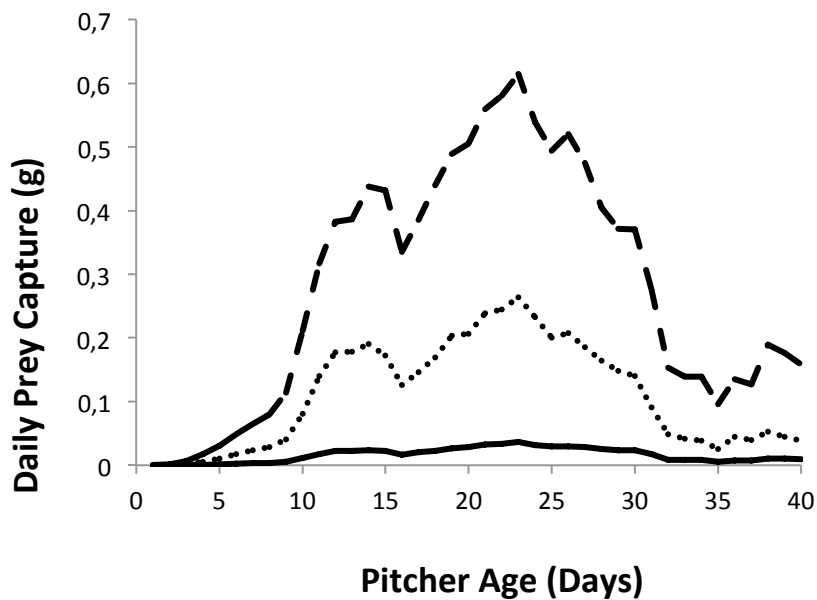


Baiser, B., Buckley, H. L., Gotelli, N. J. and Ellison, A. M. 2012. Predicting food-web structure with metacommunity models. – Oikos 000: 000–000.

Appendix A1

Figure A1. Example prey capture curves for model pitcher plants. The three lines represent pitchers with high (dashed), medium (dotted), and low (solid) prey capture rates. For models where pitchers have the same resource levels (e.g. patch dynamics), the same exact prey curve was used for all 20 pitchers the simulation. Prey capture in grams is standardized between 0-1 per day.



Appendix A2

Table A2. Table of model parameters. Parameters re-drawn each simulation are shaded.

Parameter	Description	Value	Source
G_i	probability of species i dispersing into a pitcher	normalized frequency of species i presence	empirical site data
b_i	intrinsic growth rate for species i	$-0.03 < b_i < 0$	statistical distribution
a_{ij}	per capita effect of species j on the per capita growth rate of species i	gamma distribution ($k = 1, \theta = 0.1$)	statistical distribution
a_{ii}	per capita effect of intraspecific competition	-1	constant
R_v	daily rainfall in cm^3	empirical distribution	empirical site data
A_p	area of pitcher opening in cm^2	FTN= 4.15, QUS= 5.31, GEO=3.14	empirical site data
E	daily evaporation in cm^3	0.04	constant
M	daily water loss due to <i>E. fax</i> in cm^3	0.01	constant
N_{max}	maximum prey capture per pitcher	prey capture function	model derived
p_{ij}	dispersal difference between species i and j	$G_i - G_j$	empirical data

Appendix A3

Table A3. ANOVA tables for each food web metric. Significant terms ($p < 0.05$) are italicized.

Metric: connectance					
	DF	Sum sq	Mean sq	F	p
<i>Site (Block)</i>	2	762	381.01	5.95	0.006
<i>Model type</i>	2	4054.3	2027.17	31.65	< 0.001
Dispersal	1	159.9	159.89	2.50	0.122
Coefficient (a_{ij})	2	298.6	149.31	2.33	0.111
Model type \times Dispersal	2	201.9	100.93	1.58	0.220
<i>Model type \times Coefficient</i>	4	858.2	214.55	3.35	0.019
Dispersal \times Coefficient	2	203	101.52	1.58	0.218
Residuals	38	2434.2	64.06		

