APPENDIX

ROCHA, K.J. et al. Influence of edaphic variables on predominance of forest species after selective logging in the Amazon.

Appendix S1. Autoecological characteristics of identified species, in a forest fragment under the influence of selective logging, Amazonian Biome.

Species	Common name	Family	Ecological group	Dispersion	Type
Abarema jupunba (Willd.) Britton & Killip	Tento Azul/Angelim	Fabaceae	Early secondary	Biotic	Zoochoric
Abuta grandifolia (Mart.) Sandwith	Abuta	Menispermaceae	Non-classified	Biotic	Zoochoric
Amaioua guianensis Aubl.	Marmelada	Rubiaceae	Early secondary	Biotic	Zoochoric
Anacardium giganteum W.Hancock ex Engl.	Cajueiro da mata	Anacardiaceae	Early secondary	Biotic	Zoochoric
Aspidosperma cf. desmanthum Benth. ex Müll.Arg.	Araracanga-preta	Apocynaceae	Early secondary	Abiotic	Anemochoric
Aspidosperma discolor A.DC.	Guarantã	Apocynaceae	Early secondary	Abiotic	Anemochoric
Balizia pedicellaris (DC.) Barneby & J.W.Grimes	Farinha-seca	Fabaceae	Non-classified	Non-classified	Non-classified
Bellucia grossularioides (L.) Triana	Goiaba-de-anta	Melastomataceae	Pioneer	Biotic	Zoochoric
Byrsonima intermedia A.Juss.	Murici	Malpighiaceae	Non-classified	Non-classified	Non-classified
Calophyllum brasiliensis Cambess.	Guanandi	Calophyllaceae	Early secondary	Abiotic	Autocórica
Caraipa densifolia Mart.	Tamaquaré	Calophyllaceae	Late secondary	Biotic	Zoochoric
Casearia arborea (Rich.) Urb.	Espeteira	Salicaceae	Late secondary	Biotic	Zoochoric
Chaetocarpus echinocarpus (Baill.) Ducke	Vermelhinha	Peraceae	Non-classified	Biotic	Zoochoric
Cheiloclinium cognatum (Miers) A.C.Sm.	Ciputá	Celastraceae	Late secondary	Biotic	Zoochoric
Connarus perrottetii (DC.) Planch.	Pau-sangue	Connaraceae	Pioneer	Abiotic	Autocórica
Copaifera langsdorffii Desf.	Copaíba	Fabaceae	Early secondary	Biotic	Zoochoric
Cordia selloviana Cham.	Louro branco	Boraginaceae	Late secondary	Biotic	Zoochoric
Coussapoa trinervia Spruce ex Mildbr.	Couçapoua	Urticaceae	Late secondary	Biotic	Zoochoric
Diplotropis purpurea (Rich.) Amshoff	Sucupira-preta	Fabaceae	Early secondary	Abiotic	Anemochoric
Endlicheria lhotzkyi (Nees) Mez	Canela sassafrás	Lauraceae	Non-classified	Non-classified	Non-classified
Erisma uncinatum Warm.	Cedrinho	Vochysiaceae	Early secondary	Abiotic	Anemochoric
Helicostylis tomentosa (Poepp. & Endl.) Rusby	Muiratinga	Moraceae	Late secondary	Biotic	Zoochoric
Hymenaea courbaril L.	Jatobá	Fabaceae	Late secondary	Biotic	Zoochoric
Jacaranda copaia (Aubl.) D.Don	Caroba	Bignoniaceae	Pioneer	Abiotic	Anemochoric
Licania blackii Prance	João duro	Chrysobalanaceae	Non-classified	Non-classified	Non-classified
Licania kunthiana Hook.f.	João duro	Chrysobalanaceae	Early secondary	Biotic	Zoochoric
Mabea fistulifera Mart.	Mamoninha	Euphorbiaceae	Pioneer	Biotic	Zoochoric
Matayba arborescens (Aubl.) Radlk.	Pitombarana	Sapindaceae	Pioneer	Biotic	Zoochoric
Miconia acutifolia Ule	Desintera família	Melastomataceae	Non-classified	Non-classified	Non-classified
Miconia minutiflora (Bonpl.) DC.	Chumbinho	Melastomataceae	Pioneer	Biotic	Zoochoric
Micropholis venulosa (Mart. & Eichler) Pierre	Leiteido	Sapotaceae	Early secondary	Biotic	Zoochoric
Minquartia guianensis Aubl.	Acariquara	Olacaceae	Early secondary	Biotic	Zoochoric
Mollia lepidota Spruce ex Benth.	Açoita-cavalo falso	Malvaceae	Non-classified	Non-classified	Non-classified
Mouriri apiranga Spruce ex Triana	Canela-de-cutia	Melastomataceae	Late secondary	Biotic	Zoochoric
Myrcia amazonica DC.	Goiabinha	Myrtaceae	Non-classified	Biotic	Zoochoric
Myrciaria floribunda (H.West ex Willd.) O.Berg	Goiabinha vermelha	Myrtaceae	Early secondary	Biotic	Zoochoric
Nectandra cuspidata Nees	Louro-tamanco	Lauraceae	Pioneer	Biotic	Zoochoric
Ocotea acutangula (Miq.) Mez	Louro-preto	Lauraceae	Early secondary	Biotic	Zoochoric
Ormosia paraensis Ducke	Tento hormosia	Fabaceae	Early secondary	Biotic	Zoochoric
Ouratea discophora Ducke	Vassoura-de-bruxa	Ochnaceae	Non-classified	Non-classified	Non-classified
Pera amazonica	Cafezinho	Peraceae	Non-classified	Non-classified	Non-classified
Pouteria guianensis Aubl.	Parajú	Sapotaceae	Early secondary	Biotic	Zoochoric
Pouteria macrophylla (Lam.) Eyma	Fruta banana	Sapotaceae	Non-classified	Biotic	Zoochoric
Protium heptaphyllum (Aubl.) Marchand	Amescla	Burseraceae	Pioneer	Biotic	Zoochoric
Protium sagotianum Marchand	Amesclinha	Burseraceae	Early secondary	Biotic	Zoochoric
Pseudolmedia laevigata Trécul	Cega corrente	Moraceae	Late secondary	Biotic	Zoochoric
Qualea paraensis Ducke	Cambará	Vochysiaceae	Early secondary	Abiotic	Autocórica
Sacoglottis guianensis Benth.	Uchi	Humiriaceae	Non-classified	Biotic	Zoochoric
Schefflera morototoni (Aubl.) Maguire et al.	Morototó	Araliaceae	Pioneer	Biotic	Zoochoric
Simarouba amara Aubl.	Marupá	Simaroubaceae	Late secondary	Biotic	Zoochoric
Sloanea sinemariensis Aubl.	Pateiro	Elaeocarpaceae	Non-classified	Biotic	Zoochoric
Sterigmapetalum obovatum Kuhlm.	Murucirana	Rhizophoraceae	Non-classified	Non-classified	Non-classified
Tachigali myrmecophila (Ducke) Ducke	Tachi-preto	Fabaceae	Early secondary	Abiotic	Anemochoric
Tachigali vulgaris L.G.Silva & H.C.Lima	Carvoeiro	Fabaceae	Non-classified	Non-classified	Non-classified
Talisia guianensis Aubl.	Pitomba	Sapindaceae	Pioneer	Biotic	Zoochoric
Tapirira guianensis Aubl.	Pombeiro	Anacardiaceae	Late secondary	Biotic	Zoochoric
Toulicia guianensis Aubl.	Catinga-de-mulata	Sapindaceae	Late secondary	Biotic	Zoochoric
Tovomita umbellata Benth.	Tovomita	Clusiaceae	Non-classified	Non-classified	Non-classified
Trattinickia rhoifolia Willd.	Morcegueira	Burseraceae	Non-classified	Non-classified	Non-classified
Trichilia elegans A.Juss.	Marinheiro	Meliaceae	Early secondary	Biotic	Zoochoric
Virola calophylla Warb.	Ucuúba	Myristicaceae	Late secondary	Biotic	Zoochoric
Vitex panshiniana Moldenke	Tarumã	Lamiaceae	Late secondary	Biotic	Zoochoric
Vochysia vismiifolia Spruce ex Warm.	Quaruba-lacre	Vochysiaceae	Early secondary	Abiotic	Autocórica
Xylopia amazonica R.E.Fr.	Pindaíba vermelha	Annonaceae	Non-classified	Biotic	Zoochoric
Xylopia benthamii R.E.Fr.	Envira-amarela	Annonaceae	Early secondary	Biotic	Zoochoric
Xylopia calophylla R.E.Fr.	Envira	Annonaceae	Late secondary	Biotic	Zoochoric

