

## Variations in Wood Traits across Major Gymnosperm and Angiosperm Tree Species and the Driving Factors in China

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**Abstract :** Many wood traits are important functional attributes for tree species, connected with resource competition among species, community dynamics, and ecosystem functions. Large variations in these traits exist among taxonomic categories, but variation in these traits between gymnosperms and angiosperms is still poorly documented. This paper explores the systematic differences in 12 traits between the two tree categories and the potential effects of environmental factors and life form. Based on a database of wood traits for major gymnosperm and angiosperm tree species across China, the values of 12 wood traits and their driving factors in gymnosperms vs. angiosperms were compared. The results are summarized below: i) Means of wood traits were all significantly lower in gymnosperms than in angiosperms. ii) Air-dried density (ADD) and tangential shrinkage coefficient (TSC) reflect the basic information of wood traits for gymnosperms, while ADD and radial shrinkage coefficient (RSC) represent those for angiosperms, providing higher explanation power when used as the evaluation index of wood traits. iii) For both gymnosperm and angiosperm species, life form exhibits the largest explanation rate for large-scale spatial patterns of ADD, TSC (RSC), climatic factors the next, and edaphic factors have the least effect, suggesting that life form is the dominant factor controlling spatial patterns of wood traits. Variations in the magnitude and key traits between gymnosperms and angiosperms and the same dominant factors might indicate the evolutionary divergence and convergence in key functional traits among woody plants.

**Keywords :** allometry, functional traits, phylogeny, shrinkage coefficient, wood density

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