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How do tropical trees cope with drought: the case of *Erythrophleum* species

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Understanding the mechanisms used by tropical tree species to cope with drought will be central in predicting forest responses to climate change. The study of plant traits, as wood anatomy and hydraulics, holds promise for capturing response to drought with the major aim of informing projections of climate impacts. However, the links between wood anatomy, plant hydraulics and species fitness in a given environment are still barely understood for the majority of tropical trees.
We proposed to use hydraulics and wood traits to examine adaptation to water availability among congeneric tropical tree species in Africa. We hypothesized that wood anatomy determines tree hydraulics and drought responses which, in turn, influence individual tree performance and fitness. We specifically focused on two congeneric species, *Erythrophleum ivorense* and *Erythrophleum suaveolens*, with known phylogeny and occupying contrasting habitats.
In the natural habitat of each species, we quantified vulnerability to cavitation, volumetric water content and capacitance and the underlying wood traits in branch and stem. Growth was also examined. A common garden in the natural habitat of *E. suaveolens* was specifically used to confirm that the observed differences in wood traits and growth are largely genotypic in origin rather than environmentally plastic.
While the two species broadly share the same general wood anatomical features (Inside Wood 2004) and are hard to distinguish in the field, we identified some but slight differences in wood traits, particularly in vessel-associated traits, that resulted in strong differences in tree hydraulics, performance and overall distribution. Specifically, the wet forest species, *E. ivorense*, had wider vessels, lower vessel cell-wall reinforcement and wider intervessel pits than *E. suaveolens*. These traits allow a high hydraulic conductivity and the fast growth of *E. ivorense*, but confer high vulnerability to cavitation.