SUPPORTING INFORMATION

McFadden *et al.* Global plant-frugivore trait matching is shaped by climate and biogeographic history. *Ecology Letters*

a: Maximum trait values of each botanical country

Response	Predictor	Estimate	DF	p-value
Gape size	Fruit size	0.258	126	0.01
Gape size	Palm richness	0.466	128	< 0.001
Gape size	MAT	-0.14	128	0.066
Fruit size	MAT	0.26	127	< 0.001
Fruit size	NPP	0.041	128	0.595
Fruit size	Palm richness	0.388	127	< 0.001
Palm richness	MAT	0.368	129	< 0.001
Palm richness	NPP	0.397	119	< 0.001

b: Median trait values of each botanical country

Response	Predictor	Estimate	DF	p-value
Gape size	Fruit size	0.292	125	0.01
Gape size	Palm richness	0.2	123	0.005
Gape size	MAT	0.021	122	0.748
Fruit size	MAT	0.11	124	0.032
Fruit size	NPP	-0.157	127	0.011
Fruit size	Palm richness	-0.116	124	0.046
Palm richness	MAT	0.118	128	0.132
Palm richness	NPP	0.372	111	< 0.001

Table S1 | Model coefficient (estimate) values, degrees of freedom (DF) and p-values for structural equation models in Fig. 2 and Fig. S6, which were fit with maximum (a) and median (b) botanical country values respectively.

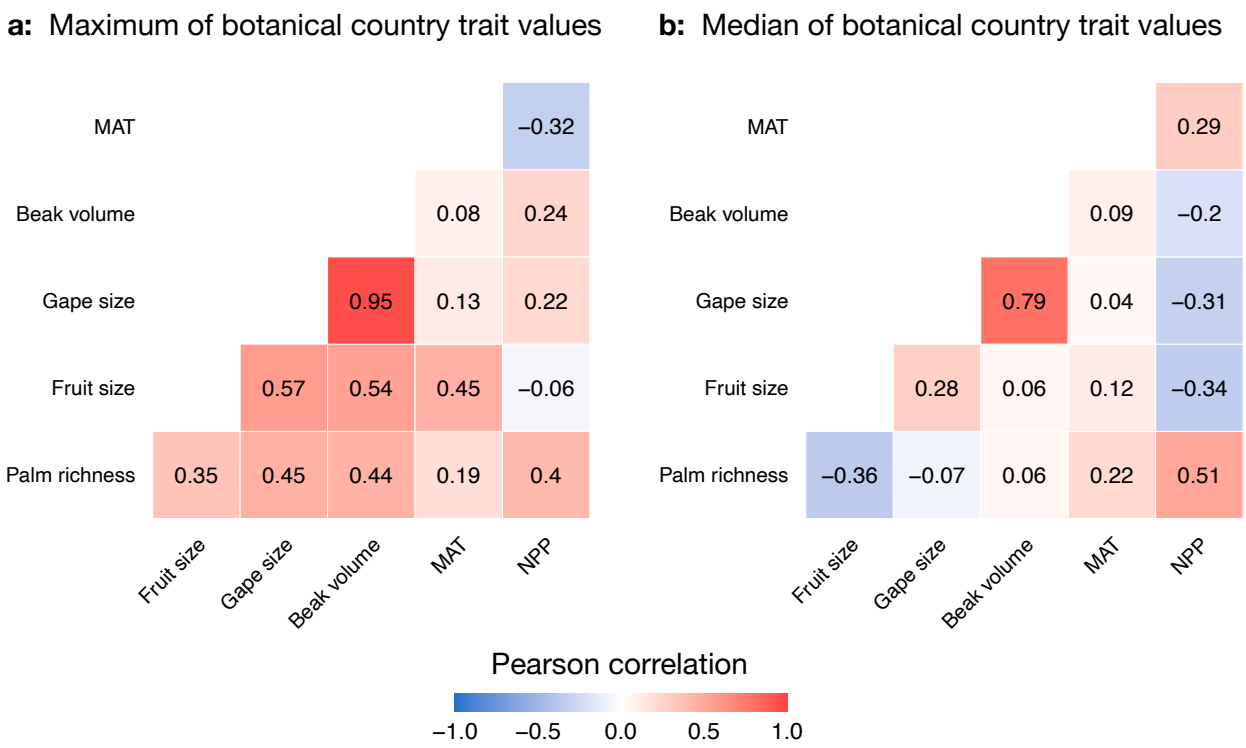

Figure S1 | Correlation heatmaps for log transformed bird and palm traits and climatic variables at the level of botanical countries. MAT: mean annual temperature; NPP: net primary productivity. Units: beak volume- cm^3; gape size- cm; fruit size- cm.