Metric: SD connectance					
	DF	Sum sq	Mean sq	F	p
<i>Site (Block)</i>	2	44.72	22.36	7.54	0.002
<i>Model type</i>	2	1183.54	591.77	199.70	< 0.001
<i>Dispersal</i>	1	16.3	16.3	5.50	0.024
<i>Coefficient (a_{ij})</i>	2	125.73	62.86	21.21	< 0.001
<i>Model type \times Dispersal</i>	2	20.63	10.32	3.48	0.041
<i>Model type \times Coefficient</i>	4	258.35	64.59	21.80	< 0.001
Dispersal \times Coefficient	2	8.48	4.24	1.43	0.252
Residuals	38	112.61	2.96		

Metric: linkage density					
	Df	Sum Sq	Mean Sq	F	p
Site (Block)	2	153.85	76.93	2.38	0.106
<i>Model type</i>	2	1943.51	971.76	30.10	< 0.001
Dispersal	1	24.83	24.83	0.77	0.386
<i>Coefficient (a_{ij})</i>	2	296.36	148.18	4.59	0.016
Model type \times Dispersal	2	57.24	28.62	0.89	0.420
Model type \times Coefficient	4	306.28	76.57	2.37	0.069
Dispersal \times Coefficient	2	81.26	40.63	1.26	0.296
Residuals	38	1226.74	32.28		

Metric: SD linkage density					
	DF	Sum sq	Mean sq	F	p
<i>Site (Block)</i>	2	157.815	78.908	38.14	< 0.001
<i>Model type</i>	2	43.597	21.799	10.54	<0.001
<i>Dispersal</i>	1	9.455	9.455	4.57	0.039
<i>Coefficient (a_{ij})</i>	2	14.487	7.244	3.50	0.040
Model type × Dispersal	2	2.015	1.008	0.49	0.618
Model type × Coefficient	4	50.393	12.598	6.09	< 0.001
Dispersal × Coefficient	2	0.931	0.465	0.23	0.800
Residuals	38	78.612	2.069		

Metric: species richness					
	DF	Sum sq	Mean sq	F	p
<i>Site (Block)</i>	2	144.2	72.12	5.54	0.008
<i>Model type</i>	2	3746	1873.01	143.88	< 0.001
<i>Dispersal</i>	1	109.7	109.65	8.42	0.006
<i>Coefficient (a_{ij})</i>	2	160	80.01	6.15	0.005
Model type × Dispersal	2	228.9	114.45	8.79	< 0.001
Model type × Coefficient	4	194.6	48.64	3.74	0.012
Dispersal × Coefficient	2	66.9	33.47	2.57	0.090
Residuals	38	494.7	13.02		

Metric: SD species richness					
	DF	Sum sq	Mean sq	F	p
<i>Site (Block)</i>	2	171.627	85.813	97.68	< 0.001
<i>Model type</i>	2	20.392	10.196	11.61	< 0.001
<i>Dispersal</i>	1	3.77	3.77	4.29	0.045
<i>Coefficient (a_{ij})</i>	2	4.109	2.054	2.34	0.110
Model type × Dispersal	2	9.942	4.971	5.66	0.007
Model type × Coefficient	4	18.47	4.618	5.26	0.002
Dispersal × Coefficient	2	1.849	0.925	1.05	0.359
Residuals	38	33.384	0.879		

Metric: β -diversity					
	DF	Sum sq	Mean sq	F	p
Site (Block)	2	0.116	0.058	0.09	0.918
<i>Model type</i>	2	306.121	153.061	226.82	< 0.001
<i>Dispersal</i>	1	2.983	2.983	4.42	0.042
<i>Coefficient (a_{ij})</i>	2	9.824	4.912	7.28	0.002
<i>Model type</i> × <i>Dispersal</i>	2	8.434	4.217	6.25	0.005
Model type × Coefficient	4	3.468	0.867	1.28	0.293
Dispersal × Coefficient	2	0.291	0.145	0.22	0.807
Residuals	38	25.643	0.675		

