

Supplementary Figure 1

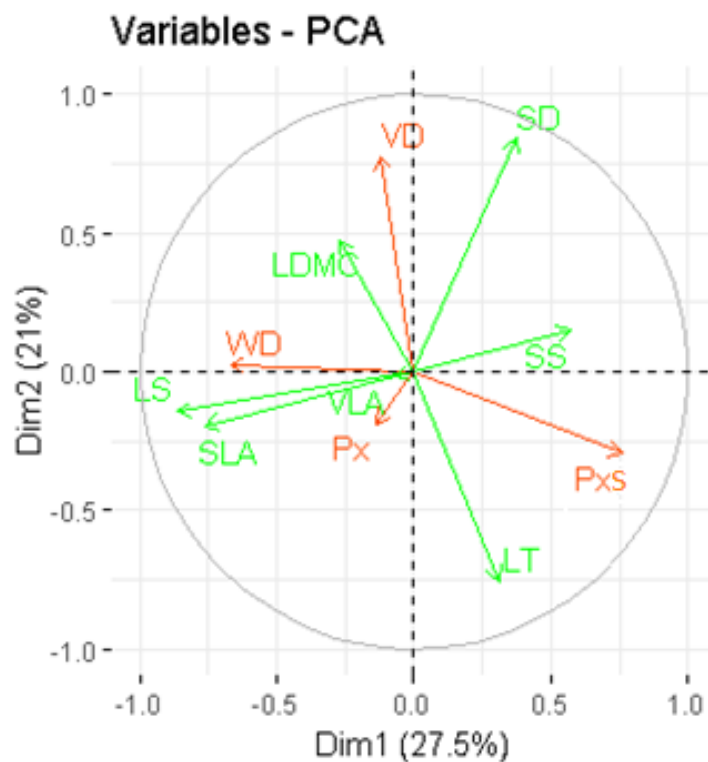


Fig. S1 Principal component analysis of functional species composition highlighting the first and the second qualitative PCA axes (Proportion of variance). Leaf functional traits in green: LDMC, leaf dry matter content; LS, leaf size; LT, leaf thickness; SLA, specific leaf area; SD, stomatal density; SS, size stomata; and VLA, vein density. Stem wood functional traits in orange: Px, lianescent xylem; Pxs, self-supporting xylem; VD, vessel density; WD, wood density.

Supplementary Figure 2

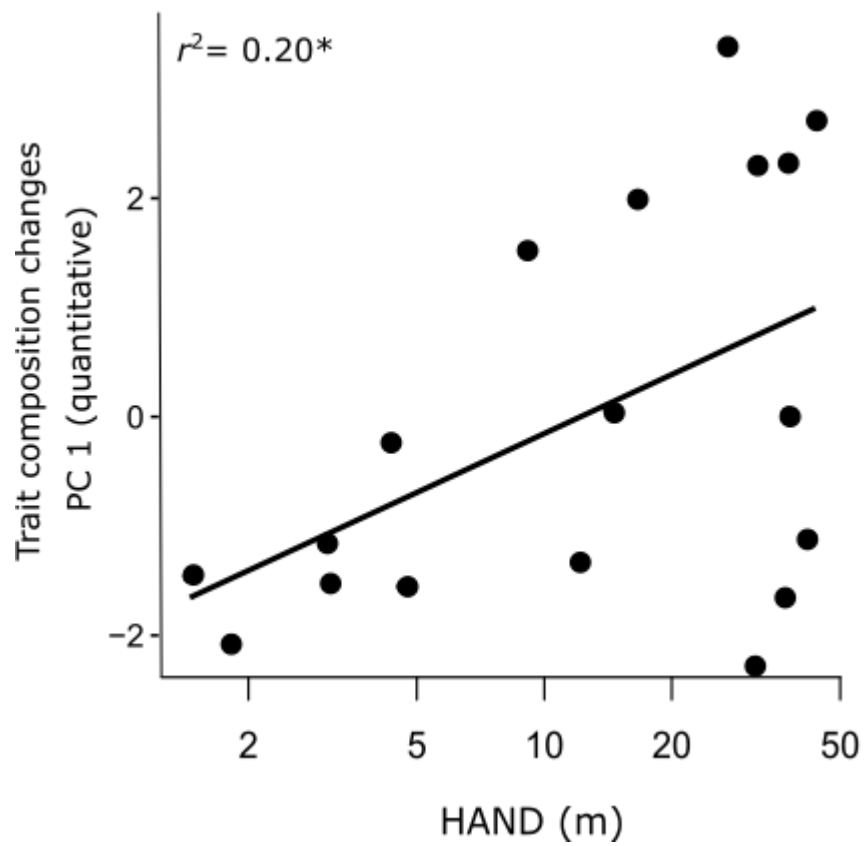


Fig. S2 Relationship between liana mean traits composition represented by the quantitative PCA-1 axis and the HAND gradient in 18 permanent plots at Ducke Reserve. r^2 adj and significance level ($*P < 0.005$) are shown.

