Legume Abundance Along Successional And Rainfall Gradients In Neotropical Forests

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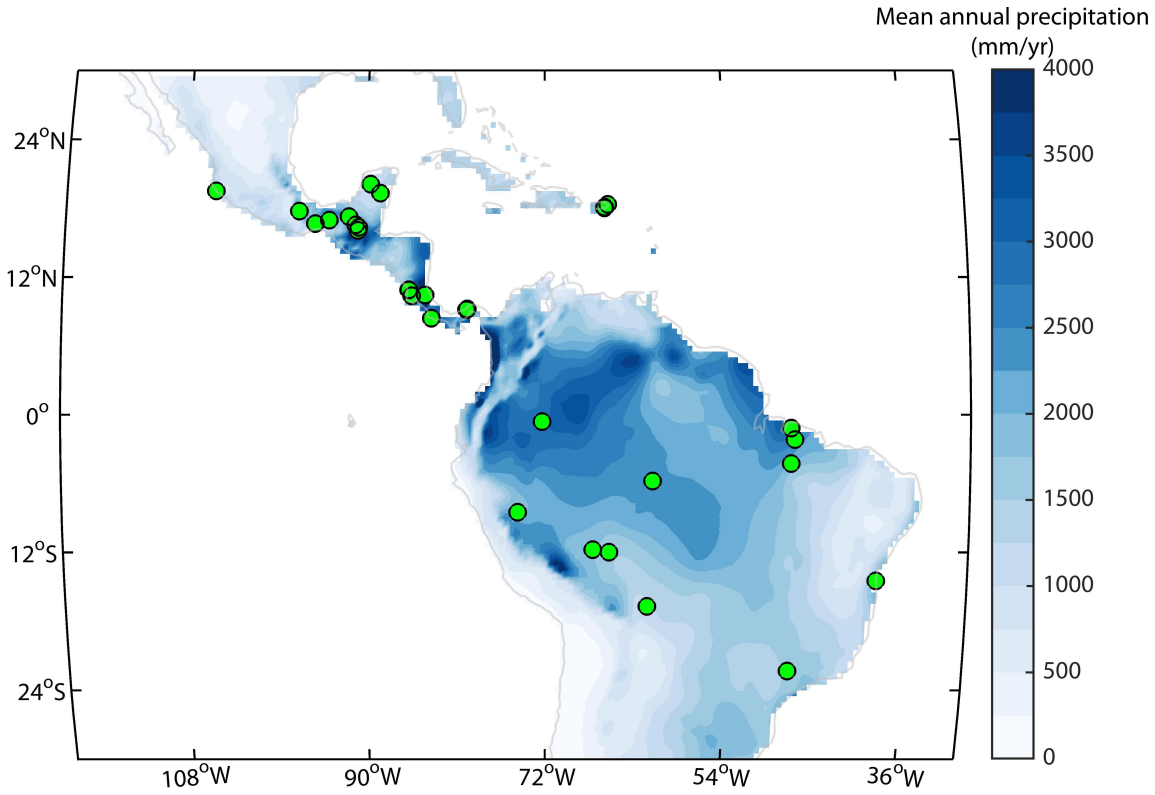
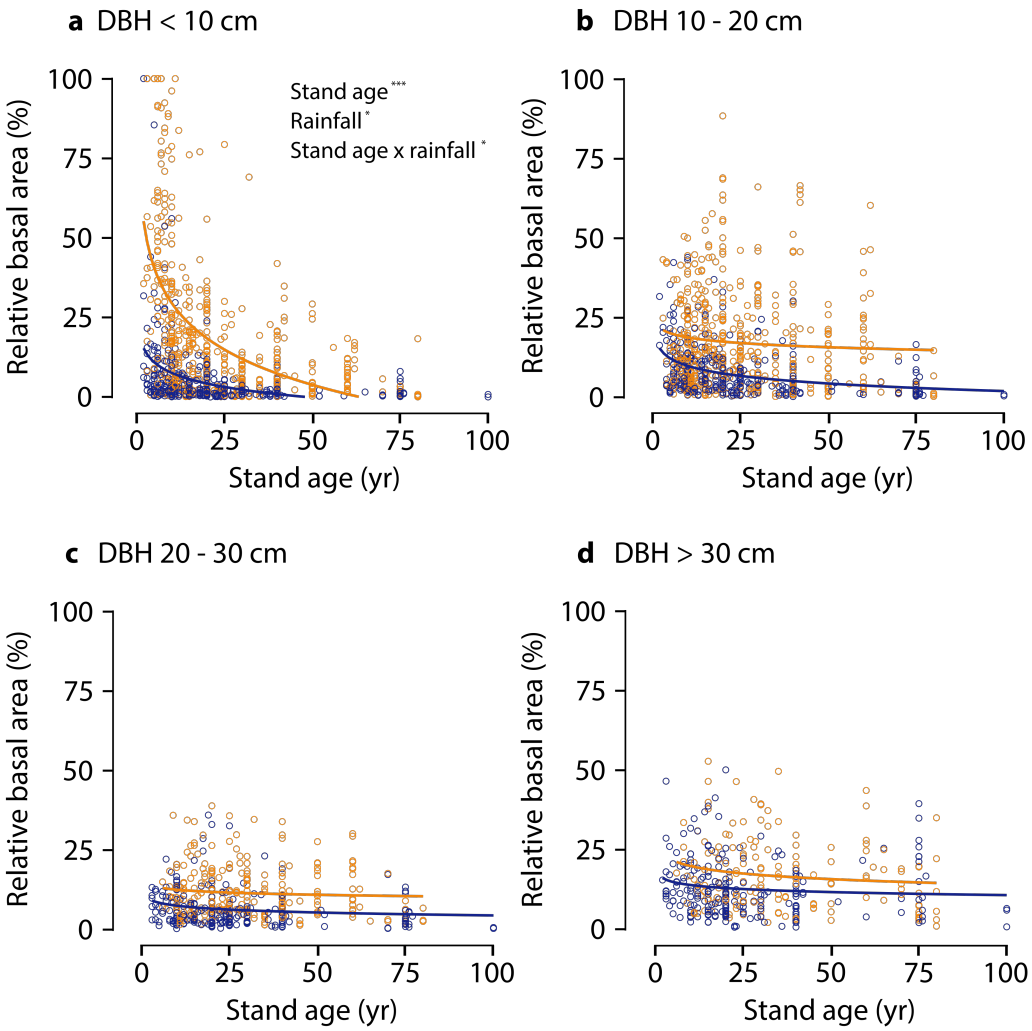
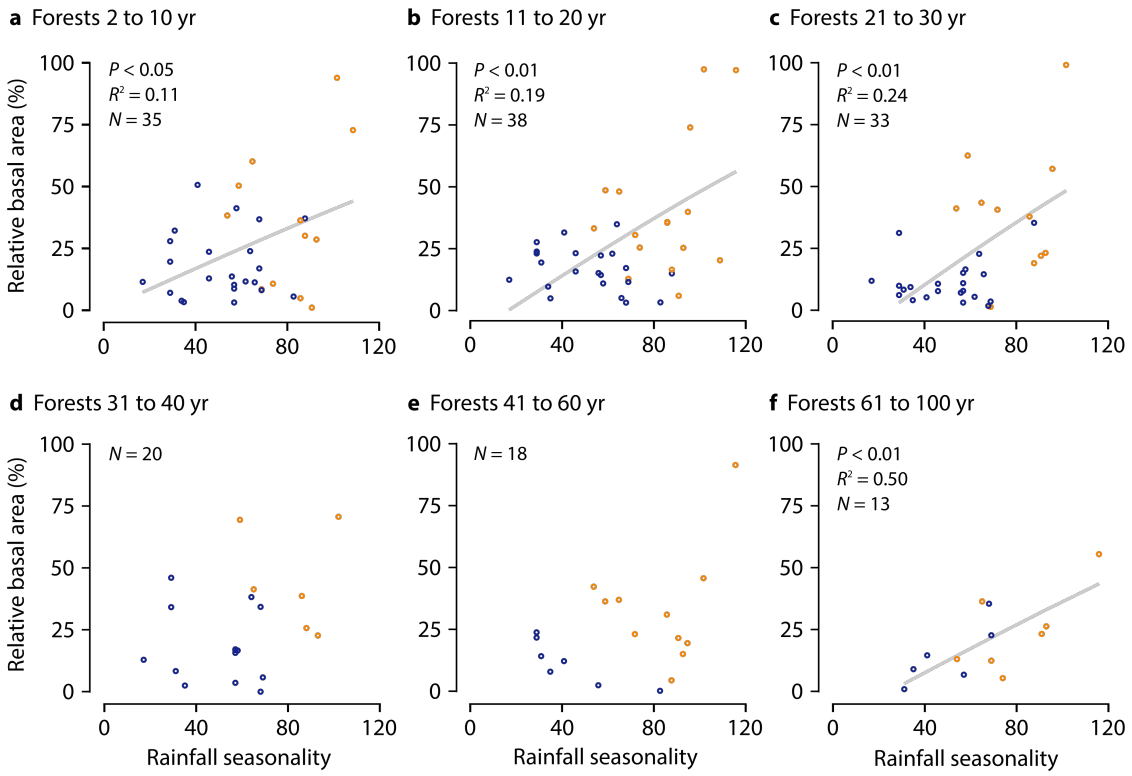