Metric: trophic diversity					
	DF	Sum sq	Mean sq	F	p
Site (Block)	2	270.7	135.35	2.20	0.124
<i>Model type</i>	2	4999.3	2499.63	40.70	< 0.001
Dispersal	1	211.5	211.51	3.44	0.071
<i>Coefficient (a_{ij})</i>	2	552.7	276.37	4.50	0.018
Model type × Dispersal	2	336.8	168.4	2.74	0.077
<i>Model type</i> × <i>Coefficient</i>	4	884.8	221.19	3.60	0.014
Dispersal × Coefficient	2	214.8	107.38	1.75	0.188
Residuals	38	2333.7	61.41		

Metric: SD trophic diversity					
	DF	Sum sq	Mean sq	F	p
<i>Site (Block)</i>	2	228.436	114.218	60.22	< 0.001
Model type	2	6.148	3.074	1.62	0.211
Dispersal	1	0.63	0.63	0.33	0.568
Coefficient (a_{ij})	2	6.025	3.012	1.59	0.218
Model type × Dispersal	2	7.371	3.685	1.94	0.157
<i>Model type</i> × <i>Coefficient</i>	4	45.725	11.431	6.03	< 0.001
Dispersal × Coefficient	2	4.101	2.05	1.08	0.349
Residuals	38	72.072	1.897		

Appendix A4

Table A4. Tukey's HSD test for within model comparisons for the model type $\times a_{ij}$ distribution term. ME corresponds to mass effects, SS to species sorting, and Patch to patch dynamics.

Tables are only shown for food web metrics for which model type $\times a_{ij}$ distribution was significant in the ANOVA and within model pairwise comparisons were significant ($p < 0.05$).

Column head 'diff' is the difference in means between factor levels and 'lwr', 'upr' are the 95% confidence intervals. Significant differences in means are italicized.

Metric: connectance				
	diff	lwr	upr	p
ME \times Gamma (6,0.05)–ME \times Gamma (1,0.1)	-12.01	-27.19	3.18	0.221
<i>ME\timesUniform–ME\timesGamma (1,0.1)</i>	<i>-19.39</i>	<i>-34.57</i>	<i>-4.20</i>	<i>0.004</i>
ME \times Uniform–ME \times Gamma (6,0.05)	-7.38	-22.56	7.81	0.801
Patch \times Gamma (6,0.05)–Patch \times Gamma (1,0.1)	0.51	-14.68	15.70	1.000
Patch \times Uniform–Patch \times Gamma (1,0.1)	1.08	-14.10	16.27	1.000
Patch \times Uniform–Patch \times Gamma (6,0.05)	0.57	-14.61	15.76	1.000
SS \times Gamma (6,0.05)–SS \times Gamma (1,0.1)	0.72	-14.46	15.91	1.000
SS \times Uniform–SS \times Gamma (1,0.1)	1.21	-13.97	16.40	1.000
SS \times Uniform–SS \times Gamma (6,0.05)	0.49	-14.70	15.68	1.000

Metric: SD connectance				
	diff	lwr	upr	p
<i>ME\timesGamma (6,0.05)–ME\timesGamma (1,0.1)</i>	<i>-6.86</i>	<i>-10.13</i>	<i>-3.59</i>	<i><0.001</i>
<i>ME\timesUniform–ME\timesGamma (1,0.1)</i>	<i>-11.22</i>	<i>-14.49</i>	<i>-7.95</i>	<i><0.001</i>
<i>ME\timesUniform–ME\timesGamma (6,0.05)</i>	<i>-4.36</i>	<i>-7.63</i>	<i>-1.09</i>	<i>0.003</i>
Patch \times Gamma (6,0.05)–Patch \times Gamma (1,0.1)	-0.12	-3.39	3.15	1.000
Patch \times Uniform–Patch \times Gamma (1,0.1)	0.03	-3.24	3.29	1.000
Patch \times Uniform–Patch \times Gamma (6,0.05)	0.15	-3.12	3.41	1.000
SS \times Gamma (6,0.05)–SS \times Gamma (1,0.1)	-0.07	-3.34	3.19	1.000
SS \times Uniform–SS \times Gamma (1,0.1)	0.12	-3.15	3.39	1.000
SS \times Uniform–SS \times Gamma (6,0.05)	0.19	-3.07	3.46	1.000

