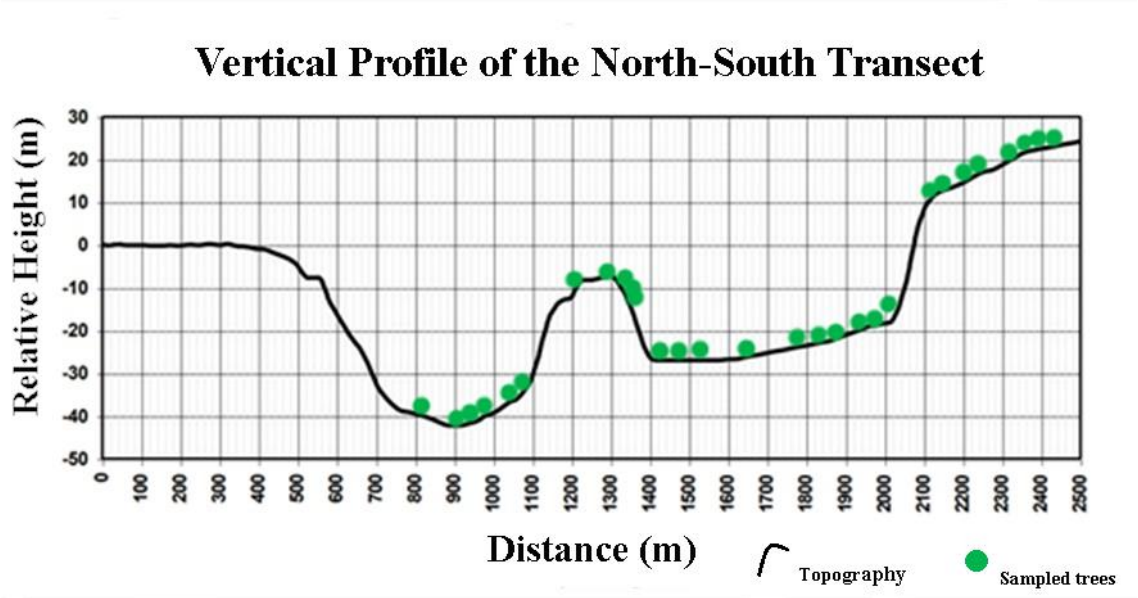
Comparative analysis of nutrient concentrations in generalist and specialist tree species on clay and sandy soils in the Central Amazon

Sarah Camelo da Silva[1], Bárbara Bomfim[2], Jeffrey Quintin Chambers[3], Regison Costa de Oliveira[1], Cacilda Adélia Sampaio de Souza[1], Marcelo Nunes Vilas-Boas[1], Adriano José Nogueira Lima[1], Niro Higuchi[1], Bruno Oliva Gimenez[1,3]

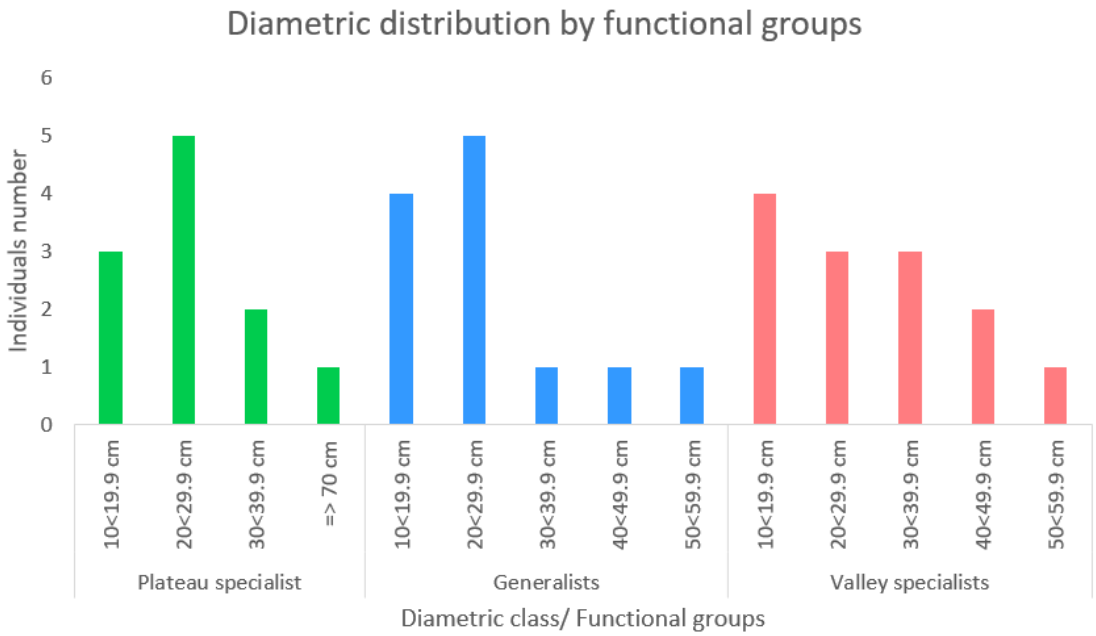
[1]Tropical Forestry Department, National Institute of Amazonian Research (INPA), Manaus- AM, 69060-082, Brazil
[2]Climate and Ecosystem Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA
[3]Department of Geography, University of California Berkeley, Berkeley, CA, 94720, USA