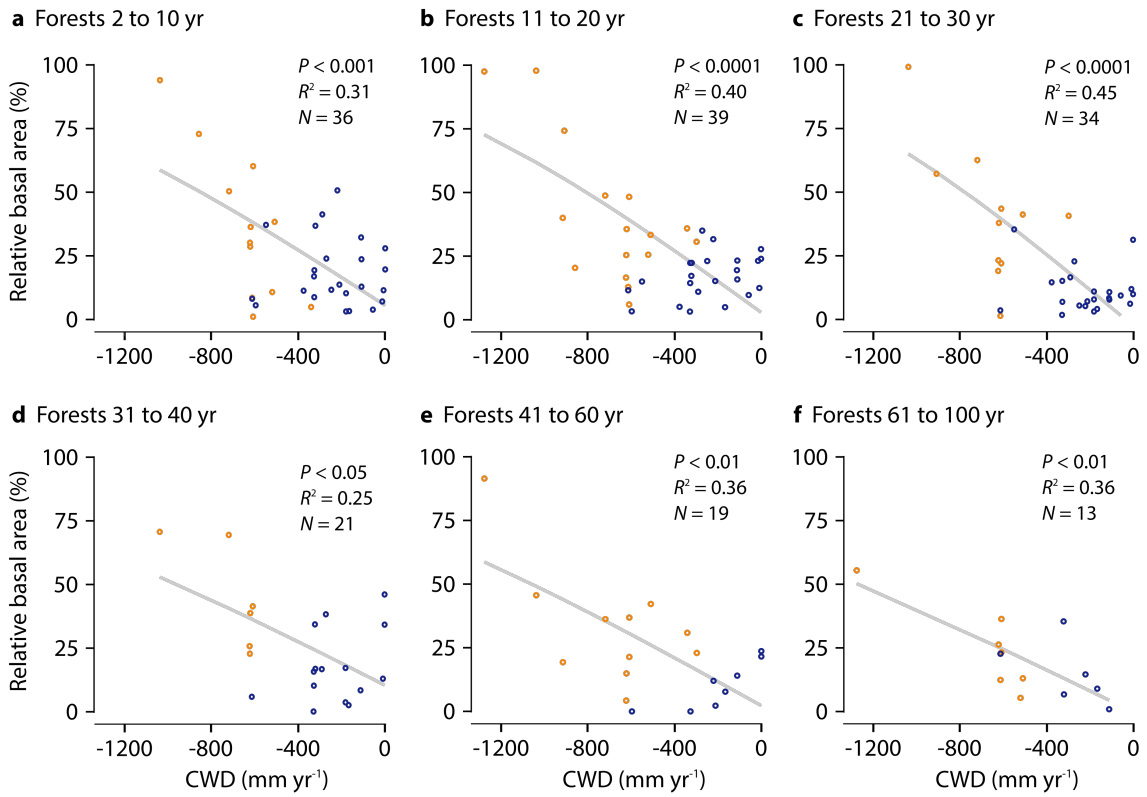
Supplementary Fig. 1 | The 2ndFOR study sites included in this study ($N = 42$). Shading illustrates mean annual precipitation between 1971 and 2010 (derived from the TS2p1 dataset, Climate Research Unit, University of East Anglia)[63].



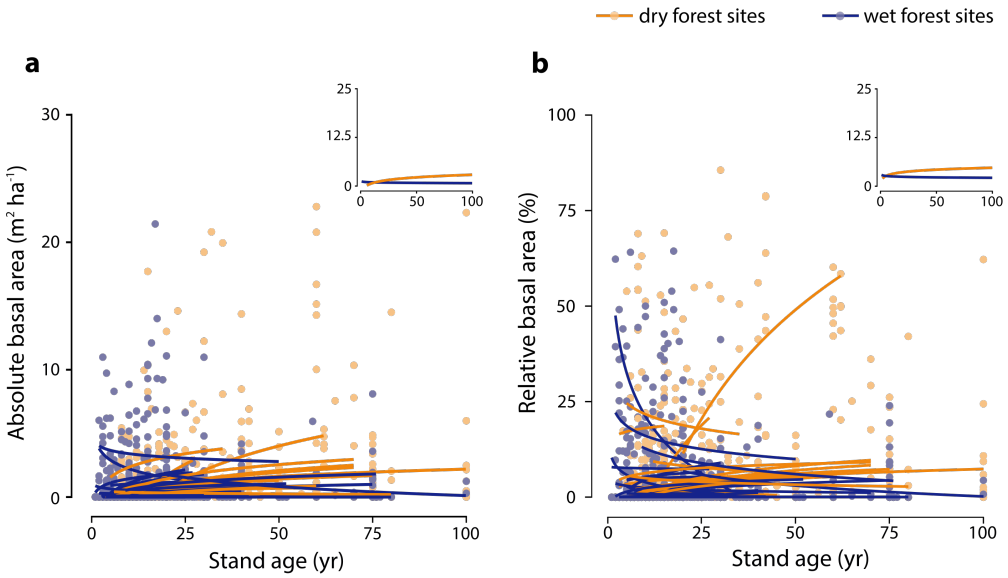
Supplementary Fig. 2 | Plot-level relative basal area of legumes in secondary dry (orange circles) and wet forests (blue circles), stratified by size classes, $N = 42$ sites. Results of a linear mixed model, with stand age and rainfall (and their interaction) as fixed effects and site as random effect are shown ($^{\dagger}P < 0.05$; $^{*}P < 0.01$; $^{**}P < 0.001$; $^{***}P < 0.0001$).



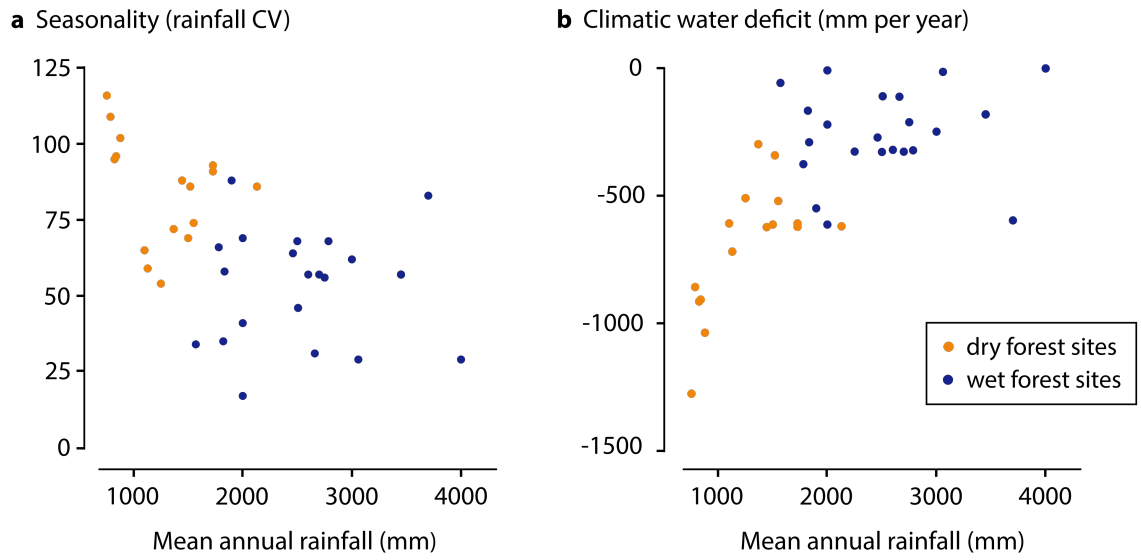
Supplementary Fig. 3 | Relationship between legume relative basal area and rainfall seasonality at sites of similar stand age.
(**a**) 2 to 10 yr old forests, (**b**) 11 to 20 yr old forests, (**c**) 21 to 30 yr old forests, (**d**) 31 to 40 yr old forests, (**e**) 41 to 60 yr old forests, and (**f**) 61 to 100 yr old forests. Dry forest sites are shown orange circles, and wet forests as blue circles. Results of linear regressions performed on arcsin transformed RA are shown in each panel († $P < 0.05$; * $P < 0.01$; ** $P < 0.001$; *** $P < 0.0001$).



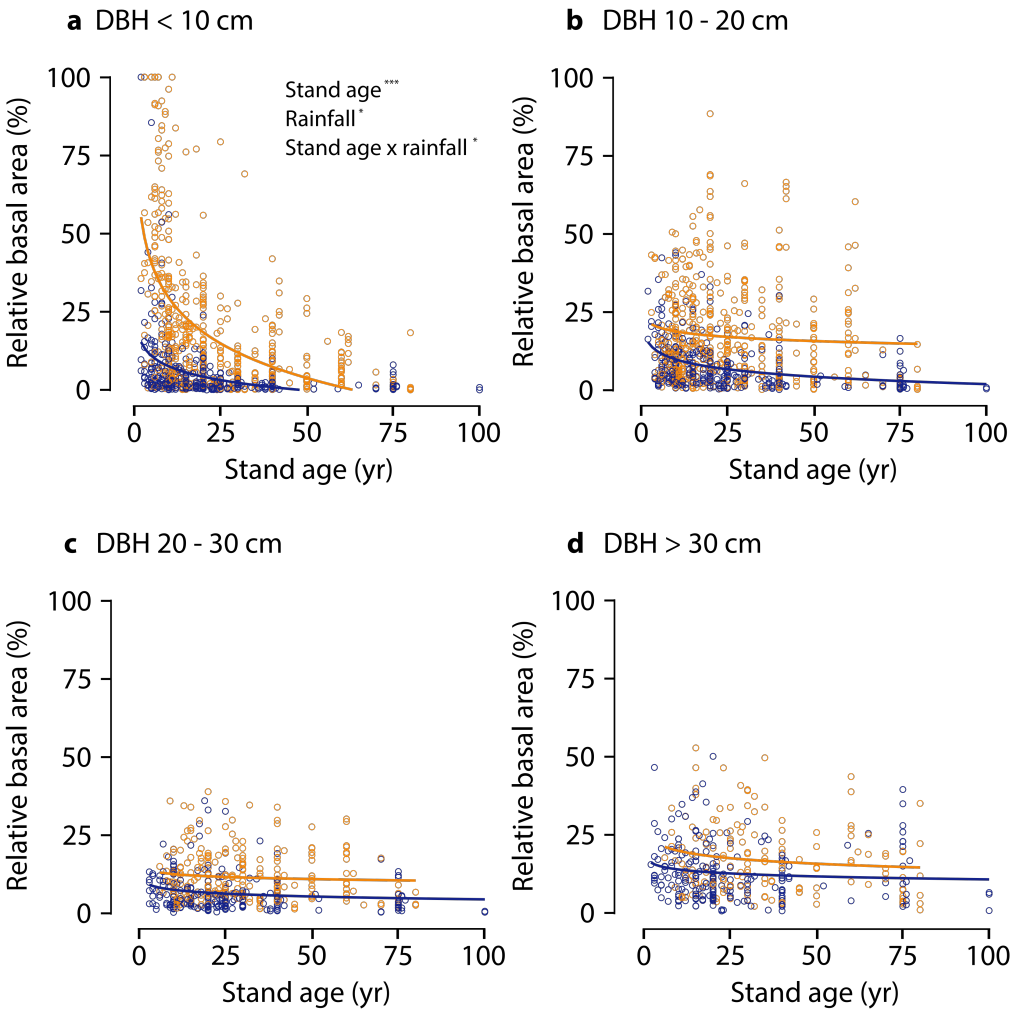
Supplementary Fig. 4 | Relationship between legume relative basal area and climatic water deficit at sites of similar stand age.
(**a**) 2 to 10 yr old forests, (**b**) 11 to 20 yr old forests, (**c**) 21 to 30 yr old forests, (**d**) 31 to 40 yr old forests, (**e**) 41 to 60 yr old forests, and (**f**) 61 to 100 yr old forests. Dry forest sites are shown orange circles, and wet forests as blue circles. Results of linear regressions performed on arcsin transformed RA are shown in each panel († $P < 0.05$; * $P < 0.01$; ** $P < 0.001$; *** $P < 0.0001$).



