

## Supplementary Materials for:

Ecosystem size and complexity are extrinsic drivers of food chain length in branching networks

**This PDF file includes:**

- XXX
- References

**Table S1 Sensitivity analysis for ecosystem size**

Sensitivity analysis of the ecosystem size effect on the FCL. Parameter estimates of linear regression models are shown. The response variable is the Spearman's rank correlation between food chain length and ecosystem size. Response and explanatory variables (i.e., simulation parameters) were standardized (mean = 0, SD = 1) before the analysis.

Term	Interpretation	Estimate	SE
$p_m$	Disturbance prob.	0.034	0.038
$\mu_m$	Disturbance intensity	0.091	0.039
$\sigma_s$	Disturbance variation at headwaters	0.003	0.039
$\sigma_l$	Local disturbance variation	0.024	0.039
$r_b$	Reproductive rate of basal species	-0.066	0.038
$e_{bc}$	Conversion efficiency (B to C)	-0.216	0.038
$e_{bp}$	Conversion efficiency (B to P)	-0.027	0.039
$e_{cp}$	Conversion efficiency (C to P)	0.003	0.038
$a_{bc}$	Attack rate (B to C)	-0.184	0.038
$a_{bp}$	Attack rate (B to P)	0.152	0.038
$a_{cp}$	Attack rate (C to P)	-0.214	0.038
$h_{bc}$	Handling time (B to C)	0.045	0.039
$h_{bp}$	Handling time (B to P)	0.264	0.039
$h_{cp}$	Handling time (C to P)	-0.249	0.039
$s_0$	Survival prob.	-0.067	0.039
$p_d$	Dispersal prob.	-0.003	0.038
$\theta$	Dispersal distance	0.035	0.039

**Table S2 Sensitivity analysis for ecosystem complexity**

Sensitivity analysis of the ecosystem complexity effect on the FCL. Parameter estimates of linear regression models are shown. The response variable is the Spearman's rank correlation between food chain length and ecosystem complexity. Response and explanatory variables (i.e., simulation parameters) were standardized (mean = 0, SD = 1) before the analysis.

Term	Interpretation	Estimate	SE
$p_m$	Disturbance prob.	-0.007	0.036
$\mu_m$	Disturbance intensity	-0.037	0.036
$\sigma_s$	Disturbance variation at headwaters	0.019	0.036
$\sigma_l$	Local disturbance variation	0.031	0.036
$r_b$	Reproductive rate of basal species	0.121	0.036
$e_{bc}$	Conversion efficiency (B to C)	0.270	0.036
$e_{bp}$	Conversion efficiency (B to P)	0.053	0.036
$e_{cp}$	Conversion efficiency (C to P)	0.002	0.036
$a_{bc}$	Attack rate (B to C)	0.187	0.036
$a_{bp}$	Attack rate (B to P)	-0.193	0.036
$a_{cp}$	Attack rate (C to P)	0.249	0.036
$h_{bc}$	Handling time (B to C)	-0.100	0.036
$h_{bp}$	Handling time (B to P)	-0.244	0.037
$h_{cp}$	Handling time (C to P)	0.280	0.037
$s_0$	Survival prob.	0.078	0.036
$p_d$	Dispersal prob.	-0.004	0.036
$\theta$	Dispersal distance	-0.004	0.036