Supporting Information. Müller, R., H. Elsenbeer, B. L. Turner. Evidence for Soil Phosphorus Resource Partitioning in a Diverse Tropical Tree Community.

Supplementary File. Supplemental Tables and Figures

Section S1: Supporting Tables

Table S1: Pearson correlation coefficients (r) and corresponding p values (p) and degrees of freedom (df) of soil phosphorus fractions and topographic variables in the 50-ha forest dynamics plot on Barro Colorado Island.

		RP	MP	NP	NHP	UP	TP	X	Y	Z
RP	r	1.000	0.340	0.382	0.247	0.432	0.739	0.082	0.015	0.087
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.160	0.803	0.132
	df	297	294	293	297	297	297	297	297	297
MP	r	0.340	1.000	0.356	0.333	0.553	0.555	-0.055	-0.073	0.248
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.342	0.209	<0.001
	df	294	294	290	294	294	294	294	294	294
NP	r	0.382	0.356	1.000	0.162	0.561	0.579	0.260	-0.080	0.092
	p	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	0.171	0.115
	df	293	290	293	293	293	293	293	293	293
NHP	r	0.247	0.333	0.162	1.000	0.888	0.766	0.059	0.078	0.532
	p	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	0.309	0.178	<0.001
	df	297	294	293	297	297	297	297	297	297
UP	r	0.432	0.553	0.561	0.888	1.000	0.927	0.148	0.012	0.488
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.010	0.840	<0.001
	df	297	294	293	297	297	297	297	297	297
TP	r	0.739	0.555	0.579	0.766	0.927	1.000	0.130	0.007	0.392
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.024	0.909	<0.001
	df	297	294	293	297	297	298	298	298	298
X	r	0.082	-0.055	0.260	0.059	0.148	0.130	1.000	0.003	-0.060
	p	0.160	0.342	<0.001	0.309	0.010	0.024	<0.001	0.953	0.299
	df	297	294	293	297	297	298	298	298	298
Y	r	0.015	-0.073	-0.080	0.078	0.012	0.007	0.003	1.000	0.532
	p	0.803	0.209	0.171	0.178	0.840	0.909	0.953	<0.001	<0.001
	df	297	294	293	297	297	298	298	298	298
Z	r	0.087	0.248	0.092	0.532	0.488	0.392	-0.060	0.532	1.000
	p	0.132	<0.001	0.115	<0.001	<0.001	<0.001	0.299	<0.001	<0.001
	df	297	294	293	297	297	298	298	298	298

RP = reactive phosphorus, MP = monoesterase-hydrolyzable phosphorus, NP = nuclease-hydrolyzable phosphorus, NHP = non-hydrolyzed phosphorus, UP = unreactive phosphorus, TP = total phosphorus, X,Y = spatial Cartesian coordinates, Z = elevation (from digital terrain model by Dalling et al. [89])

Table S2: Octile skewness (OS) and Box-Cox transformation parameter (λ) of non-transformed soil phosphorus fractions as well as trend, variogram, parameter estimates (†) and cross-validation statistics (‡) of spatial models of transformed soil phosphorus fractions.

Fraction	OS	λ	Trend	Variogram model	Effective range†,*	Nugget†	Partial sill†	NSR	NRMSE‡	MSDR‡
RP	0.31	0.0	no	exponential	84.1	0.25	0.22	0.53	0.94	1.00
MP	0.24	0.5	no	exponential	148.9	0.05	0.05	0.53	0.92	1.01
NP	0.27	0.0	no	exponential	203.3	0.29	0.26	0.52	0.88	1.00
NHP	0.27	0.5	2nd	spherical	223.6	0.12	0.14	0.46	0.64	1.00

RP = reactive phosphorus, MP = monoesterase-hydrolyzable phosphorus, NP = nuclease-hydrolyzable phosphorus, NHP = non-hydrolyzed phosphorus, NSR = nugget-to-sill ratio, NRMSE = normalized root mean squared error, MSDR = mean squared deviation ratio

* The range of the spherical model is the lag distance at which the variogram reaches its sill. The effective range of the exponential model is defined as the distance at which the semivariance is 95% of the sill.

Table S3: Parameter estimates, goodness of fit statistics and optimization parameters of point process models (PPMs) for tree species in the 50-ha forest dynamics plot on Barro Colorado Island. Parameters of cluster process models (Thomas, Matérn, Cauchy or Variance-gamma) are the point intensity (λ), the intensity of cluster centres (κ), the mean number of points per cluster (μ) and the scale parameter (Scale) that determines the cluster size. The cluster processes differ in the way that cluster size is parametrized [35]. For a Matérn cluster process the scale parameter is the radius of a disc centered around the parent point. For a Thomas cluster process the scale parameter is the variance of the isotropic Gaussian distribution. For a Cauchy cluster process the scale parameter is the squared scale parameter of the bivariate Cauchy distribution. For a Variance-gamma cluster process the scale parameter is the scale parameter of the variance-gamma distribution. The Variance-gamma process requires an extra shape parameter (ν). The Poisson process is described by a single parameter, that is the point intensity (λ). The optimization parameters reported are the power transformation parameter (c) and the upper boundary of the distance interval (d_{max}) of the minimum contrast criterion [56]. The optimization algorithms (Algorithm) used for numerical optimization were either the downhill simplex method (Nelder-Mead, see [90]) or simulated annealing (SANN, see [91]). The Poisson point models were fitted analytically and thus neither optimization parameters nor optimization algorithms are reported. The goodness of fit statistics reported are the p values of the Diggle-Cressie-Loosmore-Ford test [62-65] using either the empty space function (p_F) or the nearest neighbor distance function (p_G) as summary statistics.

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Acalypha macrostachya	Euphorbiaceae	Jacq.	acalma	Thomas	$1.24 \cdot 10^{-4}$	$5.21 \cdot 10^{-6}$	$2.38 \cdot 10$	$6.54 \cdot 10^{2}$		0.25	175	SANN	0.069	0.098
Adelia triloba	Euphorbiaceae	(Müll.Arg.) Hemsl.	ade1tr	Thomas	$2.40 \cdot 10^{-4}$	$1.63 \cdot 10^{-5}$	$1.47 \cdot 10$	$1.24 \cdot 10^{3}$		0.50	50	SANN	0.064	0.515
Alibertia edulis	Rubiaceae	(Rich.) A.Rich. ex DC.	alibed	Cauchy	$9.10 \cdot 10^{-4}$	$2.93 \cdot 10^{-5}$	$3.11 \cdot 10$	$9.55 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.250	0.840
Allophylus psilospermus	Sapindaceae	Radlk.	allops	Thomas	$1.94 \cdot 10^{-4}$	$4.50 \cdot 10^{-5}$	4.31	$3.77 \cdot 10^{3}$		0.50	275	SANN	0.195	0.902
Alseis blackiana	Rubiaceae	Hemsl.	alsebl	Variance-gamma	$1.61 \cdot 10^{-2}$	$2.37 \cdot 10^{-4}$	$6.80 \cdot 10$	$2.69 \cdot 10$	0.0	0.25	300	Nelder-Mead	0.160	0.290
Anaxagorea panamensis	Annonaceae	Standl.	anaxpa	Thomas	$1.78 \cdot 10^{-3}$	$2.35 \cdot 10^{-6}$	$7.60 \cdot 10^{2}$	1.85		0.50	300	SANN	0.997	0.767
Andira inermis	Fabaceae	(W. Wright) Kunth ex DC.	andiin	Thomas	$4.94 \cdot 10^{-4}$	$1.08 \cdot 10^{-4}$	4.57	$2.00 \cdot 10^{3}$		0.50	300	SANN	0.849	0.597
Annona acuminata	Annonaceae	Saff.	annoac	Cauchy	$9.84 \cdot 10^{-4}$	$2.87 \cdot 10^{-5}$	$3.43 \cdot 10$	$6.80 \cdot 10^{2}$		0.50	300	Nelder-Mead	0.210	0.100

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Annona spraguei	Annonaceae	Saff.	annosp	Thomas	$1.68 \cdot 10^{-4}$	$1.99 \cdot 10^{-5}$	8.45	$3.38 \cdot 10^{3}$		0.25	300	SANN	0.072	0.866
Apeiba membranacea	Malvaceae	Spruce ex Benth.	apeime	Thomas	$5.22 \cdot 10^{-4}$	$1.65 \cdot 10^{-4}$	3.16	$1.77 \cdot 10^{3}$		0.25	300	SANN	0.646	0.938
Ardisia fendleri	Primulaceae	Lundell	ardife	Cauchy	$2.66 \cdot 10^{-4}$	$2.88 \cdot 10^{-5}$	9.23	$7.57 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.140	0.570
Aspidosperma cruentum	Apocynaceae	Woodson	aspicr	Thomas	$9.82 \cdot 10^{-4}$	$9.60 \cdot 10^{-5}$	$1.02 \cdot 10$	$6.92 \cdot 10^{2}$		0.25	275	SANN	0.072	0.950
Astrocaryum standleyanum	Arecaceae	L.H.Bailey	ast1st	Thomas	$2.66 \cdot 10^{-4}$	$1.17 \cdot 10^{-4}$	2.28	$3.14 \cdot 10^{3}$		0.25	300	SANN	0.621	0.831
Astronium graveolens	Anacardiaceae	Jacq.	ast2gr	Thomas	$2.64 \cdot 10^{-4}$	$1.14 \cdot 10^{-5}$	$2.32 \cdot 10$	$1.40 \cdot 10^{3}$		0.50	50	SANN	0.073	0.492
Bactris coloniata	Arecaceae	L.H.Bailey	bactc1	Thomas	$1.08 \cdot 10^{-4}$	$3.57 \cdot 10^{-6}$	$3.03 \cdot 10$	$3.35 \cdot 10^{3}$		0.25	50	SANN	0.204	0.405
Bactris major	Arecaceae	Jacq.	bactma	Thomas	$1.88 \cdot 10^{-4}$	$4.24 \cdot 10^{-6}$	$4.43 \cdot 10$	$4.66 \cdot 10^{2}$		0.25	300	SANN	0.763	0.159
Beilschmiedia tovarensis	Lauraceae	(Klotzsch & H.Karst. ex Meisn.) Sachiko Nishida	beilpe	Variance-gamma	$3.78 \cdot 10^{-3}$	$6.22 \cdot 10^{-5}$	$6.08 \cdot 10$	$1.99 \cdot 10$	0.5	0.50	300	Nelder-Mead	0.250	0.860
Brosimum alicastrum	Moraceae	Sw.	brosal	Thomas	$1.71 \cdot 10^{-3}$	$3.80 \cdot 10^{-4}$	4.51	$5.52 \cdot 10^{2}$		0.50	300	SANN	0.426	0.311
Calophyllum longifolium	Calophyllaceae	Willd.	calolo	Variance-gamma	$4.35 \cdot 10^{-3}$	$1.40 \cdot 10^{-5}$	$3.10 \cdot 10^{2}$	$4.07 \cdot 10$	0.0	0.25	300	Nelder-Mead	0.120	0.350
Capparidastrum frondosum	Capparaceae	(Jacq.) Cornejo & Iltis	cappfr	Thomas	$4.44 \cdot 10^{-3}$	$3.82 \cdot 10^{-5}$	$1.16 \cdot 10^{2}$	$6.99 \cdot 10^{3}$		0.25	275	Nelder-Mead	0.082	0.776
Casearia aculeata	Salicaceae	Jacq.	caseac	Thomas	$9.32 \cdot 10^{-4}$	$1.58 \cdot 10^{-4}$	5.91	$8.03 \cdot 10^{2}$		0.50	300	SANN	0.213	0.239
Casearia arborea	Salicaceae	(Rich.) Urb.	casear	Thomas	$2.08 \cdot 10^{-4}$	$2.05 \cdot 10^{-5}$	$1.01 \cdot 10$	$3.79 \cdot 10^{3}$		0.50	300	SANN	0.359	0.332
Casearia sylvestris	Salicaceae	Sw.	casesy	Thomas	$2.54 \cdot 10^{-4}$	$2.06 \cdot 10^{-4}$	1.23	$3.81 \cdot 10^{3}$		0.25	300	SANN	0.391	0.263

