**Intra-annual wood formation in tropical forests: case study on the Mayombe forest, west of the Democratic Republic of the Congo**

S. Maginet1, T. De Mil1,2, H. Beeckman2, J. Van Acker1 and J. Van den Bulcke1

*1 UGCT – Laboratory of Wood Technology (Woodlab-UGent), Faculty of Bioscience Engineering, Ghent University (UGent), Belgium*

*2 Service of Wood Biology, Royal Museum for Central Africa, Belgium*

**Corresponding author:** [[selwin.maginet@ugent.be](mailto:a.jansen@abc.be)](mailto:a.jansen@abc.be)

**Keywords:** cambial pinning, dendroclimatology, intra-annual wood formation, X-ray CT

Intra-annual wood formation has hardly been studied in tropical forests. The purpose of this work is, therefore, to study tree growth, and the impact of climate and phenology on wood formation in detail, through a combination of tree ring analysis, wood anatomy and X-ray tomography on cambial pinnings of stem discs. In the Luki Biosphere Reserve (Mayombe forest), 18 selected trees of 5 different species were monthly pinned during one growing season (from September 2013 till July 2014) and harvested in August 2014. The pinned stem discs are digitized with a flatbed scanner and camera to reconstruct their shape and relocate the marks when destructively subsampled. Tree rings are measured on these optical images using an in-house developed toolbox [1]. Cores of approximately 3 cm in diameter were then drilled containing the pinnings. These cores were scanned with X-ray CT, resulting in a three dimensional view on the wood structure of and around the pinned zone. Based on the X-ray CT scan analysis, cross-sections are taken for detailed wound study. This approach allows to show clear differences in growth between the different species. Combining growth ring and high resolution pinning data leads to fundamental knowledge about intra-annual tree growth of tropical trees. The results are valuable for management of tropical forests and predicting changes in tree growth as a result of climate change. This stepwise approach can also be used for the study of the historic pinnings found in trees from the Nkulapark in Luki and thus is suitable for other studies where cambial marks are available.

**References**

[1] Van den Bulcke, J. et al. (2014). 3D tree-ring analysis using helical X-ray tomography. *Dendrochronologia* 32:39-46.