References

Gandolfi, S., Leitão Filho, H.F. & Bezerra, C.L.F. 1995. Levantamento florístico e caráter sucessional das espécies arbustivo-arbóreas de uma Floresta Semidecídua no município de Guarulhos, SP. **Revista Brasileira de Biologia**, v. 55, n. 4, p.753-767.

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Appendix S2. Physosociological parameters analyzed of the 20 highest importance species, in a forest fragment under the influence of selective logging, Amazonian Biome

Species	RF	RDo	RD	IV%
Qualea paraensis Ducke	5.33	14.51	7.30	9.05
Aspidosperma discolor A.DC.	3.81	10.87	4.35	6.34
Matayba arborescens (Aubl.) Radlk.	4.82	5.53	8.35	6.23
Vochysia vismiifolia Spruce ex Warm.	4.06	6.55	6.78	5.80
Pouteria guianensis Aubl.	3.81	6.10	5.22	5.04
Pseudolmedia laevigata Trécul	3.55	2.59	3.48	3.21
Xylopia sp. 1	3.81	1.91	3.83	3.18
Nectandra cuspidata Nees	3.55	1.62	4.35	3.17
Ocotea acutangula (Miq.) Mez	2.54	2.32	3.30	2.72
Tachigali vulgaris L.G.Silva & H.C.Lima	3.05	1.65	3.13	2.61
Sterigmapetalum obovatum Kuhlm.	2.79	2.14	2.26	2.40
Inga sp. 3	2.03	2.63	1.74	2.13
Erisma uncinatum Warm.	2.28	2.17	1.91	2.12
Toulicia guianensis Aubl.	2.03	1.47	2.09	1.86
Tapirira guianensis Aubl.	2.28	1.46	1.74	1.83
Diplotropis purpurea (Rich.) Amshoff	1.78	1.72	1.91	1.80
Bellucia grossularioides (L.) Triana	1.52	2.09	1.74	1.78
Licania blackii Prance	1.78	1.70	1.39	1.62
Helicostylis tomentosa (Poepp. & Endl.) Rusby	1.78	1.53	1.39	1.57
Cheiloclinium cognatum (Miers) A.C.Sm.	2.03	0.91	1.57	1.50

RF – relative frequency (%); RDo – relative dominance (%); RD – relative density (%); IV – importance value (%).

References

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Appendix S3. Result of chemical, physical and total organic carbon analysis in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome

Edaphic variables	Depth (cm)		
	5	25	50
pH in water	4.3 - 4.9	4.4 - 4.9	4.5 - 4.8
pH in chlorine	3.5 - 4.2	3.6 - 4.1	3.8 - 4.1
Phosphor (mg dm^{-3})	1.1 - 2.3	0.6 - 1.7	0.3 - 1.1
Potassium (mg dm^{-3})	16 - 23	11 - 19	7 - 13
Zinc (mg dm^{-3})	0.3 - 0.6	0.2 - 0.4	0.1 - 0.2
Copper (mg dm^{-3})	0.3 - 0.8	0.2 - 0.5	0.1 - 0.3
Iron (mg dm^{-3})	32 - 195	127 - 233	98 - 215
Manganese (mg dm^{-3})	1.3 - 11.4	0.4 - 8.6	0.8 - 5.2
Borium (mg dm^{-3})	0.24 - 0.38	0.20 - 0.26	0.10 - 0.20
Sulfur (mg dm^{-3})	3.8 - 5.4	4.5 - 6.1	5.1 - 6.7
Calcium and Magnesium ($cmol_c$ dm^{-3})	0.3 - 0.5	0.2 - 0.4	0.2 - 0.3
Calcium ($cmol_c$ dm^{-3})	0.2 - 0.3	0.1 - 0.2	0.1 - 0.2
Magnesium ($cmol_c$ dm^{-3})	0.1 - 0.2	0.1 - 0.2	0.1
Aluminum ($cmol_c$ dm^{-3})	0.7 - 2.0	0.8 - 1.5	0.7 - 1.6
Hydrogen ($cmol_c$ dm^{-3})	3.2 - 13.1	2.6 - 5.0	1.5 - 3.6
Organic matter ($cmol_c$ dm^{-3})	13.4 - 64.9	10.7 - 27.1	6.8 - 20.0
Sand (g kg^{-1})	730 - 823	723 - 790	707 - 756
Silt (g kg^{-1})	28 - 59	41 - 63	48 - 63
Clay (g kg^{-1})	141 - 269	165 - 288	191 - 245
Sum of bases ($cmol_c$ dm^{-3})	0.3 - 0.6	0.2 - 0.4	0.2 - 0.3
Cation exchange capacity ($cmol_c$ dm^{-3})	4.4 - 15.6	3.9 - 6.8	2.9 - 5.3
Base saturation (%)	3.5 - 12.4	4.9 - 10.6	4.3 - 10.3
Calcium to magnesium ratio	1.2 - 1.8	1.2 - 1.6	1.0 - 1.3
Potassium-calcium ratio	3.5 - 7.2	3.6 - 7.0	3.0 - 8.2
Magnesium to potassium ratio	2.6 - 5.0	2.8 - 4.8	2.5 - 6.4
Calcium saturation (%)	1.9 - 6.8	2.4 - 5.1	1.9 - 4.7
Magnesium saturation (%)	1.3 - 4.7	2.0 - 3.9	1.6 - 3.9
Potassium Saturation (%)	0.3 - 1.3	0.5 - 1.2	0.4 - 1.1
Hydrogen saturation (%)	70.8 - 84.0	64.2 - 75.2	51.2 - 74.6
Aluminum saturation (%)	55.4 - 82.4	63.3 - 85.7	69.5 - 87.5
Total organic carbon (g kg^{-1})	8.6 - 38.6	7.1 - 16.5	4.7 - 12.3