Correspondence to: Sarah Camelo *(scamelo16@gmail.com)* and Bruno O. Gimenez *(bruno.oliva.gimenez@gmail.com)*

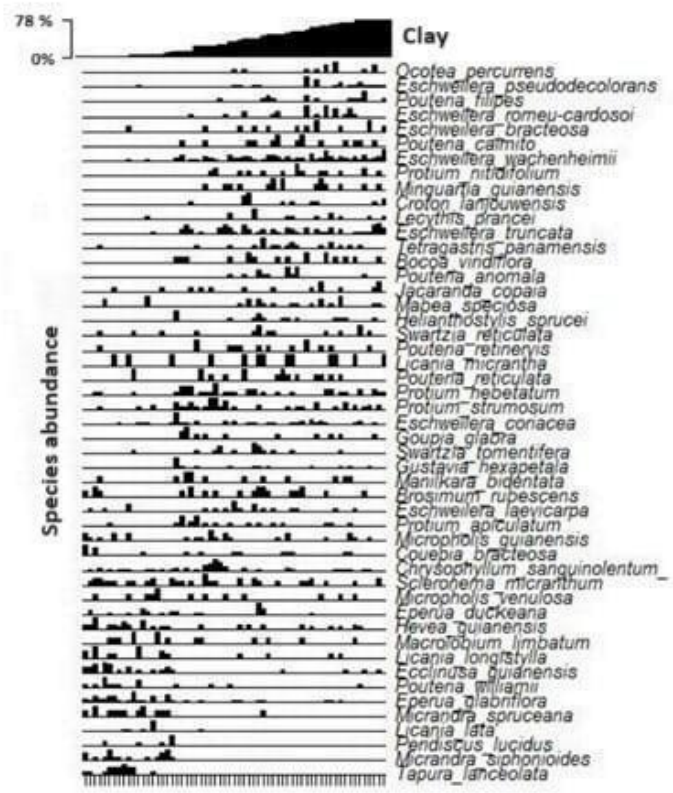
SUPPLEMENTARY MATERIAL



Supplementary Figure 1: Image of the topographic profile of the North - South Transect, where the green dots represent the trees where plant tissues (leaf and wood) were collected for nutrient analysis. In this graph, we can see the variation in the topography of the area. Image adapted from Higuchi et al. (1998)

