

Supplementary Material

Tab. S1 - List of species recorded during the field inventory conducted in June 2017 in the plots where treatments were established. Reg = Regenerants . E.C. = Ecological classification.

Scientific name	E.C.	Reg.	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
<i>Bauhinia forficata</i> Link	P	N	2	2	4	5	5	4	4	4	2	2
<i>Cecropia</i> spp.	P	S	11	13	8	12	8	26	17			3
<i>Citharexylum myrianthum</i> Cham.	P	N	6	2	8	5	5	7	4	7	20	11
<i>Croton floribundus</i> Spreng	P	N	8	5	7	7	11	6	5	10	17	16
<i>Croton urucurana</i> Baill.	P	N	13	19	7	11	12	16	13	16	15	17
<i>Enterolobium contortisiliquum</i> (Vell.) Morong	P	N	1	2	1	5	2	3		1	1	4
<i>Erythrina speciosa</i> Andrews	P	N	2	5	5	8	7	5	4	5	4	10
<i>Myrsine ferruginea</i> (= <i>Rapanea ferruginea</i> (Ruiz & Pav.) Mez)	P	N	6	3	3	3	5	4	1	4		
<i>Peltophorum dubium</i> (Spreng.) Taub.	P	N	5	3	6	8	5	3	1	7		1
<i>Senna multijuga</i> H. S. Irwin & Barneby	P	S	2	1	2	3	1	5	2	2	2	7
<i>Schinus terebinthifolius</i> Raddi	P	S	3	1	3		1	2			1	
<i>Solanum pseudoquina</i> A.St.-Hil.	P	N	1	2	1	2	2	4	2	3		5
<i>Tabernaemontana hystrix</i> Steud.	P	N	1	1	1	1		2	2	1	3	6
<i>Tibouchina granulosa</i> (Desr.) Cogn.	P	N	2	1	3	3	7	3	3	4	4	19
<i>Trema micrantha</i> (L.) Blume	P	N	3	5	6	10	5	4	2	7	12	12
<i>Albizia polycephala</i> (Benth.) Killip ex Record	NP	N			5	7	2	2	9	2	3	13
<i>Psidium cattleianum</i> Sabine	NP	S	1						1			1
<i>Copaiifera langsdorffii</i> Desf.	NP	N	1			3	1		2			
<i>Ceiba speciosa</i> (A.St.-Hil.) Ravenna	NP	N	2		2	5	2	2	5	1	1	8
<i>Handroanthus impetiginosus</i> (= <i>Tabebuia avellaneda</i> Lorentz ex Griseb.)	NP	N	1		3	4	6	3	3	2	5	10
<i>Anadenanthera colubrina</i> var. <i>cebil</i> (= <i>Anadenanthera macrocarpa</i> (Benth.) Brenan)	NP	N	2	1	1	4	3	2	1	3	1	5
<i>Miconia cinnamomifolia</i> (DC.) Naudin	NP	N			2	3	2	2	1	1	2	8
<i>Myroxylon peruiferum</i> L.f.	NP	N			3	1	1	2		2	1	2
<i>Cedrela fissilis</i> Vell.	NP	N	1	1	1	4	3	3	5	1	2	4
<i>Cabralea canjerana</i> (Vell.) Mart.	NP	N		1	1	5	2	5	2	2		1
<i>Centrolobium tomentosum</i> Guillemain ex Benth.	NP	N		2	1	7	2	3	1	3	5	15
<i>Hymenaea courbaril</i> L.	NP	N	1	2	3	8	5	4	2	1	1	1
<i>Cariniana estrellensis</i> (Raddi) Kuntze	NP	N	2	1		1	2		2		2	10

Scientific name	E.C.	Reg.	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
<i>Luehea grandiflora</i> Mart. & Zucc.	NP	S	7	6	4	10	8	6	5	13	18	16
<i>Inga laurina</i> (Sw.) Willd.	NP	N	3	4	3	7	5	4	5	6		5
<i>Myrsine umbellata</i> (= <i>Rapanea umbellata</i> (Mart.) Mez)	NP	N	2	4	7	7	3	6	3	2	3	3
Unknown 3											1	
<i>Pterogyne nitens</i> Tul.	NP	N	1	3	5	1	5	1	1	5		
Unknown 5							1					
<i>Ocotea catharinensis</i> Mez	NP	N		2	1					1		
Unknown 1					1							
Unknown 2					1	1						1
Unknown 3			5	4	3	3		2	1			
Unknown 4					2							
Unknown 5			16	8	3	2	5	3	1		2	1
Unknown 6					1		1		1			1
Unknown 7						1				1		

Tab. S2 - List of species used in the planting carried out in March 2012. A total of 2,100 individuals from 33 species were distributed across different treatments.

