

Key factors contributing to high local diversity of trees of Euphorbiaceae in Xishuangbanna

August 29 2022, by Zhang Nannan



20-ha forest dynamics plot in tropical seasonal rain forest in Xishuangbanna.
Credit: XTBG

Co-occurrence of numerous closely related species at a local scale is a

hallmark of diverse tropical forests. However, identifying the factors that permit closely related species to co-exist in species-rich tropical forests continues to be a major challenge in ecology.

In a study published in the *Journal of Ecology*, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences tried to identify the key axes of variation that contribute to the high local diversity of trees in a single plant family (Euphorbiaceae) in a local community.

The researchers measured 40 functional traits related to resource acquisition, [photosynthetic capacity](#), hydraulic conductivity and efficiency, and secondary-metabolite profiles for all 26 free-standing woody species of Euphorbiaceae in a 20-ha forest dynamics plot in tropical seasonal rain forest in Xishuangbanna, southwest China.

Using a trait networking approach, the researchers examined the correlation structure of interspecific variation among the 40 traits and interspecific variation in leaf [secondary metabolites](#) by using untargeted metabolomics. They coupled those traits with detailed measurements of variation in [soil nutrients](#), light environment, soil water content and herbivore pressure to identify the axes of trait variation that may define niche differences among co-occurring woody Euphorbiaceae.

They found substantial differentiation in trait dimensions related to photosynthetic, hydraulic, resource-acquisition and defensive strategies with the potential to contribute to species coexistence by allowing species to segregate with respect to variation in resource availability and herbivore pressure over time and space

"Our results suggest that resource-utilization traits and the habitat associations play a significant role in the niche segregation of co-occurring woody plants in the Euphorbiaceae. Secondary metabolites,

however, may enhance diversity at a finer spatial scale by allowing closely [related species](#) with similar functional traits to partition biotic niche space within shared habitats in [tropical rainforest](#)," said Yang Jie of XTBG.

More information: Xue-Zhao Wang et al, Niche differentiation along multiple functional-trait dimensions contributes to high local diversity of Euphorbiaceae in a tropical tree assemblage, *Journal of Ecology* (2022). [DOI: 10.1111/1365-2745.13984](https://doi.org/10.1111/1365-2745.13984)

Provided by Chinese Academy of Sciences

Citation: Key factors contributing to high local diversity of trees of Euphorbiaceae in Xishuangbanna (2022, August 29) retrieved 6 May 2024 from <https://phys.org/news/2022-08-key-factors-contributing-high-local.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.