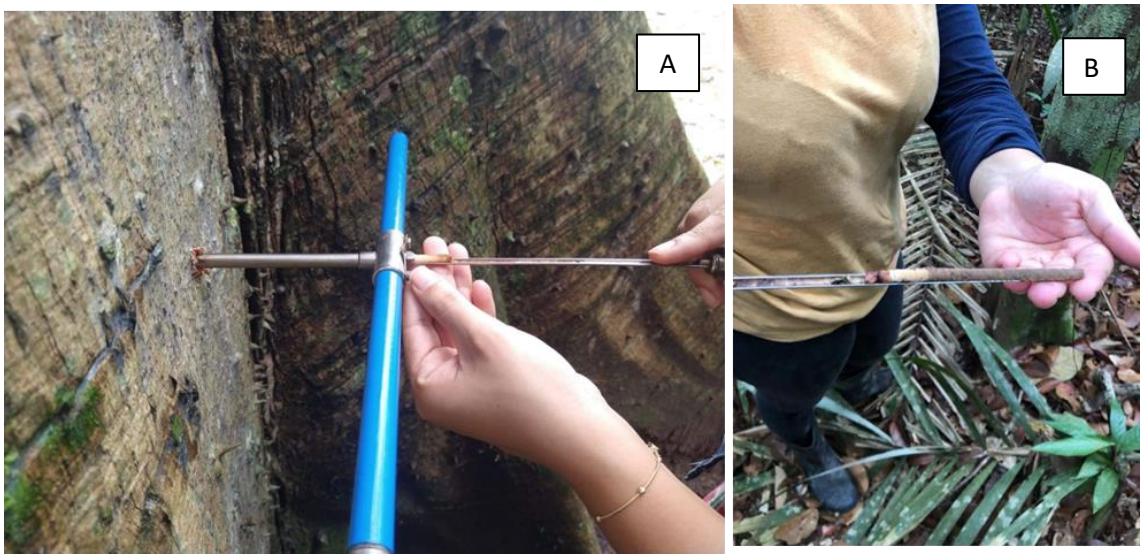


Supplementary Figure 2: Diametric distribution (cm) of the individuals selected according to each functional group



Supplementary Figure 3: Distribution of the 50 most common tree species with DBH ≥ 10 cm inventoried in the transect along the soil texture gradient, represented by clay content (in %). This image is adapted from Souza (2011), which studied the dynamics of a terra firme forest in Central Amazonia

Supplementary Figure 4: The first image is a photo of the collection of woody material in the field with a 25 mm diameter drill attached to a drill press (A), in the second image we have a photo of the drill used (B)



Supplementary Figure 5 Illustrative image of the Pressler drill embedded in a tree (A); sample obtained with the Pressler drill (B) to determine wood density

Supplementary Table 1: Table results of the analysis of variance for the nutritional concentration and carbon in the leaves between the different functional groups.

Variables	Source of variation	G.L	SQ	QM	F	*P*
C	Group	2	3004	1505	2.562	0.092
	Error	32	18760	586.3		
N	Group	2	219.1	109.53	15.93	1.6e-05
	Error	32	220	6.88		
P	Group	2	0.48	0.245	8.824	0.00089
	Error	32	0.89	0.028		
K	Group	2	241.1	120.54	15.58	1.9e-05
	Error	32	247.6	7.74		

G.L = Degrees of freedom; SQ = Sum of squares; QM = Mean square; F = F-statistic; P = P-value

Supplementary Table 2: Summary of the analysis of variance for nutritional variables that did not follow a normal distribution (Kruskal-Wallis test) in the leaves between the groups.

Variables	*p*-value
Ca	0.00092
Mg	0.031

Supplementary Table 3: Mean concentration and confidence interval (CI = 95%) in g.kg-¹ of carbon and nutrients in the leaf.

Chemical elements in leaves	*Functional Group*		
	Generalists	***Plateau specialists***	***Valley specialists***
C	601.81 ± 13.86	613.09 ± 10.99*	590.23 ± 15.61
N	14.47 ± 1.02	19.63 ± 1.80***	14.05 ± 1.55
P	0.62 ± 0.05	0.65 ± 0.08	0.88 ± 0.12**
K	5.57 ± 0.99	3.40 ± 0.92**	9.56 ± 2.08**
Ca	2.75 ± 0.92	0.89 ± 0.33**	4.09 ± 1.99
Mg	1.09 ± 0.36	0.70 ± 0.11*	1.28 ± 0.34

***p <0,001; **p <0,01; *p <0,05

Supplementary table 4: Table of results of the analysis of variance for the nutritional concentration and carbon in the trunk between the different functional groups.

Nutrients	Source of variation	G.L	SQ	QM	F	*P*
N	Group	2	4.65	2.33	3.485	0.043
	Error	32	21.36	0.67		

G.L = Degrees of freedom; SQ = Sum of squares; QM = Mean square; F = F-statistic; P = P-value.