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Cassipourea elliptica	Rhizophoraceae	(Sw.) Poir.	cassel	Thomas	$2.19 \cdot 10^{-3}$	$3.97 \cdot 10^{-5}$	$5.53 \cdot 10$	$3.15 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.335	0.128
Cecropia obtusifolia	Urticaceae	Bertol.	cecrob	Cauchy	$5.94 \cdot 10^{-4}$	$8.85 \cdot 10^{-5}$	6.71	$1.37 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.190	0.220
Ceiba pentandra	Malvaceae	(L.) Gaertn.	ceibpe	Poisson	$1.28 \cdot 10^{-4}$								0.920	0.514
Celtis schippii	Cannabaceae	Standl.	celtsc	Poisson	$2.12 \cdot 10^{-4}$								0.837	0.256
Cestrum schlechtendalii	Solanaceae	G. Don.	cestme	Thomas	$1.60 \cdot 10^{-4}$	$4.83 \cdot 10^{-5}$	3.31	$3.54 \cdot 10^{3}$		0.50	300	SANN	0.069	0.527
Chamguava schippii	Myrtaceae	(Standl.) Landrum	cha2sc	Thomas	$1.15 \cdot 10^{-3}$	$4.18 \cdot 10^{-6}$	$2.76 \cdot 10^{2}$	$1.96 \cdot 10^{2}$		0.50	300	SANN	0.890	0.078
Chrysochlamys eclipes	Clusiaceae	L.O.Williams	chr1ec	Thomas	$8.24 \cdot 10^{-4}$	$6.06 \cdot 10^{-5}$	$1.36 \cdot 10$	$7.86 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.055	0.818
Chrysophyllum argenteum	Sapotaceae	Jacq.	chr2ar	Thomas	$1.48 \cdot 10^{-3}$	$3.14 \cdot 10^{-4}$	4.72	$6.71 \cdot 10^{2}$		0.25	300	SANN	0.277	0.784
Chrysophyllum cainito	Sapotaceae	L.	chr2ca	Thomas	$3.54 \cdot 10^{-4}$	$3.78 \cdot 10^{-5}$	9.36	$2.12 \cdot 10^{3}$		0.50	300	SANN	0.351	0.323
Cinnamomum triplinerve	Lauraceae	(Ruiz & Pav.) Kosterm.	phoeci	Thomas	$1.42 \cdot 10^{-4}$	$7.89 \cdot 10^{-5}$	1.80	$6.31 \cdot 10^{3}$		0.50	250	SANN	0.357	0.528
Coccoloba coronata	Polygonaceae	Jacq.	coccco	Thomas	$2.62 \cdot 10^{-4}$	$4.52 \cdot 10^{-5}$	5.79	$3.18 \cdot 10^{3}$		0.50	300	SANN	0.709	0.466
Coccoloba manzinellensis	Polygonaceae	Beurl.	coccma	Thomas	$6.52 \cdot 10^{-4}$	$4.70 \cdot 10^{-5}$	$1.39 \cdot 10$	$9.40 \cdot 10^{3}$		0.50	275	Nelder-Mead	0.054	0.546
Conostegia cinnamomea	Melastomataceae	(Beurl.) Wurdack	conoci	Thomas	$1.66 \cdot 10^{-4}$	$2.38 \cdot 10^{-5}$	6.97	$3.78 \cdot 10^{3}$		0.50	300	SANN	0.201	0.898
Cordia alliodora	Cordiaceae	(Ruiz & Pav.) Oken	cordal	Cauchy	$4.42 \cdot 10^{-4}$	$1.06 \cdot 10^{-4}$	4.16	$7.47 \cdot 10$		0.25	300	Nelder-Mead	0.110	0.520
Cordia bicolor	Cordiaceae	A.DC.	cordbi	Thomas	$1.46 \cdot 10^{-3}$	$2.60 \cdot 10^{-5}$	$5.61 \cdot 10$	$6.03 \cdot 10^{3}$		0.50	225	Nelder-Mead	0.155	0.740
Cordia lasiocalyx	Cordiaceae	Pittier	cordla	Thomas	$2.15 \cdot 10^{-3}$	$3.50 \cdot 10^{-4}$	6.15	$4.50 \cdot 10^{2}$		0.50	300	SANN	0.188	0.139

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Coussarea curvigemmia	Rubiaceae	Dwyer	cou2cu	Thomas	$3.92 \cdot 10^{-3}$	$2.45 \cdot 10^{-5}$	$1.60 \cdot 10^{2}$	$2.18 \cdot 10^{3}$		0.25	250	Nelder-Mead	0.326	0.078
Croton billbergianus	Euphorbiaceae	Müll.Arg.	crotbi	Cauchy	$1.26 \cdot 10^{-3}$	$4.03 \cdot 10^{-5}$	$3.12 \cdot 10$	$7.59 \cdot 10$		0.25	300	Nelder-Mead	0.260	0.160
Cupania americana	Sapindaceae	L.	cupala	Thomas	$1.40 \cdot 10^{-4}$	$1.53 \cdot 10^{-5}$	9.15	$5.50 \cdot 10^{3}$		0.50	300	SANN	0.334	0.964
Cupania rufescens	Sapindaceae	Triana & Planch.	cuparu	Thomas	$2.48 \cdot 10^{-4}$	$7.88 \cdot 10^{-6}$	$3.15 \cdot 10$	$2.06 \cdot 10^{3}$		0.50	300	SANN	0.080	0.321
Cupania seemannii	Sapindaceae	Triana & Planch.	cupasy	Thomas	$2.68 \cdot 10^{-3}$	$1.29 \cdot 10^{-4}$	$2.07 \cdot 10$	$6.82 \cdot 10^{2}$		0.25	200	Nelder-Mead	0.209	0.150
Damburneya umbrosa	Lauraceae	(Kunth) Trofimov	nectpu	Thomas	$1.76 \cdot 10^{-4}$	$1.23 \cdot 10^{-5}$	$1.43 \cdot 10$	$4.17 \cdot 10^{3}$		0.50	300	SANN	0.423	0.317
Dendropanax arboreus	Araliaceae	(L.) Decne. & Planch.	dendar	Thomas	$1.38 \cdot 10^{-4}$	$1.77 \cdot 10^{-5}$	7.81	$4.81 \cdot 10^{3}$		0.50	300	SANN	0.489	0.843
Desmopsis panamensis	Annonaceae	(B.L.Rob.) Saff.	des2pa	Thomas	$2.18 \cdot 10^{-2}$	$1.86 \cdot 10^{-4}$	$1.17 \cdot 10^{2}$	$5.50 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.277	0.095
Diospyros artanthifolia	Ebenaceae	Mart. ex Miq.	dio2ar	Thomas	$2.50 \cdot 10^{-4}$	$3.03 \cdot 10^{-5}$	8.26	$3.45 \cdot 10^{3}$		0.50	300	SANN	0.522	0.547
Dipteryx oleifera	Fabaceae	Benth.	diptpa	Thomas	$1.22 \cdot 10^{-4}$	$2.80 \cdot 10^{-5}$	4.36	$5.72 \cdot 10^{3}$		0.50	50	SANN	0.316	0.892
Drypetes standleyi	Putranjivaceae	G.L.Webster	drypst	Thomas	$4.28 \cdot 10^{-3}$	$6.37 \cdot 10^{-6}$	$6.72 \cdot 10^{2}$	$1.17 \cdot 10^{4}$		0.50	300	Nelder-Mead	0.442	0.895
Erythrina costaricensis	Fabaceae	Micheli	ery1co	Thomas	$1.20 \cdot 10^{-4}$	$4.42 \cdot 10^{-5}$	2.71	$6.93 \cdot 10^{3}$		0.50	300	SANN	0.452	0.404
Erythroxylum macrophyllum	Erythroxylaceae	Cav.	ery2ma	Thomas	$6.34 \cdot 10^{-4}$	$4.17 \cdot 10^{-4}$	1.52	$1.36 \cdot 10^{3}$		0.50	300	SANN	0.242	0.672
Erythroxylum panamense	Erythroxylaceae	Turcz.	ery2pa	Thomas	$2.36 \cdot 10^{-4}$	$2.36 \cdot 10^{-4}$	1.00	$3.12 \cdot 10^{3}$		0.25	275	SANN	0.180	0.756
Eugenia coloradoensis	Myrtaceae	Standl.	eugeco	Thomas	$1.17 \cdot 10^{-3}$	$1.74 \cdot 10^{-4}$	6.74	$7.17 \cdot 10^{2}$		0.50	50	SANN	0.274	0.164
Eugenia galalonensis	Myrtaceae	(C.Wright ex Griseb.) Krug & Urb.	eugega	Variance-gamma	$4.54 \cdot 10^{-3}$	$3.88 \cdot 10^{-5}$	$1.17 \cdot 10^{2}$	$2.44 \cdot 10$	4.0	0.25	100	SANN	0.200	0.630

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Eugenia nesiotica	Myrtaceae	Standl.	eugene	Thomas	$1.04 \cdot 10^{-3}$	$2.11 \cdot 10^{-4}$	4.91	$9.63 \cdot 10^{2}$		0.25	125	SANN	0.069	0.228
Eugenia oerstediana	Myrtaceae	O.Berg	eugeoe	Variance-gamma	$4.05 \cdot 10^{-3}$	$2.76 \cdot 10^{-5}$	$1.46 \cdot 10^{2}$	$2.60 \cdot 10$	4.0	0.50	300	Nelder-Mead	0.090	0.680
Faramea occidentalis	Rubiaceae	(L.) A.Rich.	faraoc	Thomas	$4.76 \cdot 10^{-2}$	$3.42 \cdot 10^{-4}$	$1.39 \cdot 10^{2}$	$1.25 \cdot 10^{3}$		0.25	125	Nelder-Mead	0.130	0.072
Garcinia madruno	Clusiaceae	(Kunth) Hammel	gar2ma	Thomas	$8.12 \cdot 10^{-4}$	$4.41 \cdot 10^{-5}$	$1.84 \cdot 10$	$8.93 \cdot 10^{2}$		0.50	300	SANN	0.054	0.177
Garcinia recondita	Clusiaceae	Hammel	gar2in	Variance-gamma	$1.02 \cdot 10^{-2}$	$1.60 \cdot 10^{-4}$	$6.41 \cdot 10$	$2.30 \cdot 10$	2.0	0.25	300	Nelder-Mead	0.100	0.240
Genipa americana	Rubiaceae	L.	geniam	Thomas	$1.30 \cdot 10^{-4}$	$3.40 \cdot 10^{-5}$	3.83	$7.31 \cdot 10^{3}$		0.50	300	SANN	0.646	0.858
Guapira standleyana	Nyctaginaceae	Woodson	guapst	Thomas	$3.14 \cdot 10^{-4}$	$8.18 \cdot 10^{-5}$	3.84	$3.00 \cdot 10^{3}$		0.50	300	SANN	0.585	0.636
Guarea bullata	Meliaceae	Radlk.	guarsp	Thomas	$1.23 \cdot 10^{-3}$	$4.64 \cdot 10^{-4}$	2.65	$8.02 \cdot 10^{2}$		0.25	300	SANN	0.632	0.925
Guarea grandifolia	Meliaceae	(L.) Sleumer	guargr	Thomas	$1.62 \cdot 10^{-4}$	$1.24 \cdot 10^{-4}$	1.30	$6.44 \cdot 10^{3}$		0.50	300	SANN	0.987	0.709
Guarea guidonia	Meliaceae	(L.) Sleumer	guargu	Thomas	$3.93 \cdot 10^{-3}$	$5.86 \cdot 10^{-5}$	$6.71 \cdot 10$	$2.89 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.072	0.471
Guatteria lucens	Annonaceae	Standl.	guatdu	Thomas	$1.78 \cdot 10^{-3}$	$2.47 \cdot 10^{-4}$	7.21	$4.55 \cdot 10^{2}$		0.25	100	SANN	0.059	0.950
Guazuma ulmifolia	Malvaceae	Lam.	guazul	Thomas	$1.60 \cdot 10^{-4}$	$1.83 \cdot 10^{-4}$	$8.72 \cdot 10^{-1}$	$2.89 \cdot 10$		0.25	125	Nelder-Mead	0.085	0.236
Guettarda foliacea	Rubiaceae	Standl.	guetfo	Thomas	$4.66 \cdot 10^{-4}$	$2.16 \cdot 10^{-4}$	2.16	$1.88 \cdot 10^{3}$		0.25	300	SANN	0.605	0.616
Gustavia superba	Lecythidaceae	(Kunth) O.Berg	gustsu	Cauchy	$1.34 \cdot 10^{-3}$	$5.31 \cdot 10^{-6}$	$2.52 \cdot 10^{2}$	$2.35 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.690	0.180
Hamelia axillaris	Rubiaceae	Sw.	hameax	Thomas	$2.06 \cdot 10^{-4}$	$2.29 \cdot 10^{-5}$	8.99	$2.49 \cdot 10^{3}$		0.50	225	SANN	0.174	0.464
Hampea appendiculata	Malvaceae	(Donn.Sm.) Standl.	hampap	Thomas	$2.34 \cdot 10^{-4}$	$1.75 \cdot 10^{-5}$	$1.34 \cdot 10$	$2.44 \cdot 10^{3}$		0.50	300	SANN	0.220	0.203