Supplementary Fig. 5 | Relationship between relative basal area of non-fixing legume species and stand age in Neotropical secondary forests, *N* = 42 sites. (**a**) Plot-level total basal area, and (**b**) relative basal area of non-fixing legumes. Each circle represents one plot and each line the successional trajectory of an individual chronosequence ($N = 42$). In panel (**b**), the dry forest curve with a positive trend (spanning from 1 to 58% relative basal area) describes the observed increase in the relative abundance of *Caesalpinia pyramidalis* in older forests at Patos, Brazil.



Supplementary Fig. 6 | (**a**) Seasonality (rainfall coefficient of variation from WorldClim[25]), $N = 41$ sites (one site was excluded because no climatic data were available), and (**b**) climatic water deficit (calculated as the total rainfall minus evapotranspiration during dry months and expressed in mm/yr[26], http://chave.ups-tlse.fr/pantropical_allometry.htm) in dry and wet forest sites, $N = 42$ sites.



Supplementary Fig. 7 | Relationship between relative basal area of legume species and stand age in Neotropical secondary forests, *N* = 42 sites.
(**a**) Legume species with bipinnate, (**b**) pinnate, and (**c**) unifoliolate leaves. Each line represents a different chronosequence site.

Supplementary Table 1 | Metadata associated with 2ndFOR sites in the Neotropics.

Site	Country	Lat.	Long.	MAT	Rainfall	Forest	CWD	Seasonality	Age	Ref.
El Tigre	Bolivia	-11.98	-65.72	26.3	1780	wet	-375.63	66	3-25	*64*
El Turi	Bolivia	-11.75	-67.33	26	1833	wet	-289.58	58	2-40	*64*
San Lorenzo	Bolivia	-16.7	-61.87	19.2	1129	dry	-718.63	59	3-50	*65*
Bahia	Brazil	-14.48	-39.09	9.8	2000	wet	-7.67	17	10-40	*66*
Cajueiro	Brazil	-14.98	-43.9	24.4	840	dry	-907	96	15-59	
Serra do Cipó	Brazil	-19.35	-43.62	20.9	1519	dry	-341	86	8-50	
Eastern Pará 1	Brazil	-4.26	-47.73	25.8	1898	wet	-548.79	88	5-25	*67*
Eastern Pará 2	Brazil	-2.16	-47.38	26.4	2460	wet	-270.92	64	5-40	*67*
Eastern Pará 3	Brazil	-1.17	-47.75	26.4	2785	wet	-321.25	68	2-70	*67*
Middle Madeira	Brazil	-5.77	-61.43	11.3	2507	wet	-109.25	46	5-30	*68*
Middle Madeira	Brazil	-5.77	-61.43	11.3	2507	wet	-109.25	46	6.5-30	*68*
Mata Seca	Brazil	-14.86	-43.99	24.2	825	dry	-914	95	14-58	*69*
Patos	Brazil	-7.02	-37.25		750	dry	-1276	116	22-64	*70*
São Paulo	Brazil	-22.32	-47.57	20.4	1367	dry	-297.17	72	11-45	*24*
Araracuara	Colombia	-0.6	-72.37	26.8	3059	wet	-13.54	29	2-30	*71*
Nicoya	Costa Rica	9.97	-85.3	25	2130	dry	-619.32	86	5-35	*72*
Matapalo	Costa Rica	8.4	-83.33	26	3450	wet	-180.25	57	5-30	*14*

Site	Country	Lat.	Long.	MAT	Rainfall	Forest	CWD	Seasonality	Age	Ref.
Mogos	Costa Rica	8.4	-83.33	26	3450	wet	-180.25	57	5-40	*14*
Santa Rosa (oak forest)	Costa Rica	10.89	-85.6	25	1727	dry	-608.25	91	5-70	*73*
Palo Verde	Costa Rica	10.36	-85.31	26.5	1444	dry	-622.5	88	7-60	*73*
Piro	Costa Rica	8.4	-83.33	26	3450	wet	-180.25	57	15-40	*14*
Santa Rosa	Costa Rica	10.86	-85.61	24.9	1727	dry	-621.25	93	6-70	*73*
Sarapiqui (Chazdon)	Costa Rica	10.43	-83.98	26	4000	wet	0	29	10-41	*74*
Sarapiqui (Letcher)	Costa Rica	10.43	-83.98	26	4000	wet	0	29	10-42	*75*
Chajul	Mexico	16.07	-90.75	25.5	3000	wet	-248	62	0-27	*76*
Chamela	Mexico	19.5	-105.05	26.4	788	dry	-857.54	109	3-15	*77*
Chinantla	Mexico	17.75	-96.65	18.4	3700	wet	-596.08	83	5-50	*24*
El Ocote 1	Mexico	16.96	-93.63	21.8	1500	dry	-612.42	69	2-75	*78*
El Ocote 2	Mexico	16.96	-93.63	21.8	2000	wet	-612.42	69	3-75	*78*
JM Morelos	Mexico	19.31	-88.57	25.8	1250	dry	-508.96	54	2-100	*79*
Kaxil Kiuic	Mexico	20.08	-89.55	25.6	1100	dry	-608.13	65	3-70	*80*
Lacandona	Mexico	16.54	-90.96	24.6	2500	wet	-327.71	68	1-31	*24*
Marqués de Comillas	Mexico	16.33	-90.67		2250	wet	-326.21	NA	2-50	*24*
Nizanda	Mexico	16.66	-95.01	26.2	878	dry	-1036.88	102	2-60	*81*
Zona Norte	Mexico	17.27	-91.66	25.8	2750	wet	-211	56	2-52	*24*

Site	Country	Lat.	Long.	MAT	Rainfall	Forest	CWD	Seasonality	Age	Ref.
Agua Salud	Panama	9.22	-79.78	26	2700	wet	-326.63	57	2-31	*82*
Barro Colorado	Panama	9.15	-79.85	26	2600	wet	-319.46	57	20-100	*83*
Playa Venado	Panama	7.43	-80.18	26.4	1550	dry	-520.05	74	6-80	
Pucallpa	Peru	-8.5	-74.8	26.2	1570	wet	-56.83	34	5-30	*24*
Cayey	Puerto Rico	18.02	-66.08	21.5	2000	wet	-220.17	41	10-80	*84*
El Carite	Puerto Rico	18.08	-66.07	21.5	1822	wet	-165.79	35	4-77	*85*
Luquillo	Puerto Rico	18.34	-65.76	24.4	2660	wet	-111	31	9-76	*85*

Supplementary Table 2 | Taxonomic distribution[45], nitrogen fixation potential, and leaf arrangement in the 398 legume species present at our 42 study sites.

Functional trait or subfamily	Number of species	Percentage of total species within each trait or category
Leguminosae subfamily		
Caesalpinioideae	216	54%
Cercidoideae	12	3%
Detarioideae	9	2%
Dialioideae	3	1%
Papilionoideae	158	40%
N fixation potential		
Fixer	298	75%
Non-fixer	96	24%
Unknown fixation	4	1%
Leaf type		
Bipinnate	104	26%
Pinnate	275	69%
Unifoliolate	19	5%
N-fixing species and leaf type		
Fixer bipinnate	75	25%
Fixer pinnate	219	73%
Fixer unifoliolate	4	1%
Non-fixing species and leaf type		
Non-fixer bipinnate	25	26%
Non-fixer pinnate	56	58%
Non-fixer unifoliolate	15	16%
Bipinnate leaves and N fixation potential		
Bipinnate fixer	75	72%
Bipinnate non-fixer	25	24%
Bipinnate unknown fixation	4	4%
Pinnate leaves and N fixation potential		
Pinnate fixer	219	80%
Pinnate non-fixer	56	20%
Unifoliolate leaves and N fixation potential		
Unifoliolate fixer	4	21%
Unifoliolate non-fixer	15	79%

Supplementary Table 3 | List of 398 Leguminosae species present in 42 Neotropical chronosequences, their current[45] (and previous[46]) subfamily classification, their potential to form symbioses with N-fixing bacteria, leaf type, and average (and standard deviation) leaflet length and width (cm).

