

Supplemental Material

for

Species Distribution Modelling: Contrasting presence-only models with plot abundance data

Vitor F. Gomes*, Stéphanie D. IJff, Niels Raes, Iêda Leão Amaral, Rafael P. Salomão, Luiz de Souza Coelho, Francisca Dionízia de Almeida Matos, Carolina V. Castilho, Diogenes de Andrade Lima Filho, Dairon Cárdenas López, Juan Ernesto Guevara, William E. Magnusson, Oliver L. Phillips, Florian Wittmann, Marcelo de Jesus Veiga Carim, Maria Pires Martins, Mariana Victória Irume, Daniel Sabatier, Jean-François Molino, Olaf S. Bánki, José Renan da Silva Guimarães, Nigel C.A. Pitman, Maria Teresa Fernandez Piedade, Abel Monteagudo Mendoza, Bruno Garcia Luize, Eduardo Martins Venticinque, Evlyn Márcia Moraes de Leão Novo, Percy Núñez Vargas, Thiago Sanna Freire Silva, Angelo Gilberto Manzatto, John Terborgh, Neidiane Farias Costa Reis, Juan Carlos Montero, Katia Regina Casula, Beatriz S. Marimon, Ben-Hur Marimon Jr., Euridice N. Honorio Coronado, Ted R. Feldpausch, Alvaro Duque, Charles Eugene Zartman, Nicolás Castaño Arboleda, Timothy J. Killeen, Bonifacio Mostacedo, Rodolfo Vasquez, Jochen Schöngart, Rafael L. Assis, Marcelo Brilhante Medeiros, Marcelo Fragomeni Simon, Ana Andrade, William F. Laurance, José Luís Camargo, Layon O. Demarchi, Susan G.W. Laurance, Emanuelle de Sousa Farias, Henrique Eduardo Mendonça Nascimento, Juan David Cardenas Revilla, Adriano Quaresma, Flávia R.C. Costa, Ima Célia Guimarães Vieira, Bruno Barçante Ladvocat Cintra, Hernán Castellanos, Roel Brien, Pablo R. Stevenson, Yuri Feitosa, Joost F. Duivenvoorden, Gerardo A. Aymard C., Hugo F. Mogollón, Natalia Targhetta, James A. Comiskey, Alberto Vicentini, Aline Lopes, Gabriel Damasco, Nállarett Dávila, Roosevelt García-Villacorta, Carolina Levis, Juliana Schiatti, Priscila Souza, Thaise Emilio, Alfonso Alonso, David Neill, Francisco Dallmeier, Leandro Valle Ferreira, Alejandro Araujo-Murakami, Daniel Praia, Dário Dantas do Amaral, Fernanda Antunes Carvalho, Fernanda Coelho de Souza, Kenneth Feeley, Luzmila Arroyo, Marcelo Petratti Pansonato, Rogerio Gribel, Boris Villa, Juan Carlos Licona,