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Handroanthus guayacan	Bignoniaceae	(Seem.) S.O.Grose	tab1gu	Thomas	$1.32 \cdot 10^{-4}$	$2.41 \cdot 10^{-5}$	5.48	$3.96 \cdot 10^{3}$		0.50	300	SANN	0.215	0.462
Hasseltia floribunda	Salicaceae	Kunth	hassfl	Thomas	$7.74 \cdot 10^{-4}$	$1.15 \cdot 10^{-4}$	6.75	$9.25 \cdot 10^{2}$		0.50	200	SANN	0.090	0.533
Heisteria acuminata	Olacaceae	(Humb. & Bonpl.) Engl.	heisac	Thomas	$1.90 \cdot 10^{-4}$	$3.13 \cdot 10^{-5}$	6.06	$4.28 \cdot 10^{3}$		0.50	300	SANN	0.422	0.640
Heisteria concinna	Olacaceae	Standl.	heisco	Thomas	$1.74 \cdot 10^{-3}$	$3.23 \cdot 10^{-4}$	5.39	$4.26 \cdot 10^{2}$		0.25	150	SANN	0.544	0.472
Herrania purpurea	Malvaceae	(Pittier) R.E. Schult.	herrpu	Thomas	$1.07 \cdot 10^{-3}$	$4.16 \cdot 10^{-4}$	2.58	$7.84 \cdot 10^{2}$		0.25	300	SANN	0.121	0.515
Hieronyma alchorneoides	Phyllanthaceae	Allemão	hyeral	Thomas	$2.20 \cdot 10^{-4}$	$3.55 \cdot 10^{-5}$	6.21	$2.78 \cdot 10^{3}$		0.50	250	SANN	0.263	0.390
Hirtella triandra	Chrysobalanaceae	Sw.	hirttr	Thomas	$8.33 \cdot 10^{-3}$	$1.49 \cdot 10^{-4}$	$5.61 \cdot 10$	$9.27 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.404	0.121
Hura crepitans	Euphorbiaceae	L.	huracr	Thomas	$1.88 \cdot 10^{-4}$	$2.20 \cdot 10^{-5}$	8.53	$2.95 \cdot 10^{3}$		0.50	300	SANN	0.474	0.829
Inga acuminata	Fabaceae	Benth.	ingas1	Thomas	$1.79 \cdot 10^{-3}$	$1.98 \cdot 10^{-4}$	9.05	$3.35 \cdot 10^{2}$		0.25	50	SANN	0.065	0.097
Inga cocleensis	Fabaceae	Pittier	ingaco	Thomas	$1.16 \cdot 10^{-4}$	$2.68 \cdot 10^{-5}$	4.32	$9.20 \cdot 10^{3}$		0.50	225	SANN	0.063	0.722
Inga goldmanii	Fabaceae	Pittier	ingago	Thomas	$6.16 \cdot 10^{-4}$	$2.51 \cdot 10^{-4}$	2.45	$1.46 \cdot 10^{3}$		0.50	300	SANN	0.212	0.809
Inga laurina	Fabaceae	(Sw.) Willd.	ingafa	Thomas	$1.02 \cdot 10^{-4}$	$2.03 \cdot 10^{-5}$	5.03	$1.13 \cdot 10^{4}$		0.50	300	SANN	0.502	0.834
Inga marginata	Fabaceae	Willd.	ingama	Cauchy	$2.21 \cdot 10^{-3}$	$1.98 \cdot 10^{-4}$	$1.12 \cdot 10$	$2.16 \cdot 10^{2}$		0.50	200	SANN	0.110	0.100
Inga nobilis	Fabaceae	Willd.	ingaqu	Thomas	$1.08 \cdot 10^{-3}$	$3.21 \cdot 10^{-4}$	3.37	$8.39 \cdot 10^{2}$		0.50	300	SANN	0.173	0.433
Inga pezizifera	Fabaceae	Benth.	ingape	Thomas	$3.18 \cdot 10^{-4}$	$3.85 \cdot 10^{-6}$	$8.26 \cdot 10$	$1.08 \cdot 10^{3}$		0.50	300	SANN	0.979	0.303
Inga sapindoides	Fabaceae	Willd.	ingasa	Thomas	$4.20 \cdot 10^{-4}$	$2.39 \cdot 10^{-4}$	1.76	$1.93 \cdot 10^{3}$		0.25	300	SANN	0.418	0.669
Inga thibaudiana	Fabaceae	DC.	ingath	Thomas	$5.74 \cdot 10^{-4}$	$2.29 \cdot 10^{-6}$	$2.50 \cdot 10^{2}$	$1.76 \cdot 10^{4}$		0.50	300	Nelder-Mead	0.706	0.899
Inga umbellifera	Fabaceae	(Vahl) Steud.	ingaum	Thomas	$1.54 \cdot 10^{-3}$	$3.83 \cdot 10^{-4}$	4.02	$5.68 \cdot 10^{2}$		0.50	275	SANN	0.596	0.210
Jacaranda copaia	Bignoniaceae	(Aubl.) D.Don	jac1co	Cauchy	$6.14 \cdot 10^{-4}$	$6.77 \cdot 10^{-5}$	9.07	$1.72 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.150	0.790

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Lacistema aggregatum	Lacistemataceae	(P.J.Bergius) Rusby	laciag	Thomas	$2.70 \cdot 10^{-3}$	$3.91 \cdot 10^{-4}$	6.91	$3.63 \cdot 10^{2}$		0.25	275	SANN	0.654	0.195
Lacmellea panamensis	Apocynaceae	(Woodson) Markgr.	lacmpa	Thomas	$2.08 \cdot 10^{-4}$	$1.39 \cdot 10^{-4}$	1.49	$4.39 \cdot 10^{3}$		0.25	300	SANN	0.920	0.761
Laetia thamnia	Salicaceae	L.	laetth	Thomas	$8.66 \cdot 10^{-4}$	$5.83 \cdot 10^{-5}$	$1.49 \cdot 10$	$6.48 \cdot 10^{2}$		0.25	175	SANN	0.054	0.329
Licania hypoleuca	Chrysobalanaceae	Benth.	licahy	Cauchy	$3.20 \cdot 10^{-4}$	$8.90 \cdot 10^{-6}$	$3.59 \cdot 10$	$2.60 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.230	0.610
Lonchocarpus heptaphyllus	Fabaceae	(Poir.) DC.	loncla	Thomas	$1.26 \cdot 10^{-3}$	$2.32 \cdot 10^{-4}$	5.43	$5.76 \cdot 10^{2}$		0.25	300	SANN	0.504	0.950
Luehea seemannii	Malvaceae	Triana & Planch.	luehse	Thomas	$3.94 \cdot 10^{-4}$	$9.03 \cdot 10^{-5}$	4.36	$2.19 \cdot 10^{3}$		0.50	175	SANN	0.121	0.904
Macrocnemum roseum	Rubiaceae	(Ruiz & Pav.) Wedd.	macrgl	Thomas	$1.78 \cdot 10^{-4}$	$5.52 \cdot 10^{-6}$	$3.22 \cdot 10$	$1.18 \cdot 10^{3}$		0.25	300	SANN	0.068	0.255
Maquira guianensis	Moraceae	Aubl.	maquco	Thomas	$2.45 \cdot 10^{-3}$	$4.44 \cdot 10^{-4}$	5.52	$2.69 \cdot 10^{2}$		0.25	150	SANN	0.245	0.242
Miconia affinis	Melastomataceae	DC.	micoaf	Thomas	$8.86 \cdot 10^{-4}$	$3.66 \cdot 10^{-6}$	$2.42 \cdot 10^{2}$	$1.54 \cdot 10^{4}$		0.50	250	Nelder-Mead	0.169	0.679
Miconia argentea	Melastomataceae	(Sw.) DC.	micoar	Cauchy	$1.27 \cdot 10^{-3}$	$2.63 \cdot 10^{-4}$	4.83	$9.16 \cdot 10$		0.25	300	Nelder-Mead	0.120	0.150
Miconia hondurensis	Melastomataceae	Donn. Sm.	micoho	Thomas	$1.50 \cdot 10^{-4}$	$4.83 \cdot 10^{-6}$	$3.11 \cdot 10$	$2.18 \cdot 10^{3}$		0.50	300	SANN	0.640	0.892
Miconia nervosa	Melastomataceae	(Sm.) Triana	micone	Thomas	$8.18 \cdot 10^{-4}$	$3.57 \cdot 10^{-6}$	$2.29 \cdot 10^{2}$	$1.44 \cdot 10^{4}$		0.50	300	Nelder-Mead	0.100	0.891
Monteverdia sieberiana	Celastraceae	(Krug & Urb.) Biral	maytsc	Thomas	$1.56 \cdot 10^{-4}$	$2.62 \cdot 10^{-5}$	5.95	$5.68 \cdot 10^{3}$		0.50	300	SANN	0.360	0.644
Moquilea platypus	Chrysobalanaceae	Hemsl.	licapl	Thomas	$4.80 \cdot 10^{-4}$	$2.19 \cdot 10^{-5}$	$2.19 \cdot 10$	$1.14 \cdot 10^{3}$		0.50	125	SANN	0.065	0.877
Mosannona garwoodii	Annonaceae	Chatrou & Welzenis	malmsp	Thomas	$1.08 \cdot 10^{-3}$	$1.50 \cdot 10^{-4}$	7.22	$8.02 \cdot 10^{2}$		0.50	50	SANN	0.061	0.752
Mouriri myrtilloides	Melastomataceae	(Sw.) Poir.	mourmy	Thomas	$1.41 \cdot 10^{-2}$	$1.51 \cdot 10^{-5}$	$9.37 \cdot 10^{2}$	$3.18 \cdot 10^{4}$		0.50	300	Nelder-Mead	0.300	0.351