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Abarema adenophora	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	5.03 ± 1.45	3.44 ± 1.12
Abarema aggregatum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate		
Abarema barbouriana	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.93 ± 0.45	0.43 ± 0.19
Abarema cochleata	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	4.84 ± 1.26	2.44 ± 0.42
Abarema jupunba	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.54 ± 1.18	1.5 ± 0.7
Abarema macradenia	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.66 ± 0.77	1.14 ± 0.43
Abarema turbinata	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	9.8 ± 2.94	3.84 ± 1.2
Acacia pennatula	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.18 ± 0.04	0.06 ± 0.03
Acosmium cardenasii	Papilionoideae	Yes	pinnate	1.26 ± 0.41	0.41 ± 0.11
Acosmium lentiscifolium	Papilionoideae	Yes	pinnate	3.23 ± 1.75	1.16 ± 0.53
Albizia adinocephala	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	4.41 ± 1.52	1.44 ± 0.36
Albizia leucocalyx	Caesalpinioideae (Mimosoideae)	Yes	bipinnate		
Albizia niopoides	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.67 ± 0.31	0.13 ± 0.05
Albizia occidentalis	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.8 ± 0.39	3.23 ± 0.79
Albizia polycephala	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.63 ± 0.19	0.27 ± 0.09
Albizia tomentosa	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.14 ± 0.14	0.44 ± 0.05

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Alexa grandiflora	Papilionoideae	No	pinnate	4.95 ± 2.28	2.99 ± 1.45
Amburana cearensis	Papilionoideae	No	pinnate	9.94 ± 5.47	4.02 ± 1.72
Anadenanthera colubrina	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.48 ± 0.14	0.13 ± 0.04
Andira inermis	Papilionoideae	Yes	pinnate	7.23 ± 1.14	2.66 ± 0.63
Andira legalis	Papilionoideae	Yes	pinnate	10.95 ± 3.27	5.04 ± 1.93
Andira lewisii	Papilionoideae	Yes	pinnate		
Andira multistipula	Papilionoideae	Yes	pinnate	7.97 ± 3.15	2.73 ± 1.04
Andira parviflora	Papilionoideae	Yes	pinnate	3.9 ± 1.14	1.76 ± 0.34
Apoplanesia paniculata	Papilionoideae	No	pinnate	3.35 ± 1.11	1.29 ± 0.25
Apuleia leiocarpa	Dialioideae (Caesalpinioideae)	No	pinnate	3.39 ± 0.86	1.71 ± 0.33
Arapatiella psilophylla	Caesalpinioideae	No	pinnate	7.89 ± 1.44	3.51 ± 0.66
Ateleia cubensis	Papilionoideae	Yes	pinnate	3.22 ± 0.97	1.52 ± 0.27
Ateleia herbert-smithii	Papilionoideae	Yes	pinnate	6.98 ± 1.09	3.46 ± 0.45
Balizia elegans	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.45 ± 0.08	0.15 ± 0.03
Balizia leucocalix	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.57 ± 0.54	1.37 ± 0.37
Balizia pedicellaris	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.67 ± 0.13	0.21 ± 0.04
Batesia floribunda	Caesalpinioideae	No	pinnate	11.35 ± 2.51	4.87 ± 0.92
Bauhinia acreana	Cercidoideae (Caesalpinioideae)	No	unifoliolate	7.7 ± 1.13	6.02 ± 1.56
Bauhinia acuruana	Cercidoideae (Caesalpinioideae)	No	unifoliolate	6.21 ± 2.4	4.03 ± 1.12
Bauhinia brevipes	Cercidoideae (Caesalpinioideae)	No	unifoliolate	4.31 ± 0.95	2.32 ± 0.49
Bauhinia cheilantha	Cercidoideae (Caesalpinioideae)	No	unifoliolate	7.72 ± 1.78	7.6 ± 1.4
Bauhinia divaricata	Cercidoideae (Caesalpinioideae)	No	unifoliolate	5.87 ± 2.97	6.51 ± 1.54
Bauhinia guianensis	Cercidoideae (Caesalpinioideae)	No	bifoliolate	11.19 ± 3.93	3.79 ± 0.59

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Bauhinia longicuspis	Cercidoideae (Caesalpinioideae)	No	unifoliolate	12.93 ± 1.74	6 ± 2.23
Bauhinia melastomatoides	Cercidoideae (Caesalpinioideae)	No	unifoliolate	17.47 ± 1.71	7.33 ± 1.04
Bauhinia ovata	Cercidoideae (Caesalpinioideae)	No	unifoliolate	7.72 ± 0.9	4.83 ± 0.9
Bauhinia pauletia	Cercidoideae (Caesalpinioideae)	No	unifoliolate	4.04 ± 1.08	4.23 ± 1.46
Bauhinia rufa	Cercidoideae (Caesalpinioideae)	No	unifoliolate	8.42 ± 2.34	7.64 ± 1.81
Bauhinia ungulata	Cercidoideae (Caesalpinioideae)	No	unifoliolate	8.42 ± 4.32	6.17 ± 3.06
Bowdichia virgilioides	Papilionoideae	Yes	pinnate	3.36 ± 0.82	1.42 ± 0.56
Caesalpinia caladenia	Caesalpinioideae	No	bipinnate	1.67 ± 0.45	0.92 ± 0.26
Caesalpinia coriaria	Caesalpinioideae	No	bipinnate	0.45 ± 0.08	0.15 ± 0.02
Caesalpinia eriostachys	Caesalpinioideae	No	bipinnate	0.95 ± 0.21	0.45 ± 0.06
Caesalpinia exostemma	Caesalpinioideae	No	bipinnate	1.73 ± 0.44	0.86 ± 0.17
Caesalpinia ferrea	Caesalpinioideae	No	bipinnate	1.66 ± 0.51	0.89 ± 0.26
Caesalpinia floribunda	Caesalpinioideae	No	bipinnate	0.72 ± 0.13	0.4 ± 0.04
Caesalpinia gaumeri	Caesalpinioideae	No	bipinnate	1.68 ± 0.35	0.98 ± 0.22
Caesalpinia mollis	Caesalpinioideae	No	bipinnate	4.46 ± 1.32	1.89 ± 0.27
Caesalpinia platyloba	Caesalpinioideae	No	bipinnate	3.35 ± 1.06	1.55 ± 0.2
Caesalpinia pyramidalis	Caesalpinioideae	No	bipinnate	1.96 ± 0.36	1.22 ± 0.17
Caesalpinia sclerocarpa	Caesalpinioideae	No	bipinnate	1.61 ± 0.56	0.87 ± 0.32
Caesalpinia yucatanensis	Caesalpinioideae	No	bipinnate	3.08 ± 0.86	1.46 ± 0.44
Calliandra formosa	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.69 ± 0.23	0.31 ± 0.08
Calliandra grandiflora	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.39 ± 0.18	0.11 ± 0.04
Cassia fastuosa	Caesalpinioideae	No	pinnate	3.78 ± 0.8	1.01 ± 0.15
Cassia ferruginea	Caesalpinioideae	No	pinnate	2.74 ± 0.5	0.86 ± 0.09
Cassia grandis	Caesalpinioideae	No	pinnate	4.04 ± 1.47	1.39 ± 0.23

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Cenostigma tocantinum	Caesalpinioideae	No	pinnate	9.55 ± 2.83	3.67 ± 0.76
Centrolobium microchaete	Papilionoideae	Yes	pinnate	5.53 ± 1.88	4.08 ± 2.36
Centrolobium sclerophyllum	Papilionoideae	Yes	pinnate	7.48 ± 1.91	4.38 ± 0.9
Centrolobium tomentosum	Papilionoideae	Yes	pinnate	9.75 ± 2.28	5.21 ± 1.33
Ceratonia siliqua	Caesalpinioideae	No	pinnate	4.82 ± 0.81	3.17 ± 0.54
Chamaecrista apoucouita	Caesalpinioideae	Yes	pinnate	5.76 ± 1.27	2.56 ± 0.6
Chamaecrista bahiae	Caesalpinioideae	Yes	pinnate	7.63 ± 1.89	4.36 ± 0.8
Chamaecrista duartei	Caesalpinioideae	Yes	pinnate	9.94 ± 2.64	4.37 ± 0.8
Chamaecrista eitenorum	Caesalpinioideae	Yes	pinnate	5.47 ± 1.28	2.77 ± 0.67
Chamaecrista xinguensis	Caesalpinioideae	Yes	pinnate	5.91 ± 2.23	2.46 ± 1
Chloroleucon dumosum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.77 ± 0.19	0.26 ± 0.1
Chloroleucon foliolosum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.22 ± 0.1	0.07 ± 0.02
Chloroleucon mangense	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.72 ± 0.26	0.29 ± 0.18
Clathrotropis macrocarpa	Papilionoideae	Yes	pinnate	12.6 ± 4.63	5.14 ± 1.34
Clitoria glaberrima	Papilionoideae	Yes	pinnate	10.06 ± 3.22	5.26 ± 1.55
Cojoba arborea	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.59 ± 0.18	0.13 ± 0.03
Copaifera langsdorffii	Detarioideae (Caesalpinioideae)	No	pinnate	3.18 ± 1	1.65 ± 0.44
Coursertia ferruginea	Papilionoideae	Yes	pinnate	3.25 ± 0.94	1.87 ± 0.28
Crotalaria maypurensis	Papilionoideae	Yes	pinnate	4.85 ± 1.33	1.54 ± 0.32
Crudia amazonica	Detarioideae (Caesalpinioideae)	No	pinnate	5.37 ± 1.47	1.64 ± 0.34
Dalbergia acuta	Papilionoideae	Yes	pinnate	1.81 ± 0.6	0.63 ± 0.15
Dalbergia brownei	Papilionoideae	Yes	pinnate	3.99 ± 1.2	2.78 ± 1.18

