Supporting Information

Figure S1 Bivariate relationships between potential predictors and range-size mean and standard deviation. Predictors: precipitation seasonality (PSEA) and climate rarity (ClimRare, unitless). Linear and Gaussian local (LOESS, fitted with span = 0.75 and a quadratic term) regressions were fitted for all cells with at least one recorded species.

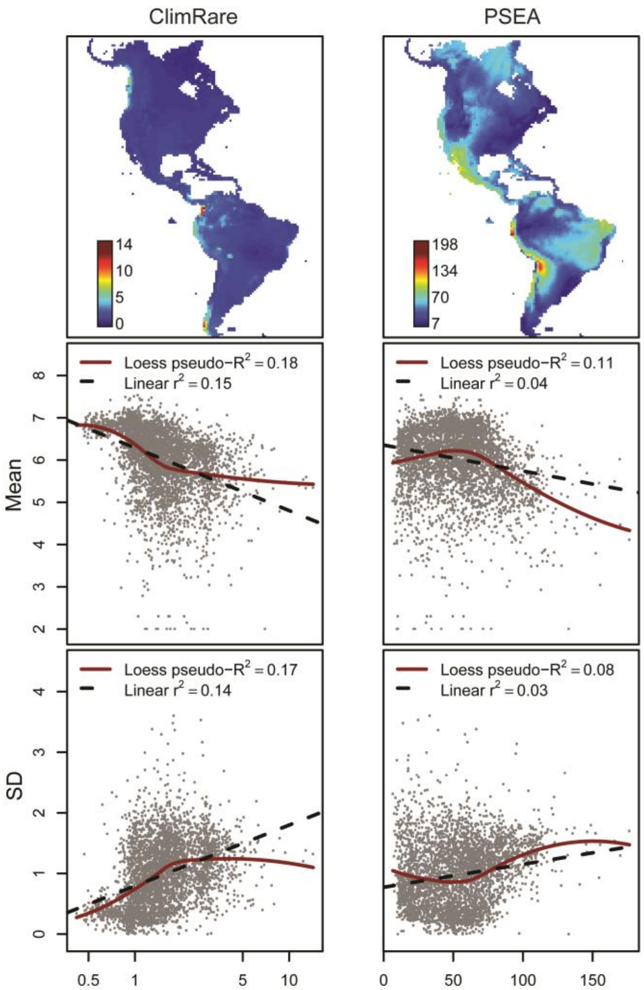

Figure S2 Maps for (a) range-size median (km^2), skewness and kurtosis of New World plants; and (b) deviations of range-size spectra from random expectation. Cells with a range-size spectra value greater or lower than expected given the observed species richness are colored red or blue, respectively. Black line delimits glaciated areas during the Last Glacial Maximum.

