis* allometric relations in a different way. The study was performed at the Atlantic Tropical Rain Forest of Serra do Mar state park and sampling consisted of three 1ha plots in the upper forest (1,000m a.s.l.) and three 1ha plots in the lower forest (100-200m a.s.l.). All individuals were measured for trunk height and diameter at ground level. They were also classified into size categories: small (height<1m), intermediate (1≤height≤5m) and large (height>5m), since we expect different growth strategies to emerge at different sizes. We also tested for stem diameter-height fit to three mechanical models (geometric, elastic, and stress similarity), an attempt to verify if *B. australis*, as a sub-canopy specie with large leaves, adjusts to the elastic similarity model. All lines were fitted using standardized major axis method. Smaller individuals fitted for the geometric model (b ~ 1) in both altitudes showing that at this phase height growth in search of light is a priority at both environments. Line-fitting slopes than reduced with size following the need for more stability. However, only at the upper forest, larger individuals fitted for the elastic similarity model (b ~ 0.67). The upper forest also presented higher slopes than the lower one for large (upper: b = 0.65 and lower: b = 0.55) and overall individuals (upper: b = 1.13 and lower: b = 1.05). We conclude that altitude is a major factor influencing allometry, as from a certain size growth trajectories change between these two environments.