

## Appendix 1



Figure A1. The mesocosm cages used in the experiment (sealed all around and at both ends with 5 mm polyethylene mesh).

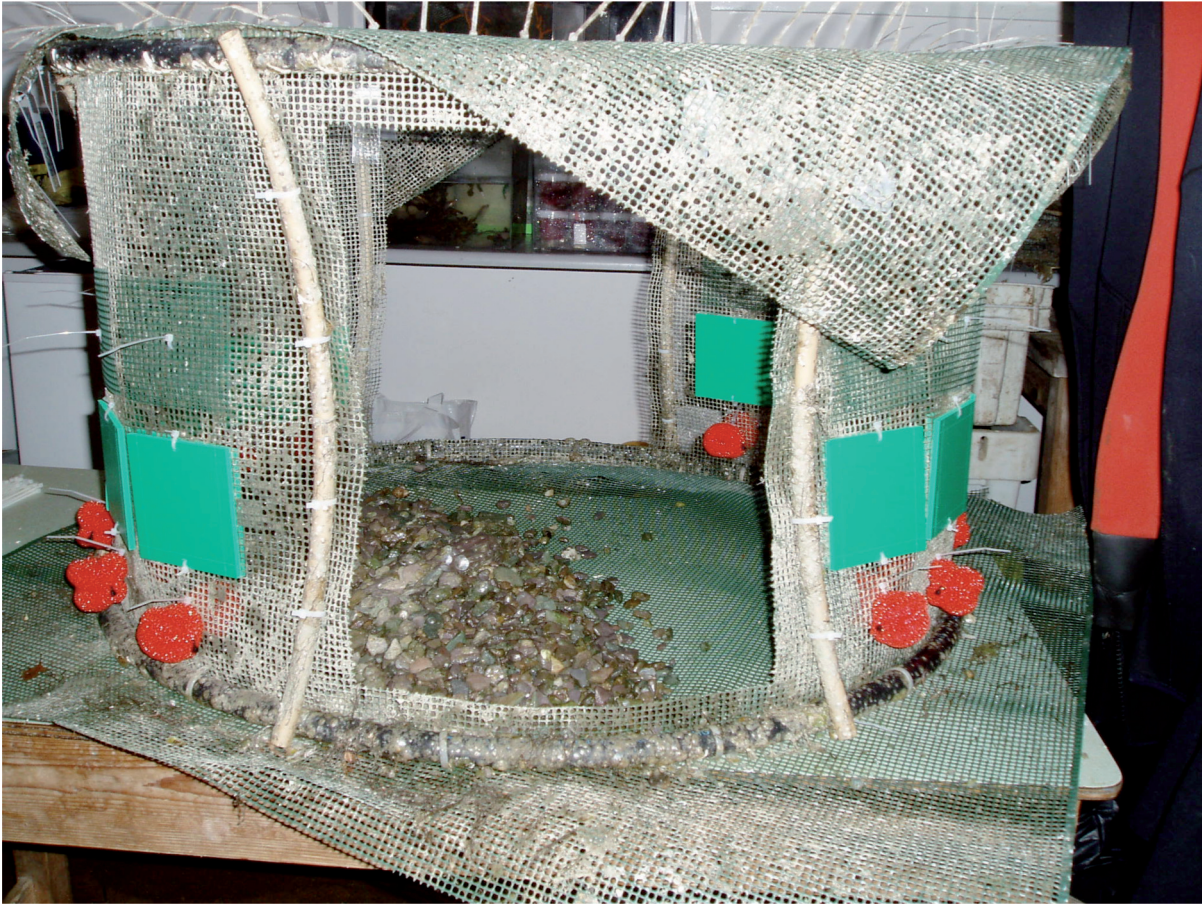


Figure A2. Photograph of a control cage employed in the experiment to assess the effect of the structure of the cage on ecosystem functioning measurements.