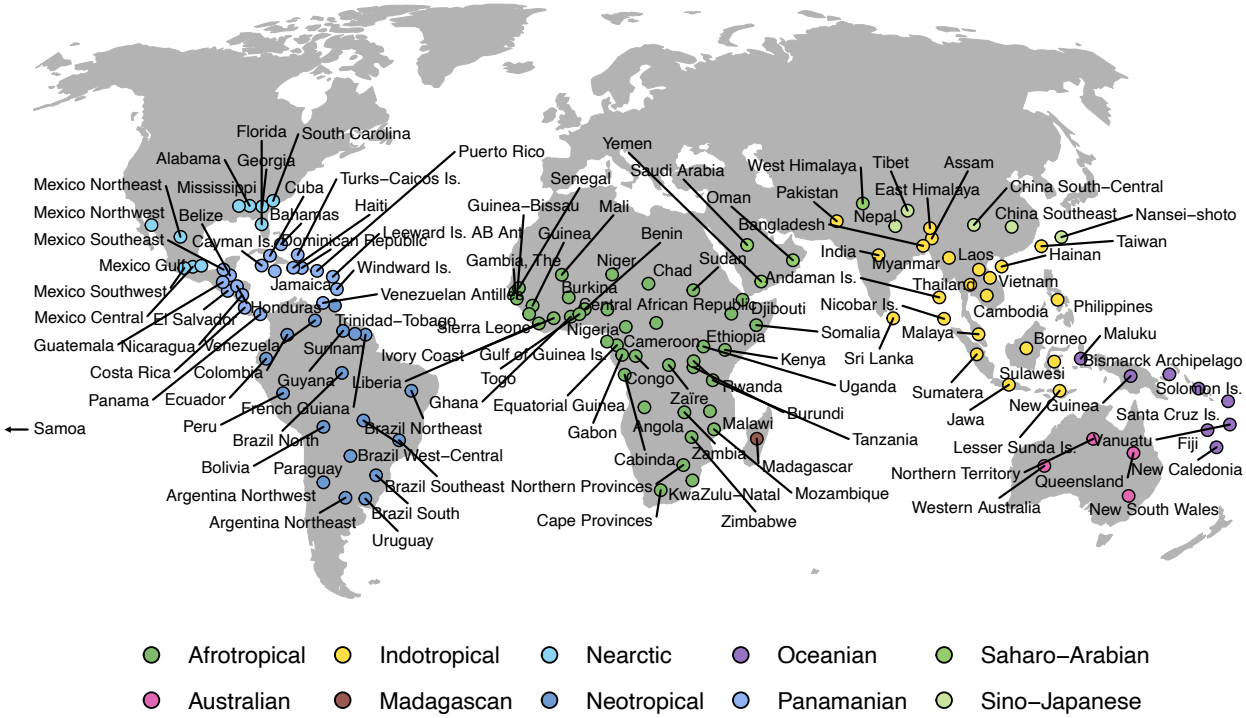

Figure S2 | Map of the 132 botanical countries used in the analysis (see *Methods*). Colors indicate the zoogeographic realm (*sensu* Holt *et al.* 2013) to which each botanical country belongs, dots are located at the centroids of botanical countries.

