# Aboveground biomass and expansion factors of a riparian forest in the Brazilian Savanna

Luanna Elis Guimarães, Gabriel Mendes Santana, Indiara Nunes Mesquita Ferreira, Fernanda Gomes Ferreira, Joberto Veloso de Freitas, Iris Roitman, Fábio Venturoli

## Introduction

- The Brazilian Savanna (Cerrado biome) has large vegetation carbon stocks but few studies evaluate biomass stocks in non-wood compartments.
- We estimated biomass for different aboveground compartments of a riparian forest in Niquelândia, Goiás, Brazil (**Fig 1**) and determined expansion factors for necromass, litter, herbaceous layer, tree poles and undergrowth.



Fig 1. Study area: Niquelândia, Goiás, Brazil.

## Material and Methods

- Tree sample: 20 (10 x 10 m) plots of trees with diameter at breast height (dbh) ≥ 5 cm, distributed in four equidistant transects (five plots per transect) 50 m apart form each other.
- For each plot, we sampled the tree above compartment and the following compartments in five (1 x 1 m) subplots: tree poles (dbh < 5 cm and height (h) ≥ 1.5 m), undergrowth (trees, shrubs and herbs with h < 1.5 m), necromass, and litter. The herbaceous layer sample consisted of one (0.4 x 0.6 m) subplot per plot (**Fig 2**).
- Tree dry biomass was estimated with the equation developed by Soloforo et al. (2008): $\ln(AGB) = -10.4398 + 2.1183 * \ln(dbh) + 0.8339 * \ln(h)$, where AGB, dbh and h are in Mg, cm, and m, respectively. Fresh weight of all other compartments was measured in the field (**Fig 3**) and dry weight was determined in the laboratory.
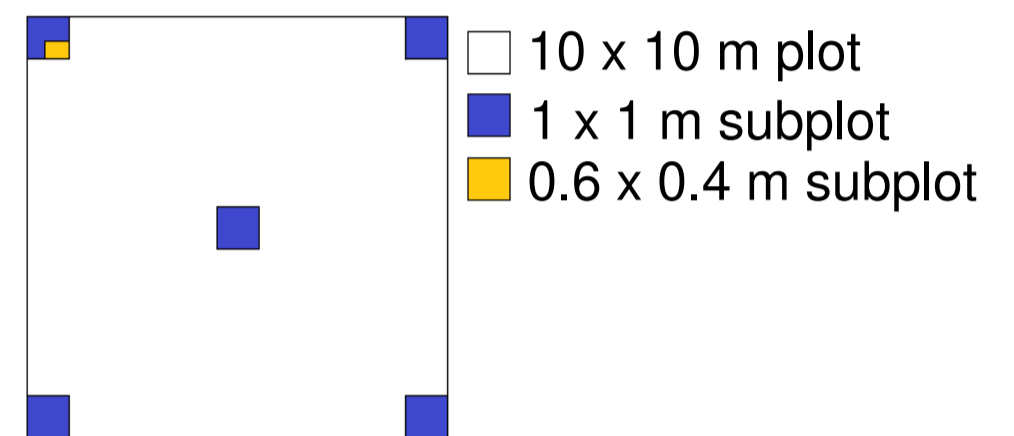


□ 10 x 10 m plot
■ 1 x 1 m subplot
■ 0.6 x 0.4 m subplot

Fig 2: Plots and subplots.

## Results

Total biomass was 97,6 Mg ha$^{-1}$. Most of it (95%) was stocked in the tree-aboveground compartment, followed by litter and necromass (**Table 1**).



**FIG 2**. Fresh biomass measurement.
A. Subplot quadrat for herbaceous layer.
B. Field weighting with precision balance.
C. Large volume weighing with dynamometer.

Table 1. – Tree-aboveground biomass and biomass and expansion factors for vegetation compartments in a riparian forest in Niquelândia, Goiás, Brazil. Values in parenthesis represent confidence intervals.

| Compartments | Biomass (Mg ha$^{-1}$) | Relative stock (%) | Expansion factors |
|---|---|---|---|
| tree aboveground | 92.74 (± 36.93) | 95.00 | |
| litter | 2.5675 (± 0.2365) | 2.63 | 0.0277 |
| necromass | 1.2292 (± 0.3063) | 1.26 | 0.0133 |
| tree poles | 0.4600 (± 0.1761), | 0.47 | 0.0049 |
| herbaceous layer | 0.3996 (± 0.2288) | 0.41 | 0.0043 |
| undergrowth | 0.2230 (± 0.0925) | 0.23 | 0.0024 |
| total | 97.6193 | 100 | |