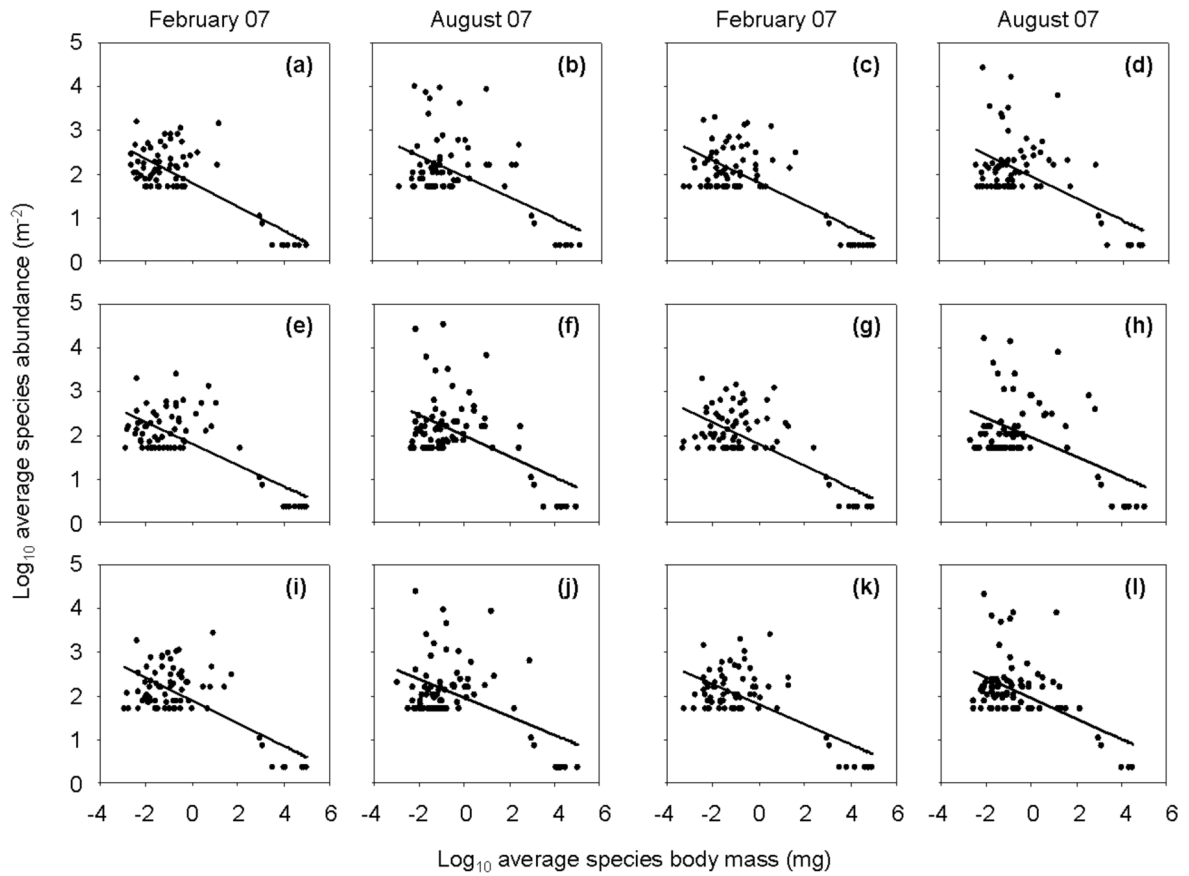


Figure A3. Comparison of average species body mass–abundance relationships between February 2007 (community assembly phase of the experiment) and August 2007 (manipulation phase of the experiment) for the six experimental treatments: (a–b) intact community, i.e.  $W^+S^+$ ; (c–d) two weakest interactors removed, i.e.  $W^{-2}S^+$ ; (e–f) three weakest interactors removed, i.e.  $W^{-3}S^+$ ; (g–h) two strongest interactors removed, i.e.  $W^+S^{-2}$ ; (i–j) three strongest interactors removed, i.e.  $W^+S^{-3}$ ; (k–l) all strong and weak interactors removed, i.e.  $W^-S^-$ . Regression line slopes, intercepts and  $r^2$  values can be found in Table A2.