Paul V.A. Fine, Carlos Cerón, Chris Baraloto, Eliana M. Jimenez, Juliana Stropp, Julien Engel, Julien Engel, Marcos Silveira, Maria Cristina Peñuela Mora, Pascal Petronelli, Paul Maas, Raquel Thomas-Caesar, Terry W. Henkel, Doug Daly, Marcos Ríos Paredes, Tim R. Baker, Alfredo Fuentes, Carlos A. Peres, Jerome Chave, Jose Luis Marcelo Pena, Kyle G. Dexter, Miles R. Silman, Peter Møller Jørgensen, Toby Pennington, Anthony Di Fiore, Fernando Cornejo Valverde, Juan Fernando Phillips, Gonzalo Rivas-Torres, Patricio von Hildebrand, Tinde R. van Andel, Ademir R. Ruschel, Adriana Prieto, Agustín Rudas, Bruce Hoffman, César I.A. Vela, Edelcilio Marques Barbosa, Egleé L. Zent, George Pepe Gallardo Gonzales, Hilda Paulette Dávila Doza, Ires Paula de Andrade Miranda, Jean-Louis Guillaumet, Linder Felipe Mozombite Pinto, Luiz Carlos de Matos Bonates, Natalino Silva, Ricardo Zárate Gómez, Stanford Zent, Therany Gonzales, Vincent A. Vos, Yadvinder Malhi, Alexandre A. Oliveira, Angela Cano, Bianca Weiss Albuquerque, Corine Vriesendorp, Diego Felipe Correa, Emilio Vilanova Torre, Geertje van der Heijden, Hirma Ramirez-Angulo, José Ferreira Ramos, Kenneth R. Young, Maira Rocha, Marcelo Trindade Nascimento, Maria Natalia Umaña Medina, Milton Tirado, Ophelia Wang, Rodrigo Sierra, Armando Torres-Lezama, Casimiro Mendoza, Cid Ferreira, Cláudia Baidier, Daniel Villarroel, Henrik Balslev, Italo Mesones, Ligia Estela Urrego Giraldo, Luisa Fernanda Casas, Manuel Augusto Ahuite Reategui, Reynaldo Linares-Palomino, Roderick Zagt, Sasha Cárdenas, William Farfan-Rios, Adeilza Felipe Sampaio, Daniela Pauletto, Elvis H. Valderrama Sandoval, Freddy Ramirez Arevalo, Isau Huamantupa-Chuquimaco, Karina Garcia-Cabrera, Lionel Hernandez, Luis Valenzuela Gamarra, Miguel N. Alexiades, Susamar Pansini, Walter Palacios Cuenca, William Milliken, Joana Ricardo, Gabriela Lopez-Gonzalez, Edwin Pos, Hans ter Steege*

*Correspondence and requests for materials should be addressed to H.T.S. (email: hans.tersteege@naturalis.nl)

Appendix S4: Cleaning pipeline results for all 227 hyperdominant species.

Cleaning pipeline results and percentages for all 227 hyperdominant species. The cleaning pipeline removed GBIF data inconsistencies. First, the total number of records download from GBIF is presented (GBIF records). Then, we present the total number of records after been removed those with no latitude, longitude and locality; duplicates at 0.5-degree spatial resolution; coordinates located in capitals; coordinates with latitude equal to longitude or equal to exactly zero; and corrected country references (cleaned GBIF records). Finally, we present the total number of records after treatment with kernel density estimate function over coordinate point patterns to remove spatial outliers (kernel-density estimate GBIF records).

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Abarema_jupunba	751	521	69.37	503	66.98
Acosmium_cardenasii	69	58	84.06	53	76.81
Alexa_imperatricis	24	10	41.67	9	37.50
Amaioua_guianensis	825	428	51.88	380	46.06
Amphiodon_effusus	89	62	69.66	61	68.54
Aparisthium_cordatum	1239	733	59.16	670	54.08
Apeiba_glabra	476	313	65.76	289	60.71
Apeiba_tibourbou	1554	976	62.81	662	42.60
Aspidosperma_excelsum	450	280	62.22	260	57.78
Astrocaryum_aculeatum	1774	174	9.81	170	9.58
Astrocaryum_murumuru	143	73	51.05	69	48.25
Astrocaryum_sciophilum	28	7	25.00	6	21.43
Attalea_butyracea	12821	198	1.54	184	1.44
Attalea_maripa	2946	232	7.88	226	7.67
Attalea_phalerata	14961	289	1.93	279	1.86
Attalea_speciosa	95	55	57.89	49	51.58
Bertholletia_excelsa	266	130	48.87	124	46.62
Bocageopsis_multiflora	397	242	60.96	239	60.20
Brosimum_guianense	249	172	69.08	121	48.59
Brosimum_lactescens	977	504	51.59	385	39.41
Brosimum_rubescens	455	213	46.81	203	44.62
Brosimum_utile	437	221	50.57	171	39.13
Calophyllum_brasiliense	1733	1075	62.03	686	39.58
Campsiandra_implexicaulis	34	22	64.71	20	58.82
Caraipa_densifolia	473	319	67.44	314	66.38
Carapa_guianensis	3084	333	10.80	197	6.39
Caryocar_glabrum	439	286	65.15	283	64.46
Catostemma_fragrans	35	20	57.14	18	51.43
Cecropia_latiloba	176	74	42.05	74	42.05
Cecropia_membranacea	238	111	46.64	104	43.70
Cecropia_sciadophylla	347	178	51.30	175	50.43
Cedrelinga_cateniformis	258	155	60.08	150	58.14