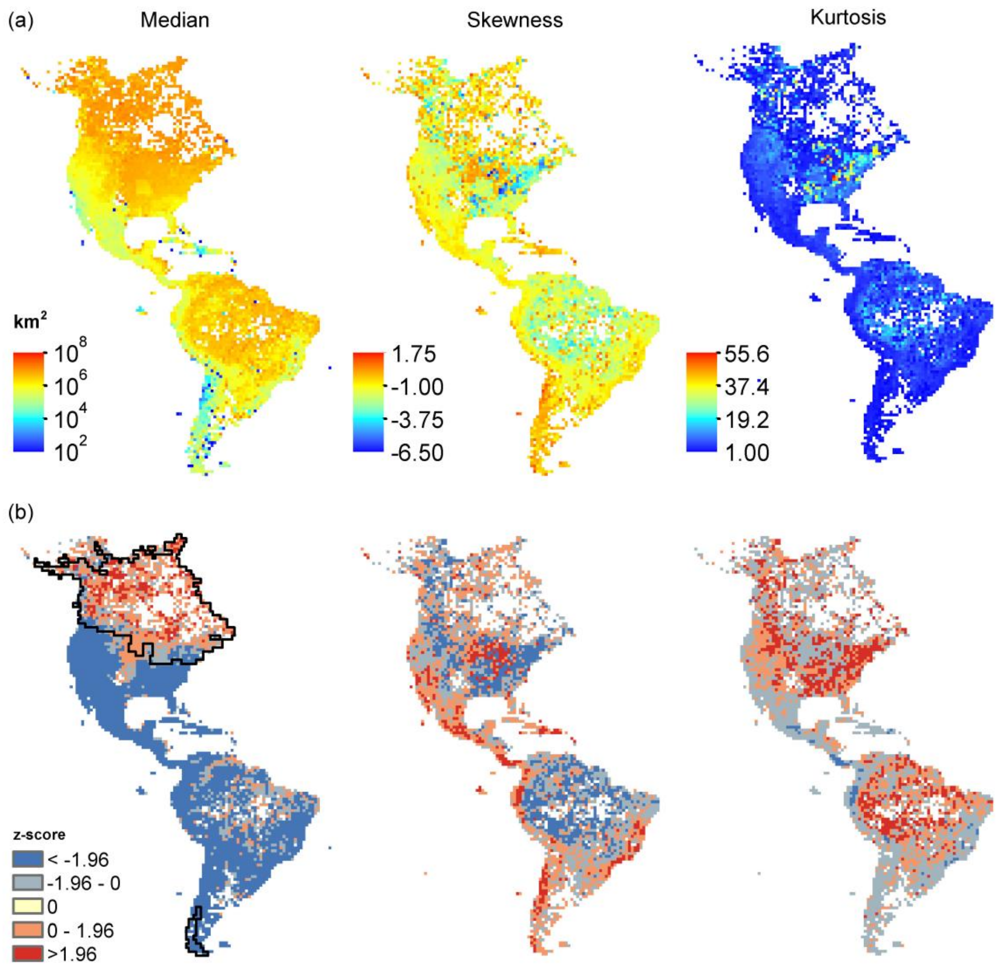

Figure S3 Result of the k-means cluster analysis, showing the four range-size spectra types mapped in Fig. 3 in the main text.

