

# Forest Ecology: Trees 'communicate' with their Neighbours

2018-03-22 Lüneburg. Trees usually grow much better in a species-rich neighbourhood than –for example– in monocultures. This has now been shown by scientists from a research association of which Leuphana University of Lüneburg is a member. The researchers were surprised to discover that trees growing in species-rich neighbourhoods can even support each other. Under such conditions, they can yield more wood. The authors of the study are convinced that these findings could have far-reaching consequences for nature conservation and forestry. Their results have now been published in the internationally renowned journal 'Nature Communications'.

In a globally unique tree biodiversity experiment ('BEF China'), European and Chinese scientists have been investigating for ten years how the diversity of tree species in forest ecosystems influences the coexistence and growth performance of trees. More than 400,000 trees and shrubs were planted for the experiment on an area of around 50 hectares in eastern China. 42 different native tree species were used. In the meantime, many trees have achieved a height of 10 to 15 m and their crowns have partly formed a dense canopy.

The scientists have measured the growth of the trees every year and have uncovered astonishing findings: Trees growing in a species-rich neighbourhood produce more wood than those surrounded by neighbours of the same species. "We were particularly impressed by the fact that the interrelationships between a tree and its immediate neighbours also lead to a significantly higher productivity of the entire forest stand" reports forest ecologist Dr. Andreas Fichtner of Leuphana. The interactions between neighbouring trees explain more than 50% of the total forest stand productivity.

The research team has also identified mechanisms underlying the phenomenon. In species-rich forests competition is less prevalent and trees can even support each other in their growth, for example by improving the microclimate or by positive interactions with soil fungi. "Trees do not only compete with each other, but they can also 'help' each other to improve their productivity," says Prof. Dr. Werner Härdtle, ecology expert at Leuphana.

The results of the study underline the importance of an effective long-term protection of global biodiversity: this will not only maintain the functionality of ecosystems, but also will safeguard ecosystem services used by humans. "Biodiversity protection is therefore by no means a purely ecological or ethical concern, but has long become a

socio-economic necessity," Härdtle concludes.

In addition to the Leuphana scientists, Prof. Dr. Goddert von Oheimb and Dr. Matthias Kunz from the TU Dresden are involved in the research partnership. The cooperation partners are Prof. Dr. Helge Bruelheide from Martin Luther University Halle-Wittenberg, Dr. Ying Li from Beijing Forestry University and the German Centre for Integrative Biodiversity Research (iDiv) in Leipzig.

The publication in Nature Communications appeared at:  
[www.nature.com/articles/s41467-018-03529-w](http://www.nature.com/articles/s41467-018-03529-w)

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