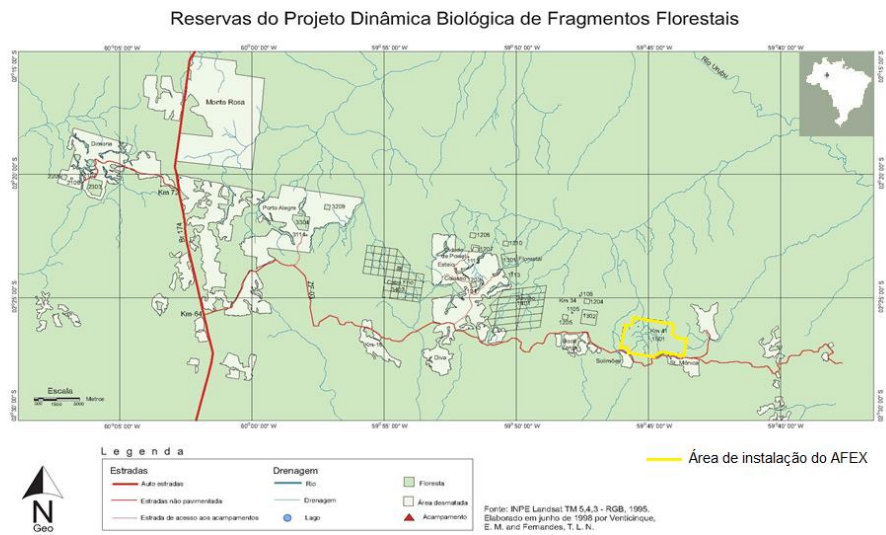


## 1. Study area

The study was developed inside the Biological Dynamics of Forest Fragments Project (BDFFP) area, in the KM41 reserve, located ~100 km from Manaus city, in the 41 kilometer of the vicinal road ZF-3 of the BR-174 highway (02° 24'S, 59° 52'W) (Figure 1). Local soils are clay-rich Ferrasols which cover ~ 30% of the Amazon Basin (Quesada et al. 2011). Rainfall ranges from 1900 - 2500 mm annually with a pronounced dry season from June to October (Ranking de Merona et al. 1992). In relation to Forest structural variables was estimated an AGB (above ground biomass) of  $322 \pm 54 \text{ Mg ha}^{-1}$  ( $\text{ind} \geq 10 \text{ dbh}$ ) and mean wood density of  $0.67 \text{ g cm}^{-3}$  (Duque et al. 2017). Regarding species richness, it was found about 280 species ( $\geq 10 \text{ cm dbh}$ ) per hectare (de Oliveira and Mori, 1999).

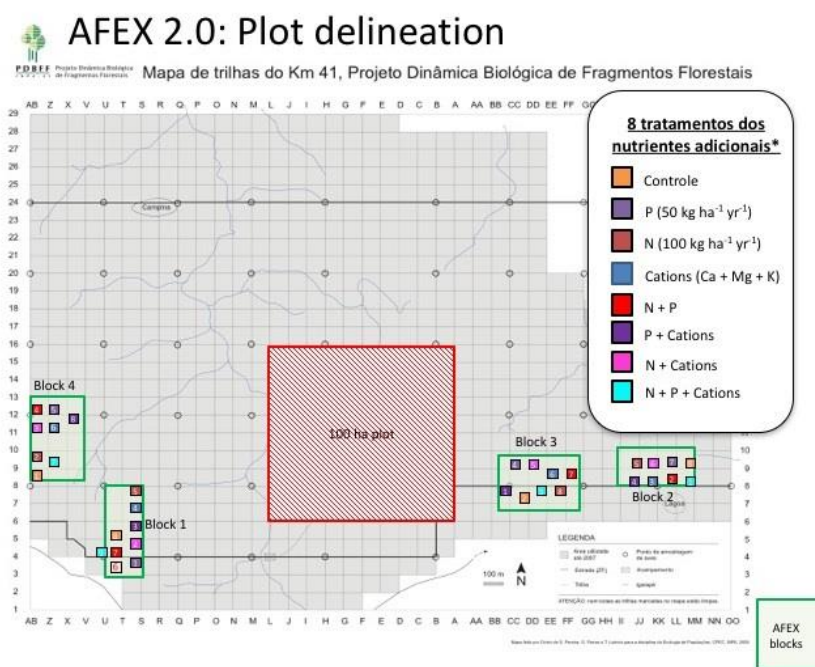


**Figure 1** – Location map of the Biological Dynamics of Forest Fragments Project (BDFFP) area. The study was developed in the KM41 reserve (yellow).