Supplementary Table 1

Table S1 Pearson correlations between the two qualitative PCA axes and community means of traits.

Significant values in bold.

Trait	abb.	Axis-1	Axis-2
<i>Leaf</i>			
Leaf dry matter content	LDMC	-0.27ns	0.48*
Leaf size	LS	-0.86***	-0.14ns
Leaf thickness	LT	-0.31ns	- 0.76***
Specific leaf area	SLA	-0.76***	-0.19ns
Stomata density	SD	0.37ns	0.84***
Stomata size	SS	0.57***	0.16ns
Vein length per unit area	VLA	0.06ns	0.01ns
<i>Stem</i>			
Lianescent xylem	Pxl	-0.13ns	-0.18ns
Self-supporting xylem	Pxa	0.76***	-0.29ns
Vessel density	VD	-0.12ns	0.77***
Wood density	WD	-0.67**	0.24ns

**** $P < 0.05$.**

***** $P < 0.001$.**

ns = not significant

Supplementary Table 2

Table S2 Summary statistics of community-weighted mean (CWM) and species mean traits for 115 liana species sampled across 18 plots in Ducke Reserve

Traits	Community weighted means			Species means		
	Mean	Min	Max	Mean	Min	Max
Leaf dry matter mass (mg g ⁻¹)	448	405	473.8	457.5	125.8	92.3
Leaf thickness (µm)	0.21	0.20	0.30	0.20	0.08	0.47
Leaf size (cm ²)	191.5	139.1	310.3	143.3	15.4	564.6
Lianescent xylem (%)	49.5	43	56	47	1.0	52.0
Self-supporting xylem (%)	5.2	2	9	5.2	0	44.0
Specific leaf area (cm ² g ⁻¹)	138.9	120.3	166.1	136.6	17.8	552.0
Stomata size (µm)	12.2	0.8	14.6	11.6	6.4	23.6
Stomata density (mm/mm ²)	137.9	105.4	179.8	124	38.0	478.
Vessel density (vessels/mm ²)	216.2	179.4	254.7	52.6	12.4	182.5
Vessel diameter (µm)	59.2	51.1	56.8	19.0	4.1	57.7
Wood density (g /cm ³)	0.50	0.50	0.60	0.50	0.50	0.70

Supplementary Table 3

TABLES - MODELS

Table S3 Model selection results for qualitative liana composition (presence/absence dataset)

distributed across 18 plots in Ducke Reserve. The first eight models considered the PCoA-1 axis, while the subsequent models consider the PCoA-2 axis. Gaussian error distribution was used in all LMMs, including none or even three fixed environmental factors: HAND (log), nutrients, and tree turnover gradients.

Models	Response variable	Fixed factors	Df	AIC	Δ AIC	Weight
1	Qualitative PCoA-1 (47%) *	HAND + Nutrients + Tree turnover	5	-17.5	3.65	0.082
2		HAND + Nutrients	4	-19.2	1.94	0.194
3		HAND + Tree turnover	4	-19.4	1.75	0.213
4		Nutrients + Tree turnover	4	9.2	30.36	0.000
5		HAND	3	-21.2	0.00	0.511
6		Nutrients	3	7.8	28.94	0.000
7		Tree turnover	3	8.5	29.67	0.000
8		1	2	6.9	28.08	0.000
9	Qualitative. PCoA-2 (10%) *	HAND + Nutrients + Tree turnover	5	-1.5	4.05	0.039
10		HAND + Nutrients	4	-3.4	2.15	0.100
11		HAND + Tree turnover	4	-3.0	2.62	0.079
12		Nutrients + Tree turnover	4	-2.0	3.56	0.049
13		HAND	3	-4.8	0.79	0.198
14		Nutrients	3	-3.8	1.78	0.120
15		Tree turnover	3	-3.9	1.74	0.122
16		1	2	-5.6	0.00	0.293

*Proportion of variance

Supplementary Table 4

Table S4 Model selection results for quantitative liana species composition (abundance dataset) distributed across 18 plots in the Ducke Reserve. The first eight models considered the PCoA-1 axis, while the subsequent models consider the PCoA-2 axis. Gaussian error distribution was used in all LMMs, including none or even three fixed environmental factors: HAND (log), nutrients, and tree turnover gradients.

