Supporting Information

Globally, tree fecundity exceeds productivity gradients
Valentin Journé *et al.*, Ecology Letters

This Supplement provides additional data summaries as tables and figures. Full summaries of the MASTIF network are available these links for sites and species.

Supplementary Tables

Table S1: Numbers of species, stands, trees, and tree-years for ISP analysis and complete inventories for CSP analysis by tropical and temperate regions. Complete inventories include all trees within a mapped plot and are needed to determine seeds per area in CSP. Because not all inventory plots use the same minimum diameter, the latter is based on trees > 7 cm.

Floristic Region	Species	Sites	Tree-years	Trees	Complete inventories
Tropical	559	64	9,723,438	85,261	47
Temperate	194	3506	2,330,294	61,461	204

Table S2: Covariates used to fit the MASTIF model and data sources. Subscripts are tree i, site j, and year t.

Covariate	Units	Data source
Diameter ($G_{ij,t}$, $G^2_{ij,t}$)	cm, cm^2	MASTIF
Crown class ($C_{ij,t}$)	ordinal (class 1-5)	MASTIF
Moisture surplus (S_j)	mm	terraClimate, CHELSA
Surplus anomaly ($S_{j,t}$)	mm	terraClimate, CHELSA
Temperature (T_j)	°C	terraClimate, CHELSA
Temperature anomaly ($T_{j,t}$)	°C	terraClimate, CHELSA
$S_j \times G_{ij,t}$	mm × cm	
CEC_j (0 - 30cm)	mmolc/kg	soilgrid250m
Slope, aspect (u_{1j}, u_{2j}, u_{3j})	radians	DEM, USGS

Table S3: Coefficients for climate effect on individual (ISP), community fecundity (CSP) and on NPP (MODIS or DGVMs TRENDY). ISP and CSP fecundity are fitted on a natural log scale. r^2 for ISP = 0.2, CSP = 0.15, NPP MODIS = 0.48, NPP DGVM = 0.52.

Variable	*Estimate*	*SE*	*P-value*
Climate effects on $\log_e$ISP			
Intercept	4.64e+00	4.93e-02	<2e-16
T	1.78e-01	6.01e-03	<2e-16
T^2	-5.60e-03	1.770e-04	<2e-16
S	-2.72e-03	4.80e-05	<2e-16
S^2	-1.12e-07	1.14e-08	<2e-16
$T \times S$	1.84e-04	1.73e-06	<2e-16
Climate effects on $\log_e$CSP			
Intercept	9.88e+00	5.61e-01	<2e-16
T	9.96e-02	7.88e-02	0.21
T^2	-2.38e-03	2.82e-03	0.40
S	-9.21e-04	7.16e-04	0.20
S^2	2.87e-08	2.20e-07	0.90
$T \times S$	1.19e-04	4.05e-05	3.60e-3
Climate effects on NPP (MODIS)			
Intercept	3.52e-01	2.46e-02	< 2e-16
T	1.54e-02	1.92e-03	5.18e-15
S	1.80e-04	3.34e-05	1.02e-07
$T \times S$	1.12e-05	2.64e-06	2.41e-05
Climate effects on NPP (DGVMs TRENDY)			
Intercept	1.455e-01	2.2e-02	7.71e-11
T	3.19e-02	1.72e-03	< 2e-16
S	3.25e-04	3.00e-05	< 2e-16
$T \times S$	-7.36e-06	2.38e-06	0.00199