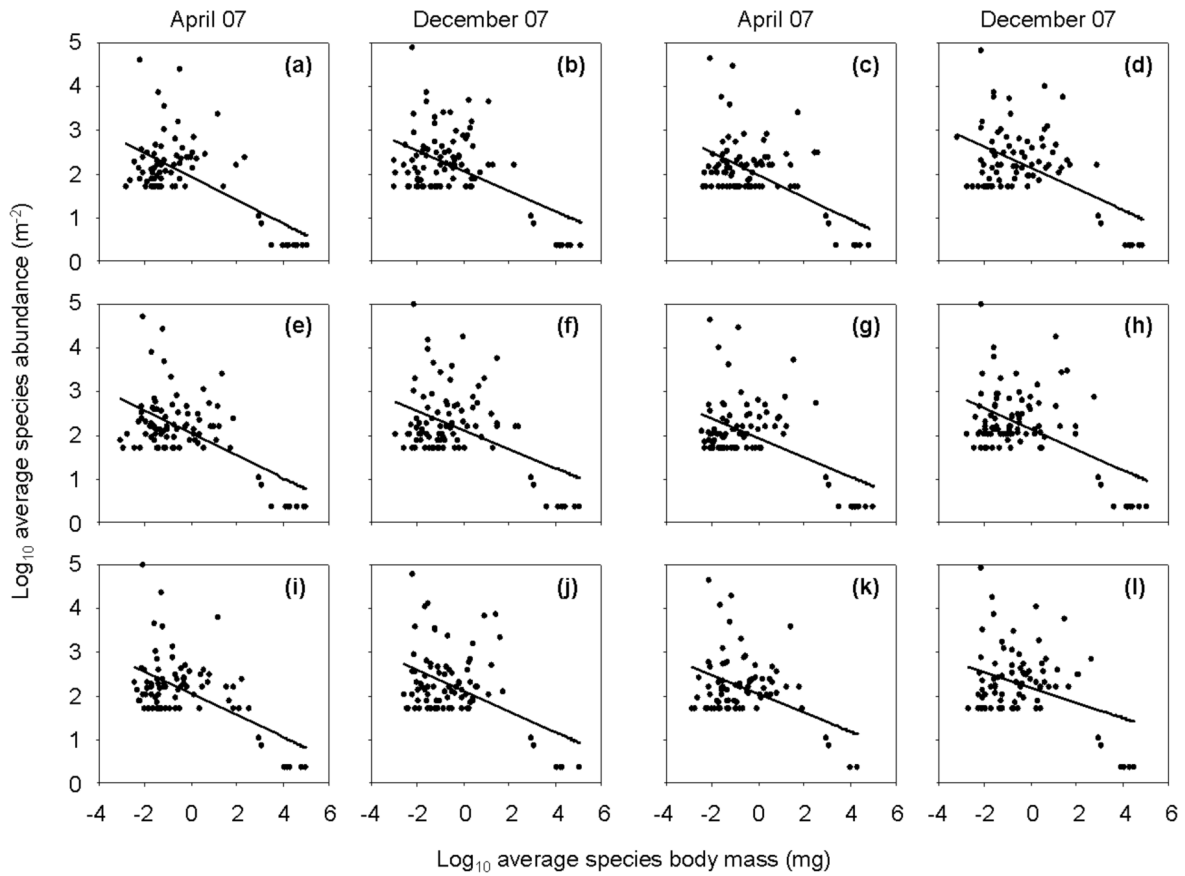


Figure A4. Comparison of average species body mass-abundance relationships between April 2007 (community assembly phase of the experiment) and December 2007 (manipulation phase of the experiment) for the six experimental treatments: (a–b) intact community, i.e.  $W^+S^+$ ; (c–d) two weakest interactors removed, i.e.  $W^{-2}S^+$ ; (e–f) three weakest interactors removed, i.e.  $W^{-3}S^+$ ; (g–h) two strongest interactors removed, i.e.  $W^+S^{-2}$ ; (i–j) three strongest interactors removed, i.e.  $W^+S^{-3}$ ; (k–l) all strong and weak interactors removed, i.e.  $W^-S^-$ . Regression line slopes, intercepts and  $r^2$  values can be found in Table A3.