Metric: linkage density				
	diff	lwr	upr	p
ME×Gamma (6,0.05)–ME×Gamma (1,0.1)	7.86	-2.92	18.64	0.315
<i>ME×Uniform–ME×Gamma (1,0.1)</i>	<i>13.94</i>	<i>3.16</i>	<i>24.72</i>	<i>0.004</i>
ME×Uniform–ME×Gamma (6,0.05)	6.08	-4.70	16.86	0.648
Patch×Gamma (6,0.05)–Patch×Gamma (1,0.1)	0.49	-10.29	11.27	1.000
Patch×Uniform–Patch×Gamma (1,0.1)	1.58	-9.20	12.36	1.000
Patch×Uniform–Patch×Gamma (6,0.05)	1.09	-9.69	11.87	1.000
SS×Gamma (6,0.05)–SS×Gamma (1,0.1)	0.64	-10.14	11.42	1.000
SS×Uniform–SS×Gamma (1,0.1)	1.69	-9.09	12.48	1.000
SS×Uniform–SS×Gamma (6,0.05)	1.05	-9.73	11.83	1.000

Metric: SD linkage density				
	diff	lwr	upr	p
<i>ME×Gamma (6,0.05)–ME×Gamma (1,0.1)</i>	<i>-2.80</i>	<i>-5.53</i>	<i>-0.07</i>	<i>0.041</i>
<i>ME×Uniform–ME×Gamma (1,0.1)</i>	<i>-4.57</i>	<i>-7.30</i>	<i>-1.84</i>	<i><0.001</i>
ME×Uniform–ME×Gamma (6,0.05)	-1.77	-4.50	0.96	0.470
Patch×Gamma (6,0.05)–Patch×Gamma (1,0.1)	0.17	-2.56	2.90	1.000
Patch×Uniform–Patch×Gamma (1,0.1)	0.25	-2.48	2.98	1.000
Patch×Uniform–Patch×Gamma (6,0.05)	0.08	-2.65	2.81	1.000
SS×Gamma (6,0.05)–SS×Gamma (1,0.1)	0.19	-2.54	2.92	1.000
SS×Uniform–SS×Gamma (1,0.1)	0.57	-2.16	3.30	0.999
SS×Uniform–SS×Gamma (6,0.05)	0.38	-2.35	3.11	1.000

Metric: species richness				
	diff	lwr	upr	p
ME×Gamma (6,0.05)–ME×Gamma (1,0.1)	3.40	-3.44	10.25	0.780
<i>ME×Uniform–ME×Gamma (1,0.1)</i>	<i>10.56</i>	<i>3.72</i>	<i>17.41</i>	<i>< 0.001</i>
<i>ME×Uniform–ME×Gamma (6,0.05)</i>	<i>7.16</i>	<i>0.31</i>	<i>14.01</i>	<i>0.034</i>
Patch×Gamma (6,0.05)–Patch×Gamma (1,0.1)	0.02	-6.82	6.87	1.000
Patch×Uniform–Patch×Gamma (1,0.1)	0.90	-5.94	7.75	1.000
Patch×Uniform–Patch×Gamma (6,0.05)	0.88	-5.97	7.73	1.000
SS×Gamma (6,0.05)–SS×Gamma (1,0.1)	0.02	-6.82	6.87	1.000
SS×Uniform–SS×Gamma (1,0.1)	0.80	-6.05	7.64	1.000
SS×Uniform–SS×Gamma (6,0.05)	0.78	-6.07	7.62	1.000

Metric: trophic diversity				
	diff	lwr	upr	p
ME×Gamma (6,0.05)–ME×Gamma (1,0.1)	-0.96	-2.74	0.82	0.701
<i>ME×Uniform–ME×Gamma (1,0.1)</i>	-1.57	-3.35	0.21	0.121
ME×Uniform–ME×Gamma (6,0.05)	-0.61	-2.39	1.17	0.966
Patch×Gamma (6,0.05)–Patch×Gamma (1,0.1)	1.64	-0.14	3.42	0.090
Patch×Uniform–Patch×Gamma (1,0.1)	1.03	-0.75	2.80	0.621
Patch×Uniform–Patch×Gamma (6,0.05)	-0.62	-2.39	1.16	0.964
SS×Gamma (6,0.05)–SS×Gamma (1,0.1)	1.32	-0.46	3.10	0.292
SS×Uniform–SS×Gamma (1,0.1)	1.29	-0.49	3.07	0.322
SS×Uniform–SS×Gamma (6,0.05)	-0.03	-1.81	1.75	1.000