Supplementary Figures

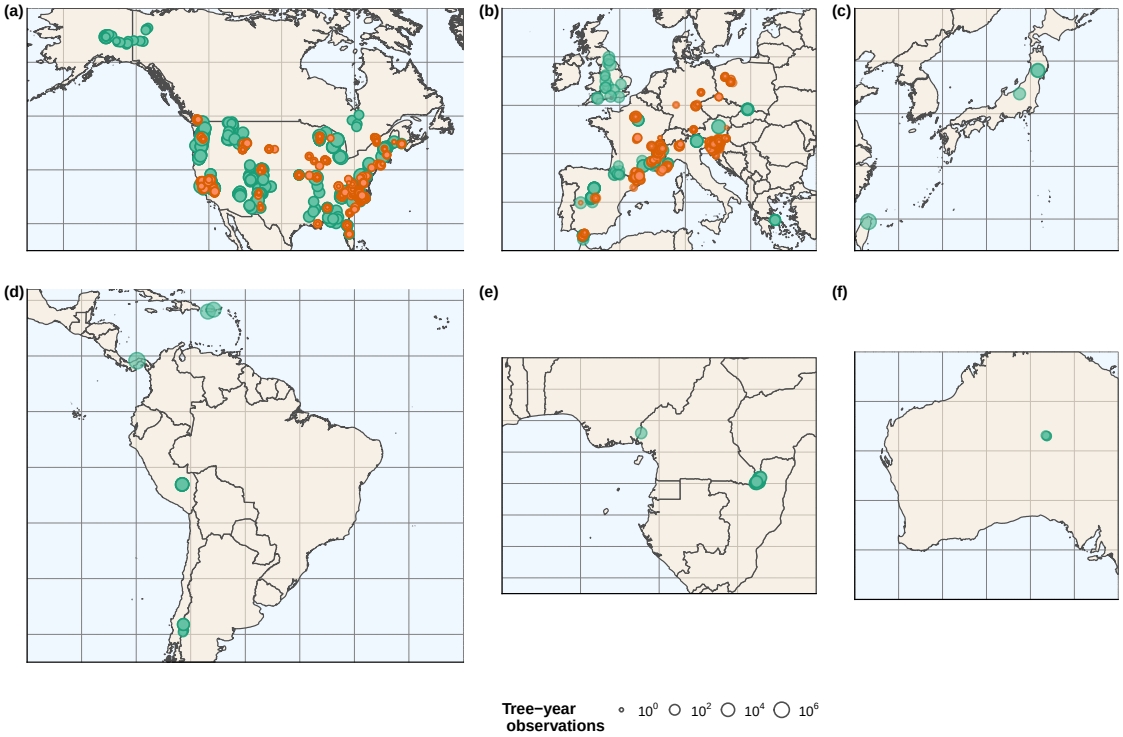

Figure S1: MASTIF data network, including longitudinal (green) and opportunistic (orange) observations in North America (a), Europe (b), Asia (c), South and Central America (d), Africa (e) and Oceania (f). Dot size represents the number of initial tree year observations at log10 scale. Numbers of observations are reported in Table S1.