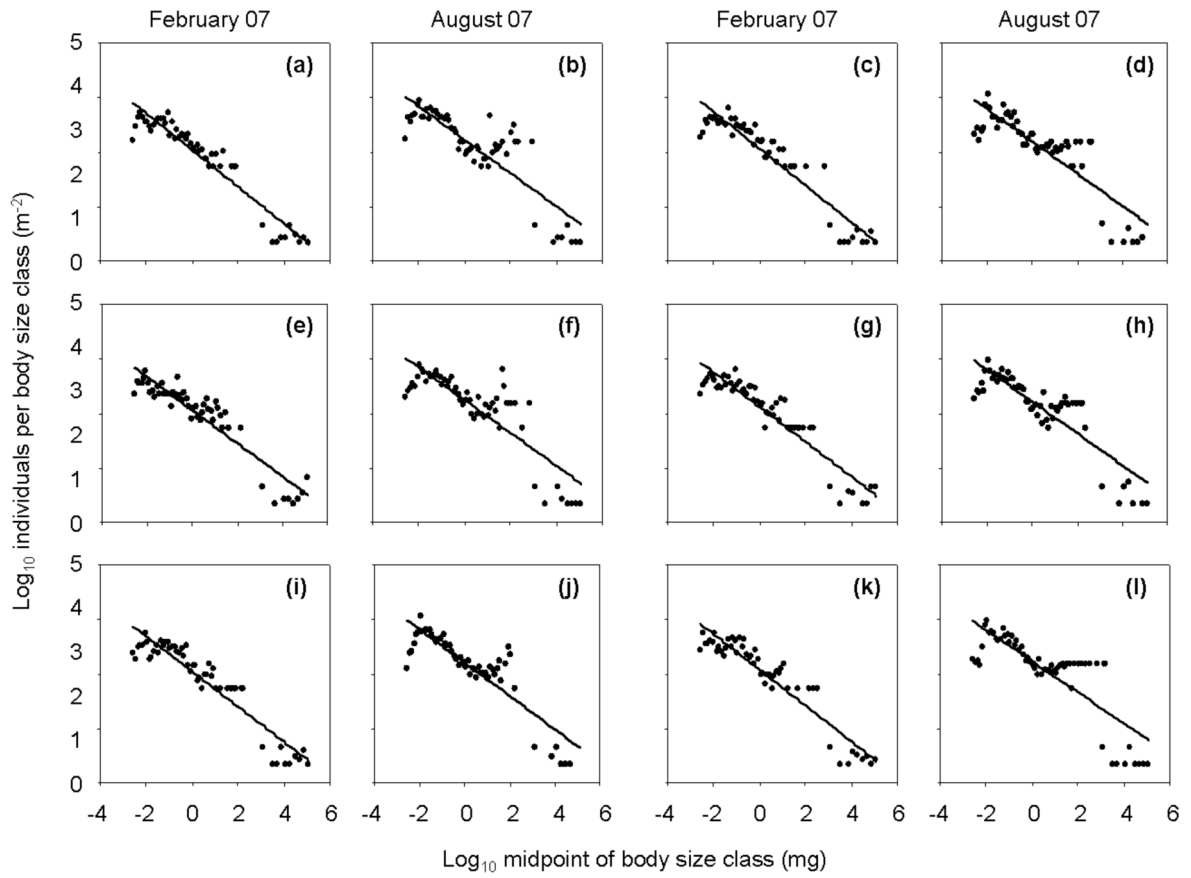


Figure A5. Comparison of individual size distributions between February 2007 (community assembly phase of the experiment) and August 2007 (manipulation phase of the experiment) for the six experimental treatments: (a–b) intact community, i.e.  $\mathbb{W}^+\mathbb{S}^+$ ; (c–d) two weakest interactors removed, i.e.  $\mathbb{W}^{-2}\mathbb{S}^+$ ; (e–f) three weakest interactors removed, i.e.  $\mathbb{W}^{-3}\mathbb{S}^+$ ; (g–h) two strongest interactors removed, i.e.  $\mathbb{W}^+\mathbb{S}^{-2}$ ; (i–j) three strongest interactors removed, i.e.  $\mathbb{W}^+\mathbb{S}^{-3}$ ; (k–l) all strong and weak interactors removed, i.e.  $\mathbb{W}^-\mathbb{S}^-$ . Regression line slopes, intercepts and  $r^2$  values can be found in Table A4.