## 2. Sampling design

### 2.1 – Amazon Fertilization Experiment (AFEX)

AFEX started in March 2017, and consists in a full factorial fertilization experiment. The experiment has eight treatments, with four replicates per treatment, totalling 32 plots, divided into four independent blocks at least 200 meters apart from each other. Fertilisation consists of 125 kg ha<sup>-1</sup> year<sup>-1</sup> of N as urea (CO(NH<sub>2</sub>)<sub>2</sub>), 50 kg ha<sup>-1</sup> year<sup>-1</sup> of P as triple superphosphate (Ca(H<sub>2</sub> PO<sub>4</sub>)<sub>2</sub>) and cations with 50 kg ha<sup>-1</sup> year<sup>-1</sup> as potassium chloride (KCl) plus 50 kg ha<sup>-1</sup> year<sup>-1</sup> of Ca and 20 kg ha<sup>-1</sup> year<sup>-1</sup> of Mg as dolomitic limestone. The treatments are: Control; nitrogen (N); phosphorus (P); cations; nitrogen (N) + phosphorus (P); nitrogen + cations; phosphorus (P) + cations and finally nitrogen (N), + phosphorus (P) + cations. Plots size is 50 x 50 meters and all are at least 50 meters apart from each other. All plots were established in areas with similar soil, vegetation and topography (Figure 2).



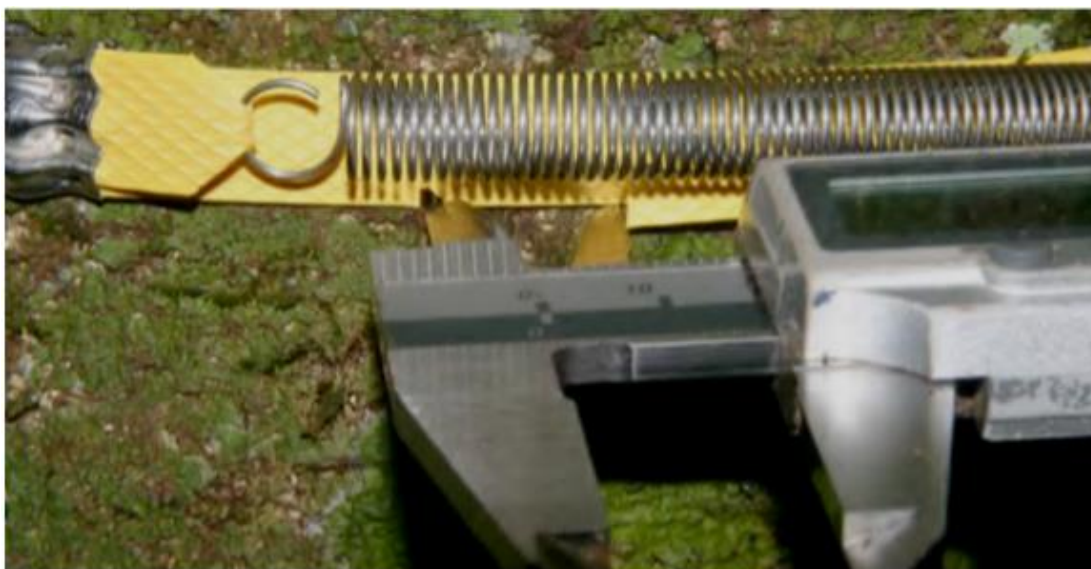
**Figure 2.** Location map from all fertilized AFEX blocks and plots inside the KM41 reserve.

Fertilization is carried out annually, divided into three applications, in order to mitigate nutrient loss by leaching and runoff. Fertilizers are spread by hand throwing during a systemic walk within the plots.

## **2.2 Collection methods**

The forest inventory was conducted annually from 2017 to 2019. The first inventory (2017) took a longer time to be carried out (June- November), because it involved the botanical identification of the species. The second and third inventories were made only in May. The diameter was collected at 1.3 m above the ground with a diametric tape in trees with DBH > 10 cm. In some cases, the diameter was collected above that height because of the presence of buttresses or some deformity at that point. For quality control, the staff was trained before collection and the data were entered into the computer in the field, to avoid errors. The recruitment was the inclusion of new individuals who reached 10 cm of DBH, and tree mortality was also recorded.

More precise growth measures and with a higher frequency of collection, are obtained by dendrometric bands, which were installed in 1299 trees. The measure contains the distance in circumference (mm) from a window on the dendrometer band measured with a digital caliper (**Figure 3**), where that distance changes when the trunk grows. We avoid collecting data during rain, because the instrument is sensitive to humidity. In 2018, the data were collected in April, June, July, August, September, October and November. In 2019, the data were collected in January, February, April, July and October and in 2020 the data were collected in January.