Appendix S4. Data simplification routine in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, by analysis of principal components of the 31 edathical variables, Amazonian Biome. With software R.

```
Library(bpca)

dados<-read.table("BD_solo_32var.txt", h=TRUE)
dados
```

	pH H_2O	pH $CaCl_2$	P		H%	Al%	COT
1A	4.7	4,0	0,0017	…	6,5723	6,5793	2,6603
1B	4.6	3.9	0.0011	…	6.5482	6.6758	2.5953
1C	4.8	4.1	0.0006	…	6.4036	6.7650	2.2824
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
25A	4.6	3.9	0.0014	…	6.6529	6.5482	2.9857
25B	4.7	4.0	0.0011	…	6.5177	6.7069	2.6462
25C	4.6	4.0	0.0006	…	6.3439	6.7581	2.0919

```
bp <- bpca(dados, iec=T)
plot(bp,var.factor=2, var.col=rainbow(7),xlim=c(-6,7),ylim=c(-7,6))
plot(bpca(dados,d=1:3), rgl.use=TRUE, var.col=rainbow(7), var.factor=3, box=TRUE)
```

Appendix S5. Data simplification routine in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, by analysis of principal components of the 16 edathical variables, Amazonian Biome. With software R.

```
library(bpca)

dadoss<-read.table("BD_solo_16var.txt", h=TRUE)
dadoss
```

	pH H_2O	pH $CaCl_2$	P		Ca%	Mg%	COT
1A	4.7	4.0	0.0017	…	3.6109	3.4340	2.6603
1C	4.6	3.9	0.0006	…	3.1781	2.9957	2.2824
2A	4.8	4.1	0.0014	…	3.8712	3.4965	2.5416
⋮	⋮	⋮	⋮	⋮			⋮
24C	4.6	3.9	0.0006	…	3.2189	3.0445	2.2407
25A	4.7	4.0	0.0014	…	3.4657	3.0910	2.9857
25C	4.6	4.0	0.0006	…	3.3322	3.1355	2.0919

```
bpp <- bpca(dadoss, iec=T)
plot(bpp,var.factor=2, var.col=rainbow(7),xlim=c(-5,5),ylim=c(-5,10))
plot(bpca(dadoss,d=1:3), rgl.use=TRUE, var.col=rainbow(7), var.factor=3, box=TRUE)
```

Appendix S6. Canonic correlation analysis of the 20 highest importance species and edathical variables, in a forest fragment under the influence of selective logging, Amazonian Biome. With software R.

```
library(vegan)

canonica<-read.table("canonica.txt",h=TRUE)
canonica
```

Y1	Y2	Y3	…	Y18	Y19	Y20	X1	X2	…	X15	X16
0	0	0	…	0	2	3	4.7000	4.0000	…	3.4340	2.6603
0	1	1	…	0	1	1	4.8000	4.1000	…	3.4965	2.5416
2	0	1	…	1	0	1	4.8000	4.1000	…	3.6109	2.6462
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	0	1	…	2	0	0	4.7000	4.0000	…	3.2189	2.8848
1	1	0	…	0	3	1	4.5000	3.8000	…	2.9444	2.8679
2	0	0	…	0	8	0	4.7000	4.0000	…	3.0910	2.9857

```
especies <- c(1:20)
solo <- c(21:36)
especies.hel <- decostand(canonica[,especies], "hel")
solo.hel <- decostand(canonica[,solo], "hel")
rownames(especies.hel) = paste("S",1:nrow(canonica),sep="")
rownames(solo.hel) = paste("S",1:nrow(canonica),sep="")
out <- CCorA(especies.hel, solo.hel)
out
biplot(out, "ov", cex=c(0.7,0.6))
biplot(out, "b", cex=c(0.7,0.6))
```

Appendix S7. Canonical redundancy analysisof the 20 highest importance species and edathical variables, in a forest fragment under the influence of selective logging, Amazonian Biome. With software R.

```
library(vegan)
library(packfor)
library(MASS)
library(ellipse)
library(FactoMineR)

especie<-read.table("especie.txt", h=TRUE)
especie
```

Y1	Y2	Y3	…	Y18	Y19	Y20
0	0	0	…	0	2	3
0	1	1	…	0	1	1
2	0	1	…	1	0	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮
1	0	1	…	2	0	0
1	1	0	…	0	3	1
2	0	0	…	0	8	0

```
solo<-read.table("solo.txt", h=TRUE)
solo
```

X1	X2	X3	…	X14	X15	X16
4.7000	4.0000	0.0624	…	3.6109	3.4340	2.6603
4.8000	4.1000	0.0811	…	3.8712	3.4965	2.5416
4.8000	4.1000	0.0811	…	3.9703	3.6109	2.6462
⋮	⋮	⋮	⋮	⋮	⋮	⋮
4.7000	4.0000	0.0811	…	3.7842	3.2189	2.8848
4.5000	3.8000	0.0509	…	3.4012	2.9444	2.8679
4.7000	4.0000	0.0811	…	3.4657	3.0910	2.9857

```
especie.hel<-decostand(especie, "hellinger")
solo.hel<-decostand(solo, "hellinger")
simpleRDA<-rda(especie.hel,solo.hel)
summary(simpleRDA)

#R2
R2<-RsquareAdj(simpleRDA)$r.squared
R2Adj<-RsquareAdj(simpleRDA)$adj.r.squared

#SCALING 1
plot(simpleRDA, scaling=1, main="Triplot RDA")
spe.sc<-scores(simpleRDA, choices=1:2, scaling=1, display="sp")
arrows(0, 0, spe.sc[,1], spe.sc[,2], length=0, lty=1, col="red")

#SCALING 2
plot(simpleRDA, main="Triplot RDA")
spe.sc<-scores(simpleRDA, choices=1:2, display="sp")
arrows(0, 0, spe.sc[,1], spe.sc[,2], length=0, lty=1, col="red")
```

