Ecography

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Supplementary material

Appendix 1

Figure A1. Trend in species similarity with body size as a function of the difference between the food and landscape fractal dimensions (F-D). All combinations of trophic guild (carnivorous in red, herbivorous in green), methods for the estimation of the landscape fractal dimension (box-counting method D_{BC} and transect D_T) and observed or null model deviations are presented. A significant linear or nonlinear association was not detected in any of the eight associations explored ($p>0.05$). The food fractal dimension F values for carnivorous (F_A) and herbivorous species (F_P) were estimated from observed food density m as $F = D + \log(m)/\log(x)$, where D is the landscape fractal dimension and x is the square root of pond area (following Ritchie 2010, p78). Z represents standardized deviations from null model expectations.

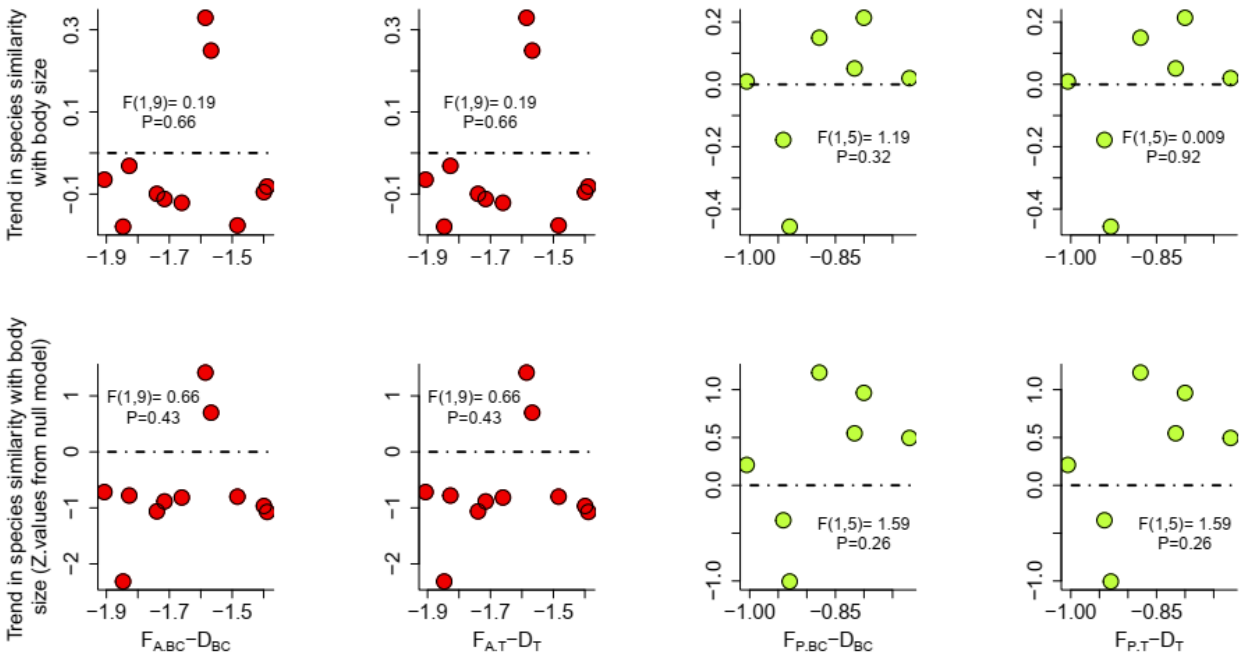

Table A1. Environmental variables of ponds considered in the *bestglm* analysis. Plant richness, area (log_{10}, m^2), mean depth (m), coefficient of variation of depth, heterogeneity (mean number of islands per meter), shape index (major versus minor diameter ratio), the landscape fractal dimension (estimated by box-counting and transect method, D_{BC} and D_T, respectively), carnivorous species richness, carnivorous average body size ratio, carnivorous body size packing trend, herbivorous species richness, herbivorous average body size ratio, herbivorous body size packing trend, plant food density (m_P), plant food fractal dimension (estimated from plant density, by box-counting [$F_{P.BC}$] and transect method [$F_{P.T}$]), animal food density (considering biomass of animals with equal or smaller body size than the average body size of pond's carnivorous coleopterans, m_A), animal food fractal dimension (estimated from animal density, by box-counting [$F_{A.BC}$] and transect method [$F_{A.T}$]), and the difference between the food fractal dimensions and the landscape fractal dimensions ($F_{P.BC}$-D_{BC}, $F_{P.T}$-D_T, $F_{A.BC}$-D_{BC} and $F_{A.T}$-D_T).