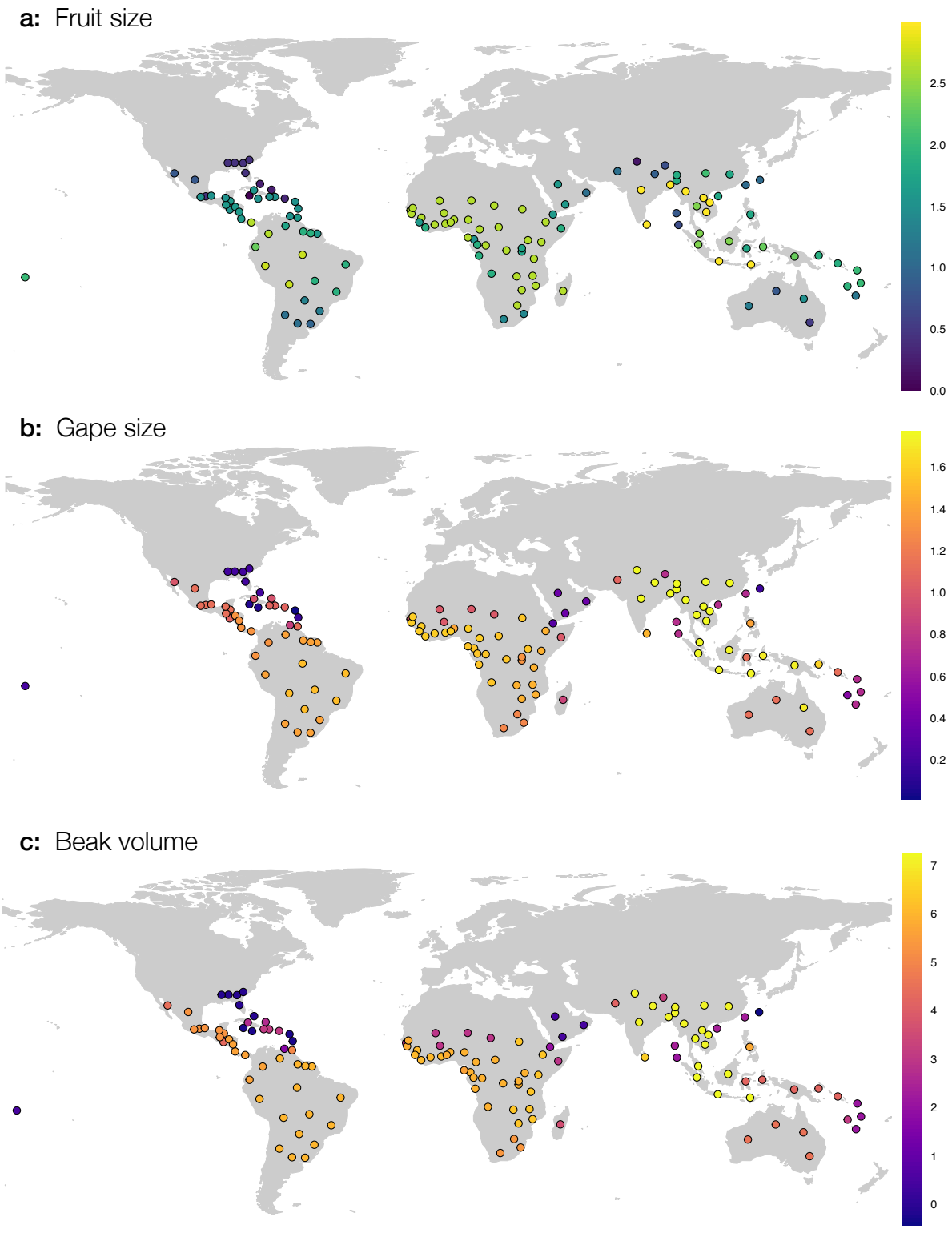

Figure S3 | Spatial patterns of trait variation in the *maximum* value of each botanical country. All traits were log-transformed before plotting. Units: fruit size and gape size- cm; beak volume- cm^3.