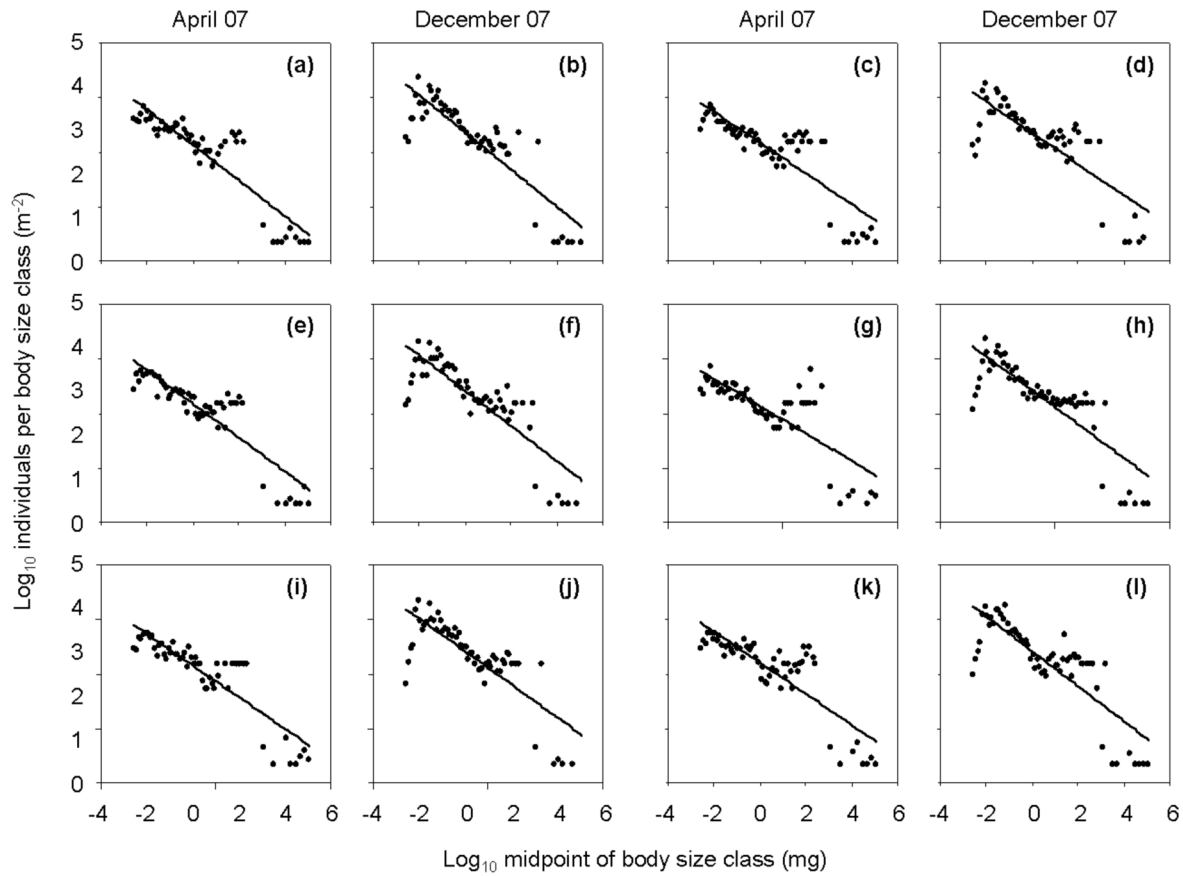


Figure A6. Comparison of individual size distributions between April 2007 (community assembly phase of the experiment) and December 2007 (manipulation phase of the experiment) for the six experimental treatments: (a–b) intact community, i.e.  $W^+S^+$ ; (c–d) two weakest interactors removed, i.e.  $W^{-2}S^+$ ; (e–f) three weakest interactors removed, i.e.  $W^{-3}S^+$ ; (g–h) two strongest interactors removed, i.e.  $W^+S^{-2}$ ; (i–j) three strongest interactors removed, i.e.  $W^+S^{-3}$ ; (k–l) all strong and weak interactors removed, i.e.  $W^-S^-$ . Regression line slopes, intercepts and  $r^2$  values can be found in Table A5.

Table A1. Statistical comparison of chlorophyll a (used as a surrogate for primary production), standing stock of invertebrate biomass (used as a surrogate for secondary production) and taxon richness of the invertebrate community, measured inside and outside each of the control cages used in the experiment (shown in Fig. A2). Comparisons were made using Welch's two sample t-test.

	Dec 2006			Jun 2007		
	t	DF	p	t	DF	p
Primary production	-1.135	5.869	0.300	1.531	4.917	0.187
Secondary production	1.101	3.645	0.338	0.941	4.057	0.399
Taxon richness	-0.228	5.750	0.827	0.182	4.395	0.864

Table A2. Body mass-abundance regression line intercepts (a), slopes (b), and  $r^2$  values for the six experimental treatments in February 2007, i.e. during the community assembly phase of the experiment, and in August 2007, i.e. during the interaction strength manipulation phase of the experiment.  $W^+S^+$  = an intact community;  $W^-2S^+$  = two weakest interactors removed;  $W^-3S^+$  = three weakest interactors removed;  $W^+S^{-2}$  = two strongest interactors removed;  $W^+S^{-3}$  = three strongest interactors removed and;  $W^-S^-$  = all strong and weak interactors removed. t1 (and t3) are the t-statistics comparing the intercept (and slope) of the body mass-abundance relationship for each treatment in February 2006 to August 2007. p1 (and p3) are the associated p-values. t2 (and t4) are the t-statistics comparing the intercept (and slope) of the body mass-abundance relationship for each treatment to the intact community, i.e.  $W^+S^+$ , in February 2007. p2 (and p4) are the associated p-values.

	$W^+S^+$	$W^-2S^+$	$W^-3S^+$	$W^+S^{-2}$	$W^+S^{-3}$	$W^-S^-$
(a) (Feb 2007)	1.7979	1.7918	1.8202	1.8021	1.8876	1.8132
(a) (Aug 2007)	1.9444	1.9458	1.9853	1.9551	1.9440	1.9578
t1	-1.4817	-1.5615	-1.5971	-1.4830	-0.5497	-1.4814
p1	0.141	0.121	0.113	0.141	0.583	0.141
t2	n/a	-0.0130	-0.3591	-0.0909	0.0028	-0.1224
p2	n/a	0.990	0.720	0.928	0.998	0.903
(b) (Feb 2007)	-0.2744	-0.2542	-0.2456	-0.2510	-0.2578	-0.2306
(b) (Aug 2007)	-0.2434	-0.2533	-0.2347	-0.2242	-0.2109	-0.2362
t3	-0.6521	-0.0189	-0.2111	-0.5345	-0.9005	0.1062
p3	0.515	0.985	0.833	0.594	0.370	0.916
t4	n/a	0.1774	-0.1485	-0.3299	-0.5575	-0.1205
p4	n/a	0.859	0.882	0.742	0.578	0.904
$r^2$ (Feb 2007)	0.61	0.53	0.53	0.53	0.50	0.45
$r^2$ (Aug 2007)	0.34	0.36	0.28	0.28	0.25	0.27

