Deforestation in the tropics has both local and global effects, but conservation remains a major challenge. New research describes a method for measuring tree growth and timber harvesting, which can lead to sustainable management of tropical timber resources. The method tailors cutting cycles according to accurate growth rates of different tree species.

Research explored the Mamirauá Sustainable Development Reserve - 11, 240 km² of highly productive floodplains, known as the várzea, in the Western Amazon basin of Brazil. The várzea fulfills a number of important functions and has been used for centuries for agriculture, pasture, fishing, hunting and timber logging. The unique ecosystem here supplies benefits such as slowing down the force of the river water, protecting river banks against erosion and reducing siltation. However, it is under severe threat as land is converted to pasture or over-exploited for timber. Almost 1000 tree species are found in the várzea, but a lack of knowledge about growth rates and regeneration have been partly responsible for many tree species disappearing entirely in recent decades.

A new method for understanding tree growth could encourage more sustainable logging. Known as Growth-Orientated Logging (GOL), the method provides a more accurate measure of tree age than existing methods. Current methods can lead to overestimates of a tree’s age.

Trees respond to seasonal floods by becoming dormant and these growth pauses form clear tree-ring boundaries in the wood. Core-samples were taken and analysed together with tree height and volume data to reveal the growth patterns of different species. The significant link between tree age and diameter was mapped for twelve tree species which revealed the species-specific optimum period for selective logging.

Currently, trees are felled after 25 years of growth across all species. The research showed forest management would be more sustainable if individual species were felled at different ages, according to their growth-rate, as judged by GOL.

The research suggests that fast-growing, light-demanding, low density trees should be harvested in groups in 17 to 60 year cycles. Depending on the species, higher density, slower-growing timber species, should be allowed to reach 53-71cm in diameter and be harvested in cycles of up to 32 years. Given the socio-economic conditions of the várzea, detailed forest inventories and an ideal forest management regime may not be viable, but the fixed cutting cycles should be avoided because, while it is low-cost, it can cause degradation of the population structure especially for the slow-growing tree species.

Using tree-ring data is a powerful tool, providing realistic predictions of tree growth. It can be adapted for other commercial tree species promoting sustainable management of timber resources in the Amazon and other tropical regions.


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