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Myrcia splendens tip. gatunensis	Myrtaceae	(Sw.) DC.	myrcga	Thomas	$1.30 \cdot 10^{-4}$	$1.10 \cdot 10^{-5}$	$1.19 \cdot 10$	$4.14 \cdot 10^{3}$		0.50	300	SANN	0.141	0.231
Nectandra cissiflora	Lauraceae	Nees	nectci	Thomas	$3.44 \cdot 10^{-4}$	$3.28 \cdot 10^{-6}$	$1.05 \cdot 10^{2}$	$8.02 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.975	0.462
Nectandra lineata	Lauraceae	(Kunth) Rohwer	nectgl	Thomas	$4.36 \cdot 10^{-4}$	$2.50 \cdot 10^{-5}$	$1.74 \cdot 10$	$1.11 \cdot 10^{3}$		0.25	275	SANN	0.093	0.259
Neea amplifolia	Nyctaginaceae	Donn.Sm.	neeaam	Thomas	$1.08 \cdot 10^{-4}$	$1.83 \cdot 10^{-5}$	5.91	$8.38 \cdot 10^{3}$		0.25	275	SANN	0.083	0.445
Ocotea cernua	Lauraceae	(Nees) Mez	ocotce	Thomas	$6.82 \cdot 10^{-4}$	$1.32 \cdot 10^{-4}$	5.17	$1.21 \cdot 10^{3}$		0.25	300	SANN	0.451	0.373
Ocotea oblonga	Lauraceae	(Meisn.) Mez	ocotob	Thomas	$5.76 \cdot 10^{-4}$	$1.02 \cdot 10^{-4}$	5.65	$1.20 \cdot 10^{3}$		0.50	175	SANN	0.134	0.557
Ocotea puberula	Lauraceae	(Rich.) Nees	ocotpu	Thomas	$3.32 \cdot 10^{-4}$	$1.14 \cdot 10^{-4}$	2.91	$2.50 \cdot 10^{3}$		0.25	300	SANN	0.167	0.960
Ocotea whitei	Lauraceae	Woodson	ocotwh	Variance-gamma	$7.82 \cdot 10^{-4}$	$1.10 \cdot 10^{-5}$	$7.12 \cdot 10$	$3.21 \cdot 10$	0.0	0.25	300	Nelder-Mead	0.190	0.940
Oenocarpus mapora	Arecaceae	H.Karst.	oenoma	Variance-gamma	$3.58 \cdot 10^{-3}$	$5.81 \cdot 10^{-5}$	$6.15 \cdot 10$	$3.28 \cdot 10$	2.0	0.50	300	Nelder-Mead	0.090	0.270
Ormosia coccinea	Fabaceae	(Aubl.) Jacks.	ormocr	Thomas	$2.26 \cdot 10^{-4}$	$1.50 \cdot 10^{-5}$	$1.50 \cdot 10$	$2.61 \cdot 10^{3}$		0.50	150	SANN	0.051	0.519
Ormosia macrocalyx	Fabaceae	Ducke	ormoma	Thomas	$2.18 \cdot 10^{-4}$	$5.66 \cdot 10^{-5}$	3.85	$4.13 \cdot 10^{3}$		0.25	300	SANN	0.675	0.465
Ouratea lucens	Ochnaceae	(Kunth) Engl.	ouralu	Cauchy	$2.40 \cdot 10^{-3}$	$7.89 \cdot 10^{-5}$	$3.04 \cdot 10$	$1.32 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.360	0.380
Palicourea deflexa	Rubiaceae	(DC.) Borhidi	psycde	Thomas	$1.38 \cdot 10^{-4}$	$7.28 \cdot 10^{-6}$	$1.90 \cdot 10$	$3.42 \cdot 10^{3}$		0.50	300	SANN	0.073	0.358
Pentagonia macrophylla	Rubiaceae	Benth.	pentma	Thomas	$6.26 \cdot 10^{-4}$	$2.64 \cdot 10^{-4}$	2.37	$3.22 \cdot 10^{2}$		0.25	225	Nelder-Mead	0.068	0.737
Perebea xanthochyma	Moraceae	H.Karst.	perexa	Thomas	$4.42 \cdot 10^{-4}$	$4.11 \cdot 10^{-6}$	$1.08 \cdot 10^{2}$	$9.60 \cdot 10^{2}$		0.50	300	SANN	0.944	0.124
Picramnia latifolia	Picramniaceae	Tul.	picrla	Thomas	$2.27 \cdot 10^{-3}$	$3.39 \cdot 10^{-5}$	$6.69 \cdot 10$	$5.89 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.469	0.665

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Piper cordulatum	Piperaceae	C. DC.	pipeco	Thomas	$1.36 \cdot 10^{-4}$	$2.69 \cdot 10^{-5}$	5.05	$5.36 \cdot 10^{3}$		0.50	200	SANN	0.276	0.819
Piper reticulatum	Piperaceae	L.	pipere	Thomas	$2.70 \cdot 10^{-4}$	$6.47 \cdot 10^{-5}$	4.17	$2.74 \cdot 10^{3}$		0.25	225	SANN	0.191	0.560
Platymiscium pinnatum	Fabaceae	(Jacq.) Dugand	pla1pi	Thomas	$3.56 \cdot 10^{-4}$	$5.40 \cdot 10^{-5}$	6.59	$1.74 \cdot 10^{3}$		0.50	150	SANN	0.062	0.661
Platypodium elegans	Fabaceae	Vogel	pla2el	Thomas	$2.02 \cdot 10^{-4}$	$3.22 \cdot 10^{-5}$	6.28	$3.46 \cdot 10^{3}$		0.50	300	SANN	0.365	0.230
Pombalia prunifolia	Violaceae	(Humb. & Bonpl. ex Willd.) Paula-Souza	hybapr	Matérn	$5.37 \cdot 10^{-2}$	$1.30 \cdot 10^{-4}$	$4.15 \cdot 10^{2}$	$9.36 \cdot 10$		0.25	225	Nelder-Mead	0.080	0.570
Posoqueria latifolia	Rubiaceae	(Rudge) Schult.	posola	Thomas	$1.50 \cdot 10^{-4}$	$2.99 \cdot 10^{-5}$	5.01	$3.84 \cdot 10^{3}$		0.50	300	SANN	0.480	0.639
Poulsenia armata	Moraceae	(Miq.) Standl.	poular	Thomas	$1.71 \cdot 10^{-3}$	$2.97 \cdot 10^{-5}$	$5.75 \cdot 10$	$1.44 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.101	0.111
Pourouma bicolor	Urticaceae	Mart.	pourbi	Thomas	$3.22 \cdot 10^{-4}$	$4.59 \cdot 10^{-6}$	$7.01 \cdot 10$	$9.92 \cdot 10^{2}$		0.50	275	SANN	0.920	0.234
Pouteria reticulata	Sapotaceae	(Engl.) Eyma	poutre	Thomas	$2.03 \cdot 10^{-3}$	$1.09 \cdot 10^{-3}$	1.87	$5.06 \cdot 10^{2}$		0.50	300	SANN	0.295	0.314
Pouteria stipitata	Sapotaceae	Cronquist	poutst	Thomas	$1.12 \cdot 10^{-4}$	$3.89 \cdot 10^{-5}$	2.88	$9.25 \cdot 10^{3}$		0.50	300	SANN	0.850	0.984
Prioria copaifera	Fabaceae	Griseb.	pri2co	Thomas	$2.55 \cdot 10^{-3}$	$4.62 \cdot 10^{-6}$	$5.51 \cdot 10^{2}$	$7.15 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.883	0.348
Protium costaricense	Burseraceae	(Rose) Engl.	protco	Thomas	$1.48 \cdot 10^{-3}$	$1.34 \cdot 10^{-4}$	$1.10 \cdot 10$	$5.22 \cdot 10^{2}$		0.25	300	SANN	0.065	0.440
Protium panamense	Burseraceae	(Rose) I.M.Johnst.	protpa	Thomas	$6.23 \cdot 10^{-3}$	$3.53 \cdot 10^{-5}$	$1.77 \cdot 10^{2}$	$4.10 \cdot 10^{3}$		0.25	275	Nelder-Mead	0.203	0.513
Protium stevensonii	Burseraceae	(Standl.) Daly	tet2pa	Variance-gamma	$1.04 \cdot 10^{-2}$	$9.79 \cdot 10^{-5}$	$1.06 \cdot 10^{2}$	$1.13 \cdot 10$	8.0	0.50	300	Nelder-Mead	0.180	0.530

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Protium tenuifolium subsp. *sessiliflorum*	Burseraceae	Engl.	protte	Thomas	$6.13 \cdot 10^{-3}$	$1.27 \cdot 10^{-5}$	$4.82 \cdot 10^{2}$	$5.47 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.461	0.189
Psidium friedrich-sthalianum	Myrtaceae	(O.Berg) Nied.	psidfr	Thomas	$1.12 \cdot 10^{-4}$	$1.03 \cdot 10^{-5}$	$1.09 \cdot 10$	$4.27 \cdot 10^{3}$		0.50	300	SANN	0.326	0.303
Psychotria graciliflora	Rubiaceae	Benth.	psycg1	Thomas	$1.32 \cdot 10^{-4}$	$3.25 \cdot 10^{-6}$	$4.06 \cdot 10$	$1.82 \cdot 10^{2}$		0.50	300	SANN	0.983	0.462
Psychotria horizontalis	Rubiaceae	Sw.	psycho	Cauchy	$3.48 \cdot 10^{-3}$	$4.63 \cdot 10^{-5}$	$7.53 \cdot 10$	$2.12 \cdot 10^{3}$		0.25	150	Nelder-Mead	0.100	0.440
Psychotria limonensis	Rubiaceae	K.Krause	psycli	Thomas	$1.16 \cdot 10^{-4}$	$5.82 \cdot 10^{-6}$	$1.99 \cdot 10$	$8.52 \cdot 10^{2}$		0.50	225	SANN	0.063	0.801
Pterocarpus hayesii	Fabaceae	Hemsl.	pterro	Thomas	$2.11 \cdot 10^{-3}$	$4.41 \cdot 10^{-4}$	4.79	$4.22 \cdot 10^{2}$		0.25	300	SANN	0.693	0.163
Quararibea asterolepis	Malvaceae	Pittier	quaras	Thomas	$4.49 \cdot 10^{-3}$	$3.40 \cdot 10^{-5}$	$1.32 \cdot 10^{2}$	$5.30 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.236	0.774
Quassia amara	Simaroubaceae	L.	quasam	Thomas	$2.24 \cdot 10^{-4}$	$6.85 \cdot 10^{-6}$	$3.27 \cdot 10$	$1.75 \cdot 10^{3}$		0.50	300	SANN	0.080	0.133
Randia armata	Rubiaceae	(Sw.) DC.	randar	Thomas	$1.84 \cdot 10^{-3}$	$4.95 \cdot 10^{-4}$	3.72	$5.53 \cdot 10^{2}$		0.25	300	SANN	0.600	0.060
Senna dariensis	Fabaceae	(Britton & Rose) H.S. Irwin & Barneby	sennda	Cauchy	$4.90 \cdot 10^{-4}$	$6.25 \cdot 10^{-5}$	7.84	$7.43 \cdot 10^{2}$		0.50	275	SANN	0.100	0.790
Simarouba amara	Simaroubaceae	Aubl.	simaam	Cauchy	$3.65 \cdot 10^{-3}$	$3.27 \cdot 10^{-4}$	$1.12 \cdot 10$	$4.41 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.300	0.150
Siparuna pauciflora	Siparunaceae	(Beurl.) A. DC.	sipapa	Cauchy	$1.08 \cdot 10^{-3}$	$9.06 \cdot 10^{-5}$	$1.20 \cdot 10$	$8.65 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.570	0.830
Sloanea terniflora	Elaeocarpaceae	(Moc. & Sessé ex DC.) Standl.	sloate	Thomas	$8.20 \cdot 10^{-4}$	$9.30 \cdot 10^{-5}$	8.81	$1.06 \cdot 10^{3}$		0.25	200	SANN	0.111	0.168
Socratea exorrhiza	Arecaceae	(Mart.) H.Wendl.	socrex	Thomas	$9.06 \cdot 10^{-4}$	$1.21 \cdot 10^{-5}$	$7.50 \cdot 10$	$2.33 \cdot 10^{3}$		0.25	225	Nelder-Mead	0.124	0.727
Sorocea affinis	Moraceae	Hemsl.	soroaf	Thomas	$4.24 \cdot 10^{-3}$	$8.09 \cdot 10^{-4}$	5.25	$2.10 \cdot 10^{2}$		0.50	275	SANN	0.852	0.060