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Dalbergia cearensis	Papilionoideae	Yes	pinnate	3.41 ± 0.99	1.77 ± 0.63
Dalbergia congestiflora	Papilionoideae	Yes	pinnate	2.97 ± 0.95	1.6 ± 0.54
Dalbergia glomerata	Papilionoideae	Yes	pinnate	4.32 ± 1.19	1.92 ± 0.44
Dalbergia monetaria	Papilionoideae	Yes	pinnate	8.05 ± 3.1	4.86 ± 1.19
Dalbergia retusa	Papilionoideae	Yes	pinnate	6.36 ± 2.1	3.11 ± 1.18
Dalbergia spruceana	Papilionoideae	Yes	pinnate	2.96 ± 0.88	1.26 ± 0.22
Dalbergia stevensonii	Papilionoideae	Yes	pinnate	6.46 ± 0.47	3.08 ± 0.21
Dialium guianense	Dialioideae (Caesalpinioideae)	No	pinnate	7.94 ± 3.08	3.45 ± 0.74
Diphysa americana	Papilionoideae	Yes	pinnate	2.49 ± 0.48	1.33 ± 0.19
Diphysa carthagenensis	Papilionoideae	Yes	pinnate	1.04 ± 0.3	0.51 ± 0.2
Diphysa robinioides	Papilionoideae	Yes	pinnate	2.19 ± 0.43	0.8 ± 0.11
Diphysa yucatanensis	Papilionoideae	Yes	pinnate	3.16 ± 0.84	1.74 ± 0.5
Diplotropis ferruginea	Papilionoideae	Yes	pinnate	5.35 ± 1.63	2.68 ± 0.34
Diplotropis incexis	Papilionoideae	Yes	pinnate	5.87 ± 1.3	2.79 ± 0.25
Diplotropis martiusii	Papilionoideae	Yes	pinnate	10.51 ± 3.01	4.34 ± 1.15
Diplotropis purpurea	Papilionoideae	Yes	pinnate	7.89 ± 2.31	4.49 ± 0.97
Diplotropis triloba	Papilionoideae	Yes	pinnate	8.02 ± 1.37	4.17 ± 0.82
Dipteryx odorata	Papilionoideae	No	pinnate	13.37 ± 2.89	5.68 ± 0.78
Dipteryx oleifera	Papilionoideae	No	pinnate		
Dipteryx panamensis	Papilionoideae	No	pinnate	11.47 ± 1.73	5.14 ± 0.58
Diptychandra aurantiaca	Caesalpinioideae	No	pinnate	4.16 ± 1.06	1.89 ± 0.39
Dussia macroprophyllata	Papilionoideae	Yes	pinnate	9.98 ± 2.63	5.93 ± 1.09
Enterolobium contortisiliquum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.62 ± 0.66	0.53 ± 0.21
Enterolobium cyclocarpum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.93 ± 0.28	0.25 ± 0.05
Enterolobium schomburgkii	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.25 ± 0.08	0.05 ± 0.02
Erythrina berteroana	Papilionoideae	Yes	pinnate	8.06 ± 0.75	5.22 ± 1.13
Erythrina costaricensis	Papilionoideae	Yes	pinnate	9.02 ± 0.31	5.66 ± 0.84
Erythrina folkersii	Papilionoideae	Yes	pinnate	7.76 ± 2.32	6.84 ± 1.39
Erythrina standleyana	Papilionoideae	Yes	pinnate		

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Exostyles venusta	Papilionoideae	No	pinnate	2.95 ± 1.09	1.38 ± 0.29
Gliricidia maculata	Papilionoideae	Yes	pinnate		
Gliricidia sepium	Papilionoideae	Yes	pinnate	5.4 ± 1.38	2.79 ± 0.84
Goniorrhachis marginata	Detarioideae (Caesalpinioideae)	No	pinnate	4.13 ± 1.05	1.85 ± 0.23
Haematoxylum brasiletto	Caesalpinioideae	No	pinnate	2.59 ± 3.61	0.72 ± 0.12
Haematoxylum campechianum	Caesalpinioideae	No	pinnate	1.67 ± 0.28	1.4 ± 0.16
Harleyodendron unifoliolatum	Papilionoideae	No	unifoliolate	26.31 ± 5.4	7.51 ± 1.27
Havardia albicans	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.59 ± 0.12	0.15 ± 0.02
Havardia campylacantha	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.26 ± 0.08	0.07 ± 0.03
Hymenaea courbaril	Detarioideae (Caesalpinioideae)	No	pinnate	7.32 ± 1.19	3.14 ± 0.3
Hymenaea parvifolia	Detarioideae (Caesalpinioideae)	No	pinnate	6.97 ± 1.4	3.46 ± 0.8
Hymenolobium mesoamericanum	Papilionoideae	Yes	pinnate	4.56 ± 1.42	1.99 ± 0.45
Indigofera fruticosa	Papilionoideae	Yes	pinnate	2.12 ± 0.24	1.16 ± 0.22
Inga acrocephala	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.52 ± 4	3.99 ± 1.16
Inga acuminata	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.07 ± 2.82	2.76 ± 0.88
Inga aestuariorum	Caesalpinioideae (Mimosoideae)	Yes	pinnate		
Inga alba	Caesalpinioideae (Mimosoideae)	Yes	pinnate	5.92 ± 2.86	4.12 ± 3.32
Inga auristellae	Caesalpinioideae (Mimosoideae)	Yes	pinnate	5.66 ± 2.69	2.62 ± 0.81
Inga bella	Caesalpinioideae (Mimosoideae)	Yes	pinnate	15.53 ± 3.74	6.82 ± 1.55

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Inga blanchetiana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.57 ± 3.45	2.15 ± 0.69
Inga brachyrhachis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	15.03 ± 4.4	6.79 ± 1.8
Inga capitata	Caesalpinioideae (Mimosoideae)	Yes	pinnate	8.3 ± 3.78	3.38 ± 1.56
Inga cayennensis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	8.09 ± 3.19	3.6 ± 1.27
Inga chartacea	Caesalpinioideae (Mimosoideae)	Yes	pinnate	16.51 ± 3.65	7.45 ± 1.97
Inga chocoensis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	15.77 ± 7.06	9.35 ± 3.45
Inga chrysantha	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.08 ± 3.48	3.19 ± 1.04
Inga cinnamomea	Caesalpinioideae (Mimosoideae)	Yes	pinnate	12.2 ± 3.27	5.02 ± 0.95
Inga cocleensis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	11.54 ± 4.08	4.27 ± 1.13
Inga coruscans	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.82 ± 4.5	4.29 ± 1.77
Inga disticha	Caesalpinioideae (Mimosoideae)	Yes	pinnate	7.85 ± 2.68	2.87 ± 0.74
Inga edulis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	8.89 ± 3.51	4.1 ± 1.85
Inga filiformis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	17.57 ± 6.36	7.53 ± 1.78
Inga flagelliformis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	11.28 ± 2.27	3.46 ± 0.77
Inga goldmanii	Caesalpinioideae (Mimosoideae)	Yes	pinnate		
Inga gracilifolia	Caesalpinioideae (Mimosoideae)	Yes	pinnate	2.81 ± 0.7	1.11 ± 0.29
Inga grandiflora	Caesalpinioideae (Mimosoideae)	Yes	pinnate	13.92 ± 4.39	5.55 ± 1.73

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Inga hayesii	Caesalpinioideae (Mimosoideae)	Yes	pinnate	7.41 ± 1.9	3.56 ± 0.67
Inga heterophylla	Caesalpinioideae (Mimosoideae)	Yes	pinnate	4.89 ± 1.19	1.72 ± 0.41
Inga ingoides	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.32 ± 2.33	4.59 ± 1.2
Inga jimenezii	Caesalpinioideae (Mimosoideae)	Yes	pinnate	18.25 ± 5.89	8.09 ± 2.03
Inga jinicuil	Caesalpinioideae (Mimosoideae)	Yes	pinnate	8.33 ± 3.2	3.4 ± 1.22
Inga lateriflora	Caesalpinioideae (Mimosoideae)	Yes	pinnate	5.89 ± 1.42	2.33 ± 0.69
Inga latibracteata	Caesalpinioideae (Mimosoideae)	Yes	pinnate	8.55 ± 3.93	4.33 ± 1.78
Inga laurina	Caesalpinioideae (Mimosoideae)	Yes	pinnate	6.12 ± 3	2.76 ± 1.28
Inga leiocalycina	Caesalpinioideae (Mimosoideae)	Yes	pinnate	8.15 ± 3.8	3.38 ± 1.36
Inga litoralis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.82 ± 3.03	4.17 ± 0.93
Inga lomatophylla	Caesalpinioideae (Mimosoideae)	Yes	pinnate	13.28 ± 4.06	6.92 ± 2.02
Inga longiflora	Caesalpinioideae (Mimosoideae)	Yes	pinnate	12.71 ± 4.43	4.07 ± 1.01
Inga luschnathiana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	5.17 ± 2.08	5.47 ± 4.1
Inga macrophylla	Caesalpinioideae (Mimosoideae)	Yes	pinnate	12.34 ± 3.13	6.38 ± 1.48
Inga marginata	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.12 ± 3.25	2.96 ± 0.65
Inga micheliana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	7.33 ± 2.98	3.03 ± 1.43
Inga microcalyx	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.76 ± 3.6	5.87 ± 1.92

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Inga mucuna	Caesalpinioideae (Mimosoideae)	Yes	pinnate	12.64 ± 2.17	6 ± 1.14
Inga multijuga	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.12 ± 4.88	3.52 ± 1.49
Inga nobilis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	7.68 ± 2.34	2.94 ± 1.13
Inga obidensis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.36 ± 2.54	4.16 ± 0.84
Inga oerstediana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.23 ± 3.17	4.63 ± 2.39
Inga paraensis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.18 ± 3.2	4.99 ± 1.18
Inga pauciflora	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.47 ± 3.85	4.33 ± 1.52
Inga pavoniana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	12.77 ± 4.68	6.25 ± 2.89
Inga pezizifera	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.54 ± 3.95	4.58 ± 1.09
Inga pilosula	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.2 ± 3.75	4.51 ± 1.37
Inga pleiogyna	Caesalpinioideae (Mimosoideae)	Yes	pinnate	15.81 ± 4.8	7.06 ± 2.06
Inga portobellensis	Caesalpinioideae (Mimosoideae)	Yes	pinnate		
Inga punctata	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.84 ± 4.49	5.26 ± 2.26
Inga rubiginosa	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.36 ± 3.3	4.91 ± 1.84
Inga ruiziana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	15.63 ± 5.45	7.29 ± 2.4
Inga sapindioides	Caesalpinioideae (Mimosoideae)	Yes	pinnate		
Inga sertulifera	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.58 ± 3.67	4.63 ± 1.91