**Figure 3:** The caliper measurement is made from the notch on the low band to the free end of the upper band.

### 3. Data spreadsheet

The spreadsheet contains (**Figure 4**):

A	B	C	D	E	F	G	H
TAG	Block	Plot	PlotID	DBH_1	DBH_2	DBH_3	OBS
1	B1	P1	B1P1	18.4	18.3	18.7	
2	B1	P1	B1P1	14.6	13.6	13.6	
3	B1	P1	B1P1	23.9	24.0	23.7	
4	B1	P1	B1P1	51.0	51.7	52.4	
5	B1	P1	B1P1	19.3	19.3	19.3	
6	B1	P1	B1P1	NA	29.7	29.6	
7	B1	P1	B1P1	10.3	10.3	10.4	
8	B1	P1	B1P1	13.8	13.9	14	
9	B1	P1	B1P1	14.3	14.6	NA	lost
10	B1	P1	B1P1	11.0	11.1	NA	death
11	B1	P1	B1P1	11.2	11.3	NA	death
12	B1	P1	B1P1	10.0	10.2	NA	death

**Figure 4.** Forest inventory data spreadsheet deposited in EIDC system.

**Column A – TAG:** Numerical identification of each individual

**Column B – Block:** Blocks of the experimental design, which can be B1, B2, B3 or B4, in which the plots are located.

**Column C – Plot:** 50 x 50 m plots, ranging from P1 to P8, and containing all fertilization treatments.

**Column D – PlotID:** combination of block and plot codes

**Column E – DBH\_1:** Data collected in 2017

**Column F – DBH\_2:** Data collected in 2018;

**Column G – DBH\_3:** Data collected in 2019

**Column H – OBS:** This column identifies dead trees, lost trees that were not found in the census, and pendant trees, where the DAP was not collected because it needs a bigger ladder to reach the point above the buttresses.

**Column I – MH:** measure height

**Column L– CR:** some features of the tree. 1= alive, 2=presence of buttresses, 3=presence of vine, 4= estimated DAP, 5= anchor tree, 6= missing.

**Column O – DN:** Some types of damage occurring to the tree. 1= broken trunk 2= fallen tree with exposed root, 3= inclined 4= almost dead 5= hole on the stem.

**Column R – Family:** Botanical family of the species

**Column W: Corrected names:** Scientific name of individuals

**Column Y – Measurement date.1:** Date in day/month/year of the first census

**Column Z– Measurement date. 2:** Date in day/month/year of the second census.

**.Column AA – Measurement date. 3.** Date in day/month/year of the third census.

The spreadsheet contains (**Figure 5**):

A	B	C	D	E	F	G	H	I
Block	Plot	PlotID	subp_x	subp_y	number	Family	specie	date_band_install
B1	P1	B1P1	0	0	4	Lauraceae	Ocotea_sp.	03/06/2019
B1	P1	B1P1	0	30	20	Sapotaceae	Pouteria_anomala	03/06/2019
B1	P1	B1P1	0	40	27	Fabaceae	Peltogyne_paniculata	03/06/2019
B1	P1	B1P1	0	40	28	Lecythidaceae	Eschweilera_truncata	03/06/2019
B1	P1	B1P1	10	40	33	Sapotaceae	Pouteria_anomala	03/06/2019
B1	P1	B1P1	10	30	42	Malvaceae	Scleronema_micranthum	04/12/2017
B1	P1	B1P1	10	20	43	Lecythidaceae	Eschweilera_truncata	04/12/2017
B1	P1	B1P1	10	20	45	Euphorbiaceae	Conceveiba_guianensis	04/12/2017
B1	P1	B1P1	10	20	46	Chrysobalanaceae	Couepia_longipendula	04/12/2017
B1	P1	B1P1	10	20	48	Burseraceae	Protium_carnosum	04/12/2017
B1	P1	B1P1	10	20	51	Lecythidaceae	Eschweilera_pedicellata	03/06/2019
B1	P1	B1P1	10	10	52	Lecythidaceae	Lecythis_prancei	04/12/2017

**Figure 5.** Dendrometric bands data spreadsheet deposited in EIDC system.

**Column A – Block:** Blocks of the experimental design, which can be B1, B2, B3 or B4, in which the plots are located.

**Column B – Plot:** : 50 x 50 m plots, ranging from P1 to P8, and containing all fertilization treatments.

**Column C – PlotID:** combination of block and plot codes

**Column F -** Numerical identification of each individual

**Column G – Family:** Botanical family of the species.

**Column H – Specie:** Scientific name of the individuals

**Column I – Date band install** – date of installation of the bands, in day/month/year.

**Column J – DBH\_2017:** tree diameter in the first inventory census

**Column K – DBH\_2018:** tree diameter in the second inventory census

**Column L – DBH\_2019:** tree diameter in the third inventory census

**Column M, O, Q, S, U, W, Y, AA, AC, AE, AG, AI, AK – Window\_Year\_Month:** distance in circumference (mm) from the window in different dates.

**Column N, P, R, T, V, X,Z,AB,AB,AF,AH,AJ,AL – Date\_Meas\_Year\_Month:** date of collection in day, month and year.

**Column AM, AN – Obs\_Year\_Month:** some observations such as if the tape is damaged, the position of the band has changed, the presence of termites.

### 3. References

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**De Oliveira A, Mori SA. 1999.** A central Amazonia terra firme forest. I. High tree species richness on poor soils. *Biodiversity and Conservation*, 8: 1219-1244.

**Quesada, CA. Lloyd, J. Anderson, LO. Fyllas, NM. Schwarz, M. Czimczik, C. I. 2011.** Soils of Amazonia with particular reference to the RAINFOR sites. Biogeosciences. v.8. 1415-1440.

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