

## Determination of sampling intensities to estimate diameter distribution in Amazon Forest

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Several studies have been conducted in the Amazon region to evaluate the diameter distribution by species or group of species, by sample surveys as alternative to optimize field activities to enable forest managers to reduce costs without reducing the results quality. The aim of this study was to determine the percentage of sample that best reflects the actual diameter distribution. The study was conducted in a 1,000 ha of primary Amazon forest in Sinop, Mato Grosso State, Brazil. All trees with diameter at breast height greater than 30 cm at the exploitable area were survey, totaling 28,578 trees. It was also considered individually the population of *Apuleia leiocarpa*, with 576 trees and *Mezilaurus itauba*, with 1,539 trees. To estimate the diameter distribution 6 models of probabilistic function were tested, and the best choice was selected based on the Kolmogorov-Smirnov test (KS). Five sampling intensities were tested with plots of 1 ha randomly distributed on the area (2.5%, 5%, 10%, 15% and 20%). The identification of the best sample intensity was made based on the results of the chi-square test and graphical analysis of estimated and actual distribution. In general, all the models showed good estimates with  $R^2_{adj.}$  above 0.70, and Johnson SB distribution presented the best adjustment. Considering the total area, the only intensities accepted by the chi-square test at 1% probability were 2.5% and 5%. The 5% intensity presented the best graphic distribution. The rejection of the other intensities may be explained by the inclusion, with increasing coverage area, of uncommon or rare species. All sample intensities were accepted by the chi-square test for *A. leiocarpa* and *M. itauba* populations. By graphic distribution analysis it was observed best fit by sampling 15% for *A. leiocarpa* and 20% for *M. itauba*. The analysis of the diameter distribution by species still requires further study, since there are many factors that may be interfering with the results, such as frequency, spatial distribution, basal area, or different site conditions. Considering the horizontal structure of the total area, a sample of 5% proved to be sufficient, and it is considered an important tool for selecting areas to be explored and to establish production scale. However, it is important to highlight that it should not be used to replace the 100% survey tree assessment, defined as a legal requirement to register forest management plans.