Appendix S8. Pearson correlation matrix among 31 environmental variables, in a forest fragment under the influence of selective logging, Amazonian Biome (Red values are negatively correlated, bold and italics are highly significant [<0.001])

	pH CaCl2	P	K	Zn	Cu	Fe	Mn	B	S	Ca+Mg	Ca	Mg	Al	H	OM	Sand	Silt	Clay	SB	CEC	V%	Ca/Mg	Ca/K	Mg/K	Ca%	Mg%	K%	H%	m%	TOC
Ph H_2O	0.91	0.15	0.29	0.19	0.34	0.23	0.16	0.14	0.38	0.50	0.46	0.50	0.83	0.26	0.23	0.09	0.33	0.28	0.47	0.30	0.93	0.07	0.41	0.31	0.86	0.84	0.68	0.15	0.76	0.25
Ph $CaCl_2$		0.10	0.22	0.08	0.25	0.24	0.14	0.08	0.32	0.43	0.38	0.46	0.76	0.31	0.26	0.10	0.27	0.20	0.40	0.32	0.87	0.00	0.35	0.34	0.77	0.77	0.63	0.05	0.67	0.27
P			0.76	0.65	0.65	0.34	0.22	0.63	0.55	0.75	0.76	0.59	0.07	0.74	0.75	0.07	0.36	0.40	0.77	0.70	0.10	0.37	0.30	0.14	0.23	0.01	0.01	0.79	0.55	0.75
K				0.76	0.70	0.23	0.30	0.63	0.68	0.82	0.80	0.73	0.22	0.64	0.70	0.03	0.48	0.51	0.88	0.63	0.30	0.25	0.06	0.26	0.38	0.18	0.41	0.77	0.70	0.69
Zn					0.71	0.32	0.35	0.59	0.65	0.77	0.76	0.66	0.09	0.66	0.66	0.04	0.47	0.41	0.79	0.66	0.24	0.30	0.32	0.04	0.37	0.17	0.10	0.67	0.58	0.66
Cu						0.20	0.11	0.62	0.70	0.76	0.75	0.65	0.37	0.54	0.54	0.08	0.57	0.52	0.77	0.45	0.36	0.27	0.33	0.01	0.47	0.26	0.19	0.70	0.71	0.53
Fe							0.02	0.41	0.06	0.26	0.25	0.24	0.39	0.58	0.48	0.14	0.34	0.30	0.26	0.60	0.31	0.01	0.07	0.07	0.24	0.37	0.37	0.22	0.00	0.50
Mn								0.23	0.28	0.36	0.36	0.31	0.01	0.14	0.25	0.03	0.01	0.00	0.36	0.26	0.21	0.12	0.22	0.07	0.27	0.15	0.07	0.18	0.23	0.24
B									0.49	0.67	0.65	0.60	0.06	0.57	0.63	0.04	0.52	0.55	0.68	0.58	0.12	0.14	0.24	0.05	0.23	0.04	0.01	0.58	0.49	0.62
S										0.64	0.65	0.51	0.36	0.38	0.45	0.03	0.51	0.46	0.67	0.33	0.37	0.33	0.26	0.12	0.46	0.29	0.31	0.62	0.60	0.44
Ca+Mg											0.98	0.87	0.38	0.64	0.66	0.09	0.50	0.47	0.99	0.61	0.51	0.33	0.55	0.14	0.57	0.32	0.22	0.80	0.87	0.65
Ca												0.76	0.35	0.65	0.68	0.08	0.47	0.46	0.98	0.62	0.48	0.50	0.62	0.01	0.56	0.29	0.19	0.81	0.83	0.67
Mg													0.40	0.52	0.50	0.09	0.49	0.42	0.87	0.47	0.52	0.17	0.26	0.45	0.50	0.34	0.27	0.62	0.84	0.49
Al														0.31	0.30	0.08	0.25	0.21	0.36	0.48	0.87	0.03	0.31	0.27	0.78	0.79	0.68	0.23	0.75	0.32
H															0.92	0.00	0.28	0.32	0.66	0.94	0.28	0.27	0.22	0.11	0.16	0.41	0.38	0.77	0.28	0.93
OM																0.01	0.33	0.35	0.69	0.93	0.27	0.36	0.21	0.23	0.15	0.40	0.31	0.82	0.30	1.00
Sand																	0.11	0.01	0.08	0.00	0.09	0.02	0.07	0.09	0.05	0.02	0.02	0.03	0.10	0.00
Silt																		0.67	0.51	0.27	0.28	0.07	0.15	0.07	0.33	0.22	0.20	0.42	0.49	0.32
Clay																			0.49	0.29	0.23	0.16	0.11	0.10	0.26	0.17	0.25	0.44	0.42	0.34
SB																				0.63	0.49	0.33	0.48	0.07	0.55	0.31	0.26	0.81	0.86	0.68
CEC																					0.33	0.28	0.18	0.16	0.19	0.44	0.38	0.64	0.18	0.94
V%																						0.07	0.42	0.33	0.92	0.92	0.74	0.12	0.79	0.29
Ca/Mg																							0.60	0.60	0.21	0.05	0.03	0.43	0.15	0.35
Ca/K																								0.28	0.47	0.31	0.19	0.37	0.46	0.21
Mg/K																									0.21	0.24	0.17	0.15	0.26	0.22
Ca%																										0.92	0.67	0.22	0.78	0.16
Mg%																											0.73	0.01	0.63	0.41
K%																												0	0.52	0.33
H%																													0.64	0.8
m%																														0.28

pH H2O - pH in water; pH $CaCl_2$ – pH in chlorine; P - Phosphor (mg dm^{-3}); K - Potassium (mg dm^{-3}); Zn - Zinc (mg dm^{-3}); Cu - Copper (mg dm^{-3}); Fe - Iron (mg dm^{-3}); Mn - Manganese (mg dm^{-3}); B - Borium (mg dm^{-3}); S - Sulfur (mg dm^{-3}); Ca+Mg - Calcium and Magnesium ($cmol_c$ dm^{-3}); Ca - Calcium ($cmol_c$ dm^{-3}); Mg - Manganese (mg dm^{-3}); Al - Aluminum ($cmol_c$ dm^{-3}); H - Hydrogen ($cmol_c$ dm^{-3}); OM - Organic matter ($cmol_c$ dm^{-3}); SB - Sum of bases ($cmol_c$ dm^{-3}); CEC - Cation exchange capacity ($cmol_c$ dm^{-3}); V% - Base saturation (%); Ca/Mg - Calcium to magnesium ratio; Ca/K - Potassium-calcium ratio; Mg/K - Magnesium to potassium ratio; Ca% - Calcium saturation (%); Mg% - Magnesium saturation (%); Ca% - Calcium saturation (%); Mg% - Magnesium saturation (%); K% - Potassium Saturation (%); H% - Hydrogen saturation (%); m% - Aluminum saturation (%); TOC - Total organic carbon (g kg^{-1}).