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Celtis_schippii	423	244	57.68	188	44.44
Cenostigma_tocantinum	73	28	38.36	21	28.77
Cheiloclinium_cognatum	1596	805	50.44	716	44.86
Chlorocardium_rodiei	47	13	27.66	13	27.66
Chrysophyllum_sanguinolentum	708	213	30.08	206	29.10
Clarisia_racemosa	623	302	48.48	267	42.86
Clathrotropis_glaucophylla	50	44	88.00	40	80.00
Clathrotropis_macrocarpa	350	160	45.71	148	42.29
Conceveiba_guianensis	555	304	54.77	297	53.51
Cordia_bicolor	475	295	62.11	198	41.68
Couepia_guianensis	345	173	50.14	158	45.80
Couepia_paraensis	275	187	68.00	185	67.27
Crateva_tapia	1573	1001	63.64	350	22.25
Cynometra_marginata	121	52	42.98	49	40.50
Dialium_guianense	1551	867	55.90	624	40.23
Dicymbe_corymbosa	6	5	83.33	4	66.67
Diplotropis_purpurea	204	120	58.82	112	54.90
Drypetes_amazonica	381	169	44.36	162	42.52
Ecclinusa_guianensis	155	75	48.39	72	46.45
Enterolobium_schomburgkii	406	236	58.13	181	44.58
Eperua_falcata	234	62	26.50	57	24.36
Eperua_grandiflora	90	20	22.22	18	20.00
Eperua_leucantha	127	70	55.12	64	50.39
Eperua_purpurea	107	66	61.68	61	57.01
Erisma_uncinatum	277	134	48.38	130	46.93
Eschweilera_albiflora	383	226	59.01	221	57.70
Eschweilera_amazonica	108	50	46.30	47	43.52
Eschweilera_atropetiolata	194	51	26.29	47	24.23
Eschweilera_bracteosa	218	132	60.55	125	57.34
Eschweilera_coriacea	2066	725	35.09	687	33.25
Eschweilera_decolorans	128	64	50.00	63	49.22
Eschweilera_grandiflora	167	73	43.71	67	40.12

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Eschweilera_parviflora	265	162	61.13	161	60.75
Eschweilera_parvifolia	418	274	65.55	267	63.88
Eschweilera_pedicellata	640	312	48.75	308	48.13
Eschweilera_sagotiana	136	53	38.97	52	38.24
Eschweilera_tessmannii	446	192	43.05	187	41.93
Eschweilera_truncata	221	77	34.84	75	33.94
Eschweilera_wachenheimii	156	59	37.82	56	35.90
Euterpe_oleracea	2868	105	3.66	76	2.65
Euterpe_precatoria	24604	953	3.87	853	3.47
Garcinia_macrophylla	482	365	75.73	291	60.37
Geissospermum_sericeum	35	23	65.71	22	62.86
Goupia_glabra	641	304	47.43	294	45.87
Guapira_venosa	51	26	50.98	22	43.14
Guarea_guidonia	2263	1137	50.24	949	41.94
Guarea_kunthiana	2532	1278	50.47	1082	42.73
Guarea_macrophylla	2617	1285	49.10	915	34.96
Guarea_silvatica	381	245	64.30	242	63.52
Gustavia_augusta	838	431	51.43	391	46.66
Gustavia_hexapetala	969	391	40.35	382	39.42
Handroanthus_barbatus	118	91	77.12	86	72.88
Haploclathra_cordata	45	13	28.89	13	28.89
Helicostylis_tomentosa	1170	552	47.18	530	45.30
Hevea_brasiliensis	645	287	44.50	199	30.85
Hevea_guianensis	901	330	36.63	321	35.63
Himatanthus_sucuuba	355	259	72.96	246	69.30
Hirtella_racemosa	2514	1409	56.05	1004	39.94
Hura_crepitans	966	506	52.38	212	21.95
Inga_alba	798	429	53.76	364	45.61
Inga_capitata	1319	721	54.66	656	49.73
Inga_edulis	1509	851	56.39	677	44.86
Inga_lateriflora	132	60	45.45	57	43.18
Inga_marginata	118	71	60.17	21	17.80

