

# Drought sensitivity shapes species distribution patterns in tropical forests

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Looking at a rainforest it's easy to see that there are hundreds of different tropical plant species that inhabit the forest. Although the patterns of plant distributions in tropical forests have been widely studied, the reasonings behind these patterns are not as well known. This study, published in *Nature*, explores these patterns.

"The results presented here emphasize the sensitivity of tropical forests to water availability," said Dr. Tyree. "Therefore, changes in soil moisture availability caused by global climate change and forest fragmentation are likely to alter tropical species distribution, community composition and diversity."

A contingent of researchers from around the world, including Panama, Germany, USA and Canada, have uncovered that tropical plant species distribution patterns are linked to the plant's drought sensitivity.

Source: University of Alberta

For this study, the researchers conducted irrigation experiments on 48 native tree and shrub species to determine drought sensitivity between dry and irrigated conditions, which confirmed that species vary widely in drought sensitivity. The researchers also assessed regional plant species distribution across two large plots on opposite sides of the Isthmus of Panama. Through this assessment it was found that the plant's densities at the dry Pacific side compared to the wet Atlantic side correlated negatively with drought sensitivity.

"Our results suggest that niche differentiation with respect to soil water availability is a direct determinant of the distributions of tropical plant species," said Dr. Mel Tyree, University of Alberta researcher.

Although tropical plant species' reactions to environmental factors, namely light and nutrients, have been experimentally assessed in numerous studies, only a few have quantitatively linked this data to distribution patterns. These studies were restricted to a small number of species, precluding analysis of the importance of environmental factors across the community. Thus, these findings represent the most thorough study so far linking tropical plant species distribution patterns with species' reactions to an environmental factor at the community level

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