



## **Can leaf angle distribution be considered a species-specific trait?**

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The leaf angle distribution is a key parameter in models useful for understanding the forest canopy processes of photosynthesis, evapotranspiration, radiation transmission, and spectral reflectance. Yet, despite the strong sensitivity of many of these models to variability in leaf angle distribution, the difficulty in measuring leaf angle distribution has limited exploration of its species-specific phenology and variation across environmental gradients and often causes it to be one of the most poorly constrained model parameters. Relatively few measurements of leaf inclination angle distributions have been reported for different tree species in literature and databases such as TRY, and various assumptions about leaf angle distribution are often made by modellers.

Here, we report on the spatial survey of leaf angle distributions within botanical gardens around Europe as well as in North America and Australia. Our particular focus were the most important forest tree species in Europe according to the spatially representative Level I monitoring net with 16 km grid size. We seek to find answers a) if (or to what extent) leaf angle distribution can be considered a species-specific trait, and b) if the often assumed spherical leaf angle distribution is a valid assumption for tree species.

Despite we found evidence that that leaf angle distribution might be indeed considered a species-specific trait for large part of the studied cases, we advocate the use of leaf angle distributions obtained from actual leaf inclination measurements whenever possible. Also, a planophile or a plagiophile leaf angle distribution appears to be a more appropriate assumption than a spherical one for modeling radiation transmission particularly through temperate and boreal broadleaf stands common to Europe when no leaf inclination angle measurements are available.