Time for a Plant Structural Economics Spectrum

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We argue that tree and crown structural diversity can and should be integrated in the whole-plant economics spectrum. Ecologists have found that certain functional trait combinations have been more viable than others during evolution, generating a trait trade-off continuum which can be summarized along a few axes of variation, such as the “worldwide leaf economics spectrum” and the “wood economics spectrum”. However, for woody plants the crown structural diversity should be included as well in the recently introduced “global spectrum of plant form and function”, which now merely focusses on plant height as structural factor. The recent revolution in terrestrial laser scanning (TLS) unlocks the possibility to describe the three dimensional structure of trees quantitatively with unprecedented detail. We demonstrate that based on TLS data, a multidimensional structural trait space can be constructed, which can be decomposed into a few descriptive axes or spectra. We conclude that the time has come to develop a “structural economics spectrum” for woody plants based on structural trait data across the globe. We make suggestions as to what structural features might lie on this spectrum and how these might help improve our understanding of tree form-function relationships.