Pre-harvest Tree and Vine Biomass in a Forest in NW Mato Grosso, Brazil

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1. Introduction and objectives

Selective logging has become a common land-use in Brazilian Amazonia. As part of a larger study to evaluate the effect of reduced impact logging on C dynamics and nutrient stocks, forest structure, and forest regeneration potential, we conducted a pre-harvest campaign to estimate tree and vine biomass in a parcel of forest managed by Rohden Lignea Ltda in northwestern Mato Grosso (MT) (Figure 1a,b).

Rohden Lignea Ltda is a small-sized company in northwestern Mato Grosso that generates contour and 3D shaded topographic landscape features. Using kriging interpolation, we estimated biomass contributions from the largest trees and vines in the parcel. We used this information to develop a database for a larger study to evaluate the effect of biomass and forest management units on carbon accumulation and forest regrowth.

2. Methods

• The study site is a 25,000 ha primary forest in the municipality of Juruena (MB) (Figure 1a).
• The forest, privately owned and managed by Rohden Lignea Ltda, is selectively logged at a rate of 1000 ha yr⁻¹ (Figure 2).
• Annual rainfall is 2,200 mm with a strong dry season from June to September.
• The soils are classified as Ultisols and Oxisols, are deep, acidic, and infertile.

• Biomass estimates were made from:
  - a 1000 ha management block, Rohden Forest, Brazil. Columns with zero values for vines had no data.
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3. Results

Commercial timber inventory (CTI) (1680 stems >30 DBH)

- Commercial biomass, 48 ± 77 Mg ha⁻¹, was highly variable in the 1000 ha (Table 3).
- Mean DBH of the CTI was 59 ± 24 cm.
- Commercial bole height averaged 13 ± 3 m.
- The 50 DBH class had the most stems.
- Stem density averaged 11 ± 12 stem ha⁻¹ (Figure 3b).

1 km Transect data (all trees =10 and vines)

- Tree height for trees =60 cm DBH averaged 33 m.
- Tree stems in the 10-30 cm DBH class made up 84% of the total stems and 32% of the total biomass.
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4. Discussion and Conclusions

- Commercial timber represents 16% of the total biomass =10 cm DBH.
- The >30 cm DBH understimates tree biomass because it does not include non-commercial species nor trees within 50 m of streams.
- Area sampled (0.2 to 1.2 ha) had no strong influence on biomass estimates (Figure 7).
- The high biomass contribution from the 10-30 cm DBH class (32%) indicates the importance of including this class in biomass estimates (Table 1).
- Our results indicate vine biomass is not insignificant (4.6% of the total biomass). This estimate is often lacking from forest biomass estimates.
- We are currently measuring soils to forest biomass, and structure, and soil and topographic landscape indicators.

5. Acknowledgements

We thank Pro-natura for logistical assistance and Rohden Lignea Industria for field support within the forest. Research was funded by the Large-scale Biosphere-Atmosphere Experiment in the Amazon (LEA-ECO) (ND-11) and an U.S. Environmental Protection Agency research fellowship to T.R. Feldpausch.