

Application of leaf size and leafing intensity scaling across subtropical trees

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Abstract

Understanding the scaling between leaf size and leafing intensity is crucial for comprehending theories about light interception and leaf carbon uptake and adjustments in life history strategies. To test whether have the broad scope predictions between leaf size variation and leafing intensity on first year stem in evergreens and deciduous. A comprehensive data set of minimum (Mmin) and maximum (Mmax) leaf mass and total leaf number in twig was compiled, as well as data for the stem volume and mass. The datasets provide measurements of 123 woody species in subtropical mountain forests. Standardized major axis (SMA) analysis was used to determine the effects of the variation in leaf size (i.e., Mmin to Mmax) and the effects of different functional groups on the trade-off between leaf size and leafing intensity, i.e., the leafing intensity based on stem volume (LIV) and stem mass (LIM). Leaf size plasticity variation did not differ between evergreen and deciduous functional groups, but Mmin scaled as the 1.19 power of Mmax. Across the 123 species, the scaling exponents of the pooled data ranged between -1.14 to -0.96 for Mmin and Mmax vs. the leafing intensity based on stem volume (LIV) and from -1.24 to -1.04 for Mmin and Mmax vs. the leafing intensity based on stem mass (LIM). Across the subtropical woody species examined in this study, the results show the scaling relationship between leaf mass and leafing intensity is constrained to be $[-1.24, -1.04]$ vs. LIV and $[-1.14, -0.96]$ vs. LIM. More importantly, the scopes in twig leaf size and the leafing intensity correlate with the biomass allocation to minimum and maximum leaf mass, and not sensitive to plant functional groups in subtropical mountain forests.

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