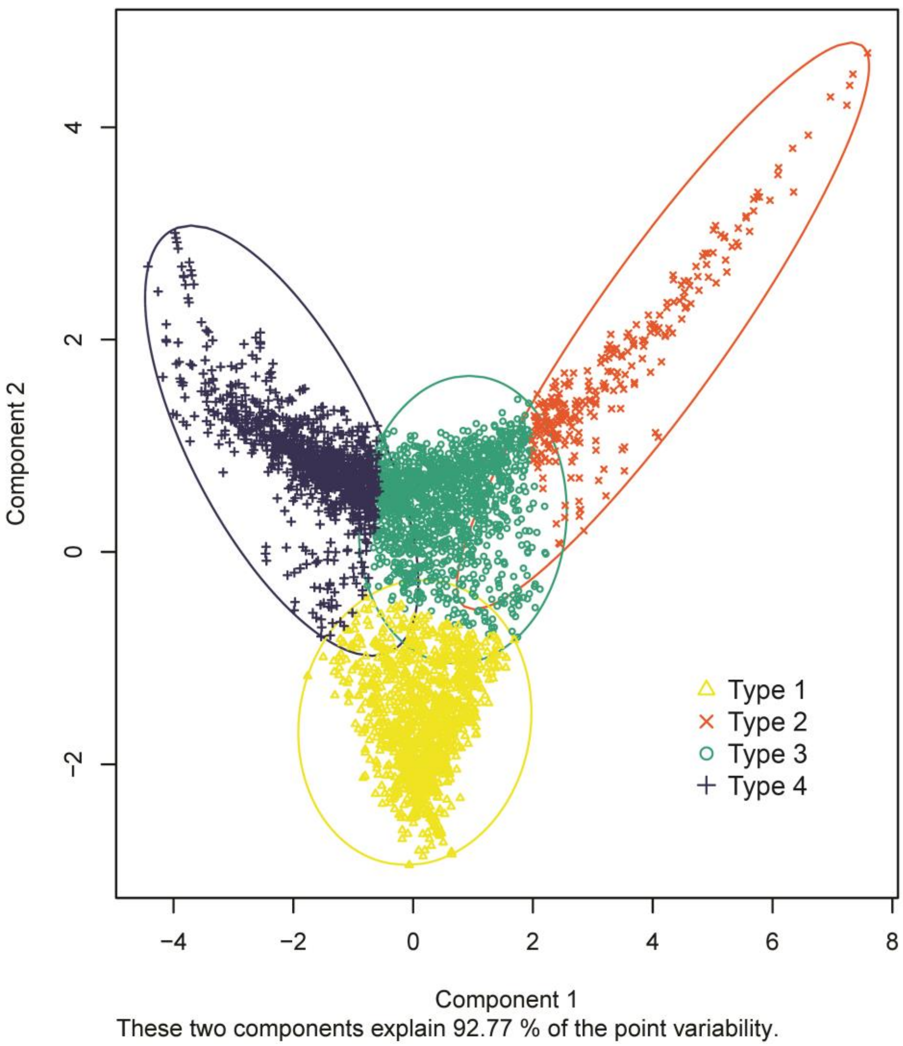

Figure S4 Overlaid range-size frequency distributions for a random sample of 250 cells within each of the four spectrum types mapped in Fig. 3 and 250 random cells across the whole study region. Range sizes are in $\log_{10}$ scale. The figure illustrates the typical histogram of range sizes within each spectrum type. For instance, the high mean, low variability and less negative kurtosis of Type 1 is arguably caused by the dominance of broad-ranged species and lack of small-ranged species.

