

# Researchers unveil patterns of species diversity and determinants in temperate forest

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The Qinling Mountains, which run east-west and serve as the geographical boundary between northern and southern China as well as

the climatic demarcation line between the subtropical and warm temperate zones in China, are of ecological significance in biodiversity study.

To determine the underlying causes of the variations of species diversity in the temperate [forest](#), Dr. He Rui, supervised by Prof. Dang Haishan from the Wuhan Botanical Garden of the Chinese Academy of Sciences, applied multivariate linear regression analysis to test the effects of biotic and [abiotic factors](#) on alpha- diversity, Local Contribution to Beta Diversity (LCBD) and Species Contribution to Beta Diversity (SCBD).

They used variation partitioning in combination with [environmental variables](#) and spatial distance to determine the contribution of environment-related variations versus spatial variations in a fully mapped 25-ha permanent forest plot in the Qinling Mountains of north-central China.

With regard to alpha diversity, results showed that the species abundance and richness had positive correlation with soil available phosphorus, and had significant negative correlation with slope.

For beta diversity, both environmental and spatial variables had significant influence on the variations of beta diversity, explaining 46% of the variation in community composition of the permanent forest plot. Nearly 60% of the variation of LCBD in the understory layer was explained jointly by [biological factors](#), soil features and topographic variables. However, in the substory layer and canopy layer, these variables explained only 40% and 29% variations of LCBD.

In addition, high species abundance was found to be associated with high SCBD values regardless of forest vertical strata, and niche position, as one of the ecological traits, significantly affected the variations of SCBD in the substory and canopy layers.

Under the exploration of the potential influencing factors of species diversity from the perspective of vertical stratification of forest community, the study enlightens the biotic factors and how species diversity in forest responds to [environmental conditions](#) and how it is influenced by biotic factors and ecological traits of species. It also provides novelty for the protection of forest biodiversity and the revelation of the mechanism of species coexistence.

This work was published in *Forest Ecosystems*, titled "Patterns of [species diversity](#) and its determinants in a temperate deciduous broad-leaved forest."

**More information:** Rui He et al, Patterns of species diversity and its determinants in a temperate deciduous broad-leaved forest, *Forest Ecosystems* (2022). [DOI: 10.1016/j.fecs.2022.100062](https://doi.org/10.1016/j.fecs.2022.100062)

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