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Paper

Rapid Simultaneous Estimation of Aboveground Biomass and Tree Diversity Across Neotropical Forests: A Comparison of Field Inventory Methods

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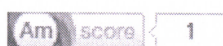
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Abstract

A standardized rapid inventory method providing information on both tree species diversity and aboveground carbon stocks in tropical forests will be an important tool for evaluating efforts to conserve biodiversity and to estimate the carbon emissions that result from deforestation and degradation (REDD). Herein, we contrast five common plot methods differing in shape, size, and effort requirements to estimate tree diversity and aboveground tree biomass (AGB). We simulated the methods across six Neotropical forest sites that represent a broad gradient in forest structure, tree species richness, and floristic composition, and we assessed the relative performance of methods by evaluating the bias and precision of their estimates of AGB and tree diversity. For a given sample of forest area, a 'several small' (< 1 ha) sampling strategy led to a smaller coefficient of variation (CV) in the estimate of AGB than a 'few large' one. The effort (person-days) required to achieve an accurate AGB estimate (< 10% CV), however, was greater for the smallest plots (0.1 ha) than for a compromise approach using 0.5 ha

modified Gentry plots, which proved to be the most efficient method to estimate AGB across all forest types. Gentry plots were also the most efficient at providing accurate estimates of tree diversity ($< 10\%$ CV of Hill number). We recommend the use of the 0.5 ha modified Gentry plot method in future rapid inventories, and we discuss a set of criteria that should inform any choice of inventory method.

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