Table A3. Body mass-abundance regression line intercepts (a), slopes (b), and  $r^2$  values for the six experimental treatments in April 2007, i.e. during the community assembly phase of the experiment, and in December 2007, i.e. during the interaction strength manipulation phase of the experiment.  $W^+S^+$  = an intact community;  $W^-2S^+$  = two weakest interactors removed;  $W^-3S^+$  = three weakest interactors removed;  $W^+S^{-2}$  = two strongest interactors removed;  $W^+S^{-3}$  = three strongest interactors removed and;  $W^-S^-$  = all strong and weak interactors removed. t1 (and t3) are the t-statistics comparing the intercept (and slope) of the body mass-abundance relationship for each treatment in April 2006 to December 2007. p1 (and p3) are the associated p-values. t2 (and t4) are the t-statistics comparing the intercept (and slope) of the body mass-abundance relationship for each treatment to the intact community, i.e.  $W^+S^+$ , in April 2007. p2 (and p4) are the associated p-values.

	$W^+S^+$	$W^-2S^+$	$W^-3S^+$	$W^+S^{-2}$	$W^+S^{-3}$	$W^-S^-$
(a) (Apr 2007)	1.8785	1.8762	1.9428	1.9069	1.8519	1.8686
(a) (Dec 2007)	2.0663	2.1433	2.1266	2.1469	2.1287	2.1982
t1	-1.9849	-2.5299	-1.7457	-2.2877	-2.6500	-3.0263
p1	0.049	0.012	0.083	0.023	0.009	0.003
t2	n/a	-0.7049	-0.5485	-0.7538	-0.5666	-1.1813
p2	n/a	0.482	0.584	0.452	0.572	0.239
(b) (Apr 2007)	-0.2584	-0.2475	-0.2471	-0.2437	-0.2516	-0.2466
(b) (Dec 2007)	-0.2296	-0.2412	-0.2173	-0.2327	-0.2385	-0.1753
t3	-0.6058	-0.1203	-0.5448	-0.2075	-0.2351	-1.2019
p3	0.545	0.904	0.587	0.836	0.814	0.231
t4	n/a	0.2036	-0.2079	0.0557	0.1454	-0.8626
p4	n/a	0.839	0.836	0.956	0.885	0.390
$r^2$ (Apr 2007)	0.52	0.49	0.47	0.43	0.52	0.46
$r^2$ (Dec 2007)	0.28	0.29	0.21	0.27	0.24	0.13

Table A4. Individual size distribution regression line intercepts (a), slopes (b), and  $r^2$  values for the six experimental treatments in February 2007, i.e. during the community assembly phase of the experiment, and in August 2007, i.e. during the interaction strength manipulation phase of the experiment.  $W^+S^+$  = an intact community;  $W^{-2}S^+$  = two weakest interactors removed;  $W^{-3}S^+$  = three weakest interactors removed;  $W^+S^{-2}$  = two strongest interactors removed;  $W^+S^{-3}$  = three strongest interactors removed and;  $W^-S^-$  = all strong and weak interactors removed.  $t_1$  (and  $t_3$ ) are the t-statistics comparing the intercept (and slope) of the individual size distribution for each treatment in February 2007 to August 2007.  $p_1$  (and  $p_3$ ) are the associated p-values.  $t_2$  (and  $t_4$ ) are the t-statistics comparing the intercept (and slope) of the individual size distribution for each treatment to the intact community, i.e.  $W^+S^+$ , in February 2007.  $p_2$  (and  $p_4$ ) are the associated p-values.