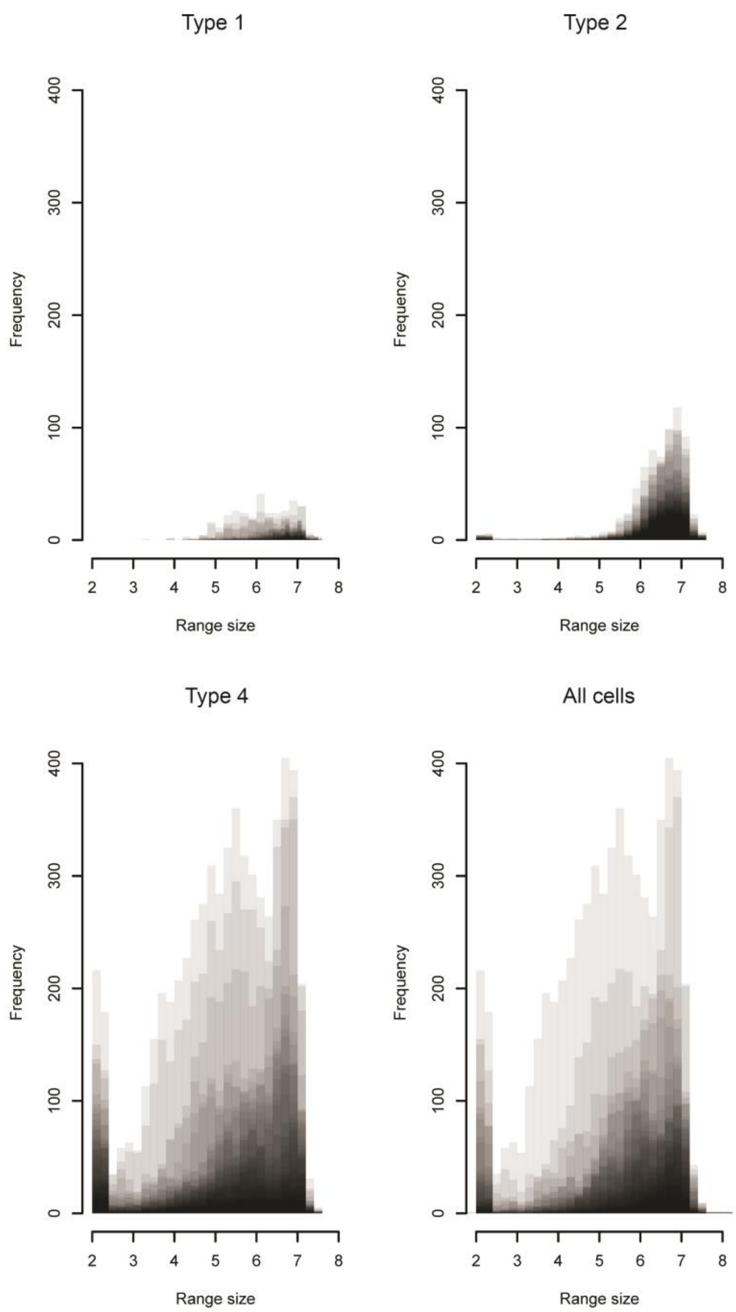

Table S1 Summary results for full OLS models explaining the mean and standard deviation (SD) patterns for log_{10}-transformed range sizes. AIC: Akaike's information criterion, minRSA: residual spatial autocorrelation (summed absolute Moran's I values of the first 20 distance classes), Max I: maximum Moran's I in the first 20 distance classes, R^2: variation explained in full models, Vc: unique contribution of climate stability, V_H: unique contribution of habitat area, V_{CH}: shared effect of climate stability and habitat area.

	AIC	minRSA	Max I	R^2	V_C	V_H	V_{CH}
Mean	7,445	4.458	0.511	0.387	0.101	0.079	0.207
SD	4,157	1.710	0.248	0.404	0.159	0.045	0.200

Table S2 Averaged standardized regression coefficients (OLS_{avg}), standard error (SE) and relative importance (summed Akaike weights, W_{AIC}) from OLS models of range-size mean and variability (standard deviation). Parameters: temperature seasonality (TSEA), precipitation seasonality (PSEA), climate-change velocity (ClimVel), land area (Land), climate rarity (ClimRare), and elevation range (ElevRange).

	OLS_{avg}	SE	W_{AIC}
Mean			
TSEA	0.602	0.029	1.000
PSEA	-0.127	0.021	1.000
ClimVel	-0.092	0.032	0.952
Land	0.421	0.023	1.000
ClimRare	-0.123	0.026	1.000
ElevRange	-0.287	0.027	1.000
SD			
TSEA	-0.554	0.018	1.000
PSEA	0.018	0.014	0.456
ClimVel	0.001	0.023	0.271
Land	-0.232	0.015	1.000
ClimRare	-0.018	0.018	0.384
ElevRange	0.156	0.016	1.000

Table S3 Results from SAR and OLS models of range-size mean and variability (standard deviation) with varying radius used for land area. Abbreviations as in Table S2.

	Land radius = 800 km						Land radius = 1300 km					
	SAR			OLS			SAR			OLS		
	SAR_{avg}	SE	W_{AIC}	OLS_{avg}	SE	W_{AIC}	SAR_{avg}	SE	W_{AIC}	OLS_{avg}	SE	W_{AIC}
Mean												
TSEA	0.405	0.100	0.997	0.593	0.028	1.000	0.412	0.100	0.998	0.593	0.029	1.000
PSEA	-0.066	0.036	0.654	-0.106	0.021	1.000	-0.068	0.036	0.681	-0.114	0.021	1.000
ClimVel	0.242	0.050	1.000	-0.035	0.032	0.400	0.247	0.048	1.000	-0.057	0.032	0.635
Land	0.327	0.065	1.000	0.346	0.021	1.000	0.414	0.083	1.000	0.382	0.022	1.000
ClimRare	-0.043	0.042	0.382	-0.118	0.026	1.000	-0.050	0.042	0.426	-0.122	0.026	1.000
ElevRange	-0.064	0.031	0.741	-0.311	0.025	1.000	-0.053	0.031	0.607	-0.282	0.028	1.000
SD												
TSEA	-0.331	0.073	0.984	-0.559	0.019	1.000	-0.367	0.072	0.998	-0.558	0.018	1.000
PSEA	-0.004	0.025	0.271	0.011	0.015	0.333	0.000	0.025	0.269	0.015	0.015	0.381
ClimVel	-0.068	0.037	0.661	-0.034	0.023	0.538	-0.075	0.037	0.739	-0.024	0.023	0.393
Land	-0.219	0.038	1.000	-0.184	0.015	1.000	-0.229	0.050	1.000	-0.202	0.015	1.000
ClimRare	0.043	0.031	0.486	-0.018	0.018	0.376	0.049	0.031	0.554	-0.016	0.018	0.358
ElevRange	0.180	0.026	1.000	0.182	0.019	1.000	0.166	0.026	1.000	0.165	0.017	1.000