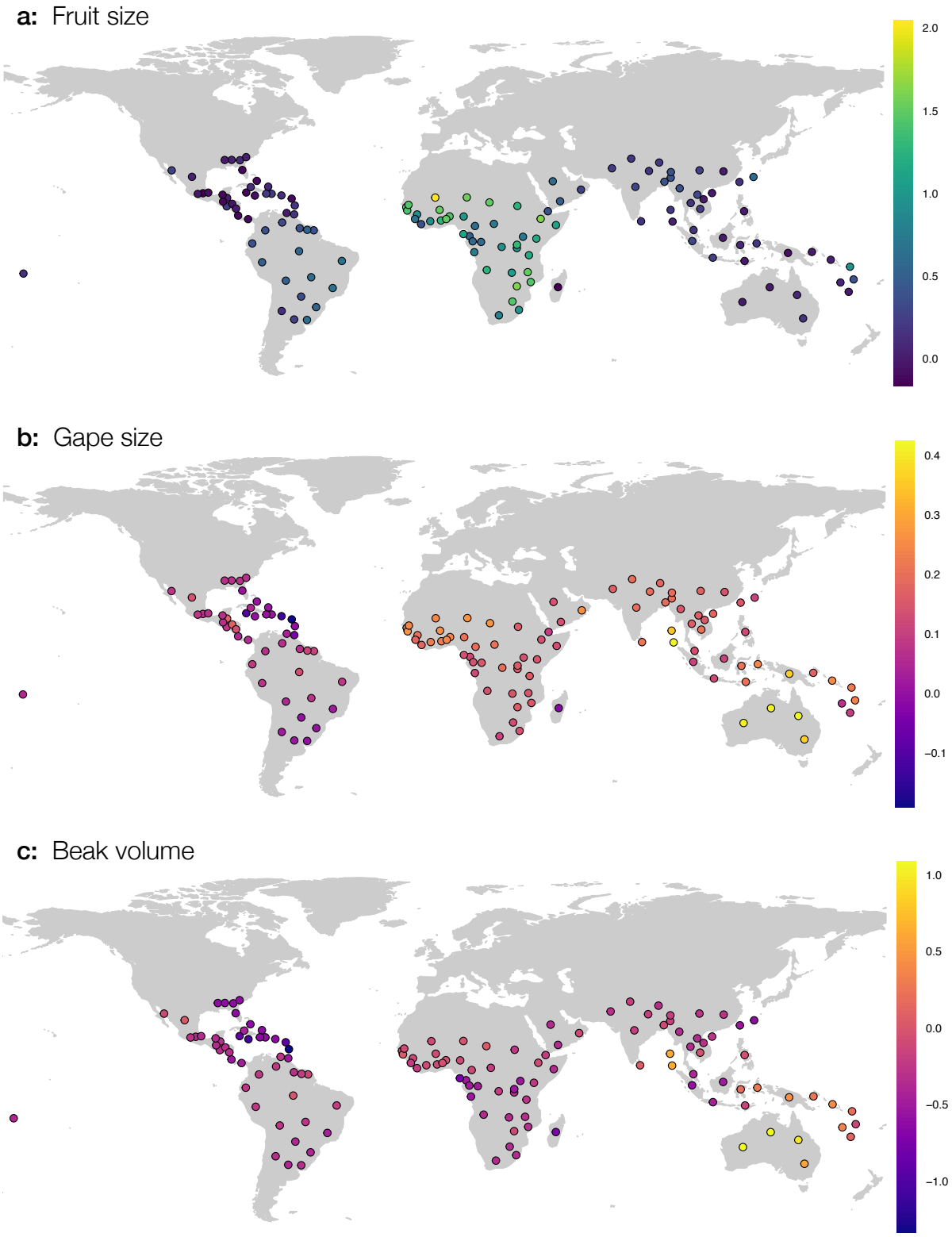

Figure S4 | Spatial patterns of trait variation in the *median* value of each botanical country. All traits were log-transformed before plotting. Units: fruit size and gape size- cm; beak volume- cm^3.