Appendix S9. Pearson correlation matrix among 16 environmental variables, in a forest fragment under the influence of selective logging, Amazonian Biome (Red values are negatively correlated, bold and italics are highly significant [<0.001])

	pH CaCl2	P	K	Ca+Mg	Ca	Mg	Al	H	OM	SB	CEC	V%	Ca%	Mg%	TOC
pH H20	0.91	0.18	0.30	0.52	0.51	0.49	0.84	0.25	0.15	0.49	0.25	0.95	0.91	0.87	0.17
pH CaCl2		0.12	0.23	0.44	0.43	0.43	0.77	0.32	0.21	0.41	0.29	0.90	0.84	0.83	0.22
P			0.83	0.79	0.80	0.72	0.07	0.77	0.81	0.82	0.75	0.13	0.28	0.01	0.81
K				0.85	0.84	0.80	0.20	0.68	0.78	0.89	0.69	0.29	0.42	0.16	0.77
Ca+Mg					0.99	0.94	0.38	0.66	0.72	1.00	0.65	0.52	0.61	0.33	0.71
Ca						0.89	0.38	0.66	0.72	0.99	0.64	0.51	0.62	0.33	0.71
Mg							0.35	0.60	0.66	0.93	0.60	0.49	0.54	0.31	0.65
Al								0.31	0.25	0.35	0.44	0.88	0.82	0.82	0.27
H									0.93	0.68	0.95	0.26	0.12	0.40	0.94
OM										0.75	0.94	0.20	0.05	0.35	1.00
SB											0.67	0.49	0.59	0.31	0.74
CEC												0.28	0.14	0.41	0.95
V%													0.95	0.94	0.21
Ca%														0.92	0.06
Mg%															0.36

pH H_20 - pH in water; pH $CaCl_2$ – pH in chlorine; P - Phosphor (mg dm^{-3}); K - Potassium (mg dm^{-3}); Ca+Mg - Calcium and Magnesium ($cmol_c$ dm^{-3}); Ca - Calcium ($cmol_c$ dm^{-3}); Mg - Manganese (mg dm^{-3}); Al - Aluminum ($cmol_c$ dm^{-3}); H - Hydrogen ($cmol_c$ dm^{-3}); OM - Organic matter ($cmol_c$ dm^{-3}); SB - Sum of bases ($cmol_c$ dm^{-3}); CEC - Cation exchange capacity ($cmol_c$ dm^{-3}); V% - Base saturation (%); Ca% - Calcium saturation (%); Mg% - Magnesium saturation (%); TOC - Total organic carbon (g kg^{-1}).

Appendix S10. Pearson correlation matrix eigenvalues among the 31 environmental variables, in a forest fragment under the influence of selective logging, Amazonian Biome

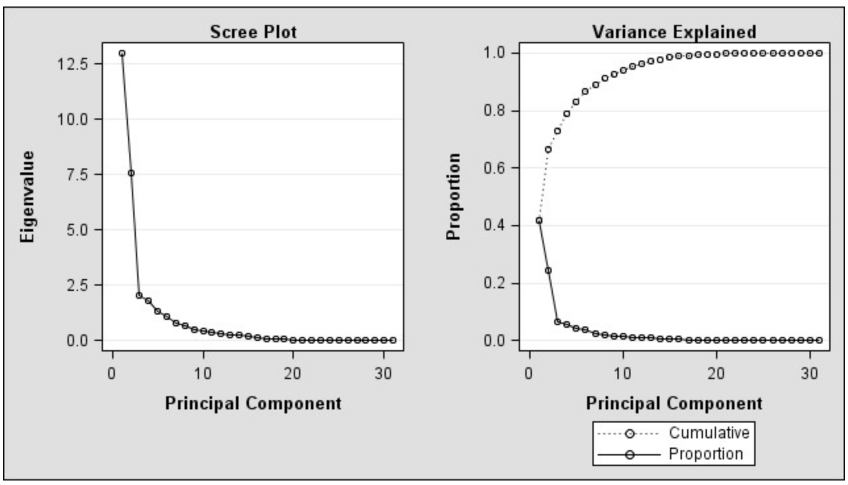
	Eigenvalue	Difference	Variance	
			Proportional	Cumulative
1	12.9914394	5.4161067	0.4191	0.4191
2	7.5753327	5.5584335	0.2444	0.6634
3	2.0168993	0.2064307	0.0651	0.7285
4	1.8104686	0.5011828	0.0584	0.7869
5	1.3092858	0.1911234	0.0422	0.8291
6	1.1181624	0.3158881	0.0361	0.8652
7	0.8022742	0.1497937	0.0259	0.8911
8	0.6524805	0.1549796	0.0210	0.9121
9	0.4975009	0.0838260	0.0160	0.9282
10	0.4136749	0.0498441	0.0133	0.9415
11	0.3638308	0.0734883	0.0117	0.9533
12	0.2903425	0.0331075	0.0094	0.9626
13	0.2572350	0.0142724	0.0083	0.9709
14	0.2429626	0.0496132	0.0078	0.9788
15	0.1933494	0.0621069	0.0062	0.9850
16	0.1312425	0.0272853	0.0042	0.9892
17	0.1039571	0.0349989	0.0034	0.9926
18	0.0689583	0.0156664	0.0022	0.9948
19	0.0532919	0.0205550	0.0017	0.9965
20	0.0327369	0.0111736	0.0011	0.9976
21	0.0215633	0.0022032	0.0007	0.9983
22	0.0193601	0.0040383	0.0006	0.9989
23	0.0153218	0.0070353	0.0005	0.9994
24	0.0082865	0.0020206	0.0003	0.9997
25	0.0062658	0.0044927	0.0002	0.9999
26	0.0017731	0.0005664	0.0001	0.9999
27	0.0012068	0.0004244	0.0000	1.0000
28	0.0007824	0.0007698	0.0000	1.0000
29	0.0000126	0.0000109	0.0000	1.0000
30	0.0000017	0.0000017	0.0000	1.0000
31	0.0000000	-	0.0000	1.0000