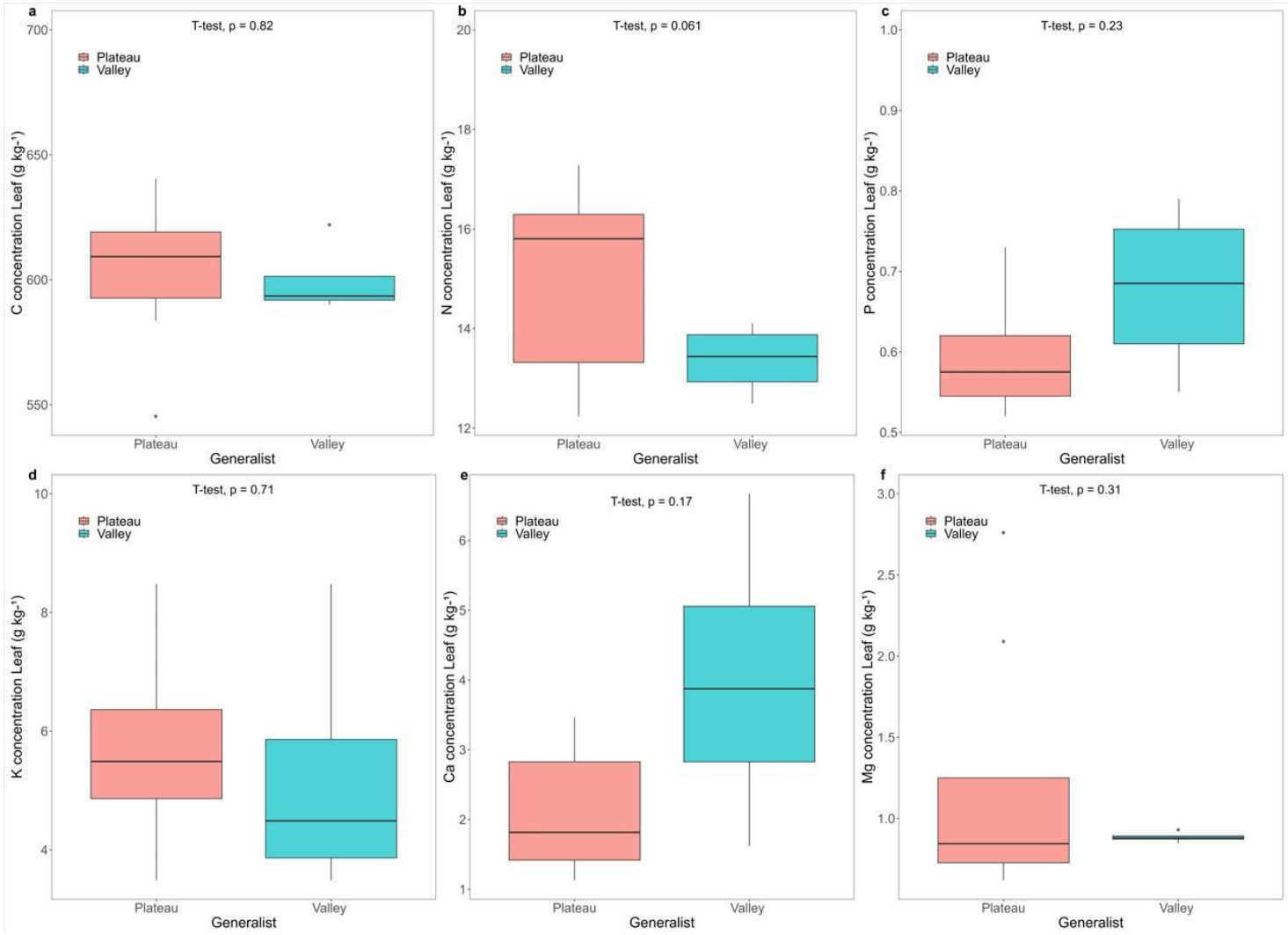
Supplementary Table 5: Summary of the analysis of variance for nutritional variables that did not follow a normal distribution (Kruskal-Wallis test) in the trunk between the groups