Table S4 Results from SAR and OLS models of range-size mean and variability (standard deviation) excluding rare species (defined as species with range size = 10 000 km^2). Abbreviations as in Table S2.

	SAR			OLS		
	SAR_{avg}	SE	W_{AIC}	OLS_{avg}	SE	W_{AIC}
Mean						
TSEA	0.371	0.078	1.000	0.493	0.024	1.000
PSEA	-0.059	0.029	0.733	-0.117	0.017	1.000
ClimVel	0.180	0.041	1.000	-0.065	0.026	0.879
Land	0.305	0.071	1.000	0.309	0.019	1.000
ClimRare	-0.026	0.034	0.332	-0.114	0.021	1.000
ElevRange	-0.058	0.025	0.837	-0.259	0.023	1.000
SD						
TSEA	-0.297	0.053	0.999	-0.415	0.016	1.000
PSEA	0.013	0.021	0.308	0.034	0.012	0.951
ClimVel	-0.074	0.030	0.876	-0.037	0.019	0.708
Land	-0.237	0.043	1.000	-0.197	0.014	1.000
ClimRare	0.029	0.026	0.416	0.011	0.016	0.327
ElevRange	0.115	0.022	1.000	0.118	0.017	1.000

Table S5 Results from SAR and OLS models of range-size mean and variability (standard deviation) excluding regions that were glaciated during the Last Glacial Maximum. Abbreviations as in Table S2.

	SAR			OLS		
	SAR_{avg}	SE	W_{AIC}	OLS_{avg}	SE	W_{AIC}
Mean						
TSEA	0.250	0.135	0.670	0.379	0.041	1.000
PSEA	-0.058	0.040	0.513	-0.033	0.025	0.465
ClimVel	0.348	0.060	1.000	-0.043	0.046	0.364
Land	0.409	0.094	0.999	0.488	0.027	1.000
ClimRare	-0.060	0.050	0.438	-0.061	0.031	0.735
ElevRange	-0.062	0.037	0.603	-0.352	0.029	1.000
SD						
TSEA	-0.410	0.087	1.000	-0.491	0.026	1.000
PSEA	-0.026	0.026	0.374	-0.011	0.017	0.313
ClimVel	-0.099	0.042	0.850	-0.023	0.031	0.330
Land	-0.252	0.055	1.000	-0.251	0.018	1.000
ClimRare	0.057	0.034	0.594	-0.027	0.020	0.468
ElevRange	0.174	0.029	1.000	0.187	0.019	1.000

Table S6 Averaged standardized regression coefficients, standard error (SE) and relative importance from SAR models of range-size mean and standard deviation in the Nearctic and Neotropic regions. The division was set at 20° of northern latitude, the border between the Nearctic and Neotropical biogeographic realms, coinciding with the latitude where the minimum mean range sizes are found for plants and other taxa (Blackburn & Gaston 1996)[1]. Abbreviations as in Table S2. The results from these models (see also Table S6) support and emphasize the findings of the classification analysis: In the Nearctic, range sizes appear to be more influenced by climate stability than habitat area compared to the Neotropics, where habitat area plays a relatively stronger role. Note the reversal of Rapoport's rule in the Neotropics, where mean range size is negatively related to TSEA, arguably due to the effect of smaller land area restricting the species' ranges towards the south.