Appendix S11. First (PCR1) and second (PCR2) autovectors principal component between 31 environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome

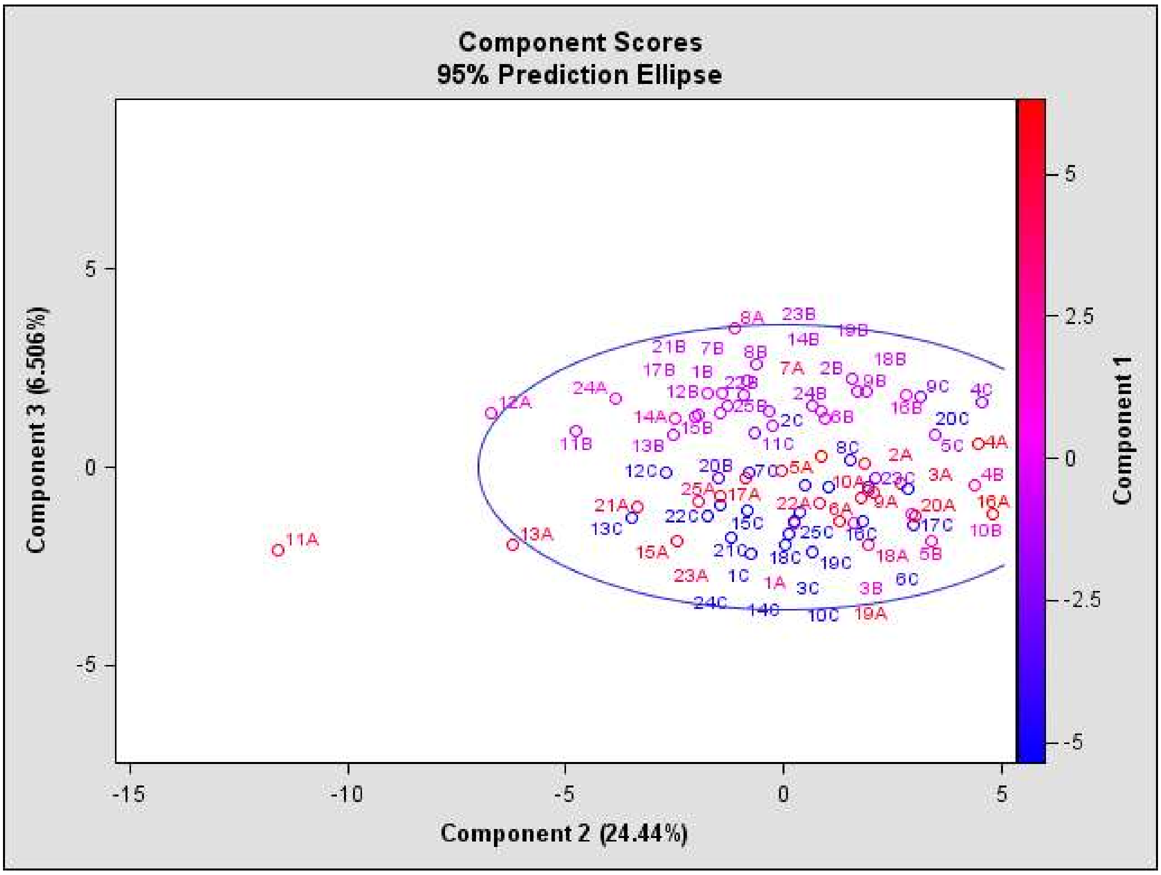
Obs.	SubA	Prof.	PCR1	PCR2	Obs.	SubA	Prof.	PCR1	PCR2
1	1	5	2.9953	0.2239	39	13	50	-4.4233	-3.4914
2	1	25	-0.3905	-1.4339	40	14	5	1.4472	-2.5135
3	1	50	-4.3954	-1.4398	41	14	25	-0.4999	-0.2629
4	2	5	4.1544	2.6878	42	14	50	-4.8454	0.0951
5	2	25	-0.6305	1.5540	43	15	5	5.1833	-2.4550
6	2	50	-4.3793	0.4899	44	15	25	-0.2363	-1.9672
7	3	5	4.6899	1.8375	45	15	50	-4.9593	-0.8307
8	3	25	0.8426	1.6083	46	16	5	6.1533	4.8103
9	3	50	-5.3584	1.0419	47	16	25	0.5838	2.8085
10	4	5	5.7260	4.4444	48	16	50	-4.5357	1.7950
11	4	25	2.0828	4.3731	49	17	5	5.4812	-1.4545
12	4	50	-1.4345	4.5620	50	17	25	-0.3218	-1.4717
13	5	5	6.3222	0.8586	51	17	50	-4.0040	2.9535
14	5	25	1.7834	3.3865	52	18	5	3.2338	1.9414
15	5	50	-0.9878	3.4793	53	18	25	-0.3511	1.8879
16	6	5	4.8794	1.7782	54	18	50	-4.6490	0.0463
17	6	25	-0.1658	0.9320	55	19	5	5.5575	1.2666
18	6	50	-4.4002	1.9265	56	19	25	0.1441	0.8551
19	7	5	4.6184	-0.0671	57	19	50	-4.7138	0.6516
20	7	25	-0.3371	-0.8249	58	20	5	5.1533	3.0003
21	7	50	-4.1846	-0.7846	59	20	25	-3.0345	-1.5058
22	8	5	1.7583	-1.1109	60	20	50	-4.9076	2.8587
23	8	25	-0.7379	-0.6266	61	21	5	4.5532	-3.3736
24	8	50	-4.0047	1.5056	62	21	25	-0.8251	-2.0481
25	9	5	4.7627	1.9546	63	21	50	-4.8911	-1.2017
26	9	25	-0.1526	1.6964	64	22	5	4.3808	0.8164
27	9	50	-2.1149	3.1522	65	22	25	-1.0178	-0.9408
28	10	5	4.8113	2.0745	66	22	50	-4.9067	-1.7609
29	10	25	0.8081	2.9485	67	23	5	4.5026	-0.8772
30	10	50	-4.3862	0.3589	68	23	25	-0.7552	-0.3597
31	11	5	4.8755	-11.5979	69	23	50	-1.9112	2.0849
32	11	25	-0.3005	-4.7642	70	24	5	0.6542	-3.8454
33	11	50	-1.6777	-0.6630	71	24	25	-0.8857	0.6414
34	12	5	1.1987	-6.7268	72	24	50	-4.5004	-0.7596
35	12	25	-0.2415	-1.7635	73	25	5	3.9348	-1.9514
36	12	50	-4.1090	-2.7048	74	25	25	-0.9386	-1.2974
37	13	5	4.5793	-6.2368	75	25	50	-4.9095	0.2440
38	13	25	-0.4395	-2.5182					

Obs. - observations; SubA - sample subunit; Depth (cm) - depth of soil sample in centimeters; PCR1 - first principal component; PCR2 - second principal component.