Scientific name	Family	Ecological classification	Number of individuals planted
<i>Albizia polycephala</i> (Benth.) Killip ex Record	Fabaceae	NP	50
<i>Amaioua guianensis</i> Aubl.	Rubiaceae	NP	50
<i>Anadenanthera macrocarpa</i> (Benth.) Brenan	Fabaceae	NP	20
<i>Aspidosperma cylindrocarpon</i> Müll.Arg.	Apocynaceae	NP	50
<i>Bauhinia forficata</i> Link	Fabaceae	P	50
<i>Cabralea canjerana</i> (Vell.) Mart.	Meliaceae	NP	50
<i>Cariniana estrellensis</i> (Raddi) Kuntze	Lecythidaceae	NP	100
<i>Cedrela fissilis</i> Vell.	Meliaceae	NP	50
<i>Ceiba speciosa</i> (A.St.-Hil.) Ravenna	Malvaceae	NP	50
<i>Centrolobium tomentosum</i> Guillemin ex Benth.	Fabaceae	NP	100
<i>Copaifera langsdorffii</i> Desf.	Fabaceae	NP	30
<i>Croton floribundus</i> Spreng	Euphorbiaceae	P	100
<i>Croton urucurana</i> Baill.	Euphorbiaceae	P	100
<i>Citharexylum myrianthum</i> Cham.	Verbenaceae	P	100
<i>Enterolobium contortisiliquum</i> (Vell.) Morong	Fabaceae	P	50
<i>Erythrina falcata</i> Benth.	Fabaceae	P	50
<i>Erythrina speciosa</i> Andrews	Fabaceae	P	50
<i>Hymenaea courbaril</i> L.	Fabaceae	NP	50
<i>Inga laurina</i> (Sw.) Willd.	Fabaceae	NP	50
<i>Miconia cinnamomifolia</i> (DC.) Naudin	Melastomataceae	NP	100
<i>Myroxylon peruiferum</i> L.f.	Fabaceae	NP	50
<i>Ocotea catharinensis</i> Mez	Lauraceae	NP	50
<i>Ocotea diospyrifolia</i> (Meisn.) Mez	Lauraceae	NP	50
<i>Peltophorum dubium</i> (Spreng.) Taub.	Fabaceae	P	50
<i>Pterogyne nitens</i> Tul.	Fabaceae	P	50
<i>Rapanea ferruginea</i> (Ruiz & Pav.) Mez	Pimulaceae	P	100
<i>Rapanea umbellata</i> (Mart.) Mez	Pimulaceae	NP	50
<i>Solanum pseudoquina</i> A.St.-Hil.	Solanaceae	P	50
<i>Tabebuia avellanadae</i> Lorentz ex Griseb.	Bignoniaceae	NP	50
<i>Tabebuia roseoalba</i> (Ridl.) Sandwith	Bignoniaceae	NP	50
<i>Tabernaemontana hystrix</i> Steud.	Apocynaceae	P	100
<i>Tibouchina granulosa</i> (Desr.) Cogn.	Melastomataceae	P	100
<i>Trema micrantha</i> (L.) Blume	Cannabaceae	P	100

Appendix 1 - Fertilizer dose conversion to kg/ha. Doses of nutrients (N, P₂O₅, K) and commercial fertilizer (NPK 4-14-8) expressed in kg/ha.

As suggested, we performed the conversion calculations based on the nutrient doses applied per plant and the planting density of each treatment. We have included a supplementary file with a detailed table presenting the nutrient (N, P₂O₅, K) and commercial fertilizer (NPK 4-14-8) doses expressed in kg/ha.

The calculations were performed using the following criteria:

- Nutrient doses applied per plant (g/plant);
- Planting density (plants/m²);
- Conversion to hectare scale (multiplying by 10,000 m² and dividing by 1,000 to convert grams to kilograms).

Planting spacing and plant density:

- 1 m × 1 m → 1.0 plant/m²
- 2 m × 1 m → 0.5 plant/m²
- 1 m × 0.3 m → 3.33 plants/m²
- 3 m × 2 m → 0.167 plant/m²

Fertilization schedule:

- Phase 1 (planting):
8.3 g of Nitrogen (N)
19 g of Phosphorus (P₂O₅)
8.3 g of Potassium (K)
- Phase 2 (1st year):
30 g of NPK 4-14-8 fertilizer (per plant)

Treatment	Spacing	Plants/m ²	N (kg/ha)	P ₂ O ₅ (kg/ha)	K (kg/ha)	NPK 4-14-8 (kg/ha)
T1	1 m × 1 m	1.0	83.0	190.0	83.0	300.0
T2	1 m × 1 m	1.0	83.0	190.0	83.0	300.0
T3	1 m × 1 m	1.0	83.0	190.0	83.0	300.0
T4	2 m × 1 m	0.5	41.5	95.0	41.5	150.0
T5	2 m × 1 m	0.5	41.5	95.0	41.5	150.0
T6	2 m × 1 m	0.5	41.5	95.0	41.5	150.0
T7	1 m × 0.3 m	3.33	276.0	633.0	276.0	999.0
T8	1 m × 0.3 m	3.33	276.0	633.0	276.0	999.0
T9	1 m × 0.3 m	3.33	276.0	633.0	276.0	999.0
T10	3 m × 2 m	0.167	13.9	31.7	13.9	50.0

To perform an exploratory assessment of soil fertility and verify whether any variation in soil parameters could potentially influence the treatment effects, soil samples were collected in December 2020 at a depth of 0–20 cm from each treatment plot. A composite sample for each treatment was obtained by combining subsamples from the three blocks. For soil texture analysis, a single composite sample representing the entire experimental area was used.