	Nearctic			Neotropic		
	SAR_{avg}	SE	W_{AIC}	SAR_{avg}	SE	W_{AIC}
Mean						
TSEA	0.930	0.101	1.000	-1.484	0.280	0.999
PSEA	-0.178	0.051	0.988	-0.008	0.045	0.272
ClimVel	0.103	0.052	0.761	0.517	0.085	1.000
Land	0.069	0.081	0.355	0.498	0.090	1.000
ClimRare	0.085	0.054	0.541	-0.075	0.056	0.477
ElevRange	0.076	0.042	0.673	-0.096	0.045	0.766
SD						
TSEA	-0.458	0.080	0.999	0.512	0.173	0.907
PSEA	0.127	0.040	0.981	-0.083	0.029	0.949
ClimVel	-0.080	0.040	0.737	-0.140	0.058	0.875
Land	-0.135	0.065	0.757	-0.210	0.056	0.998
ClimRare	0.030	0.047	0.312	0.012	0.038	0.279
ElevRange	0.022	0.037	0.339	0.229	0.037	1.000

[1]Blackburn, T.M. & Gaston, K.J. (1996). Spatial patterns in the geographic range sizes of bird species in the New World. *Philos. Trans. R. Soc. Lond., Ser. B: Biol. Sci.*, 351, 897-912.

Table S7 Variation partitioning of the two broad mechanisms, climate variability and habitat area, in the Nearctic and Neotropic regions, and areas that were non-glaciated during the Last Glacial Maximum. V_{total}: variation (R^2) explained in full models, unique contribution of climate stability (V_C) and habitat area (V_H) and their combined effect (V_{CH}).

	SAR				**OLS**			
	$\mathbf{V_{total}}$	$\mathbf{V_C}$	$\mathbf{V_H}$	$\mathbf{V_{CH}}$	$\mathbf{V_{total}}$	$\mathbf{V_C}$	$\mathbf{V_H}$	$\mathbf{V_{CH}}$
Nearctic								
Mean	0.545	0.428	0.004	0.114	0.557	0.363	0.012	0.183
SD	0.360	0.185	-0.001	0.176	0.373	0.165	0.008	0.200
Neotropic								
Mean	0.414	0.153	0.002	0.258	0.448	0.158	0.033	0.256
SD	0.213	0.046	0.039	0.127	0.227	0.051	0.052	0.125
Non-glaciated								
Mean	0.227	0.015	0.092	0.120	0.290	0.034	0.113	0.143
SD	0.262	0.109	0.053	0.100	0.270	0.111	0.060	0.099

Table S8 Contributors of data from plots in the BIEN2 database used in the study.

Source	**Observations**	**Dataset owner**
Forest Inventory and Analysis National Program (FIA)	1827366	
VegBank	419112	
Carolina Vegetation Survey	239260	
TEAM Permanent Plots	11169	
Madidi Transects	10911	Peter Jørgensen
Center for Tropical Forest Science (CTFS)	7015	
Madidi Permanent Plots	2129	Peter Jørgensen
SALVIAS		
Gentry Transect Dataset	9488	Al Gentry
RAINFOR - 0.1 ha Madre de Dios, Peru	8166	Percy Nuñez
RAINFOR - 1 ha Peru	3939	
Noel Kempff Forest Plots	1694	Tim Killeen
Boyle Transects	1658	Brad Boyle
Noel Kempff Savanna Plots	630	Tim Killeen
OTS Transects	623	Brad Boyle
DeWalt Bolivia forest plots	283	Saara DeWalt
La Selva Secondary Forest Plots	180	Susan G. Letcher
Pilon Lajas Treeplots Bolivia	164	
ACA Amazon Forest Inventories	99	
Bonifacino Forest Transects	86	Mauricio Bonifacio

Table S9 Contributors of specimen data in the BIEN2 database used in the study. Data provided through GBIF, REMIB-CONABIO, SpeciesLink and individual herbaria. Full herbarium names, institutions and locations available at http://sciweb.nybg.org/science2/IndexHerbariorum.asp.