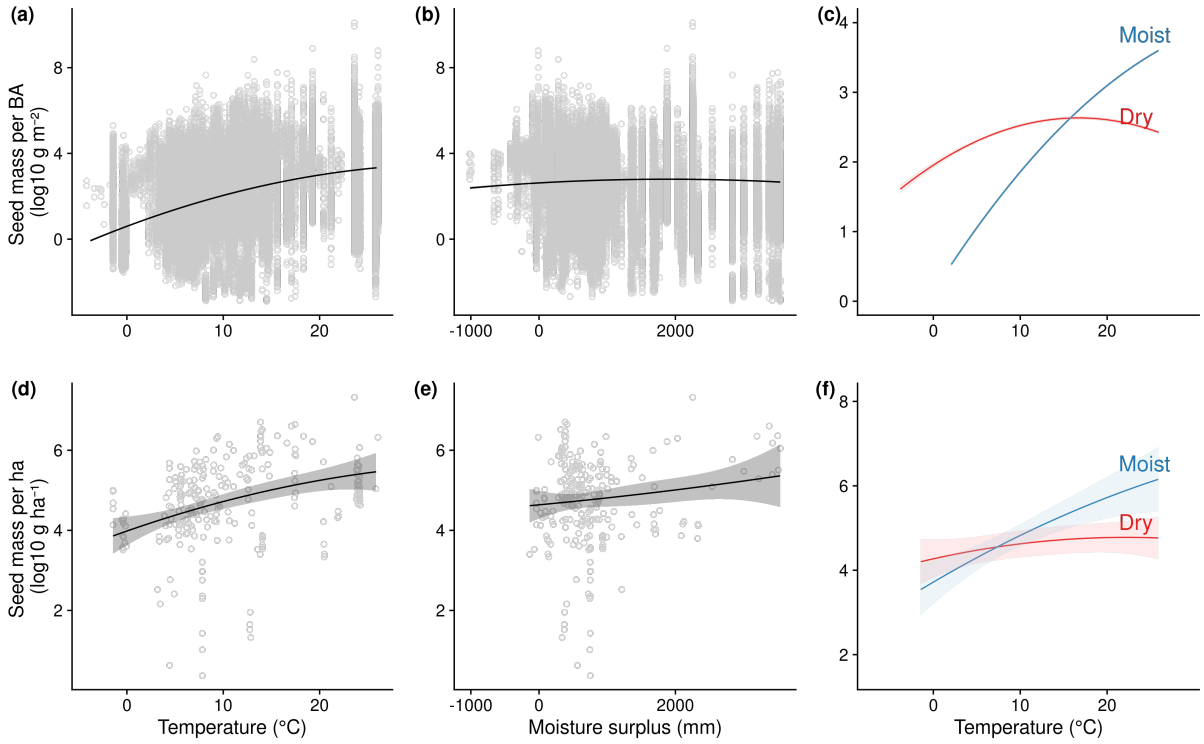

Figure S2: Climate responses for ISP (seed mass per basal area) (a, b, c) and stand-level CSP, as g ha^{-1} (d, e, f) showing marginal responses to temperature (a and d) and moisture surplus (d and e) with observations (dots) and the fitted model, and interactions between temperature and moisture surplus (c and f). Coefficient are reported in Table S3. Low and high values used for conditional plots in (c and f), labelled as Moist (S = 1500 mm) and Dry (S = −50 mm). Due to large sample size, confidence intervals around lines in (a, b, c) are not distinct from the predictive mean. Temperature and moisture surplus correspond here to a mean annual value for each sites.