	$W^+S^+$	$W^{-2}S^+$	$W^{-3}S^+$	$W^+S^{-2}$	$W^+S^{-3}$	$W^-S^-$
(a) (Feb 2007)	2.0394	2.0661	2.0593	2.0769	2.1197	2.0478
(a) (Aug 2007)	2.2281	2.1960	2.2496	2.2381	2.2181	2.2075
$t_1$	-3.1007	-2.1193	-3.0076	-2.3800	-1.6832	-2.7242
$p_1$	0.003	0.037	0.003	0.019	0.095	0.008
$t_2$	n/a	0.4534	-0.2935	-0.1292	0.1424	0.2988
$p_2$	n/a	0.651	0.770	0.897	0.887	0.766
(b) (Feb 2007)	-0.3371	-0.3374	-0.3036	-0.3276	-0.3184	-0.3222
(b) (Aug 2007)	0.3053	0.2958	-0.3009	-0.2857	-0.2927	0.3061
$t_3$	-1.1266	-1.4238	-0.0903	-1.3610	-0.9037	-0.5533
$p_3$	0.263	0.158	0.928	0.177	0.368	0.581
$t_4$	n/a	-0.2782	-0.1271	-0.5479	-0.3756	0.0234
$p_4$	n/a	0.781	0.899	0.585	0.708	0.981
$r^2$ (Feb 2007)	0.91	0.89	0.87	0.89	0.88	0.88
$r^2$ (Aug 2007)	0.74	0.74	0.73	0.67	0.75	0.76

Table A5. Individual size distribution regression line intercepts (a), slopes (b), and  $r^2$  values for the six experimental treatments in April 2007, i.e. during the community assembly phase of the experiment, and in December 2007, i.e. during the interaction strength manipulation phase of the experiment.  $W^+S^+$  = an intact community;  $W^{-2}S^+$  = two weakest interactors removed;  $W^{-3}S^+$  = three weakest interactors removed;  $W^+S^{-2}$  = two strongest interactors removed;  $W^+S^{-3}$  = three strongest interactors removed and;  $W^-S^-$  = all strong and weak interactors removed.  $t_1$  (and  $t_3$ ) are the t-statistics comparing the intercept (and slope) of the individual size distribution for each treatment in April 2007 to December 2007.  $p_1$  (and  $p_3$ ) are the associated p-values.  $t_2$  (and  $t_4$ ) are the t-statistics comparing the intercept (and slope) of the individual size distribution for each treatment to the intact community, i.e.  $W^+S^+$ , in April 2007.  $p_2$  (and  $p_4$ ) are the associated p-values.

	$W^+S^+$	$W^{-2}S^+$	$W^{-3}S^+$	$W^+S^{-2}$	$W^+S^{-3}$	$W^-S^-$
(a) (Apr 2007)	2.1324	2.1764	2.1787	2.2105	2.1390	2.1542
(a) (Dec 2007)	2.3649	2.3543	2.4208	2.4198	2.4291	2.4177
$t_1$	-3.2184	-2.3155	-3.4279	-2.6596	-3.7461	-3.5344
$p_1$	0.002	0.022	0.001	0.009	<0.001	0.001
$t_2$	n/a	0.1360	-0.7311	-0.6820	-0.8366	-0.6653
$p_2$	n/a	0.892	0.466	0.497	0.405	0.507
(b) (Apr 2007)	-0.3251	-0.2824	-0.3087	-0.2853	-0.2508	-0.2879
(b) (Dec 2007)	-0.3408	-0.2862	-0.3225	-0.3202	-0.3101	-0.3011
$t_3$	0.4605	0.1040	0.3946	0.9408	1.5782	0.3480
$p_3$	0.646	0.917	0.694	0.349	0.117	0.729
$t_4$	n/a	-1.4080	-0.4814	-0.5378	-0.8278	-0.9767
$p_4$	n/a	0.162	0.631	0.592	0.410	0.331
$r^2$ (Apr 2007)	0.81	0.71	0.79	0.71	0.61	0.77
$r^2$ (Dec 2007)	0.76	0.65	0.71	0.69	0.70	0.64