Models	Response variable	Fixed factors	Df	AIC	Δ AIC	Weight
1	Quantitative PCoA-1 (63%) *	HAND + Nutrients + Tree turnover	5	-11.5	3.09	0.098
2		HAND + Nutrients	4	-13.5	1.16	0.259
3		HAND + Tree turnover	4	-12.7	1.87	0.181
4		Nutrients + Tree turnover	4	11.6	26.22	0.000
5		HAND	3	-14.6	0.00	0.462
6		Nutrients	3	9.8	24.37	0.000
7		Tree turnover	3	11.6	26.22	0.000
8		1	2	9.7	24.28	0.000
9	Quantitative PCoA-2 (10%) *	HAND + Nutrients + Tree turnover	5	-11.5	3.09	0.098
10		HAND + Nutrients	4	-13.5	1.16	0.259
11		HAND + Tree turnover	4	-12.7	1.87	0.181
12		Nutrients + Tree turnover	4	11.6	26.22	0.000
13		HAND	3	-14.6	0.00	0.462
14		Nutrients	3	9.8	24.37	0.000
15		Tree turnover	3	11.6	26.22	0.000
16		1	2	9.7	24.37	0.000

*Proportion of variance

Supplementary Table 5

Table S5 Model selection results for functional composition (PCA axes-(presence/absence dataset) distributed across 18 plots in Ducke Reserve. The first eight models considered the PCA-1 axis, while the subsequent models the PCA-2 axis. Gaussian error distribution was used in all LMMs, including none or even three fixed environmental factors: HAND (log), nutrients, and tree turnover gradients.

Models	Response variable	Fixed factors	Df	AIC	Δ AIC	Weight
1	First Axis PC1 (29%) *	HAND + Nutrients + Tree turnover	5	68.0	1.90	0.154
2		HAND + Nutrients	4	68.4	2.30	0.126
3		HAND + Tree turnover	4	66.1	0.00	0.398
4		Nutrients + Tree turnover	4	76.2	10.12	0.003
5		HAND	3	66.6	0.54	0.303
6		Nutrients	3	74.9	8.81	0.005
7		Tree turnover	3	75.2	9.11	0.004
8		1	2	74.0	7.91	0.008
9	Second Axis PC2 (20%) *	HAND + Nutrients + Tree turnover	5	70.7	2.28	0.077
10		HAND + Nutrients	4	72.1	3.64	0.039
11		HAND + Tree turnover	4	68.7	0.28	0.209
12		Nutrients + Tree turnover	4	70.4	1.92	0.092
13		HAND	3	70.1	1.67	0.105
14		Nutrients	3	71.0	2.54	0.068
15		Tree turnover	3	68.5	0.00	0.241
16		1	2	76.2	0.71	0.169

*Proportion of variance

Supplementary Table 6

Table S6 Model selection results for functional composition (PCA axes-abundance dataset)

distributed across 18 plots in Ducke Reserve. The first eight models considered the PCA-1 axis, while the subsequent models consider the PCA-2 axis. Gaussian error distribution was used in all LMMs, including none or even three fixed environmental factors: HAND (log), nutrients, and tree turnover gradients.

Models	Response variable	Fixed factors	Df	AIC	Δ AIC	Weight
1	First Axis	HAND + Nutrients + Tree turnover	5	76.3	2.67	0.094
2		HAND + Nutrients	4	75.6	1.99	0.131
3		HAND + Tree turnover	4	74.3	0.72	0.248
4		Nutrients + Tree turnover	4	76.2	10.12	0.003
5		HAND	3	73.6	0.00	0.356
6		Nutrients	3	78.4	4.74	0.033
7		Tree turnover	3	78.0	4.40	0.040
8		1	2	76.6	2.94	0.082
9	Second Axis	HAND + Nutrients + Tree turnover	5	73.4	1.01	0.142
10		HAND + Nutrients	4	74.4	2.00	0.086
11		HAND + Tree turnover	4	73.9	1.59	0.106
12		Nutrients + Tree turnover	4	72.4	0.00	0.234
13		HAND	3	74.1	1.72	0.099
14		Nutrients	3	73.7	1.32	0.121
15		Tree turnover	3	73.8	1.43	0.115
16		1	2	74.1	1.78	0.096

*Proportion of variance