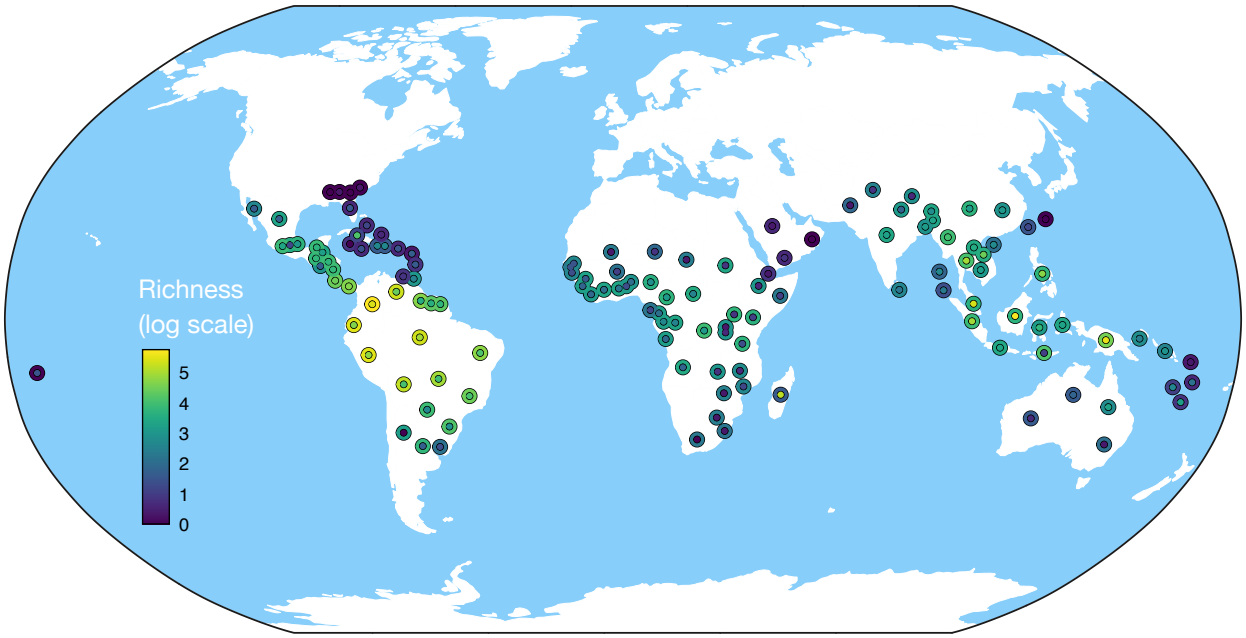

Figure S5 | Richness of avian frugivores and palms within each botanical country. As in Fig. 3, outer ring of points is colored by bird gape size and the inner points by fruit size. Warmer colors are higher values, note log-transformed scale. See Fig. S2 for names of each botanical country.

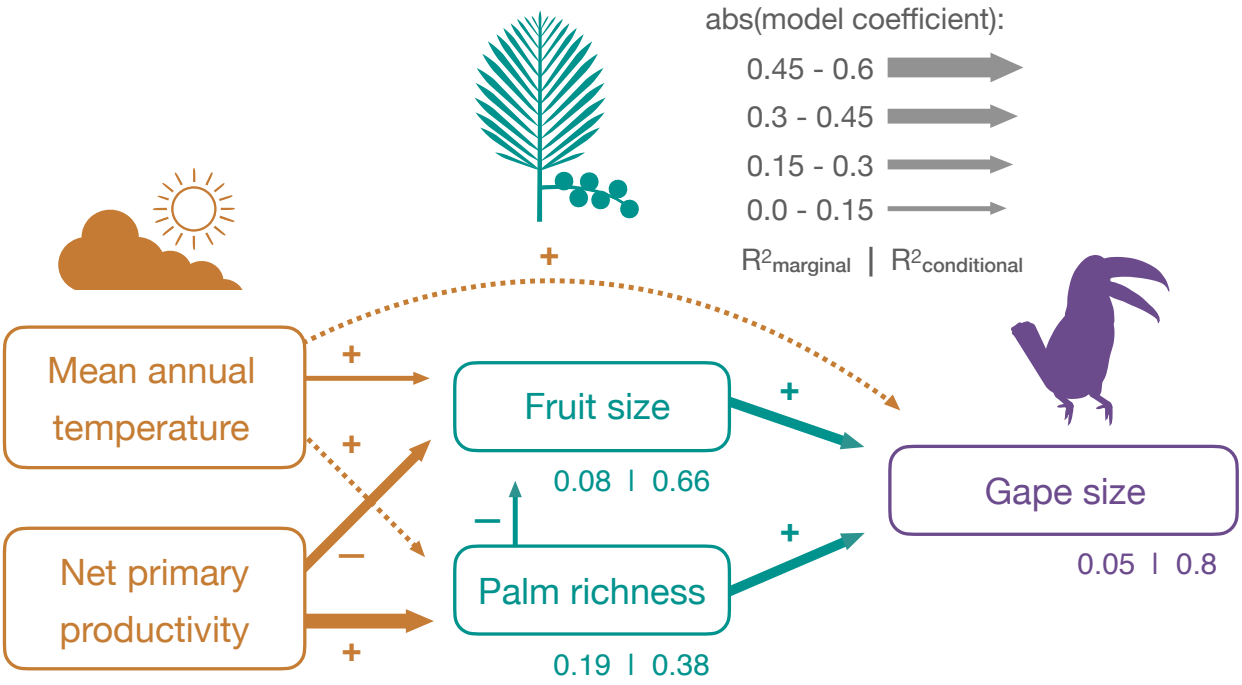

Figure S6 | Path diagram using median values of each botanical country (see *Methods*) in the SEM instead of maximum values (Fig. 2). Dotted paths indicate non-significant relationships, arrows are scaled to absolute values of model coefficients and signs (+/-) indicate direction of the relationship.

