HYDRAULIC AND WOOD TRAITS OF TWO CONGENERIC TROPICAL TREE SPECIES IN THEIR CORE HABITAT

Anaïs-Pasiphaé Gorel[1], Kathy Steppe[2], Hans Beeckman[3], Jean-Louis Doucet[4], Adeline Fayolle[1]

[1]*TERRA Forêts d'Afrique Centrale, Gembloux Agro-Bio Tech, Université de Liège, Gembloux, BE, anais.gorel@ulg.ac.be*
[2]*Laboratory of Plant Ecology, Department of Applied Ecology and Environmental Biology, Faculty of Bioscience Engineering, Ghent University, Ghent, BE*
[3]*Royal Museum for Central Africa (RMCA), Laboratory for Wood Biology and Xylarium, Tervuren, BE*
[4]*BIOSE unit, Gembloux Agro-Bio Tech, Université de Liège, Gembloux, BE*

Background: For several tropical tree genera, strong niche partitioning among species has been identified across rainfall gradients. The link between hydraulic and wood anatomical traits, associated with drought tolerance, however remains to be explored, in order to identify the mechanisms shaping the range limits of tropical tree species.
Aim: In this study, we aimed to identify the differences in hydraulic and wood traits between two congeneric tree species with contrasting distributions in moist and wet tropical forests.
Location: Central African moist and wet forests.
Methods: In the core habitat of *Erythrophleum ivorense* (wet forest) and of *E. suaveolens* (moist), we collected branches to construct vulnerability curves and measure hydraulic capacitance, and both stem and branch wood samples to link the hydraulic traits to wood anatomy.
Major results: *E. suaveolens*, which is characteristic of drier forests, is clearly more resistant to cavitation than *E. ivorense*, and also possess a greater hydraulic capacitance (i.e.the capacity that species have to mitigate the impact of drought by using internally stored water). In agreement with this great drought tolerance for *E. suaveolens*, wood anatomy revealed a high number of small vessels associated with small intervessel pits, features minimizing cavitation risk but also reducing water transport.
Main conclusions: Drought tolerance, as indicated by both hydraulic and wood traits, strongly differed between the closely related species and explained their contrasting distribution, and affinity for moist (*E. ivorense*) and wet (*E. suaveolens*) forests. However, phenotypic plasticity in hydraulic and wood traits remained to be addressed to examine the extent of water use differences between the two species.

Merian Award Applicant