Pond	Plant Richness	Area	Mean Depth	Coefficient of Variation of Depth	Heterogeneity	Shape Index	Landscape Fractal Dimension (D_{BC})	Landscape Fractal Dimension (D_{T})	Carnivorous species richness	Carnivorous average body size ratio	Carnivorous body size packing trend	Herbivorous species richness	Herbivorous average body size ratio	Herbivorous body size packing trend	Plant food density (m_{P})	Plant Food Fractal Dimension ($F_{P:BC}$)	Plant Food Fractal Dimension ($F_{P:T}$)	Animal food density (m_{A})	Animal Food Fractal Dimension (F_{ABC})	Animal Food Fractal Dimension (F_{AT})	$F_{P:BC-DBC}$	$F_{P:T-DT}$	$F_{ABC-DBC}$	F_{AT-DT}
6	13	3.65	10.76	30.43	1.62	2.53	1.76	2.69	9	0.24	-0.10	-	-	-	6.66E-04	0.93	1.86	4.44E-06	0.36	1.29	-0.83	-0.83	-1.40	-1.40
8	8	2.76	14.40	31.82	2.04	1.08	1.66	2.58	7	0.32	-0.12	-	-	-	3.54E-04	0.64	1.56	2.44E-06	0.00	0.92	-1.02	-1.02	-1.66	-1.66
10	12	3.30	11.80	32.83	0.89	1.06	1.75	2.72	10	0.27	-0.10	7	0.162	0.214	1.20E-03	0.95	1.92	4.46E-07	0.01	0.98	-0.80	-0.80	-1.74	-1.74
11	13	1.81	7.06	45.47	1.41	1.12	1.45	2.71	8	0.19	-0.11	6	0.313	-0.457	1.98E-03	0.52	1.78	1.04E-05	-0.27	0.99	-0.93	-0.93	-1.72	-1.72
40	15	3.00	9.95	34.73	1.87	1.80	1.77	2.73	7	0.32	0.25	8	0.153	-0.178	5.08E-04	0.83	1.79	3.26E-06	0.20	1.16	-0.94	-0.94	-1.57	-1.57
41	12	2.58	12.14	42.42	1.99	1.88	1.75	2.73	8	0.29	0.33	-	-	-	6.01E-04	0.77	1.75	6.13E-06	0.16	1.15	-0.98	-0.98	-1.59	-1.59
44	9	2.02	6.67	35.65	1.92	1.27	1.7	2.66	14	0.16	-0.03	-	-	-	1.42E-04	0.42	1.38	3.18E-06	-0.13	0.84	-1.28	-1.28	-1.83	-1.83
47	6	1.74	8.64	55.69	0.94	1.15	1.63	2.67	13	0.17	-0.18	-	-	-	2.96E-04	0.40	1.44	4.99E-06	-0.22	0.82	-1.23	-1.23	-1.85	-1.85
49	7	2.17	11.25	51.68	1.56	3.86	1.64	2.66	8	0.31	-0.06	6	0.238	0.009	7.91E-04	0.63	1.66	1.31E-06	-0.27	0.76	-1.01	-1.01	-1.91	-1.91
51	14	3.93	8.26	43.69	1.70	1.22	1.69	2.70	11	0.22	-0.08	8	0.158	0.02	1.40E-03	0.97	1.98	3.13E-06	0.30	1.31	-0.72	-0.72	-1.39	-1.39
55	9	3.29	15.05	43.09	1.02	1.00	1.66	2.74	-	-	-	9	0.114	0.15	6.28E-04	0.78	1.86	2.83E-06	0.14	1.22	-0.88	-0.88	-1.52	-1.52
56	12	3.29	12.15	37.88	1.24	1.00	1.71	2.71	6	0.40	-0.18	8	0.171	0.051	1.05E-03	0.89	1.90	3.90E-06	0.23	1.23	-0.82	-0.82	-1.48	-1.48

Table A2. Five best models accounting for average body size ratio between adjacent species and for the body size packing trend for carnivorous and herbivorous species. Environmental variables: area, the landscape fractal dimension (estimated by box-counting method, D_{BC}), the landscape fractal dimension-transect estimator (D_T), mean depth, plant food fractal dimension (estimated from D_{BC} and following Ritchie (2010, p 78), F_{PBC}), heterogeneity (mean number of islands per meter, Het), animal food density (m_A), plant food density (m_P), carnivore richness (S_{carn}), herbivore richness (S_{herb}), plant richness (S_{plant}). The weight of evidence (w_i), adjusted R-squared (R^2) and p-value (p) associated with each model are presented.

		Carnivorous						Herbivorous					
	Model	a	b_1	b_2	R^2	p	w_i	Model	a	b	R^2	p	w_i
Average body size ratio between adjacent species	$m_A + S_{carn}$	0.263	-1.22E+04	-2.55E-02	0.89	1.3E-04	0.772	S_{herb}	0.187	-0.052	0.786	0.008	0.486
	$D_{BC} + S_{carn}$	0.263	0.315	-0.024	0.855	4.4E-04	0.138	Area	0.187	-0.078	0.741	0.013	0.246
	Depth + S_{carn}	0.263	0.014	-0.016	0.820	0.001	0.042	D_{BC}	0.187	-0.518	0.683	0.022	0.122
	$m_P + S_{carn}$	0.263	-39.167	-0.027	0.783	0.002	0.015	F_{PBC}	0.187	-0.320	0.641	0.031	0.079
	S_{carn}	0.263	-0.024	-	0.706	0.001	0.008	m_P	0.187	90.52	0.478	0.086	0.021
Trend in species similarity with body size	Het + D_T	-0.035	0.304	2.561	0.721	0.006	0.872	Depth	-0.027	0.065	0.577	0.048	0.313
	$D_T + m_P$	-0.035	2.742	-163.57	0.452	0.090	0.021	F_{PBC}	-0.027	0.948	0.489	0.080	0.162
	Het	-0.035	0.237	-	0.326	0.067	0.018	D_{BC}	-0.027	1.47391	0.481	0.084	0.153
	Het + D_{BC}	-0.035	0.210	0.605	0.431	0.105	0.017	Area	-0.027	0.209	0.457	0.095	0.132
	S_{plant} + Het	-0.035	0.017	0.216	0.422	0.112	0.016	Het	-0.027	-0.339	0.287	0.215	0.051