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ANNUAL MEETING OF THE SOCIETY FOR TROPICAL ECOLOGY (GTÖ)

CHALLENGES IN TROPICAL ECOLOGY AND CONSERVATION - GLOBAL PERSPECTIVES

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THE LIMITED CONTRIBUTION OF LARGE TREES TO BIOMASS DYNAMICS IN AN OLD-GROWTH TROPICAL FOREST

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Although the importance of large trees regarding biodiversity and carbon stock in old-growth forests is undeniable, their annual contribution to biomass dynamics and carbon uptake remains poorly studied at the stand level.
To clarify the role of large trees in biomass dynamics, we used data of tree growth, mortality and recruitment monitored during 20 years in 10×4-ha plots in a species rich tropical forest (Central African Republic). Using a random block design, three different silvicultural treatments, control, logged, and logged + thinned, were applied in the 10 plots. Biomass gains and losses were analyzed in relation to the relative biomass abundance of large trees and by tree size classes using a spatial bootstrap procedure.
Despite large trees showing a high individual growth rates and holding a substantial amount of biomass, we showed that stand-level biomass production decreased with the abundance of large trees in all treatments and plots. The contribution of large trees to annual stand-level biomass production appeared limited in comparison to that of small trees. This pattern did not only originate from differences in abundance of small versus large trees or differences in initial biomass stocks among tree size classes but also from a reduced relative growth rate of large trees and a relatively constant mortality rate among tree size classes.
In a context in which large trees are increasingly gaining attention as being a valuable and a key structural characteristic of natural forests, the present study brought key insights to (1) better gauge the relatively limited role of large trees in the biomass dynamics at the stand level and (2) carefully up-scale results of biomass growth observed at the tree or species levels.