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Inga spectabilis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	11.68 ± 4.77	5.99 ± 2.9
Inga stipularis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	11.96 ± 2.58	5.32 ± 1.56
Inga tenuis	Caesalpinioideae (Mimosoideae)	Yes	pinnate	2.17 ± 0.63	0.9 ± 0.18
Inga thibaudiana	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.06 ± 2.86	4.48 ± 1.55
Inga tonduzii	Caesalpinioideae (Mimosoideae)	Yes	pinnate	10.54 ± 4.34	5.62 ± 1.92
Inga umbellifera	Caesalpinioideae (Mimosoideae)	Yes	pinnate	7.6 ± 2.57	2.3 ± 0.65
Inga venusta	Caesalpinioideae (Mimosoideae)	Yes	pinnate	11.65 ± 4.49	4.95 ± 2.65
Inga vera	Caesalpinioideae (Mimosoideae)	Yes	pinnate	9.36 ± 4.12	3.69 ± 1.62
Leptolobium panamense	Papilionoideae	Yes	pinnate	4.85 ± 1.5	2.1 ± 0.43
Leucaena lanceolata	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.72 ± 1.08	1.14 ± 0.4
Leucaena leucocephala	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.86 ± 0.2	0.19 ± 0.04
Lonchocarpus acuminatus	Papilionoideae	Yes	pinnate	5.74 ± 1.22	3 ± 0.75
Lonchocarpus campestris	Papilionoideae	Yes	pinnate	3.66 ± 1.58	1.56 ± 0.44
Lonchocarpus castilloi	Papilionoideae	Yes	pinnate	4.57 ± 1.13	1.21 ± 0.18
Lonchocarpus costaricensis	Papilionoideae	Yes	pinnate	8.56 ± 3.86	5.27 ± 2.14
Lonchocarpus felipei	Papilionoideae	Yes	pinnate	10.13 ± 4.51	5.9 ± 2.76
Lonchocarpus ferrugineus	Papilionoideae	Yes	pinnate	20.37 ± 4.4	8.84 ± 2.28
Lonchocarpus guatemalensis	Papilionoideae	Yes	pinnate	6.99 ± 2.55	3.15 ± 1.19

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Lonchocarpus heptaphyllus	Papilionoideae	Yes	pinnate	9.68 ± 2.74	4.31 ± 1.46
Lonchocarpus hondurensis	Papilionoideae	Yes	pinnate	6.36 ± 2.29	2.91 ± 1.06
Lonchocarpus hughesii	Papilionoideae	Yes	pinnate	1.32 ± 0.25	0.58 ± 0.06
Lonchocarpus lanceolatus	Papilionoideae	Yes	pinnate	4.85 ± 0.84	1.92 ± 0.31
Lonchocarpus macrophyllus	Papilionoideae	Yes	pinnate		
Lonchocarpus minimiflorus	Papilionoideae	Yes	pinnate	3.48 ± 1.69	1.65 ± 0.77
Lonchocarpus montanus	Papilionoideae	Yes	pinnate		
Lonchocarpus mutans	Papilionoideae	Yes	pinnate	5.44 ± 0.87	2.44 ± 0.44
Lonchocarpus parviflorus	Papilionoideae	Yes	pinnate	3.45 ± 1.51	1.68 ± 0.71
Lonchocarpus peninsularis	Papilionoideae	Yes	pinnate	5.74 ± 1.22	3 ± 0.75
Lonchocarpus phaseolifolius	Papilionoideae	Yes	pinnate	6.46 ± 4.2	4.49 ± 2.66
Lonchocarpus rugosus	Papilionoideae	Yes	pinnate	4.14 ± 1.01	1.6 ± 0.23
Lonchocarpus salvadorensis	Papilionoideae	Yes	pinnate	7.21 ± 1.39	3.19 ± 0.71
Lonchocarpus sericeus	Papilionoideae	Yes	pinnate	7.94 ± 2.75	3.95 ± 0.97
Lonchocarpus torresiorum	Papilionoideae	Yes	pinnate		
Lonchocarpus velutinus	Papilionoideae	Yes	pinnate	10.56 ± 4.32	4.32 ± 1.9
Lonchocarpus xuul	Papilionoideae	Yes	pinnate	4.99 ± 1.08	2.28 ± 0.4
Lonchocarpus yucatanensis	Papilionoideae	Yes	pinnate	4.15 ± 1.4	1.88 ± 0.46
Luetzelburgia andrade-limae	Papilionoideae	No	pinnate		
Lysiloma acapulcense	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.33 ± 0.09	0.09 ± 0.01

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Lysiloma auritum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.2 ± 0.13	0.35 ± 0.69
Lysiloma divaricatum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.34 ± 0.21	0.13 ± 0.09
Lysiloma latisiliquum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.75 ± 2.57	1.03 ± 1.46
Lysiloma microphyllum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.3 ± 0.08	0.12 ± 0.03
Machaerium acutifolium	Papilionoideae	Yes	pinnate	5.93 ± 0.84	2.75 ± 0.31
Machaerium biovulatum	Papilionoideae	Yes	pinnate	4.02 ± 0.87	2.24 ± 0.35
Machaerium brasiliense	Papilionoideae	Yes	pinnate	4.43 ± 1.16	1.69 ± 0.26
Machaerium hirtum	Papilionoideae	Yes	pinnate	1.47 ± 0.28	0.37 ± 0.06
Machaerium hoehneanum	Papilionoideae	Yes	pinnate	7.26 ± 1.86	2.57 ± 0.3
Machaerium nyctitans	Papilionoideae	Yes	pinnate	2.18 ± 0.51	0.87 ± 0.31
Machaerium pittieri	Papilionoideae	Yes	pinnate		
Machaerium scleroxylon	Papilionoideae	Yes	pinnate	1.62 ± 0.63	0.64 ± 0.19
Machaerium stipitatum	Papilionoideae	Yes	pinnate	3.03 ± 1.09	1.21 ± 0.56
Machaerium vestitum	Papilionoideae	Yes	pinnate	3.85 ± 0.77	1.6 ± 0.22
Machaerium villosum	Papilionoideae	Yes	pinnate	5.14 ± 1.26	2.14 ± 0.44
Macrolobium costaricense	Detarioideae (Caesalpinioideae)	No	pinnate		
Macrolobium latifolium	Detarioideae (Caesalpinioideae)	No	pinnate	9.42 ± 5.19	4 ± 2.26
Macrolobium limbatum	Detarioideae (Caesalpinioideae)	No	pinnate	14.01 ± 1.2	5.69 ± 0.52
Mariosousa centralis	Caesalpinioideae (Mimosoideae)	unknown	bipinnate	0.25 ± 0.1	0.1 ± 0.03
Mariosousa usumacintensis	Caesalpinioideae (Mimosoideae)	unknown	bipinnate	0.39 ± 0.11	0.12 ± 0.03

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Marmaroxylon racemosum	Caesalpinioideae (Mimosoideae)	No	bipinnate	1.04 ± 0.22	0.44 ± 0.09
Mimosa acantholoba var eurycarpa	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.56 ± 0.22	0.14 ± 0.09
Mimosa arenosa	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.38 ± 0.13	0.09 ± 0.03
Mimosa bahamensis	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.32 ± 0.09	0.21 ± 0.07
Mimosa tenuiflora	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.5 ± 0.16	0.12 ± 0.02
Moldenhauera blanchetiana	Caesalpinioideae	Yes	pinnate		
Myrospermum frutescens	Papilionoideae	No	pinnate		
Myroxylon peruiferum	Papilionoideae	No	pinnate	5.15 ± 0.98	2.45 ± 0.12
Ormosia amazonica	Papilionoideae	Yes	pinnate	15.47 ± 4.41	7.14 ± 1.59
Ormosia coccinea	Papilionoideae	Yes	pinnate	14.5 ± 4.43	7.35 ± 0.93
Ormosia discolor	Papilionoideae	Yes	pinnate	13.02 ± 3.65	5.12 ± 0.82
Ormosia flava	Papilionoideae	Yes	pinnate	11.01 ± 3.32	4.4 ± 1.48
Ormosia grossa	Papilionoideae	Yes	pinnate	12.48 ± 3.91	7.6 ± 1.72
Ormosia isthmensis	Papilionoideae	Yes	pinnate	10.92 ± 2.89	5.34 ± 0.45
Ormosia krugii	Papilionoideae	Yes	pinnate	15.03 ± 3.01	7.53 ± 1.29
Ormosia macrocalyx	Papilionoideae	Yes	pinnate	9.23 ± 2.2	4.47 ± 0.84
Ormosia macrophylla	Papilionoideae	Yes	pinnate	11.88 ± 2.73	6.54 ± 1.71
Ormosia nobilis	Papilionoideae	Yes	pinnate	16.91 ± 2.77	7.37 ± 0.74
Ormosia paraensis	Papilionoideae	Yes	pinnate	6.02 ± 0.99	3.28 ± 0.76
Ormosia subsimplex	Papilionoideae	Yes	pinnate	11.07 ± 2.77	4.29 ± 0.74
Ormosia velutina	Papilionoideae	Yes	pinnate	8 ± 2.24	4.79 ± 0.92
Parkia bahiae	Caesalpinioideae (Mimosoideae)	No	bipinnate	2.1 ± 0.32	0.49 ± 0.06
Parkia decussata	Caesalpinioideae (Mimosoideae)	No	bipinnate	2.82 ± 0.53	0.73 ± 0.15
Parkia multijuga	Caesalpinioideae (Mimosoideae)	No	bipinnate	0.87 ± 0.13	0.25 ± 0.04