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Inga_rubiginosa	114	54	47.37	51	44.74
Inga_thibaudiana	1627	950	58.39	723	44.44
Iriartea_deltoidea	20270	573	2.83	498	2.46
Iryanthera_juruensis	1585	717	45.24	699	44.10
Iryanthera_laevis	597	274	45.90	267	44.72
Iryanthera_ulei	1026	456	44.44	434	42.30
Jacaranda_copaia	816	478	58.58	420	51.47
Laetia_corymbulosa	77	40	51.95	37	48.05
Laetia_procera	640	265	41.41	195	30.47
Lecythis_corrugata	353	197	55.81	187	52.97
Lecythis_idatimon	251	88	35.06	71	28.29
Leonia_crassa	356	231	64.89	226	63.48
Leonia_glycycarpa	1029	509	49.47	501	48.69
Licania_alba	87	26	29.89	25	28.74
Licania_apetala	898	448	49.89	446	49.67
Licania_buxifolia	11	5	45.45	4	36.36
Licania_densiflora	81	33	40.74	30	37.04
Licania_heteromorpha	1303	621	47.66	603	46.28
Licania_kunthiana	364	222	60.99	193	53.02
Licania_micrantha	379	226	59.63	205	54.09
Licania_oblongifolia	84	35	41.67	34	40.48
Licania_octandra	42	31	73.81	23	54.76
Luehea_cymulosa	185	120	64.86	119	64.32
Mabea_nitida	591	344	58.21	335	56.68
Mabea_speciosa	367	216	58.86	213	58.04
Macrolobium_acaciifolium	903	525	58.14	519	57.48
Macrolobium_angustifolium	366	277	75.68	272	74.32
Manilkara_bidentata	767	290	37.81	246	32.07
Maquira_coriacea	255	93	36.47	91	35.69
Matayba_scrobiculata	95	36	37.89	29	30.53
Matisia_ochrocalyx	789	440	55.77	367	46.51
Mauritia_flexuosa	3357	230	6.85	223	6.64

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Mauritiella_aculeata	816	59	7.23	58	7.11
Metrodorea_flavida	392	229	58.42	215	54.85
Mezilaurus_itauba	194	98	50.52	97	50.00
Micrandra_elata	104	43	41.35	40	38.46
Micrandra_glabra	27	9	33.33	9	33.33
Micrandra_spruceana	319	116	36.36	114	35.74
Micrandra_sprucei	82	37	45.12	34	41.46
Micropholis_gardneriana	257	130	50.58	121	47.08
Micropholis_guyanensis	1291	607	47.02	558	43.22
Micropholis_venulosa	980	525	53.57	492	50.20
Minuartia_guianensis	786	404	51.40	321	40.84
Mollia_gracilis	135	67	49.63	63	46.67
Monopteryx_uaucu	55	43	78.18	40	72.73
Mora_excelsa	42	13	30.95	10	23.81
Mora_gonggrijpii	13	6	46.15	6	46.15
Ocotea_aciphylla	1154	570	49.39	508	44.02
Ocotea_cernua	1399	737	52.68	476	34.02
Oenocarpus_bacaba	3076	85	2.76	83	2.70
Oenocarpus_bataua	52272	565	1.08	546	1.04
Osteophloeum_platyspermum	772	364	47.15	340	44.04
Otoba_parvifolia	973	389	39.98	372	38.23
Oxandra_polyantha	139	66	47.48	62	44.60
Pachira_brevipes	187	46	24.60	42	22.46
Pentaclethra_maculoba	399	237	59.40	113	28.32
Poulsenia_armata	489	280	57.26	175	35.79
Pourouma_bicolor	3171	518	16.34	386	12.17
Pourouma_cecropiifolia	410	258	62.93	248	60.49
Pourouma_guianensis	802	406	50.62	383	47.76
Pourouma_minor	733	379	51.71	340	46.38
Pouteria_caimito	905	521	57.57	474	52.38
Pouteria_cuspidata	738	376	50.95	353	47.83
Pouteria_elegans	250	169	67.60	168	67.20