Metric: SD trophic diversity				
	diff	lwr	upr	p
ME×Gamma (6,0.05)–ME×Gamma (1,0.1)	-2.14	-4.75	0.47	0.184
<i>ME×Uniform–ME×Gamma (1,0.1)</i>	-3.60	-6.21	-0.98	0.002
ME×Uniform–ME×Gamma (6,0.05)	-1.45	-4.07	1.16	0.663
Patch×Gamma (6,0.05)–Patch×Gamma (1,0.1)	1.49	-1.12	4.11	0.632
Patch×Uniform–Patch×Gamma (1,0.1)	0.81	-1.81	3.42	0.982
Patch×Uniform–Patch×Gamma (6,0.05)	-0.69	-3.30	1.93	0.994
SS×Gamma (6,0.05)–SS×Gamma (1,0.1)	1.30	-1.31	3.91	0.780
SS×Uniform–SS×Gamma (1,0.1)	1.07	-1.55	3.68	0.912
SS×Uniform–SS×Gamma (6,0.05)	-0.23	-2.85	2.38	1.000

Appendix A5

Table A5. Tukey's HSD test for within model comparisons for the model type \times dispersal distribution term. ME corresponds to mass effects, SS to species sorting, and Patch to patch dynamics. Tables are only shown for food web metrics for which model type \times dispersal distribution was significant in the ANOVA and within model pairwise comparisons were significant ($p < 0.05$). Significant differences in means are italicized.

Metric: SD connectance				
	diff	lwr	upr	p
<i>ME×Emod–ME×Empirical</i>	-2.85	-5.28	-0.41	<i>0.014</i>
Patch×Emod-Patch×Empirical	-0.27	-2.70	2.16	0.999
SS×Emod-SS×Empirical	-0.18	-2.61	2.25	1.000

Metric: species richness				
	diff	lwr	upr	p
<i>ME×Emod–ME×Empirical</i>	-8.67	-13.78	-3.57	<i><0.001</i>
Patch×Emod-Patch×Empirical	0.14	-4.96	5.25	1.000
SS×Emod-SS×Empirical	-0.02	-5.12	5.08	1.000

Appendix A6

Table A6. Variance partitioning for ANOVA's for nine food web metrics. Terms that are significant in the ANOVA are italicized. The final two columns are the mean and standard deviation of variance explained across all food web metrics for a given factor.

	Con	SD Con	LD	SD LD	S	SD S	β	TD	SD TD	Mean	SD
Site (Block)	<i>0.07</i>	<i>0.02</i>	0.02	<i>0.40</i>	<i>0.02</i>	<i>0.60</i>	0.00	0.01	<i>0.55</i>	0.19	0.24
Model type	<i>0.41</i>	<i>0.59</i>	<i>0.44</i>	<i>0.10</i>	<i>0.67</i>	<i>0.07</i>	<i>0.84</i>	0.46	0.01	0.40	0.27
Dispersal	0.01	<i>0.01</i>	0.00	<i>0.02</i>	<i>0.02</i>	<i>0.01</i>	<i>0.01</i>	0.01	0.00	0.01	0.01
Coefficient (a_{ij})	0.02	<i>0.06</i>	<i>0.05</i>	<i>0.03</i>	<i>0.02</i>	0.01	<i>0.02</i>	0.04	0.01	0.03	0.02
Model type \times Dispersal	0.02	<i>0.01</i>	0.00	0.00	<i>0.07</i>	<i>0.06</i>	<i>0.04</i>	0.04	0.02	0.03	0.02
Model type \times Coefficient	<i>0.11</i>	<i>0.22</i>	0.07	<i>0.20</i>	<i>0.05</i>	<i>0.09</i>	0.00	0.11	<i>0.17</i>	0.11	0.07
Dispersal \times Coefficient	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.02	0.00	0.01	0.01
Residuals	0.36	0.08	0.41	0.29	0.13	0.17	0.10	0.31	0.25	0.23	0.11