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Parkia nitida	Caesalpinioideae (Mimosoideae)	No	bipinnate	1.13 ± 0.42	0.31 ± 0.09
Parkia oppositifolia	Caesalpinioideae (Mimosoideae)	No	bipinnate	0.83 ± 0.29	0.3 ± 0.09
Parkia pendula	Caesalpinioideae (Mimosoideae)	No	bipinnate	0.33 ± 0.07	0.08 ± 0.02
Parkinsonia praecox	Caesalpinioideae	No	bipinnate	0.65 ± 0.16	0.25 ± 0.04
Peltogyne pauciflora	Detarioideae (Caesalpinioideae)	No	pinnate	5.64 ± 1.73	2.55 ± 0.75
Peltogyne purpurea	Detarioideae (Caesalpinioideae)	No	pinnate	5.59 ± 0.24	2.33 ± 0.27
Peltogyne venosa	Detarioideae (Caesalpinioideae)	No	pinnate	11.18 ± 1.57	4.43 ± 0.56
Peltophorum dubium	Caesalpinioideae	No	bipinnate	0.67 ± 0.16	0.24 ± 0.07
Pentaclethra macroloba	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.57 ± 0.2	0.22 ± 0.17
Piptadenia constricta	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.91 ± 0.3	0.49 ± 0.17
Piptadenia gonoacantha	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.59 ± 0.19	0.13 ± 0.03
Piptadenia moniliformis	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.21 ± 0.38	0.53 ± 0.13
Piptadenia obliqua	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.38 ± 0.37	0.87 ± 0.23
Piptadenia paniculata	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.95 ± 0.88	1.27 ± 0.35
Piptadenia stipulacea	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.54 ± 0.16	0.09 ± 0.02
Piptadenia viridiflora	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.5 ± 0.1	0.13 ± 0.03
Piscidia carthagenensis	Papilionoideae	Yes	pinnate	6.16 ± 1.29	3.59 ± 1.44
Piscidia piscipula	Papilionoideae	Yes	pinnate	7.6 ± 1.64	4.73 ± 1.46
Pithecellobium arboreum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.94 ± 0.31	0.45 ± 0.3

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Pithecellobium bipinnatum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	3.14 ± 0.82	1.5 ± 0.31
Pithecellobium dulce	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.68 ± 0.78	1.28 ± 0.33
Pithecellobium hymenaeifolium	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	6.97 ± 2.41	3.44 ± 1.43
Pithecellobium lanceolatum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	4.7 ± 0.85	1.55 ± 0.35
Plathymenia reticulata	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.94 ± 0.11	0.41 ± 0.06
Platycyamus regnellii	Papilionoideae	Yes	pinnate	15.34 ± 3.23	15.67 ± 4.88
Platymiscium blanchetii	Papilionoideae	Yes	pinnate		
Platymiscium curuense	Papilionoideae	Yes	pinnate	10.76 ± 3.02	4.75 ± 1.08
Platymiscium dimorphandrum	Papilionoideae	Yes	pinnate	6.29 ± 1.45	2.68 ± 0.67
Platymiscium lasiocarpum	Papilionoideae	Yes	pinnate		
Platymiscium parviflorum	Papilionoideae	Yes	pinnate	8.09 ± 2.24	6.88 ± 2.86
Platymiscium pinnatum	Papilionoideae	Yes	pinnate	6.53 ± 1.97	3.55 ± 0.83
Platymiscium speciosum	Papilionoideae	Yes	pinnate	10.01 ± 3.58	4.67 ± 1.33
Platymiscium ulei	Papilionoideae	Yes	pinnate	6.06 ± 2.05	2.7 ± 0.9
Platymiscium yucatanum	Papilionoideae	Yes	pinnate	3.27 ± 0.93	1.56 ± 0.36
Platypodium elegans	Papilionoideae	Yes	pinnate	2.89 ± 0.49	1.14 ± 0.2
Poecilanthe effusa	Papilionoideae	Yes	pinnate	8.85 ± 1.9	3.2 ± 0.49
Poeppigia procera	Dialioideae (Caesalpinioideae)	No	pinnate	1.5 ± 0.42	0.39 ± 0.1
Poincianella pluviosa	Caesalpinioideae	No	bipinnate	2.04 ± 0.52	1.51 ± 0.3
Prioria copaifera	Detarioideae (Caesalpinioideae)	No	pinnate	9.72 ± 2.25	4.74 ± 1.19
Pseudopiptadenia contorta	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.25 ± 0.09	0.07 ± 0.01

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Pseudosamanea guachapele	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.91 ± 1	1.53 ± 0.51
Pterocarpus acapulcensis	Papilionoideae	Yes	pinnate	5.7 ± 2.17	2.86 ± 1.18
Pterocarpus hayesii	Papilionoideae	Yes	pinnate	11.12 ± 2.94	4.18 ± 0.49
Pterocarpus michelianus	Papilionoideae	Yes	pinnate		
Pterocarpus officinalis	Papilionoideae	Yes	pinnate	8.9 ± 1.41	4.54 ± 0.4
Pterocarpus orbiculatus	Papilionoideae	Yes	pinnate	8.53 ± 0.81	3.27 ± 0.03
Pterocarpus rohrii	Papilionoideae	Yes	pinnate	9.61 ± 1.71	4.17 ± 0.79
Pterocarpus violaceus	Papilionoideae	Yes	pinnate	6.15 ± 1.74	2.96 ± 0.47
Pterocarpus zehntneri	Papilionoideae	Yes	pinnate		
Pterodon abruptus	Papilionoideae	No	pinnate	1.54 ± 0.3	1.07 ± 0.17
Pterogyne nitens	Caesalpinioideae	No	pinnate	4.87 ± 1.01	2.06 ± 0.41
Samanea saman	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	3.42 ± 1.5	1.65 ± 0.54
Schizolobium amazonicum	Caesalpinioideae	No	bipinnate	3.35 ± 1.35	2.26 ± 0.87
Schizolobium parahyba	Caesalpinioideae	No	bipinnate	2.96 ± 0.43	0.78 ± 0.1
Sclerolobium costaricense	Caesalpinioideae	Yes	pinnate	12.69 ± 2.29	5.53 ± 0.88
Sclerolobium densiflorum	Caesalpinioideae	Yes	pinnate	8.54 ± 2.25	5.1 ± 1.17
Sclerolobium paniculatum	Caesalpinioideae	Yes	pinnate	10.27 ± 1.96	3.94 ± 0.92
Sclerolobium paraense	Caesalpinioideae	Yes	pinnate	12.27 ± 2.9	4.04 ± 0.81
Senegalia gaumeri	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.9 ± 0.21	0.33 ± 0.06
Senegalia langsdorffii	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.99 ± 1.18	0.84 ± 1.76
Senegalia loretensis	Caesalpinioideae (Mimosoideae)	unknown	bipinnate	0.62 ± 0.14	0.14 ± 0.04

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Senegalia martii	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.34 ± 0.07	0.09 ± 0.02
Senegalia piauhiensis	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.88 ± 0.16	0.26 ± 0.08
Senegalia picachensis	Caesalpinioideae (Mimosoideae)	unknown	bipinnate	0.8 ± 0.14	0.25 ± 0.08
Senegalia polyphylla	Caesalpinioideae (Mimosoideae)	No	bipinnate		
Senna acuruensis	Caesalpinioideae	No	pinnate	1.36 ± 0.2	0.65 ± 0.07
Senna atomaria	Caesalpinioideae	No	pinnate	3.73 ± 1.81	2.38 ± 1.19
Senna bacillaris	Caesalpinioideae	No	pinnate	10.5 ± 3.16	4.6 ± 0.87
Senna fruticosa	Caesalpinioideae	No	pinnate	7.89 ± 2.1	3.87 ± 1.51
Senna hayesiana	Caesalpinioideae	No	pinnate	9.08 ± 2.93	4.08 ± 0.97
Senna multijuga	Caesalpinioideae	No	pinnate	2.14 ± 0.75	0.6 ± 0.22
Senna papillosa	Caesalpinioideae	No	pinnate	14.65 ± 2.75	6.13 ± 0.83
Senna racemosa	Caesalpinioideae	No	pinnate	7.89 ± 2.1	3.87 ± 1.51
Senna spectabilis	Caesalpinioideae	No	pinnate	5.04 ± 1.09	1.83 ± 0.29
Senna sylvestris	Caesalpinioideae	No	pinnate	6.96 ± 1.73	2.47 ± 0.48
Senna undulata	Caesalpinioideae	No	pinnate	6.11 ± 1.79	3.01 ± 0.77
Senna velutina	Caesalpinioideae	No	pinnate	5.13 ± 1.6	2.1 ± 0.65
Senna villosa	Caesalpinioideae	No	pinnate	3.97 ± 0.89	1.66 ± 0.34
Stryphnodendron barbatimam	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.6 ± 0.17	1.4 ± 0.1
Stryphnodendron guianense	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.85 ± 0.27	0.37 ± 0.11
Stryphnodendron microstachyum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	2.18 ± 0.61	1.03 ± 0.25
Stryphnodendron occhionianum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate		
Stryphnodendron pulcherrimum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.6 ± 0.17	0.21 ± 0.07
Stryphnodendron purpureum	Caesalpinioideae (Mimosoideae)	Yes	bipinnate		
Swartzia apetala	Papilionoideae	Yes	pinnate	6.34 ± 1.16	2.94 ± 0.46