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Spondias mombin	Anacardiaceae	L.	sponmo	Thomas	$3.26 \cdot 10^{-4}$	$5.92 \cdot 10^{-6}$	$5.50 \cdot 10$	$1.93 \cdot 10^{4}$		1.00	300	Nelder-Mead	0.074	0.736
Spondias radlkoferi	Anacardiaceae	Donn.Sm.	sponra	Cauchy	$4.68 \cdot 10^{-4}$	$7.41 \cdot 10^{-5}$	6.32	$7.18 \cdot 10^{2}$		0.50	300	Nelder-Mead	0.290	0.250
Staphylea occidentalis	Staphyleaceae	Sw.	turpoc	Thomas	$1.12 \cdot 10^{-4}$	$1.27 \cdot 10^{-5}$	8.79	$6.18 \cdot 10^{3}$		0.50	300	SANN	0.241	0.826
Sterculia apetala	Malvaceae	(Jacq.) H.Karst.	sterap	Poisson	$1.00 \cdot 10^{-4}$								0.481	0.337
Stylogyne turbacensis	Primulaceae	(Kunth) Mez	stylst	Thomas	$1.48 \cdot 10^{-3}$	$2.39 \cdot 10^{-4}$	6.18	$6.08 \cdot 10^{2}$		0.50	300	SANN	0.344	0.127
Swartzia simplex var. *continentalis*	Fabaceae	(Sw.) Spreng.	swars2	Thomas	$5.91 \cdot 10^{-3}$	$1.11 \cdot 10^{-4}$	$5.33 \cdot 10$	$1.59 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.860	0.716
Swartzia simplex var. *grandiflora*	Fabaceae	(Sw.) Spreng.	swars1	Thomas	$5.86 \cdot 10^{-3}$	$1.71 \cdot 10^{-5}$	$3.43 \cdot 10^{2}$	$1.21 \cdot 10^{4}$		0.25	300	Nelder-Mead	0.615	0.431
Symphonia globulifera	Clusiaceae	L.f.	sympgl	Thomas	$3.00 \cdot 10^{-4}$	$1.47 \cdot 10^{-5}$	$2.04 \cdot 10$	$1.57 \cdot 10^{3}$		0.50	300	SANN	0.086	0.331
Tabebuia rosea	Bignoniaceae	(Bertol.) DC.	tab1ro	Thomas	$5.00 \cdot 10^{-4}$	$6.93 \cdot 10^{-5}$	7.22	$1.60 \cdot 10^{3}$		0.50	300	SANN	0.311	0.312
Tabernaemontana arborea	Apocynaceae	Rose ex J.D.Sm.	tab2ar	Thomas	$3.59 \cdot 10^{-3}$	$5.74 \cdot 10^{-4}$	6.25	$2.45 \cdot 10^{2}$		0.50	50	SANN	0.352	0.087
Tachigali panamensis	Fabaceae	van der Werff & N.Zamora	tachve	Variance-gamma	$3.81 \cdot 10^{-3}$	$6.68 \cdot 10^{-5}$	$5.71 \cdot 10$	$1.97 \cdot 10$	0.5	0.50	300	SANN	0.490	0.440
Talisia croatii	Sapindaceae	Acev.-Rodr.	talipr	Thomas	$1.48 \cdot 10^{-3}$	$3.56 \cdot 10^{-4}$	4.15	$6.31 \cdot 10^{2}$		0.25	150	SANN	0.223	0.281
Talisia nervosa	Sapindaceae	Radlk.	taline	Cauchy	$1.41 \cdot 10^{-3}$	$2.78 \cdot 10^{-5}$	$5.05 \cdot 10$	$2.12 \cdot 10^{2}$		0.50	300	SANN	0.260	0.210
Terminalia amazonia	Combretaceae	(J.F.Gmel.) Exell	termam	Thomas	$1.14 \cdot 10^{-4}$	$4.50 \cdot 10^{-6}$	$2.53 \cdot 10$	$2.71 \cdot 10^{3}$		0.25	125	SANN	0.161	0.353
Terminalia oblonga	Combretaceae	(Ruiz & Pav.) Steud.	termob	Thomas	$1.74 \cdot 10^{-4}$	$7.96 \cdot 10^{-6}$	$2.19 \cdot 10$	$1.38 \cdot 10^{3}$		0.50	300	SANN	0.244	0.962
Thevetia ahouai	Apocynaceae	(L.) A.DC.	thevah	Cauchy	$1.64 \cdot 10^{-4}$	$1.10 \cdot 10^{-5}$	$1.50 \cdot 10$	3.66		0.25	300	Nelder-Mead	0.110	0.380

Table S3: *(continued)*

Species	Family	Authority	Species code	PPM	λ	κ	μ	Scale	ν	c	d_{max}	Algorithm	p_G	p_F
Trattinnickia aspera	Burseraceae	(Standl.) Swart	tratas	Thomas	$1.42 \cdot 10^{-4}$	$2.57 \cdot 10^{-5}$	5.53	$4.71 \cdot 10^{3}$		0.50	250	SANN	0.179	0.580
Trema domingensis	Cannabaceae	Urb.	tremin	Thomas	$1.02 \cdot 10^{-4}$	$5.74 \cdot 10^{-6}$	$1.78 \cdot 10$	$2.15 \cdot 10^{3}$		0.50	50	SANN	0.064	0.614
Trichilia pallida	Meliaceae	Sw.	tri2pa	Thomas	$9.14 \cdot 10^{-4}$	$6.38 \cdot 10^{-5}$	$1.43 \cdot 10$	$8.59 \cdot 10^{2}$		0.50	250	SANN	0.085	0.116
Trichilia tuberculata	Meliaceae	(Triana & Planch.) C. DC.	tri2tu	Thomas	$2.07 \cdot 10^{-2}$	$2.43 \cdot 10^{-5}$	$8.54 \cdot 10^{2}$	$8.81 \cdot 10^{3}$		0.25	275	Nelder-Mead	0.265	0.457
Triplaris cumingiana	Polygonaceae	Fisch. & C.A.Mey.	tripcu	Thomas	$4.54 \cdot 10^{-4}$	$3.47 \cdot 10^{-5}$	$1.31 \cdot 10$	$1.32 \cdot 10^{3}$		0.50	300	SANN	0.161	0.349
Trophis caucana	Moraceae	(Pittier) C.C. Berg	olmeas	Thomas	$2.48 \cdot 10^{-4}$	$7.12 \cdot 10^{-6}$	$3.48 \cdot 10$	$1.38 \cdot 10^{3}$		0.50	300	SANN	0.471	0.465
Trophis racemosa	Moraceae	(L.) Urb.	tropra	Thomas	$4.24 \cdot 10^{-4}$	$9.96 \cdot 10^{-5}$	4.26	$1.89 \cdot 10^{3}$		0.25	300	SANN	0.385	0.782
Unonopsis pittieri	Annonaceae	Saff.	unonpi	Thomas	$1.38 \cdot 10^{-3}$	$5.86 \cdot 10^{-5}$	$2.36 \cdot 10$	$1.04 \cdot 10^{3}$		0.25	300	Nelder-Mead	0.122	0.230
Virola nobilis	Myristicaceae	A.C. Sm.	virosu	Thomas	$3.18 \cdot 10^{-4}$	$5.71 \cdot 10^{-5}$	5.57	$2.53 \cdot 10^{3}$		0.25	300	SANN	0.176	0.485
Virola sebifera	Myristicaceae	Aubl.	virose	Thomas	$2.21 \cdot 10^{-3}$	$2.57 \cdot 10^{-4}$	8.57	$3.77 \cdot 10^{2}$		0.50	300	SANN	0.251	0.084
Vismia baccifera	Hypericaceae	(L.) Triana & Planch.	vismba	Thomas	$1.00 \cdot 10^{-4}$	$6.95 \cdot 10^{-6}$	$1.44 \cdot 10$	$7.36 \cdot 10^{3}$		0.25	300	SANN	0.181	0.382
Xylopia macrantha	Annonaceae	Triana & Planch.	xyl1ma	Thomas	$4.18 \cdot 10^{-3}$	$5.88 \cdot 10^{-6}$	$7.10 \cdot 10^{2}$	$7.12 \cdot 10^{3}$		0.50	275	Nelder-Mead	0.518	0.570
Zanthoxylum acuminatum	Rutaceae	(Sw.) Sw.	zantpr	Thomas	$1.42 \cdot 10^{-4}$	$1.19 \cdot 10^{-4}$	1.19	$5.19 \cdot 10^{3}$		0.50	275	SANN	0.388	0.128
Zanthoxylum ekmanii	Rutaceae	(Urb.) Alain	zantbe	Cauchy	$4.70 \cdot 10^{-4}$	$4.27 \cdot 10^{-5}$	$1.10 \cdot 10$	$1.51 \cdot 10^{2}$		0.25	300	Nelder-Mead	0.350	0.410
Zanthoxylum panamense	Rutaceae	P.Wilson	zantp1	Thomas	$3.76 \cdot 10^{-4}$	$2.32 \cdot 10^{-5}$	$1.62 \cdot 10$	$3.41 \cdot 10^{3}$		0.50	300	Nelder-Mead	0.098	0.320

Table S4: p values of the index of association mean test (p_{mean}) and the index of association standard deviation test (p_{sd}) computed between each soil phosphorus fraction and each tree species in the 50-ha forest dynamics plot on Barro Colorado Island. The tested phosphorus fractions include reactive phosphorus (RP), monoesterase-hydrolyzable phosphorus (MP), nuclease-hydrolyzable phosphorus (NP) and non-hydrolyzed phosphorus (NHP).

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Acalypha macrostachya	Euphorbiaceae	Jacq.	acalma	0.240	0.090	0.380	0.154	0.326	0.171	0.939	0.402
Adelia triloba	Euphorbiaceae	(Müll.Arg.) Hemsl.	ade1tr	0.120	0.925	0.142	0.915	0.366	0.910	0.400	0.830
Alibertia edulis	Rubiaceae	(Rich.) A.Rich. ex DC.	alibed	0.755	0.569	0.925	0.454	0.599	0.295	0.811	0.557
Allophylus psilospermus	Sapindaceae	Radlk.	allops	0.521	0.838	0.254	0.897	0.747	0.609	0.042	0.985
Alseis blackiana	Rubiaceae	Hemsl.	alsebl	0.567	0.266	0.619	0.302	0.821	0.462	0.392	0.201
Anaxagorea panamensis	Annonaceae	Standl.	anaxpa	0.116	0.424	0.843	0.874	0.096	0.211	0.070	0.272
Andira inermis	Fabaceae	(W. Wright) Kunth ex DC.	andiin	0.877	0.516	0.751	0.420	0.607	0.675	0.877	0.619
Annona acuminata	Annonaceae	Saff.	annoac	0.859	0.438	0.635	0.719	0.743	0.397	0.709	0.602
Annona spraguei	Annonaceae	Saff.	annosp	0.148	0.057	0.092	0.043	0.350	0.135	0.098	0.037
Apeiba membranacea	Malvaceae	Spruce ex Benth.	apeime	0.997	0.528	0.771	0.419	0.216	0.167	0.861	0.445
Ardisia fendleri	Primulaceae	Lundell	ardife	0.206	0.847	0.553	0.711	0.018	0.986	0.513	0.753

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Aspidosperma cruentum	Apocynaceae	Woodson	aspicr	0.050	0.964	0.917	0.479	0.094	0.958	0.330	0.820
Astrocaryum standleyanum	Arecaceae	L.H.Bailey	ast1st	0.965	0.611	0.336	0.890	0.334	0.800	0.100	0.967
Astronium graveolens	Anacardiaceae	Jacq.	ast2gr	0.174	0.927	0.488	0.754	0.753	0.464	0.653	0.746
Bactris coloniata	Arecaceae	L.H.Bailey	bactc1	0.653	0.645	0.875	0.466	0.771	0.613	0.631	0.340
Bactris major	Arecaceae	Jacq.	bactma	0.366	0.802	0.909	0.441	0.663	0.669	0.262	0.838
Beilschmiedia tovarensis	Lauraceae	(Klotzsch & H.Karst. ex Meisn.) Sachiko Nishida	beilpe	0.448	0.202	0.386	0.173	0.569	0.270	0.088	0.034
Brosimum alicastrum	Moraceae	Sw.	brosal	0.398	0.758	0.961	0.533	0.901	0.428	0.486	0.763
Calophyllum longifolium	Calophyllaceae	Willd.	calolo	0.807	0.354	0.925	0.520	0.561	0.684	0.663	0.324
Capparidastrum frondosum	Capparaceae	(Jacq.) Cornejo & Iltis	cappfr	0.849	0.563	0.731	0.670	0.787	0.617	0.282	0.878
Casearia aculeata	Salicaceae	Jacq.	caseac	0.244	0.927	0.254	0.893	0.382	0.797	0.020	0.987
Casearia arborea	Salicaceae	(Rich.) Urb.	casear	0.094	0.093	0.350	0.201	0.058	0.036	0.871	0.436
Casearia sylvestris	Salicaceae	Sw.	casesy	0.783	0.610	0.957	0.455	0.260	0.149	0.663	0.690

