Abstract

Based on relevant allometric models can we predict a height of a tree or standing leaf biomass of the tree from a diameter of the tree? How does environment surrounding the tree influence such relationships? Does an „ideal tree“ exist? I have been exploring these and also other questions using 75 *Betula spp*. trees on 25 sites of a latitudinal gradient (mostly in Sweden). There is a lot of studies trying to adress similar questions by working in a framework of metabolic theory of ecology. Considering diameter-height relationship scaling models predict a scaling coefficient (slope of a regression line on log-log scale) $\beta = 2/3$, others $\beta = 2$ to 3. For diameter-standing leaf biomass relationship I found in literature $\beta = 2$. I have tested whether these models are valid even in their relationship to the tree environment. I have not confirmed the theoretical values of scaling coefficients. I have shown that the diameter-height relationship is more sensitive to environmental impact than the diameter-standing leaf biomass relationship. And I found that apparently the scaling coefficient is dependent on the height of measuring of the tree diameter. My study emphasises the variability of tree allometry and offers a direction for future research.

Keywords

trees, metabolic theory of biodiversity, scaling