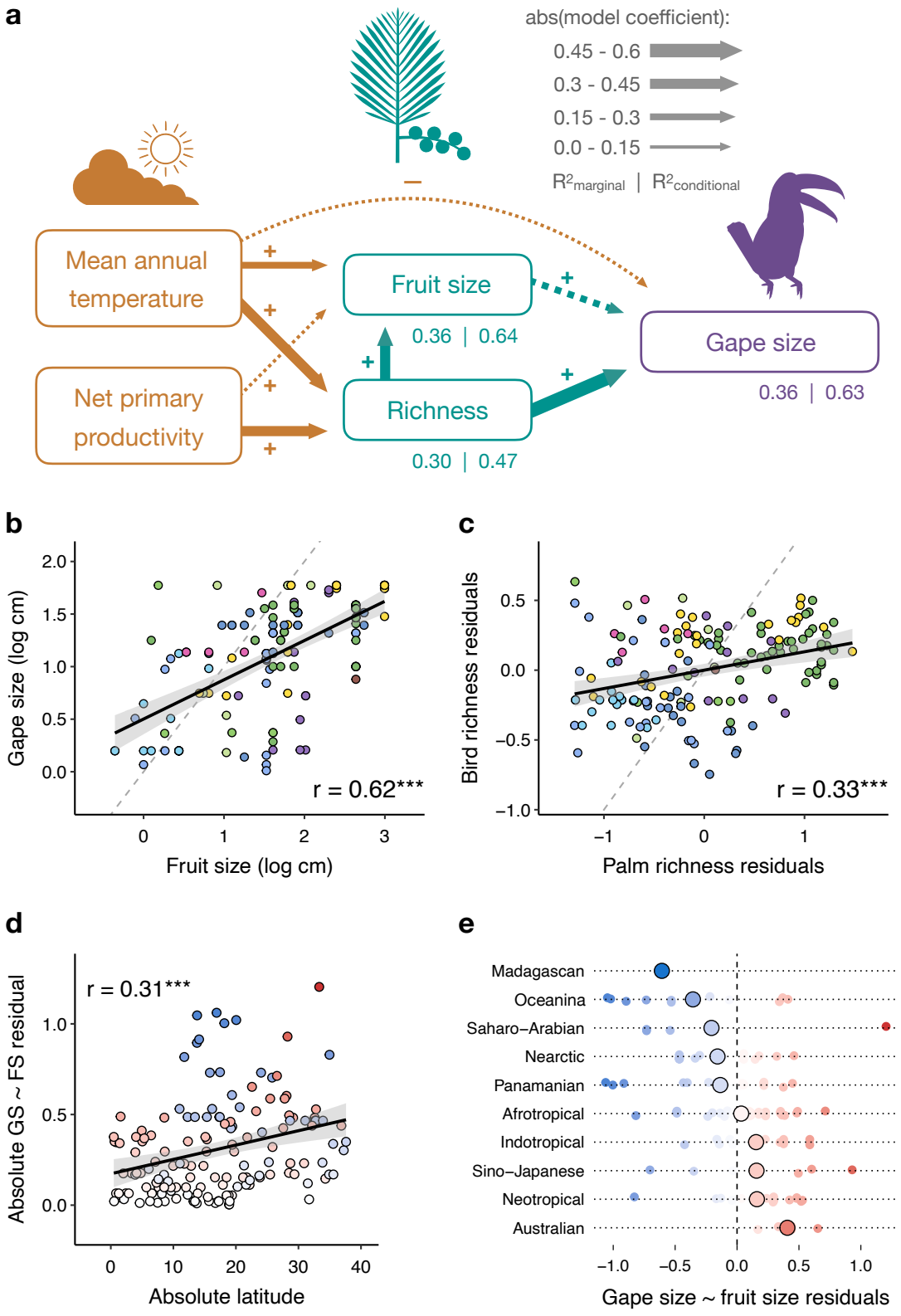

Figure S7 | Re-analysis of the data with the addition of 20 botanical countries with 1-2 species, using maximum trait values. Color values and line types are the same as in figures 2, 3 and 5.