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Cassipourea elliptica	Rhizophoraceae	(Sw.) Poir.	cassel	0.689	0.329	0.829	0.404	0.320	0.199	0.909	0.477
Cecropia obtusifolia	Urticaceae	Bertol.	cecrob	0.450	0.801	0.096	0.061	0.799	0.354	0.464	0.236
Ceiba pentandra	Malvaceae	(L.) Gaertn.	ceibpe	0.619	0.386	0.108	0.920	0.831	0.569	0.220	0.864
Celtis schippii	Cannabaceae	Standl.	celtsc	0.917	0.477	0.106	0.053	0.284	0.809	0.010	0.003
Cestrum schlechtendalii	Solanaceae	G. Don.	cestme	0.450	0.203	0.008	0.004	0.404	0.140	0.020	0.011
Chamguava schippii	Myrtaceae	(Standl.) Landrum	cha2sc	0.358	0.217	0.028	0.033	0.084	0.059	0.597	0.310
Chrysochlamys eclipes	Clusiaceae	L.O.Williams	chr1ec	0.120	0.071	0.010	0.005	0.607	0.254	0.002	0.001
Chrysophyllum argenteum	Sapotaceae	Jacq.	chr2ar	0.218	0.096	0.320	0.120	0.494	0.192	0.002	0.001
Chrysophyllum cainito	Sapotaceae	L.	chr2ca	0.096	0.963	0.456	0.773	0.410	0.790	0.054	0.978
Cinnamomum triplinerve	Lauraceae	(Ruiz & Pav.) Kosterm.	phoeci	0.571	0.687	0.166	0.054	0.939	0.600	0.763	0.363
Coccoloba coronata	Polygonaceae	Jacq.	coccco	0.999	0.532	0.687	0.672	0.587	0.340	0.458	0.780
Coccoloba manzinellensis	Polygonaceae	Beurl.	coccma	0.739	0.608	0.773	0.608	0.118	0.058	0.613	0.297

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Conostegia cinnamomea	Melastomataceae	(Beurl.) Wurdack	conoci	0.525	0.207	0.476	0.231	0.557	0.630	0.553	0.254
Cordia alliodora	Cordiaceae	(Ruiz & Pav.) Oken	cordal	0.220	0.895	0.915	0.629	0.881	0.621	0.190	0.108
Cordia bicolor	Cordiaceae	A.DC.	cordbi	0.274	0.142	0.386	0.182	0.112	0.074	0.364	0.160
Cordia lasiocalyx	Cordiaceae	Pittier	cordla	0.703	0.287	0.182	0.085	0.791	0.278	0.072	0.057
Coussarea curvigemmia	Rubiaceae	Dwyer	cou2cu	0.845	0.556	0.707	0.354	0.332	0.187	0.751	0.615
Croton billbergianus	Euphorbiaceae	Müll.Arg.	crotbi	0.763	0.596	0.408	0.257	0.188	0.121	0.727	0.602
Cupania americana	Sapindaceae	L.	cupala	0.541	0.258	0.160	0.101	0.414	0.732	0.242	0.119
Cupania rufescens	Sapindaceae	Triana & Planch.	cuparu	0.641	0.316	0.264	0.140	0.166	0.103	0.945	0.493
Cupania seemannii	Sapindaceae	Triana & Planch.	cupasy	0.551	0.271	0.362	0.186	0.106	0.087	0.492	0.255
Damburneya umbrosa	Lauraceae	(Kunth) Trofimov	nectpu	0.887	0.552	0.699	0.346	0.238	0.115	0.208	0.107
Dendropanax arboreus	Araliaceae	(L.) Decne. & Planch.	dendar	0.811	0.445	0.693	0.322	0.200	0.085	0.440	0.191
Desmopsis panamensis	Annonaceae	(B.L.Rob.) Saff.	des2pa	0.462	0.764	0.338	0.845	0.406	0.830	0.298	0.847

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Diospyros artanthifolia	Ebenaceae	Mart. ex Miq.	dio2ar	0.881	0.465	0.631	0.313	0.298	0.145	0.058	0.039
Dipteryx oleifera	Fabaceae	Benth.	diptpa	0.921	0.429	0.482	0.254	0.899	0.522	0.883	0.429
Drypetes standleyi	Putranjivaceae	G.L.Webster	drypst	0.793	0.602	0.619	0.341	0.228	0.854	0.482	0.271
Erythrina costaricensis	Fabaceae	Micheli	ery1co	0.501	0.329	0.032	0.012	0.144	0.062	0.092	0.028
Erythroxylum macrophyllum	Erythroxylaceae	Cav.	ery2ma	0.591	0.609	0.585	0.290	0.741	0.633	0.555	0.672
Erythroxylum panamense	Erythroxylaceae	Turcz.	ery2pa	0.426	0.760	0.813	0.585	0.913	0.638	0.787	0.542
Eugenia coloradoensis	Myrtaceae	Standl.	eugeco	0.967	0.509	0.158	0.085	0.967	0.488	0.438	0.263
Eugenia galalonensis	Myrtaceae	(C.Wright ex Griseb.) Krug & Urb.	eugega	0.735	0.328	0.947	0.533	0.569	0.275	0.703	0.651
Eugenia nesiotica	Myrtaceae	Standl.	eugene	0.338	0.845	0.338	0.830	0.783	0.669	0.268	0.868
Eugenia oerstediana	Myrtaceae	O.Berg	eugeoe	0.174	0.931	0.250	0.875	0.589	0.715	0.066	0.977
Faramea occidentalis	Rubiaceae	(L.) A.Rich.	faraoc	0.270	0.872	0.040	0.977	0.853	0.488	0.014	0.994

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Garcinia madruno	Clusiaceae	(Kunth) Hammel	gar2ma	0.352	0.175	0.585	0.270	0.114	0.074	0.200	0.098
Garcinia recondita	Clusiaceae	Hammel	gar2in	0.701	0.677	0.839	0.426	0.743	0.609	0.999	0.545
Genipa americana	Rubiaceae	L.	geniam	0.827	0.626	0.364	0.247	0.601	0.655	0.496	0.332
Guapira standleyana	Nyctaginaceae	Woodson	guapst	0.050	0.972	0.028	0.987	0.318	0.802	0.088	0.956
Guarea bullata	Meliaceae	Radlk.	guarsp	0.661	0.668	0.697	0.422	0.456	0.778	0.138	0.089
Guarea grandifolia	Meliaceae	(L.) Sleumer	guargr	0.034	0.971	0.244	0.887	0.116	0.933	0.565	0.296
Guarea guidonia	Meliaceae	(L.) Sleumer	guargu	0.861	0.428	0.278	0.208	0.440	0.732	0.408	0.250
Guatteria lucens	Annonaceae	Standl.	guatdu	0.144	0.059	0.002	0.001	0.649	0.317	0.002	0.001
Guazuma ulmifolia	Malvaceae	Lam.	guazul	0.096	0.974	0.302	0.869	0.058	0.984	0.042	0.988
Guettarda foliacea	Rubiaceae	Standl.	guetfo	0.769	0.361	0.827	0.542	0.879	0.608	0.531	0.688
Gustavia superba	Lecythidaceae	(Kunth) O.Berg	gustsu	0.857	0.554	0.348	0.809	0.336	0.851	0.154	0.929
Hamelia axillaris	Rubiaceae	Sw.	hameax	0.719	0.365	0.803	0.641	0.809	0.390	0.917	0.491
Hampea appendiculata	Malvaceae	(Donn.Sm.) Standl.	hampap	0.947	0.524	0.454	0.778	0.318	0.861	0.571	0.715

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Handroanthus guayacan	Bignoniaceae	(Seem.) S.O.Grose	tab1gu	0.515	0.680	0.861	0.535	0.665	0.407	0.715	0.322
Hasseltia floribunda	Salicaceae	Kunth	hassfl	0.324	0.207	0.194	0.100	0.084	0.045	0.296	0.149
Heisteria acuminata	Olacaceae	(Humb. & Bonpl.) Engl.	heisac	0.839	0.361	0.943	0.514	0.677	0.591	0.685	0.318
Heisteria concinna	Olacaceae	Standl.	heisco	0.831	0.515	0.953	0.492	0.150	0.032	0.054	0.041
Herrania purpurea	Malvaceae	(Pittier) R.E. Schult.	herrpu	0.372	0.156	0.202	0.105	0.482	0.165	0.014	0.006
Hieronyma alchorneoides	Phyllanthaceae	Allemão	hyeral	0.308	0.811	0.885	0.412	0.184	0.916	0.310	0.822
Hirtella triandra	Chrysobalanaceae	Sw.	hirttr	0.066	0.032	0.034	0.018	0.607	0.645	0.020	0.008
Hura crepitans	Euphorbiaceae	L.	huracr	0.733	0.613	0.589	0.744	0.158	0.900	0.747	0.687
Inga acuminata	Fabaceae	Benth.	ingas1	0.102	0.938	0.100	0.955	0.016	0.988	0.002	1.000
Inga cocleensis	Fabaceae	Pittier	ingaco	0.913	0.583	0.010	0.009	0.603	0.271	0.162	0.106
Inga goldmanii	Fabaceae	Pittier	ingago	0.779	0.556	0.577	0.285	0.615	0.671	0.847	0.338
Inga laurina	Fabaceae	(Sw.) Willd.	ingafa	0.855	0.356	0.693	0.310	0.152	0.100	0.599	0.256
Inga marginata	Fabaceae	Willd.	ingama	0.324	0.850	0.432	0.820	0.136	0.954	0.068	0.973
Inga nobilis	Fabaceae	Willd.	ingaqu	0.747	0.553	0.202	0.105	0.256	0.793	0.204	0.092
Inga pezizifera	Fabaceae	Benth.	ingape	0.887	0.471	0.204	0.138	0.873	0.443	0.296	0.190

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Inga sapindoides	Fabaceae	Willd.	ingasa	0.515	0.383	0.775	0.403	0.302	0.188	0.278	0.143
Inga thibaudiana	Fabaceae	DC.	ingath	0.450	0.242	0.723	0.345	0.084	0.051	0.509	0.241
Inga umbellifera	Fabaceae	(Vahl) Steud.	ingaum	0.567	0.253	0.370	0.169	0.072	0.061	0.881	0.371
Jacaranda copaia	Bignoniaceae	(Aubl.) D.Don	jac1co	0.793	0.379	0.162	0.133	0.052	0.037	0.170	0.097
Lacistema aggregatum	Lacistemataceae	(P.J.Bergius) Rusby	laciag	0.442	0.173	0.170	0.060	0.212	0.113	0.745	0.247
Lacmellea panamensis	Apocynaceae	(Woodson) Markgr.	lacmpa	0.158	0.919	0.735	0.724	0.941	0.595	0.717	0.687
Laetia thamnia	Salicaceae	L.	laetth	0.917	0.462	0.068	0.034	0.006	0.004	0.188	0.079
Licania hypoleuca	Chrysobalanaceae	Benth.	licahy	0.947	0.478	0.228	0.106	0.653	0.332	0.959	0.468
Lonchocarpus heptaphyllus	Fabaceae	(Poir.) DC.	loncla	0.963	0.765	0.218	0.089	0.016	0.011	0.048	0.023
Luehea seemannii	Malvaceae	Triana & Planch.	luehse	0.797	0.459	0.819	0.440	0.893	0.486	0.294	0.859
Macrocnemum roseum	Rubiaceae	(Ruiz & Pav.) Wedd.	macrgl	0.761	0.633	0.935	0.513	0.737	0.626	0.474	0.807
Maquira guianensis	Moraceae	Aubl.	maquco	0.573	0.252	0.563	0.282	0.484	0.204	0.004	0.002
Miconia affinis	Melastomataceae	DC.	micoaf	0.314	0.177	0.549	0.294	0.072	0.062	0.841	0.403