Appendix S12. Scree plot and variance explained graphic built by analysis of principal components between 31 environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome



Appendix S13. 95% confident prediction ellipsis built by analysis of principal components between 31 environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome



Appendix S14. First (PCR1) and second (PCR2) autovectors principal component between 16 environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome

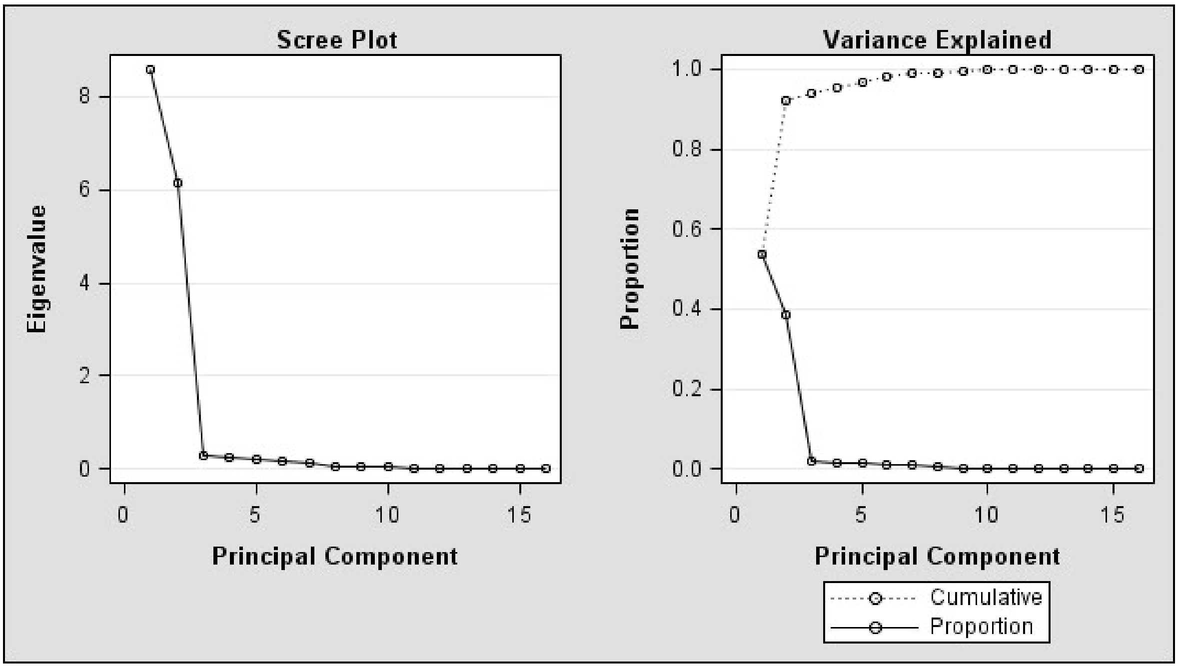
Eigenvalues of the correlation matrix				
	Eigenvalue	Difference	Proportional	
			Proportional	Acumulada
1	8.5868	2.4336	0.5367	0.5367
2	6.1532	5.8516	0.3846	0.9213
3	0.3015	0.0497	0.0188	0.9401
4	0.2518	0.0329	0.0157	0.9558
5	0.2189	0.0478	0.0137	0.9695
6	0.1710	0.0386	0.0107	0.9802
7	0.1323	0.0635	0.0083	0.9885
8	0.0688	0.0108	0.0043	0.9928
9	0.0579	0.0258	0.0036	0.9964
10	0.0321	0.0149	0.0020	0.9984
11	0.0172	0.0103	0.0011	0.9995
12	0.0068	0.0057	0.0004	0.9999
13	0.0011	0.0010	0.0000	1.0000
14	0.0000	0.0000	0.0000	1.0000
15	0.0000	0.0000	0.0000	1.0000
16	0.0000	0.0000	0.0000	1.0000

Appendix S15. First (PCR1) and second (PCR2) autovectors selected by preliminary analysis of principal component between 16 environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome

