

## **NAILING THE FACTS: LEGACY OF 66 YEARS OF INDIVIDUAL TREE GROWTH IN CENTRAL AFRICA SHOWS DIFFERING GROWTH RATES**

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Long-term tree growth observations are scarce in Central Africa. Permanent sample plot data on average do not go back in time further than a few decades, whereas tree ring analysis can if properly crossdated. This study combines diameter measurements with analysis of tree ring descriptors in order to link radial increment to xylem increment. The Nkulapark is a forest monitoring plot established in 1947 which lies in the Luki Biosphere Reserve (33,000ha) which is part of semi-deciduous tropical rainforest situated at the southernmost edge of the Mayombe forest near the Atlantic Ocean (western D.R. Congo).

In this study, old records of diameter data of 6300 trees measured from 1948-1957 (INEAC 1947), were digitized and analysed. Moreover, old maps and trees with original number tags allowed us to relocate 400 trees in the field during a 2014 field campaign. Rediscovered trees were measured and the nails that carry the original 1948 number tag, can be considered as a timestamp, as the cambium was wounded that year. This provides us the unique opportunity to assess the individual long term response of these trees at the xylem level, as the distance between the nail wound reaction and the cambium can be measured.

A subset of 100 of these trees was cored adjacent to the nail for macroscopic inspection of the xylem structure as well as an assessment of the tree ring descriptors via an X-ray CT field-to-desktop toolchain. After 66 years, the average radial increment was highly variable, with some understorey trees showing no radial increment at all. When the xylem structure was examined, it was shown that only a few rings were formed in understorey trees, pointing out the high degree of missing rings, whereas other canopy trees showed considerable radial growth, had clear rings and thus give a reliable view on the tree's past.