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Miconia argentea	Melastomataceae	(Sw.) DC.	micoar	0.344	0.840	0.671	0.323	0.775	0.501	0.128	0.912
Miconia hondurensis	Melastomataceae	Donn. Sm.	micoho	0.434	0.262	0.913	0.481	0.078	0.049	0.897	0.521
Miconia nervosa	Melastomataceae	(Sm.) Triana	micone	0.316	0.184	0.689	0.347	0.170	0.113	0.811	0.396
Monteverdia sieberiana	Celastraceae	(Krug & Urb.) Biral	maytsc	0.613	0.680	0.036	0.019	0.777	0.547	0.044	0.029
Moquilea platypus	Chrysobalanaceae	Hemsl.	licapl	0.627	0.291	0.200	0.101	0.194	0.833	0.142	0.098
Mosannona garwoodii	Annonaceae	Chatrou & Welzenis	malmsp	0.505	0.185	0.018	0.007	0.104	0.049	0.050	0.014
Mouriri myrtilloides	Melastomataceae	(Sw.) Poir.	mourmy	0.619	0.325	0.721	0.616	0.338	0.204	0.639	0.651
Myrcia splendens tip. gatunensis	Myrtaceae	(Sw.) DC.	myrcga	0.867	0.399	0.066	0.036	0.262	0.113	0.216	0.115
Nectandra cissiflora	Lauraceae	Nees	nectci	0.639	0.349	0.793	0.594	0.240	0.112	0.270	0.127
Nectandra lineata	Lauraceae	(Kunth) Rohwer	nectgl	0.729	0.605	0.723	0.437	0.537	0.681	0.913	0.599
Neea amplifolia	Nyctaginaceae	Donn.Sm.	neeaam	0.186	0.099	0.603	0.319	0.224	0.137	0.745	0.618
Ocotea cernua	Lauraceae	(Nees) Mez	ocotce	0.807	0.599	0.583	0.742	0.887	0.656	0.801	0.551
Ocotea oblonga	Lauraceae	(Meisn.) Mez	ocotob	0.925	0.397	0.110	0.077	0.829	0.611	0.274	0.133

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Ocotea puberula	Lauraceae	(Rich.) Nees	ocotpu	0.112	0.938	0.466	0.813	0.444	0.804	0.673	0.696
Ocotea whitei	Lauraceae	Woodson	ocotwh	0.883	0.507	0.420	0.196	0.266	0.831	0.202	0.087
Oenocarpus mapora	Arecaceae	H.Karst.	oenoma	0.701	0.316	0.078	0.037	0.070	0.030	0.146	0.054
Ormosia coccinea	Fabaceae	(Aubl.) Jacks.	ormocr	0.607	0.703	0.484	0.259	0.707	0.602	0.256	0.159
Ormosia macrocalyx	Fabaceae	Ducke	ormoma	0.557	0.729	0.216	0.897	0.889	0.599	0.472	0.757
Ouratea lucens	Ochnaceae	(Kunth) Engl.	ouralu	0.462	0.752	0.458	0.266	0.643	0.359	0.693	0.394
Palicourea deflexa	Rubiaceae	(DC.) Borhidi	psycde	0.775	0.388	0.444	0.266	0.162	0.119	0.589	0.655
Pentagonia macrophylla	Rubiaceae	Benth.	pentma	0.146	0.094	0.060	0.028	0.517	0.184	0.002	0.001
Perebea xanthochyma	Moraceae	H.Karst.	perexa	0.220	0.124	0.723	0.351	0.060	0.027	0.328	0.163
Picramnia latifolia	Picramniaceae	Tul.	picrla	0.769	0.594	0.875	0.479	0.174	0.896	0.821	0.498
Piper cordulatum	Piperaceae	C. DC.	pipeco	0.244	0.161	0.386	0.206	0.138	0.068	0.234	0.119
Piper reticulatum	Piperaceae	L.	pipere	0.599	0.662	0.871	0.449	0.326	0.831	0.881	0.534
Platymiscium pinnatum	Fabaceae	(Jacq.) Dugand	pla1pi	0.354	0.897	0.428	0.759	0.727	0.479	0.697	0.611

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Platypodium elegans	Fabaceae	Vogel	pla2el	0.372	0.168	0.372	0.176	0.022	0.019	0.827	0.534
Pombalia prunifolia	Violaceae	(Humb. & Bonpl. ex Willd.) Paula-Souza	hybapr	0.236	0.140	0.909	0.452	0.486	0.318	0.919	0.437
Posoqueria latifolia	Rubiaceae	(Rudge) Schult.	posola	0.793	0.392	0.539	0.330	0.809	0.380	0.843	0.463
Poulsenia armata	Moraceae	(Miq.) Standl.	poular	0.250	0.124	0.028	0.015	0.833	0.329	0.008	0.004
Pourouma bicolor	Urticaceae	Mart.	pourbi	0.605	0.719	0.953	0.523	0.422	0.197	0.174	0.088
Pouteria reticulata	Sapotaceae	(Engl.) Eyma	poutre	0.807	0.528	0.959	0.527	0.344	0.247	0.410	0.808
Pouteria stipitata	Sapotaceae	Cronquist	poutst	0.292	0.132	0.194	0.107	0.096	0.073	0.424	0.225
Prioria copaifera	Fabaceae	Griseb.	pri2co	0.711	0.394	0.472	0.753	0.791	0.379	0.991	0.491
Protium costaricense	Burseraceae	(Rose) Engl.	protco	0.366	0.164	0.068	0.034	0.991	0.496	0.048	0.017
Protium panamense	Burseraceae	(Rose) I.M.Johnst.	protpa	0.160	0.075	0.052	0.027	0.018	0.007	0.072	0.033
Protium stevensonii	Burseraceae	(Standl.) Daly	tet2pa	0.865	0.371	0.174	0.074	0.637	0.282	0.034	0.017

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Protium tenuifolium subsp. *sessiliflorum*	Burseraceae	Engl.	protte	0.839	0.402	0.112	0.077	0.795	0.559	0.088	0.052
Psidium friedrich-sthalianum	Myrtaceae	(O.Berg) Nied.	psidfr	0.725	0.606	0.152	0.931	0.198	0.855	0.232	0.900
Psychotria graciliflora	Rubiaceae	Benth.	psycg1	0.701	0.638	0.372	0.807	0.314	0.170	0.501	0.722
Psychotria horizontalis	Rubiaceae	Sw.	psycho	0.190	0.912	0.048	0.972	0.326	0.860	0.008	0.997
Psychotria limonensis	Rubiaceae	K.Krause	psycli	0.567	0.094	0.266	0.056	0.741	0.459	0.046	0.008
Pterocarpus hayesii	Fabaceae	Hemsl.	pterro	0.416	0.194	0.450	0.191	0.078	0.064	0.196	0.066
Quararibea asterolepis	Malvaceae	Pittier	quaras	0.799	0.573	0.398	0.808	0.256	0.854	0.438	0.799
Quassia amara	Simaroubaceae	L.	quasam	0.603	0.701	0.585	0.326	0.941	0.522	0.332	0.215
Randia armata	Rubiaceae	(Sw.) DC.	randar	0.881	0.675	0.094	0.968	0.476	0.347	0.058	0.973
Senna dariensis	Fabaceae	(Britton & Rose) H.S. Irwin & Barneby	sennda	0.519	0.391	0.727	0.406	0.400	0.247	0.819	0.534
Simarouba amara	Simaroubaceae	Aubl.	simaam	0.983	0.457	0.238	0.083	0.022	0.013	0.430	0.144

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Siparuna pauciflora	Siparunaceae	(Beurl.) A. DC.	sipapa	0.997	0.561	0.593	0.370	0.230	0.872	0.432	0.241
Sloanea terniflora	Elaeocarpaceae	(Moc. & Sessé ex DC.) Standl.	sloate	0.731	0.295	0.262	0.111	0.314	0.138	0.018	0.010
Socratea exorrhiza	Arecaceae	(Mart.) H.Wendl.	socrex	0.244	0.133	0.466	0.213	0.080	0.041	0.060	0.026
Sorocea affinis	Moraceae	Hemsl.	soroaf	0.559	0.204	0.004	0.002	0.088	0.034	0.002	0.002
Spondias mombin	Anacardiaceae	L.	sponmo	0.188	0.090	0.058	0.021	0.094	0.066	0.979	0.459
Spondias radlkoferi	Anacardiaceae	Donn.Sm.	sponra	0.933	0.633	0.018	0.008	0.422	0.200	0.060	0.036
Staphylea occidentalis	Staphyleaceae	Sw.	turpoc	0.817	0.538	0.206	0.910	0.436	0.740	0.446	0.818
Sterculia apetala	Malvaceae	(Jacq.) H.Karst.	sterap	0.543	0.637	0.444	0.768	0.104	0.042	0.482	0.217
Stylogyne turbacensis	Primulaceae	(Kunth) Mez	stylst	0.482	0.734	0.985	0.502	0.318	0.816	0.607	0.720
Swartzia simplex var. *continentalis*	Fabaceae	(Sw.) Spreng.	swars2	0.312	0.160	0.044	0.020	0.176	0.085	0.008	0.004
Swartzia simplex var. *grandiflora*	Fabaceae	(Sw.) Spreng.	swars1	0.350	0.843	0.144	0.930	0.454	0.793	0.072	0.965
Symphonia globulifera	Clusiaceae	L.f.	sympgl	0.585	0.306	0.040	0.028	0.839	0.386	0.044	0.022

Table S4: *(continued)*

Species	Family	Authority	Species code	p^{RP}_{mean}	p^{RP}_{sd}	p^{MP}_{mean}	p^{MP}_{sd}	p^{NP}_{mean}	p^{NP}_{sd}	p^{NHP}_{mean}	p^{NHP}_{sd}
Tabebuia rosea	Bignoniaceae	(Bertol.) DC.	tab1ro	0.050	0.960	0.855	0.605	0.336	0.838	0.204	0.914
Tabernaemontana arborea	Apocynaceae	Rose ex J.D.Sm.	tab2ar	0.404	0.249	0.392	0.209	0.018	0.020	0.951	0.399
Tachigali panamensis	Fabaceae	van der Werff & N.Zamora	tachve	0.266	0.134	0.811	0.423	0.797	0.385	0.759	0.381
Talisia croatii	Sapindaceae	Acev.-Rodr.	talipr	0.128	0.924	0.008	0.997	0.002	1.000	0.002	1.000
Talisia nervosa	Sapindaceae	Radlk.	taline	0.360	0.811	0.490	0.296	0.865	0.553	0.216	0.175
Terminalia amazonia	Combretaceae	(J.F.Gmel.) Exell	termam	0.701	0.324	0.372	0.158	0.715	0.339	0.687	0.585
Terminalia oblonga	Combretaceae	(Ruiz & Pav.) Steud.	termob	0.531	0.259	0.895	0.474	0.372	0.766	0.979	0.503
Thevetia ahouai	Apocynaceae	(L.) A.DC.	thevah	0.881	0.449	0.058	0.033	0.182	0.120	0.617	0.300
Trattinnickia aspera	Burseraceae	(Standl.) Swart	tratas	0.400	0.816	0.304	0.146	0.236	0.135	0.036	0.018
Trema domingensis	Cannabaceae	Urb.	tremin	0.969	0.507	0.673	0.446	0.907	0.451	0.927	0.519
Trichilia pallida	Meliaceae	Sw.	tri2pa	0.515	0.771	0.164	0.939	0.811	0.715	0.012	0.990
Trichilia tuberculata	Meliaceae	(Triana & Planch.) C. DC.	tri2tu	0.464	0.762	0.541	0.764	0.216	0.894	0.450	0.818
Triplaris cumingiana	Polygonaceae	Fisch. & C.A.Mey.	tripcu	0.232	0.894	0.228	0.917	0.278	0.872	0.044	0.988