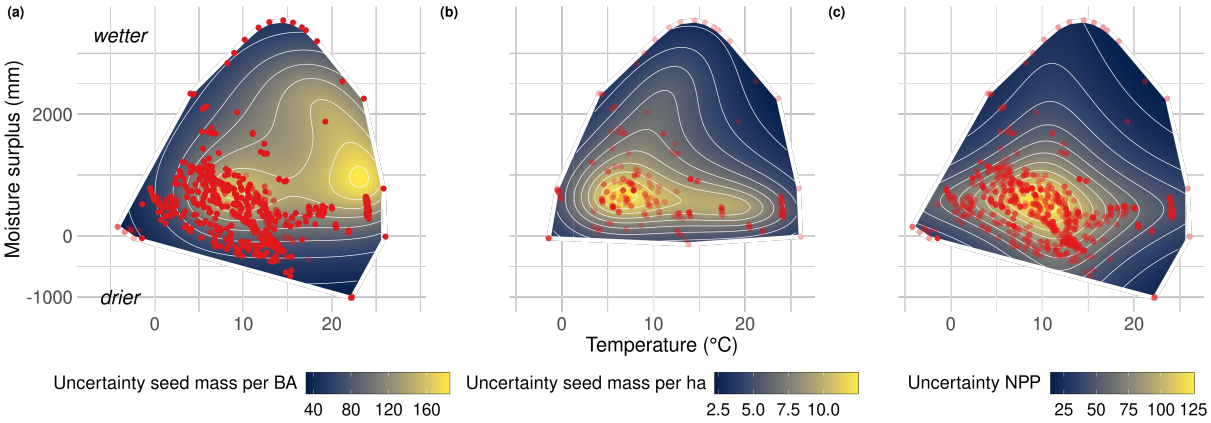

Figure S3: a) Uncertainty in the climate responses, defined as the inverse of the predictive standard error, for (a) ISP (seed production per tree basal area, $\log_{10}$ g m^{-2} y^{-1}) (b) CSP (seed production per ha forest floor, $\log_{10}$ g ha^{-1} y^{-1}), and (c) NPP (kg C m^{-2} y^{-1}). Convex hulls are defined by observations (red), including individual trees (a, c) and inventory plots (b). Surface scale color decreases as the inverse of the predictive standard error–blue edges reflect increased uncertainty at data extremes.

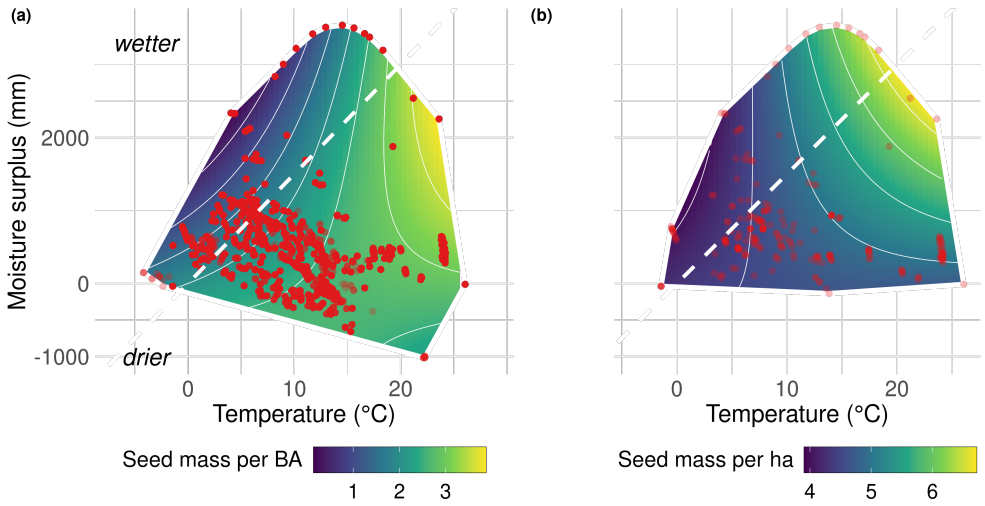

Figure S4: Because BCI includes the largest sample of tree years, we show that the same trend exists without BCI for both (a) ISP, (seed production per tree basal area, $\log_{10}$ values) and (b) CSP (seed mass per ha forest floor, $\log_{10}$ values).

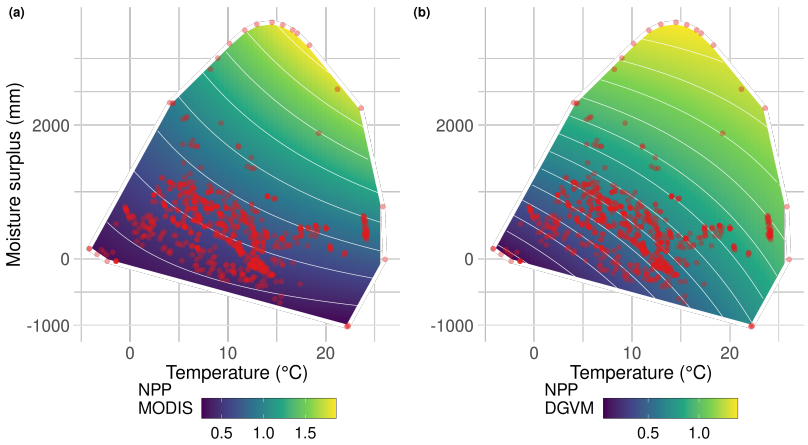

Figure S5: Climate response for NPP from MODIS (a) and the mean value from 11 DGVMs in TRENDY (b) show the same response to temperature.