Herbarium	Observations	Herbarium	Observations	Herbarium	Observations
MO	2666166	NY	502580	US	275861
INB	167135	INPA	145142	CR	134623
ASU	119680	OSC	107013	IB	105991
XAL	100254	TEX	86936	IEB	79025
COL	73102	MNHN	66587	AAU	50032
UNM	41202	CHSC	39489	ENCB	37577
CICY	36348	LL	35398	FURB	33438
MEXU	32758	CS	31093	IPA	29979
IAC	29810	FTG	29738	MA	27712
GH	25101	UNCC	24656	K	14348
S	12657	NMC	12510	ACAD	12343
MBML	10708	HAM	10204	USP	9577
HCIB	9523	NEBC	9397	BCMEX	8239
AAS	7580	UFS	7139	UVSC	6397
UAMIZ	6367	NMCR	6063	UFRN	5969
AMES	5590	ZSS	5061	A	4253
USON	4247	LI	4173	NCU	4100
LEB	3781	HOH	3541	O	3189
UGDA	2606	IZTA	2585	GOET	2176
SANT	1868	NSW	1757	MICH	1587
SD	1367	Z	1064	OHN	1054
FH	1022	IBUG	624	GB	606
SALA	558	HUAZ	541	SEV	541
UNL	521	DAO	507	CAS	499
SLPM	482	ND	384	SNM	355
BC	338	HUAA	337	RSA	321
HYO	296	STU	267	FCO	259
BG	250	ISC	247	LD	247
F	232	NCSC	214	INIF	210
QFA	191	CHAPA	184	QUE	172
MGC	172	MT	164	COA	144
ANSM	142	DUKE	134	BH	119
TRT	116	CAN	116	SASK	111
UC	110	NLU	109	NWOSU	100

Herbarium	Observations
INEGI	88
GEO	77
HUMO	63
P	56
ABH	37
WIS	36
DCH	33
C	30
MMMN	27
NCAS	24
UFMA	23
GDA	19
CANB	17
ALTA	15
ZEA	14
FCME	12
BIO	11
TLXM	10
WCUH	8
MUB	8
PAC	7
TUC	6
EMMA	5
ODU	4
UMO	4
DES	4
VPI	3
EBUM	3
SMS	3
POM	3
M	2
UADY	2
TENN	2
NO	2
ANA	1
GDAC	1
OAC	1
GA	1

Herbarium	Observations
ASC	84
MOR	69
WIN	60
CODAGEM	45
V	37
ARAN	35
MTMG	33
VAL	30
PENN	26
IMSSM	24
KAG	21
ALBC	19
UNB	17
UAS	15
WAT	13
COCA	11
BR	11
BOON	9
G	8
B	7
PH	7
ASTC	6
NA	5
OKL	4
PACA	4
USF	3
VCU	3
UBC	3
ILLS	3
MU	2
NCC	2
TRH	2
FSU	2
OS	2
OXF	1
SWBR	1
AUA	1
DPU	1

Herbarium	Observations
JEPS	82
ECON	65
HSS	57
ARIZ	45
CIMI	36
JBAG	34
BM	31
TRTE	29
ZT	25
TI	24
CIQR	19
CIIDIR	18
UWO	16
NSPM	14
DS	12
CU	11
USCH	10
MISS	8
NMR	8
UB	7
KSC	7
BCN	6
FHO	4
RBR	4
CHAP	4
VT	3
BISH	3
SMU	3
VSC	3
CM	2
MUR	2
NDA	2
UFRJ	2
DAV	2
VMIL	1
KANU	1
MHA	1
KBSMS	1

Herbarium	Observations
DEK	1
COFC	1
IPB	1
LE	1
MH	1

Herbarium	Observations
HNT	1
CLEMS	1
KESC	1
CHL	1
FLAS	1

Herbarium	Observations
CORD	1
UPEI	1
CHRB	1
LOMA	1