

The dry season in French Guiana is not dry enough to impact *Parkia nitida* growth

H. Morel¹, S. Ponton², J. Beauchêne³ and B. Thibaut⁴

¹ UMR botAnique et bioinforMatique de l'Architecture des Plantes, CIRAD, French Guiana

² UMR Ecologie et Ecophysiologie Forestière, INRA, Nancy

³ UMR ECOlogie des FOrêts de Guyane, CIRAD, French Guiana

⁴ Laboratoire de Mécanique et Génie Civil, CNRS, Montpellier

Corresponding author: helene.morel@cirad.fr

Keywords: annual growth ring, dendrochronology, dry season, *Parkia nitida*, tropical rain forest

Knowledge of the age and growth rate of trees is essential to understand the dynamics of these ecosystems. However, due to the lack of winter conditions it is difficult to read the story in the wood of these tropical forests. In this study we evaluated the potentialities of a classical dendrochronological approach on *Parkia nitida*, a canopy emergent species of the tropical forests in French Guiana. We selected a species that yearly develops clear growth ring (*i.e.* a thin band of marginal parenchyma containing numerous crystals of calcium oxalate). The annual character of the ring production in *P. nitida*, a species that appears leafless every 10 to 13 months (Loubry, 1994; Morel et al. 2015), was established *a priori* by confronting the anatomical markers with primary growth markers as already done on a close-related species (Heuret et al. 2002; Zalamea et al. 2008; Nicolini et al. 2012). In addition, the growth ring periodicity was assessed by cambial wounding. These two results permitted to conclude that *P. nitida* has annual tree rings. At tree scale, secondary growth is homogeneous and relatively synchronous within individuals of this species in the same location. However, the influence of tested climatic parameters, such as temperature and precipitation on the annual radial growth, is low over the considered period. The study showed that, in the environment of French Guiana, marked annual seasonality of rainfall does not affect in a strong way the behavior of the trees.

References

- Heuret, P. et al. (2002) Synchronization of growth branching and flowering processes in the south american tropical tree *Cecropia obtusa* (Cecropiaceae). American Journal of Botany 89:1180-1187.
- Loubry, D. (1994) Phenology of deciduous trees in a French-Guianan forest (5 Degrees Latitude North) - Case of a determinism with endogenous and exogenous components. Canadian Journal of Botany 72:1843-1857.
- Morel, H. et al. (2015) Seasonal variations in phenological traits: leaf shedding and cambial activity in *Parkia nitida* Miq. and *Parkia velutina* Benoist (Fabaceae) in tropical rainforest. Tree, Structure and Function: DOI :10.1007/s00468-015-1177-4.
- Nicolini, E. et al. (2012) Dating branch growth units in a tropical tree using morphological and anatomical markers: the case of *Parkia velutina* Benoist (Mimosoïdeae). Annals of Forest Science 69:543-555.
- Zalamea, P.C. (2013) Effect of rainfall seasonality on the growth of *Cecropia sciadophylla*: intra-annual variation in leaf production and node length. Journal of Tropical Ecology 29:361-365.