Particle Size Distribution (g/kg)

- Clay: 90
- Silt: 252
- Sand: 658
- Textural class: Sandy loam

Soil Fertility Analysis (0–20 cm depth)

Id.	pH (CaCl ₂)	M.O.	P	Al ³⁺	H+Al	K	Ca	Mg	SB	CTC	V	S mg/dm ³
		g/dm ³		mmolc/dm ³								
T1	3.8	20	22	11	52	1.8	11.0	3.1	16.0	68	23	8
T2	3.9	18	25	8	40	1.8	14.0	3.3	19.0	59	32	8
T3	3.8	15	22	10	38	1.6	3.6	1.5	7.0	45	15	7
T4	3.9	23	22	9	38	2.0	3.2	2.0	7.0	45	16	9
T5	3.7	17	22	11	50	1.5	3.0	0.4	5.0	55	9	12
T6	3.8	21	23	10	47	1.5	1.7	0.2	3.0	50	7	8
T7	3.7	21	21	10	40	1.4	2.0	0.2	4.0	44	8	5
T8	3.8	21	26	9	45	1.8	3.0	0.6	5.0	50	11	6
T9	3.7	22	22	13	47	1.2	3.0	0.6	5.0	52	9	6
T10	3.9	23	27	10	38	1.7	0.6	0.8	3.0	41	8	5

Legend (Soil Chemical Parameters):

- ID – Treatment identification.
- pH (CaCl₂) – Soil pH measured in calcium chloride solution.
- M.O. – Organic matter content (g/dm³).
- P – Available phosphorus (mg/dm³), extracted by resin method.
- Al³⁺ – Exchangeable aluminum (mmolc/dm³).
- H+Al – Potential acidity (mmolc/dm³), representing the sum of exchangeable hydrogen and aluminum.
- K – Exchangeable potassium (mmolc/dm³).
- Ca – Exchangeable calcium (mmolc/dm³).
- Mg – Exchangeable magnesium (mmolc/dm³).
- SB – Sum of bases: K + Ca + Mg (mmolc/dm³).
- CTC – Cation exchange capacity at pH 7.0: SB + H+Al (mmolc/dm³).
- V (%) – Base saturation: (SB/CTC) × 100.
- S (%) – Aluminum saturation: (Al³⁺/CEC effective) × 100, where CEC effective = SB + Al³⁺.

Appendix 2 - Additional information regarding the PCA analysis of the title Ordering of treatments in relation to nutrient cycling.

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Call: rda(X = pcal, scale = T)
Partitioning of correlations:
Inertia Proportion
Total          7          1
Unconstrained  7          1
Eigenvalues, and their contribution to the correlations
Importance of components:
              PC1    PC2    PC3    PC4    PC5    PC6    PC7
Eigenvalue    3.3630 1.8456 1.0800 0.30290 0.19526 0.14543 0.067754
Proportion Explained 0.4804 0.2637 0.1543 0.04327 0.02789 0.02078 0.009679
Cumulative Proportion 0.4804 0.7441 0.8984 0.94165 0.96955 0.99032 1.000000

Scaling 2 for species and site scores
* Species are scaled proportional to eigenvalues
* Sites are unscaled: weighted dispersion equal on all dimensions
* General scaling constant of scores: 2.817313
Species scores
              PC1    PC2    PC3    PC4    PC5    PC6
Litter.production -0.8421 0.44947 -0.02827 0.44951 -0.12364 -0.008905
Content_N          0.6127 0.63677 0.49379 0.17726 0.25956 0.057526
Content_P          0.8191 -0.38143 0.43865 0.10957 -0.28685 0.173791
Content_K         -0.4290 -0.89825 -0.16178 0.17003 0.21627 0.202702
Content_Ca        -0.6780 -0.08198 0.78500 -0.16366 0.05052 0.013021
Content_Mg        -0.8933 -0.38389 0.35970 0.02059 -0.05238 -0.135367
Content_S         -0.7849 0.61548 -0.12556 -0.20456 -0.06634 0.267820

              Site scores (weighted sums of species scores)
              PC1    PC2    PC3    PC4    PC5    PC6
T1  0.10877 0.416789 1.40810 1.2355 -0.3631 1.3349
T2  1.53548 0.080072 -0.11222 1.2119 0.5649 -0.6968
T3  0.62691 1.318562 0.21823 -0.6895 1.3803 -0.2827
T4  0.74273 0.312891 0.37613 -1.5702 -1.4725 0.8028
T5 -0.06514 0.371726 -0.39615 -0.5306 -0.7452 -1.5102
T6 -0.08256 -0.323609 -1.88752 0.6739 -0.3879 0.9570
T7 -1.29972 -0.852498 1.20810 -0.1183 0.4759 -0.3775
T8 -0.78371 0.003221 0.01434 0.8215 -1.0678 -1.0622
T9 -1.39192 0.763008 -0.75348 -0.3720 0.9407 0.6723
T10 0.60916 -2.090162 -0.07553 -0.6622 0.6747 0.1623
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