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Pouteria_guianensis	947	497	52.48	480	50.69
Pouteria_reticulata	1081	553	51.16	261	24.14
Protium_apiculatum	401	175	43.64	172	42.89
Protium_aracouchini	1121	616	54.95	556	49.60
Protium_decandrum	314	133	42.36	125	39.81
Protium_hebetatum	412	141	34.22	138	33.50
Protium_heptaphyllum	2753	1484	53.90	1342	48.75
Protium_sagotianum	573	345	60.21	338	58.99
Protium_tenuifolium	469	252	53.73	154	32.84
Protium_trifoliolatum	417	238	57.07	229	54.92
Pseudobombax_munguba	78	58	74.36	57	73.08
Pseudolmedia_laevigata	958	449	46.87	431	44.99
Pseudolmedia_laevis	1076	442	41.08	437	40.61
Pseudolmedia_macrophylla	374	216	57.75	216	57.75
Pseudopiptadenia_suaveolens	107	65	60.75	47	43.93
Pterocarpus_amazonum	285	201	70.53	199	69.82
Pterocarpus_rohrii	1062	528	49.72	318	29.94
Pterocarpus_santalinooides	727	431	59.28	182	25.03
Qualea_paraensis	323	179	55.42	160	49.54
Quararibea_guianensis	143	93	65.03	87	60.84
Quararibea_wittii	222	109	49.10	100	45.05
Rinorea_guianensis	30	23	76.67	21	70.00
Rinorea_racemosa	360	186	51.67	181	50.28
Rinoreocarpus_ulei	420	253	60.24	250	59.52
Sacoglottis_guianensis	302	177	58.61	169	55.96
Sacoglottis_mattogrossensis	379	221	58.31	185	48.81
Sagotia_brachysepala	183	98	53.55	90	49.18
Sagotia_racemosa	356	220	61.80	208	58.43
Scleronema_micranthum	418	151	36.12	139	33.25
Senefeldera_inclinata	109	73	66.97	69	63.30
Simarouba_amara	1330	782	58.80	605	45.49
Siparuna_decipiens	919	383	41.68	373	40.59

Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Sloanea_eichleri	174	116	66.67	111	63.79
Socratea_exorrhiza	19519	775	3.97	710	3.64
Spondias_mombin	406	245	60.34	78	19.21
Sterculia_pruriens	174	83	47.70	82	47.13
Swartzia_leiocalycina	18	18	100.00	16	88.89
Swartzia_polyphylla	475	262	55.16	250	52.63
Symphonia_globulifera	335	106	31.64	68	20.30
Tachigali_chrysophylla	87	48	55.17	46	52.87
Tachigali_paniculata	474	232	48.95	226	47.68
Tachigali_rugosa	95	54	56.84	50	52.63
Tapirira_guianensis	5272	2541	48.20	2237	42.43
Tetragastris_altissima	412	259	62.86	255	61.89
Tetragastris_panamensis	1165	577	49.53	378	32.45
Theobroma_cacao	1172	476	40.61	330	28.16
Theobroma_speciosum	293	178	60.75	175	59.73
Theobroma_subincanum	829	471	56.82	466	56.21
Trattinnickia_burserifolia	294	155	52.72	151	51.36
Trichilia_micrantha	392	233	59.44	229	58.42
Trichilia_pleeana	823	426	51.76	368	44.71
Trichilia_quadrijuga	707	393	55.59	286	40.45
Triplaris_weigeltiana	140	78	55.71	71	50.71
Unonopsis_guatterioides	1121	615	54.86	604	53.88
Vatairea_guianensis	145	97	66.90	92	63.45
Virola_calophylla	1449	636	43.89	628	43.34
Virola_elongata	1736	848	48.85	826	47.58
Virola_michelii	283	106	37.46	98	34.63
Virola_pavonis	866	392	45.27	377	43.53
Virola_sebifera	2604	1283	49.27	1030	39.55
Virola_surinamensis	691	376	54.41	316	45.73
Vitex_cymosa	315	215	68.25	189	60.00
Vouacapoua_americana	91	32	35.16	26	28.57
Xylopia_amazonica	113	81	71.68	79	69.91

	Species	N GBIF records	N cleaned GBIF records	N cleaned GBIF records (% GBIF records)	N kernel-density estimate GBIF records	kernel density estimate GBIF records (% GBIF records)
Zygia_cataractae		524	359	68.51	349	66.60
Zygia_latifolia		514	360	70.04	285	55.45
Zygia_racemosa		242	129	53.31	124	51.24