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Swartzia apetala var apetala	Papilionoideae	Yes	pinnate	7.06 ± 2.23	3.4 ± 1.11
Swartzia arborescens	Papilionoideae	Yes	pinnate	3.89 ± 1.71	2.12 ± 0.55
Swartzia brachyrachis	Papilionoideae	Yes	pinnate	5.6 ± 1.88	2.68 ± 0.66
Swartzia cubensis	Papilionoideae	Yes	pinnate	6.45 ± 1.4	2.13 ± 0.18
Swartzia cuspidata	Papilionoideae	Yes	pinnate	7.91 ± 1.44	3.55 ± 0.85
Swartzia flaemingii	Papilionoideae	Yes	pinnate	3.65 ± 1.32	1.39 ± 0.64
Swartzia laurifolia	Papilionoideae	Yes	pinnate	17.87 ± 5.79	6.69 ± 2.61
Swartzia laxiflora	Papilionoideae	Yes	pinnate	7.12 ± 2.05	2.41 ± 0.63
Swartzia macrostachya	Papilionoideae	Yes	pinnate	5.2 ± 1.97	2.83 ± 1.01
Swartzia multijuga	Papilionoideae	Yes	pinnate	7.73 ± 2.23	3.12 ± 0.42
Swartzia myrtifolia	Papilionoideae	Yes	pinnate	3.76 ± 1.07	1.53 ± 0.44
Swartzia nicaraguensis	Papilionoideae	Yes	pinnate	7.9 ± 1.7	3.63 ± 0.67
Swartzia ochnacea	Papilionoideae	Yes	unifoliolate	14.37 ± 8.32	5.48 ± 2.64
Swartzia panamensis	Papilionoideae	Yes	pinnate	9.74 ± 3.37	3.24 ± 0.63
Swartzia polyphylla	Papilionoideae	Yes	pinnate	10.52 ± 4.36	3.83 ± 1.61
Swartzia reticulata	Papilionoideae	Yes	pinnate	16.01 ± 3.89	8.47 ± 1.44
Swartzia schomburgkii	Papilionoideae	Yes	pinnate	12.33 ± 2.36	5.24 ± 0.91
Swartzia simplex	Papilionoideae	Yes	unifoliolate		
Swartzia simplex var continentalis	Papilionoideae	Yes	unifoliolate	9.41 ± 2.71	4.14 ± 1.25
Swartzia simplex var grandiflora	Papilionoideae	Yes	unifoliolate	5.5 ± 1.87	2.75 ± 0.8
Swartzia tessmannii	Papilionoideae	Yes	pinnate	7.75 ± 2.67	4.03 ± 0.67
Sweetia fruticosa	Papilionoideae	No	pinnate	2.57 ± 0.76	1.27 ± 0.2
Tabaroa caatingicola	Papilionoideae	Yes	pinnate	3.94 ± 0.79	2.21 ± 0.27
Tachigali cenepensis	Caesalpinioideae	Yes	pinnate	18.63 ± 6.15	9.03 ± 1.3
Tachigali chrysaloides	Caesalpinioideae	Yes	pinnate	11.12 ± 3.7	4.32 ± 1.31
Tachigali macbridei	Caesalpinioideae	Yes	pinnate	10.5 ± 3.68	3.87 ± 1.14
Tachigali myrmecophila	Caesalpinioideae	Yes	pinnate	9.64 ± 3.01	3.8 ± 1.17
Tachigali paniculata	Caesalpinioideae	Yes	pinnate	7.93 ± 1.88	3.63 ± 1.22
Tachigali polyphylla	Caesalpinioideae	Yes	pinnate	6.34 ± 3.36	2.03 ± 1.2
Tachigali vasquezii	Caesalpinioideae	Yes	pinnate		
Tachigali versicolor	Caesalpinioideae	Yes	pinnate	15.4 ± 4.9	5.07 ± 1.11

Species	Subfamily	Potential to fix N_2	Leaf type	Leaflet length	Leaflet width
Vachellia allenii	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.7 ± 0.07	0.18 ± 0.03
Vachellia campechiana	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.11 ± 0.01	0.04 ± 0.01
Vachellia collinsii	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.69 ± 0.15	0.16 ± 0.02
Vachellia cornigera	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.62 ± 0.12	0.17 ± 0.04
Vachellia farnesiana	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.3 ± 0.05	0.08 ± 0.02
Vachellia macracantha	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.22 ± 0.06	0.06 ± 0.01
Vatairea erythrocarpa	Papilionoideae	No	pinnate	10.13 ± 3.21	4.69 ± 1.63
Vatairea lundellii	Papilionoideae	No	pinnate	5.56 ± 1.88	2.29 ± 0.58
Vataireopsis glaziovii	Papilionoideae	No	pinnate		
Vataireopsis iglesiasii	Papilionoideae	No	pinnate	7.12 ± 8.5	6.67 ± 7.42
Zapoteca formosa	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	1.81 ± 1.15	0.98 ± 0.6
Zollernia latifolia	Papilionoideae	No	unifoliolate	9.47 ± 2.47	9.36 ± 2.11
Zollernia paraensis	Papilionoideae	No	unifoliolate	10.2 ± 2.08	3.69 ± 0.68
Zygia cognata	Caesalpinioideae (Mimosoideae)	Yes	pinnate	7.71 ± 3.08	2.78 ± 1.16
Zygia gigantifoliola	Caesalpinioideae (Mimosoideae)	Yes	pinnate	17.03 ± 6.02	5.57 ± 2.4
Zygia racemosa	Caesalpinioideae (Mimosoideae)	Yes	bipinnate	0.74 ± 0.06	0.24 ± 0.02

Supplementary Table 4 | Comparison of linear mixed models addressing the effects of stand age and three climatic variables on legume relative abundance in Neotropical secondary forests.

Linear mixed models were run for relative basal area of all legume species with stand age and one of three climatic variables (mean annual rainfall, rainfall seasonality "RS", and climatic water deficit "CWD"). Random site intercepts account for between-site variation in initial legume basal area, and random slopes for the variation of the effect of stand age on legume basal area among sites. Standardized coefficients and *F*-values of each predictor and their interaction in linear mixed effects models are shown (($^{\dagger}P < 0.05$; $^{*}P \leq 0.01$; $^{**}P \leq 0.001$; $^{***}P \leq 0.001$). The standardized regression coefficients compare the effect of the independent variables on the dependent variable. Values of marginal (R^2 (m)) and conditional (R^2(c)) R^2 indicate the proportion of the variance explained by the fixed predictors of the model, and the fit of the whole model with fixed and random factors, respectively. Change in AIC for small sample sizes (ΔAICc) compared with the best model (A) and R^2 are shown. For all models $N = 41$ chronosequence sites (one site was excluded because no climatic data were available).

Dependent variable	Parameter	Standardized coefficients	F-value	R^2 (m)	R^2 (c)	ΔAICc
A. Legume relative basal area				17.18	62.14	0.00
	Stand age	-0.61	21.15^{**}			
	Rainfall	-0.95	16.23^{**}			
	Stand age × Rainfall	0.62	12.01^{*}			
B. Legume relative basal area				10.45	48.89	13.93
	Stand age	0.22	$2.08^{n.s.}$			
	RS	0.61	9.81^{**}			
	Stand age × RS	-0.49	6.05^{*}			
C. Legume relative basal area				20.45	48.43	2.66
	Stand age	0.11	$1.56^{n.s.}$			
	CWD	-0.89	22.51^{***}			
	Stand age × CWD	0.59	13.33^{***}			

Supplementary Table 5 | Effects of stand age and rainfall on the abundance of non-fixing legumes in Neotropical secondary forests.
Linear mixed models were run for absolute and relative basal area of non-fixing legume species (A and B respectively). Random site intercepts account for between-site variation in initial legume basal area, and random slopes for the variation of the effect of stand age on legume basal area among sites. Standardized coefficients and *F*-values of each predictor and their interaction in linear mixed effects models are shown ($^{\dagger}P < 0.05$; $^{*}P \leq 0.01$; $^{**}P \leq 0.001$; $^{***}P \leq 0.001$). The standardized regression coefficients compare the effect of the independent variables on the dependent variable. Values of marginal (R^2 (m)) and conditional (R^2(c)) R^2 indicate the proportion of the variance explained by the fixed predictors of the model, and the fit of the whole model with fixed and random factors, respectively. $N = 42$ chronosequence sites.

Dependent variable	Parameter	Standardized coefficients	F-value	R^2 (m)	R^2 (c)
A- Absolute basal area – non-fixing legumes				4.23	12.37
	Stand age	0.47	27.32^{**}		
	Rainfall	0.37	8.42^{*}		
	Stand age × Rainfall	-0.48	13.81^{*}		
B- Relative basal area – non-fixing legumes				3.35	26.41
	Stand age	0.39	$4.18^{n.s.}$		
	Rainfall	0.29	$1.67^{n.s.}$		
	Stand age × Rainfall	-0.48	$3.56^{n.s.}$		

Supplementary Table 6 | Modelling parameters for the effects of stand age and rainfall on legume abundance in Neotropical secondary forests, shown in Fig. 1. Equations for absolute basal area and relative basal area (RA) of all legume species as well as N-fixing and bipinnate species are shown. Random site intercepts for between-site variation in initial legume basal area, and random slopes for the variation of the effect of stand age on legume basal area among sites were both included. $N = 42$ chronosequence sites.

Dependent variable	Transformation on Y	Model
Absolute basal area of all legumes	none	basal area = – 0.15 + 1.70 × stand age – 0.18 × (rainfall/1000) + 0.08 x stand age × (rainfall/1000)
RA of all legumes	arcsin	RA = 1.30 – 0.23 × stand age – 0.40 × (rainfall/1000) + 0.08 × stand age × (rainfall/1000)
RA of N-fixing legumes	arcsin	RA = 1.34 – 0.29 × stand age – 0.43 × (rainfall/1000) + 0.10 × stand age × (rainfall/1000)
RA of bipinnate legumes	arcsin	RA = 0.82 – 0.13 × stand age – 0.26 × (rainfall/1000) + 0.04 × stand age × (rainfall/1000)

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