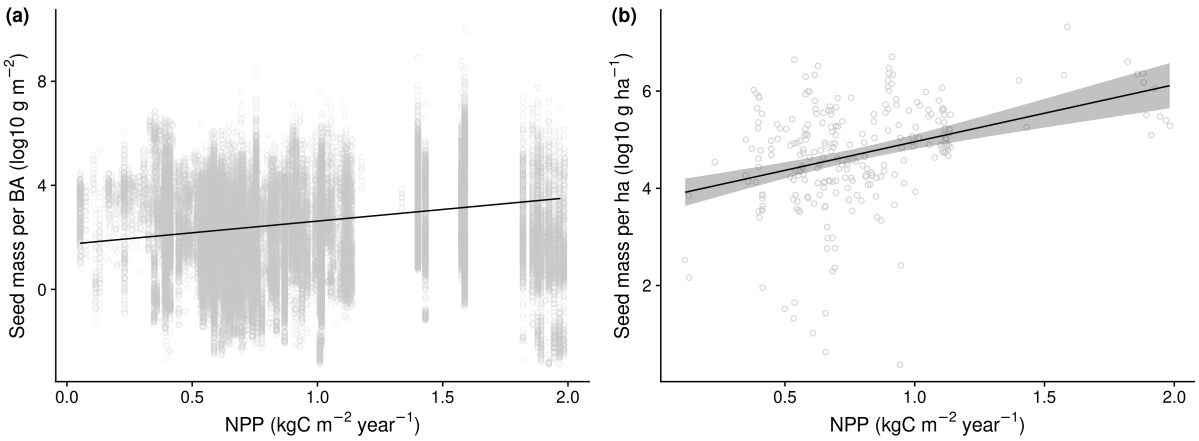

Figure S6: Relationships between NPP from MODIS and individual (standardized) fecundity ISP (a) and stand CSP (b), both positive ($p < 0.00001$) and both accounting for little of the variability ($r^2 = 0.05$ and 0.13, respectively).

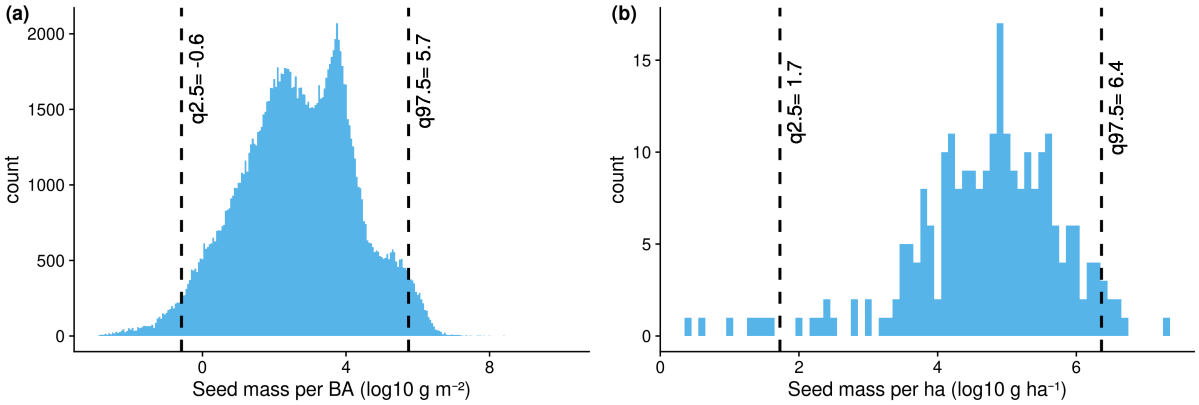

Figure S7: Distribution of (a) ISP (g seed per m^2 basal area) and (b) CSP (g seed per ha basal area) fecundities. Black dotted lines represent the quantile at 2.5 and 97.5%.