Variables	*p-value*
C	0.23
P	0.0013
K	0.0007
Ca	0.000064
Mg	0.003

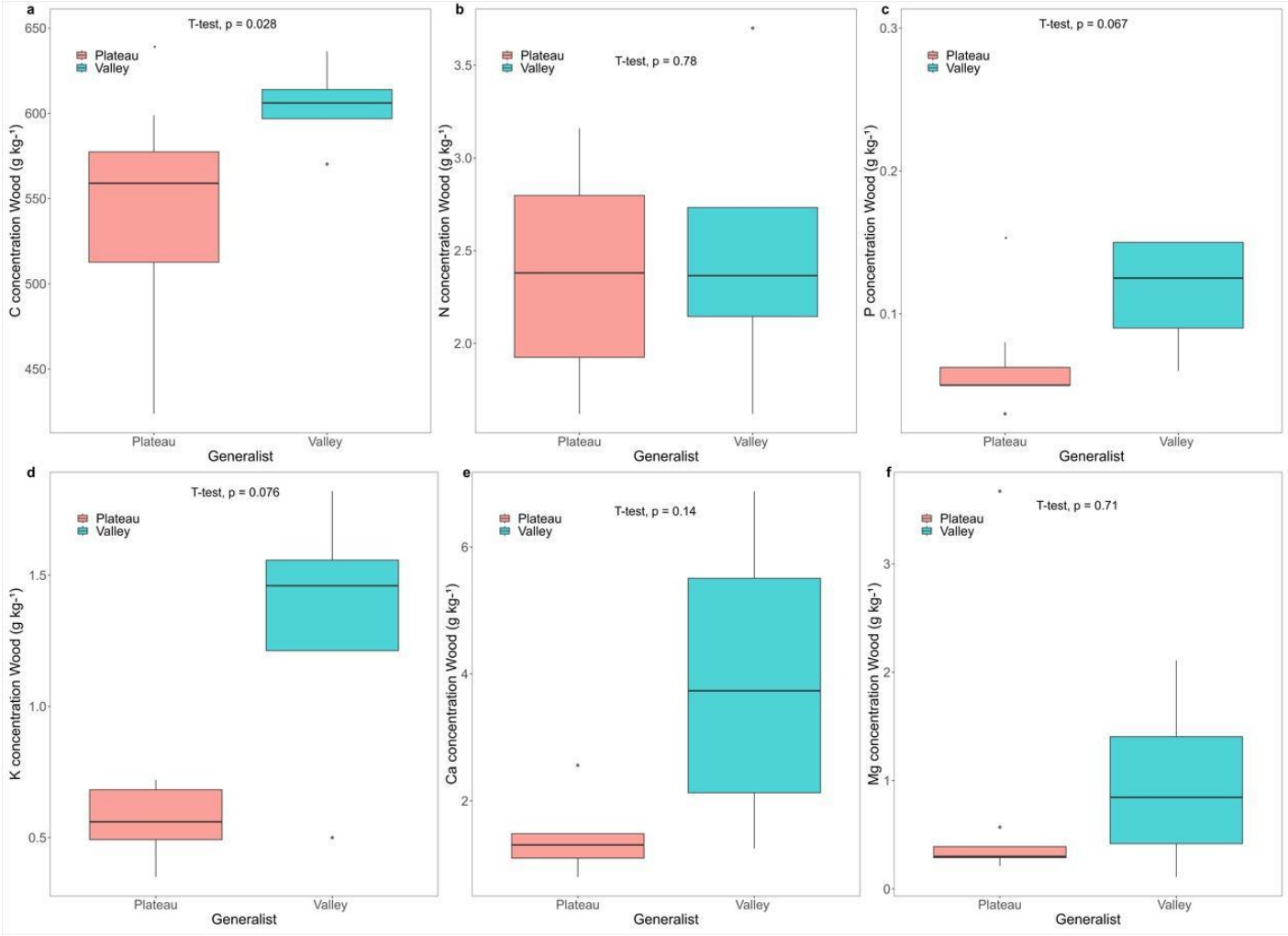
Supplementary Table 6: Mean concentration and confidence interval (CI = 95%) in g kg-¹ of carbon and nutrients in wood.

Chemical elements in wood	*Functional Group*		
	Generalists	***Plateau specialists***	***Valley specialists***
C	560.4 ± 34.6	585.81 ± 33.95	597.27 ± 26.96
N	2.42 ± 0.35*	3.17 ± 0.38	3.2 ± 0.59
P	0.076 ± 0.021	0.066 ± 0.007	0.11 ± 0.01*
K	0.81 ± 0.27*	0.44 ± 0.04***	1.40 ± 0.30
Ca	2.21 ± 1.05	0.81 ± 0.16***	3.26 ± 0.95
Mg	0.82 ± 0.59	0.22 ± 0.08**	0.59 ± 0.15

***p <0,001; **p <0,01; *p <0,05



Supplementary Figure 7: Boxplots illustrating the concentrations of leaf C and nutrients in generalist species across different topographic positions (plateaus and valleys)



Supplementary Figure 8: Boxplots illustrating the concentrations of trunk C and nutrients in generalist species across different topographic positions (plateaus and valleys)