notable increase during 1971-2013. High densities of large and/or old trees were observed in areas with restrictions on wood production emphasizing their role in maintaining biodiversity. The results reflect the destructive effects of former land use and the transition from dimensional cuttings to clear cuts and thinning from below after the 1940s. Proportionally larger changes were observed for southern Finland, where a higher population density has resulted in more intensive land use. As the densities of large trees and old trees have developed in completely different manner, our results suggest that monitoring only the size distribution of trees will not sufficiently describe the role of old trees as constituents of biodiversity.

Growth pattern of timber species in an ecotone among amazon forest types

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This work aimed to describe the individual growth of *Apuleia leiocarpa* (Vogel) J.F. Macbr., *Erisma uncinatum* Warm., *Hymenolobium excelsum* Ducke and *Trattinnickia burserifolia* Willd. in Mato Grosso State, Brazil. Growth analyzes were carried out using dendrochronology. We calculated mean increments and passage time between diameter classes, adjusted growth equations in diameter and derived volume increment curves at an individual tree level. The four species showed annual growth rings. Gompertz model showed better adjust to explain *A. leiocarpa* and *H. excelsum* growth and Johnson-Schumacher to *E. uncinatum* and *T. burserifolia*. The differences between diameter class increments, passage time and growth pattern over each species life span were related to their ecological groups. The diameter growth culmination and the maximum annual growth volume of *A. leiocarpa* occurred in smaller diameters and at younger ages when compared to the other species, which characterizes it as an early secondary species. *E. uncinatum* and *T. burserifolia* presented typical late secondary species characteristics, inverse to *A. leiocarpa*. *H. excelsum* is probably indifferent to light incidence, as trees presented constant increment during their lifetime. Our analyzes will be the basis of growth simulations at species population level, to be used in the elaboration of guidelines aiming at sustainable forest management.

Applying tree rings and population models to improve future timber yield projections of *Hymenaea courbaril* (Jatobá) in the Eastern Amazon

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To ensure sustainable timber productivity in polycyclic logging systems and to conserve forest function and services, it is crucial to adopt species-specific adaptive forest management systems. Yet, management plans are usually based on models that simulate future timber yields using limited, short-term growth, reproduction, and survival data, and that only poorly incorporate within-species variations in these vital rates. For growth data, tree-ring analyses allow for obtaining such long-term data that includes within-species growth differences. Here we combine 25 years of vital-rate data from experimental forest plots with different past exploitation (control, conventional exploitation and Reduced-Impact Logging (RIL)) with tree-ring analysis and state-of-the-art demographic models (Integral Projection Models) to simulate future timber yields of the tropical species *Hymenaea courbaril*. We simulated yields under conventional and RIL scenarios and assessed how using tree-ring data and including persistent growth differences between individuals affect timber yield projections. Future yields were below 100% of the initial exploited volume in all simulations. However, long-term yield recuperation was higher under RIL than under conventional exploitation. Using tree-ring based models and incorporating persistent growth differences lead to higher future yields. Our results suggest that timber volumes accumulated over many decades cannot grow back within current logging-cycle lengths (the “primary-forest premium”), but also that RIL practices are an important step to reach sustainable timber productivity. As more and more plot and tree-ring data comes available, approaches like ours - incorporating population dynamics and long-term vital rates - can be used to orient decision making to attain sustainable management of tropical forests.

Analysis of the diametric structure of the Amazonian forests from the point of view of forest management

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Natural forest management is currently the only land use activity that maintains approximately 88% of the number of initial trees. Nevertheless, the amazon forest management continues to be criticized. It is always questioned about its effectiveness as an environmental tool that guarantees the sustainability of natural forests. The reason for this criticism is a number of mistakes and misunderstandings about the analysis of monitoring results or simulations of natural forest management. The goal of this work was to enrich the understanding of Amazon Forest productivity when under management rules. This work also intended to analyze the misunderstandings about natural forests management. We analyzed the general diametric structure of the Amazon forest, identifying key points of transition to old forest, points of growth reduction, accumulation in basal area and decrease in timber volume production. The analysis of the species growth pattern, evolution of the individual species community over time and volumetric production help to explain the interruption of the structural balance of the Amazon forest after diameter class of 75 cm. This imbalance limits the cutting cycles that must be estimated for management, since it shows that the forest is finishing its most productive phase. We can also conclude that pursuing the original structures of an Amazon natural forest after extraction is incompatible with forest management as senescent and stagnated trees (all pristine forest structure) represent an accumulated stock, but do not represent the productive capacity of the trees in a production forest.

Forest responses to environmental perturbations in Central Europe: from permanent research plots to model projections

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