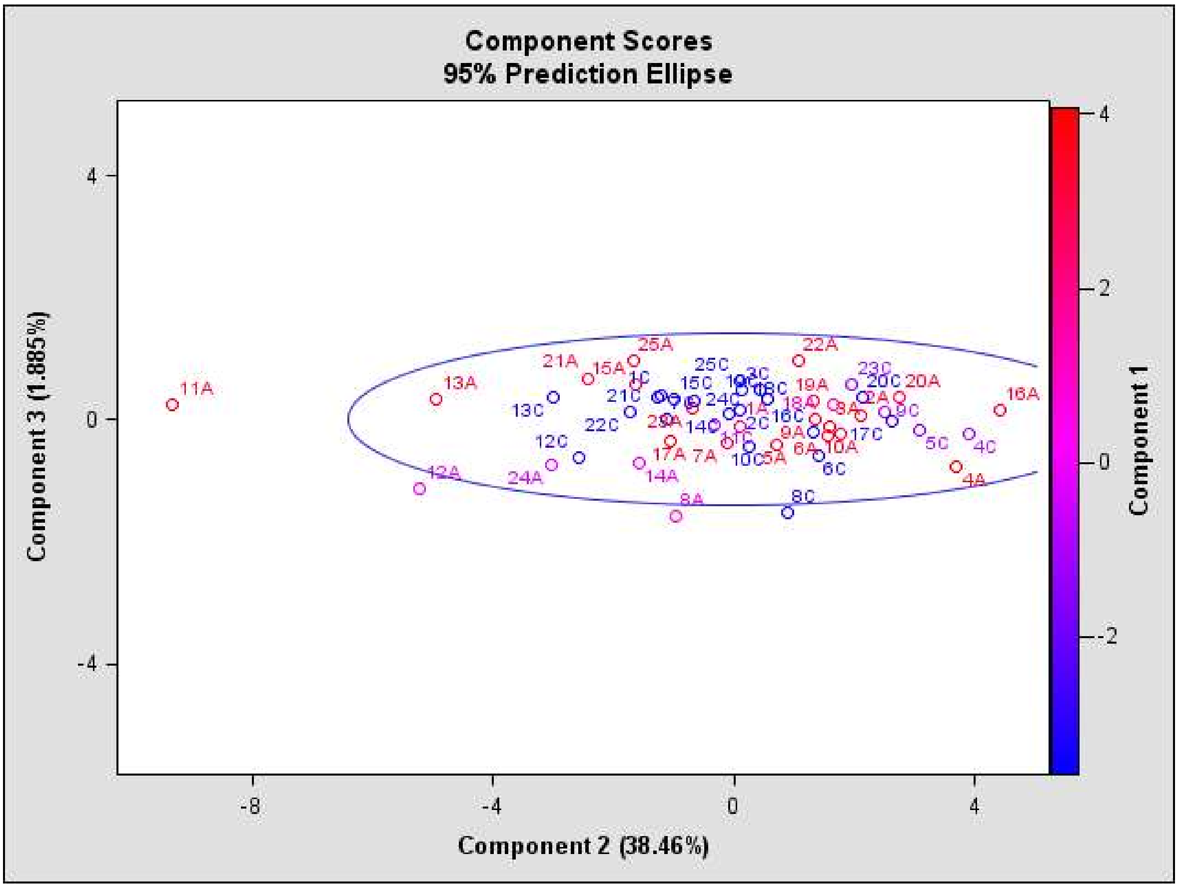
Obs.	SubA	Depth(cm)	PCR1	PCR2	Obs.	SubA	Depth(cm)	PCR1	PCR2
1	1	5	1.8658	0.1113	26	13	50	-3.0217	-2.9918
2	1	50	-2.9071	-1.2207	27	14	5	0.2028	-1.5806
3	2	5	3.0204	2.1096	28	14	50	-3.1746	-0.0831
4	2	50	-2.8599	0.1161	29	15	5	3.1937	-1.6333
5	3	5	3.7994	1.5997	30	15	50	-3.1772	-0.9880
6	3	50	-2.8784	0.4376	31	16	5	3.2896	4.4143
7	4	5	4.0740	3.7008	32	16	50	-3.3303	1.3340
8	4	50	-0.7836	3.9012	33	17	5	3.5676	-1.0655
9	5	5	3.5587	0.7106	34	17	50	-2.8263	2.6389
10	5	50	-1.0676	3.0876	35	18	5	1.3078	1.6485
11	6	5	3.5812	1.5655	36	18	50	-3.3730	0.1191
12	6	50	-3.0742	1.3953	37	19	5	3.0621	1.3188
13	7	5	3.2533	-0.1175	38	19	50	-3.5800	0.5703
14	7	50	-3.0556	-1.1076	39	20	5	2.9890	2.7569
15	8	5	0.6840	-0.9757	40	20	50	-3.0371	2.1378
16	8	50	-3.1250	0.8908	41	21	5	2.9711	-2.4241
17	9	5	3.2680	1.3394	42	21	50	-3.4918	-1.2533
18	9	50	-1.0346	2.5035	43	22	5	3.2681	1.0775
19	10	5	3.2891	1.7856	44	22	50	-3.2092	-1.7342
20	10	50	-3.1696	0.2544	45	23	5	3.4429	-0.6798
21	11	5	3.5025	-9.3282	46	23	50	-1.4723	1.9700
22	11	50	-0.7368	-0.3334	47	24	5	-0.2237	-3.0279
23	12	5	0.3533	-5.2171	48	24	50	-3.3197	-0.6542
24	12	50	-2.7587	-2.5891	49	25	5	2.9560	-1.6536
25	13	5	3.3137	-4.9357	50	25	50	-3.1262	0.0992

Obs. - observations; SubA - sample subunit; Depth (cm) - depth of soil sample in centimeters; PCR1 - first principal component; PCR2 - second principal component.

Appendix S16. Scree plot and variance explained graphic built by analysis of principal components between 16 pre-selected environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome



Appendix S17. 95% confident prediction elipsis built by analysis of principal components between 16 pre-selected environmental variables in a forest fragment under the influence of selective logging, in depth 5, 25 and 50 cm, Amazonian Biome



Appendix S18.

Results generated by canonic redundance analysis between 20 highest importance species and edathic variables after Hellinger transformation, in a forest fragment under the influence of selective logging, Amazonian Biome

Eigenvalue and its contributions			
Axis	Eigenvalue	Proportion explained	Cumulative proportion
RDA1	0.0619	0.1234	0.1234
RDA2	0.0607	0.1211	0.2445
RDA3	0.0448	0.0895	0.3340
RDA4	0.0381	0.0761	0.4100
RDA5	0.0295	0.0588	0.4688
RDA6	0.0261	0.0522	0.5210
RDA7	0.0195	0.0389	0.5599
RDA8	0.0179	0.0356	0.5955
RDA9	0.0154	0.0307	0.6262
RDA10	0.0089	0.0178	0.6440
RDA11	0.0067	0.0134	0.6574
RDA12	0.0062	0.0125	0.6698
RDA13	0.0049	0.0099	0.6797
RDA14	0.0033	0.0066	0.6863
RDA15	0.0017	0.0034	0.6897
RDA16	0.0009	0.0018	0.6915
Axis	Eigenvalue	Proportion explained	Cumulative proportion
PC1	0.0412	0.0822	0.7737
PC2	0.0364	0.0726	0.8463
PC3	0.0225	0.0448	0.8911
PC4	0.0210	0.0419	0.9330
PC5	0.0163	0.0324	0.9654
PC6	0.0077	0.0154	0.9808
PC7	0.0061	0.0122	0.9930
PC8	0.0035	0.0070	1.0000
Axis	Eigenvalue	Proportion explained	Cumulative proportion
RDA1	0.0619	0.1785	0.1785
RDA2	0.0607	0.1751	0.3536
RDA3	0.0448	0.1294	0.4830
RDA4	0.0381	0.1100	0.5930
RDA5	0.0295	0.0850	0.6780
RDA6	0.0261	0.0754	0.7534
RDA7	0.0195	0.0563	0.8096
RDA8	0.0179	0.0515	0.8612
RDA9	0.0154	0.0444	0.9055
RDA10	0.0089	0.0258	0.9313
RDA11	0.0067	0.0194	0.9507
RDA12	0.0062	0.0180	0.9687
RDA13	0.0049	0.0143	0.9829
RDA14	0.0033	0.0095	0.9924
RDA15	0.0017	0.0050	0.9974
RDA16	0.0009	0.0026	1.0000