Table S4: *(continued)*

Species	Family	Authority	Species code	p_{mean}^{RP}	p_{sd}^{RP}	p_{mean}^{MP}	p_{sd}^{MP}	p_{mean}^{NP}	p_{sd}^{NP}	p_{mean}^{NHP}	p_{sd}^{NHP}
Trophis caucana	Moraceae	(Pittier) C.C. Berg	olmeas	0.855	0.433	0.056	0.037	0.803	0.539	0.028	0.015
Trophis racemosa	Moraceae	(L.) Urb.	tropra	0.819	0.541	0.631	0.336	0.178	0.850	0.272	0.189
Unonopsis pittieri	Annonaceae	Saff.	unonpi	0.507	0.251	0.144	0.084	0.480	0.736	0.044	0.022
Virola nobilis	Myristicaceae	A.C. Sm.	virosu	0.657	0.317	0.056	0.028	0.589	0.591	0.024	0.013
Virola sebifera	Myristicaceae	Aubl.	virose	0.136	0.066	0.400	0.166	0.200	0.111	0.046	0.017
Vismia baccifera	Hypericaceae	(L.) Triana & Planch.	vismba	0.687	0.564	0.444	0.173	0.735	0.639	0.719	0.607
Xylopia macrantha	Annonaceae	Triana & Planch.	xyl1ma	0.793	0.611	0.799	0.601	0.286	0.846	0.921	0.536
Zanthoxylum acuminatum	Rutaceae	(Sw.) Sw.	zantpr	0.156	0.089	0.004	0.001	0.521	0.333	0.104	0.032
Zanthoxylum ekmanii	Rutaceae	(Urb.) Alain	zantbe	0.821	0.399	0.302	0.166	0.118	0.057	0.024	0.016
Zanthoxylum panamense	Rutaceae	P.Wilson	zantp1	0.537	0.269	0.713	0.630	0.535	0.315	0.513	0.285

Section S2: Supporting Figures

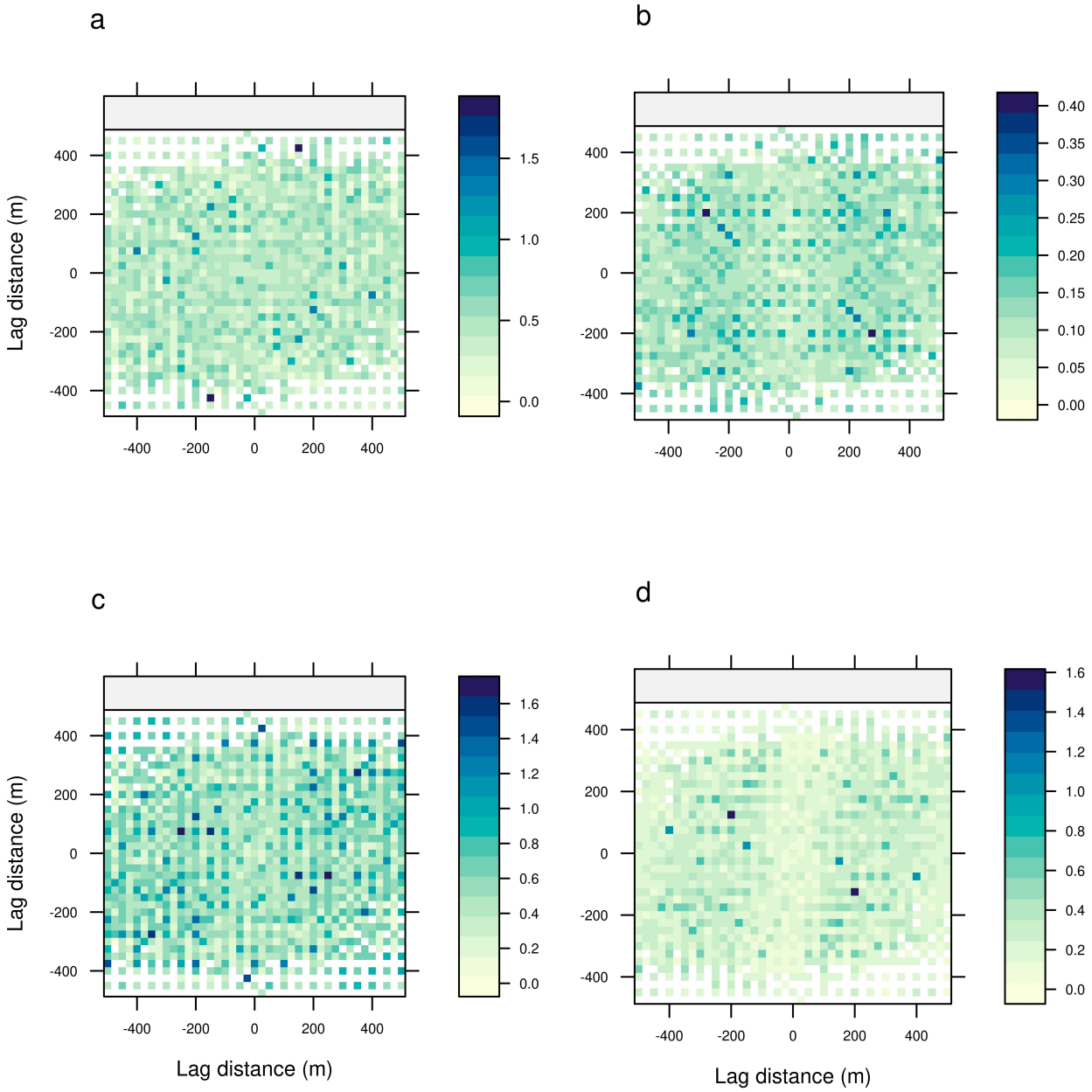


Figure S1: Variogram maps of reactive phosphorus (a), monoesterase-hydrolyzable phosphorus (b), nuclease-hydrolyzable phosphorus (c) and non-hydrolyzed phosphorus (d). Experimental semivariances were calculated using the Matheron [39] estimator either from the Box-Cox transformed phosphorus concentration or, in case of non-hydrolyzed phosphorus, from the residuals of the trend component of the fitted spatial model. Bins are only shown if they contain at least five point pairs. Bin width is 25 m.

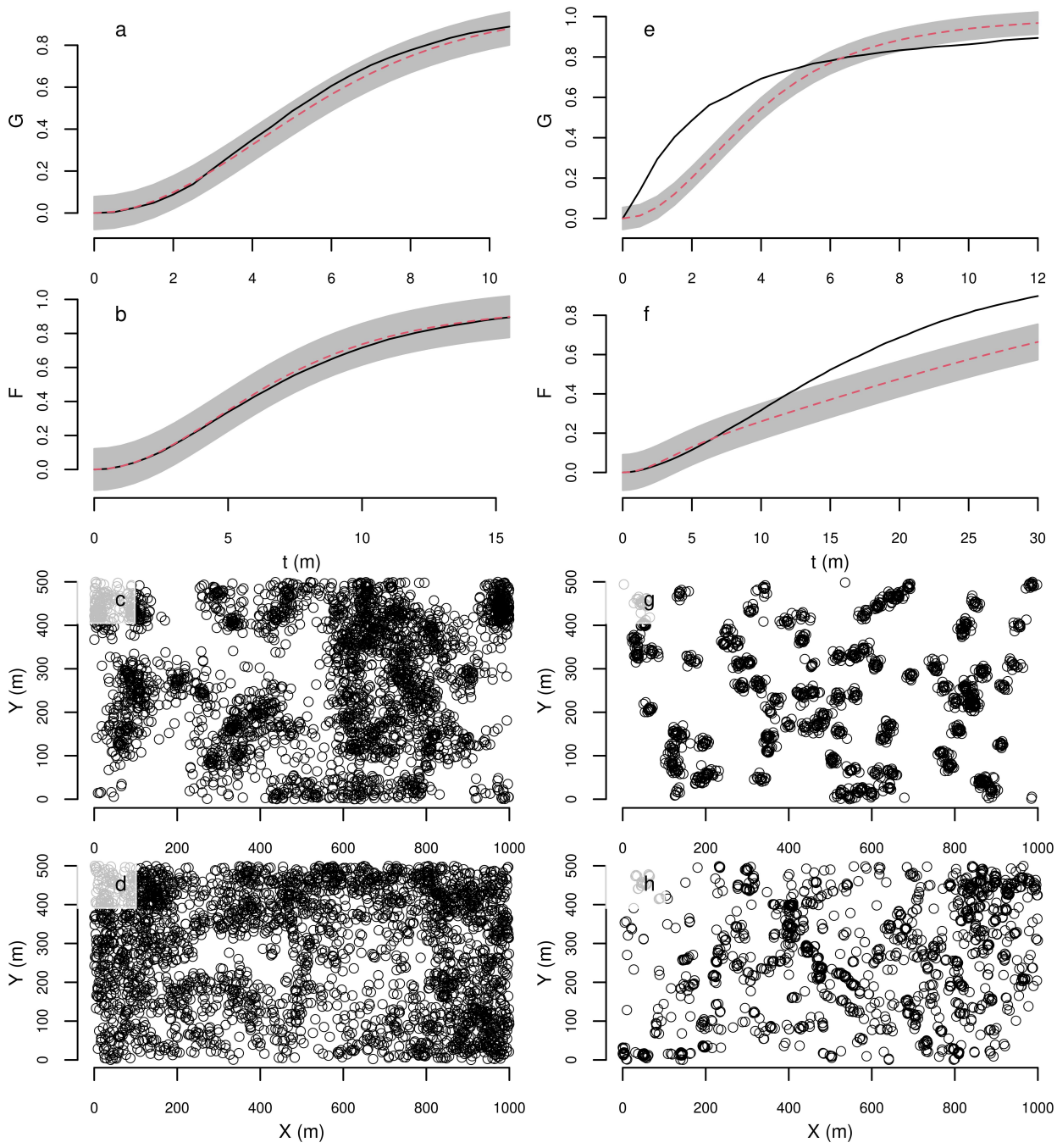

a
G
0.0
0.2
0.4
0.6
0.8
0
2
4
6
8
10
e
G
0.0
0.2
0.4
0.6
0.8
1.0
0
2
4
6
8
10
12
b
F
0.0
0.2
0.4
0.6
0.8
1.0
0
5
10
15
t (m)
f
F
0.0
0.2
0.4
0.6
0.8
0
5
10
15
20
25
30
t (m)
c
Y (m)
0
100
200
300
400
500
g
Y (m)
0
100
200
300
400
500
0
200
400
600
800
1000
d
Y (m)
0
100
200
300
400
500
h
Y (m)
0
100
200
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400
500
0
200
400
600
800
1000
X (m)
X (m)

Figure S2 (previous page): Examples of a good fit (a-d, species *Swartzia simplex* var. *continentalis*) and a bad fit (e-h, species *Acalypha diversifolia*) of a point process model to a spatial point pattern. The top panels show summary statistics of nearest neighbor distances G (a, e) and empty space distances F (b, f) that were used to assess the goodness of fit of the point process models for each species. The observed G (a, black line) for the spatial point pattern of species *S. simplex* is similar to the expected G (a, red dashed line) of the fitted Thomas cluster process for that species. Furthermore, the observed G of *S. simplex* lies well within the boundaries of the simulation envelopes of G (a, gray bars), indicating no significant deviation of the observed point pattern from the prediction of the point process model. The same applies to the summary statistic F of *S. simplex* (b). A simulation of the point process model for *S. simplex* (c) resembles the observed point pattern (d). For species *A. diversifolia*, the observed summary statistics cross the boundaries of the simulation envelopes (e, f), indicating a significant deviation of the observed point pattern from the prediction of the point process model. Indeed, the observed point pattern of *A. diversifolia* (h) is less aggregated than the realizations of the point process model for that species (g). *A. diversifolia* was therefore not included in the species-phosphorus association J-test [17].