

Supplementary Material

Contact-free modulation of stony coral productivity by sessile reef organisms

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Table S1: Ranking of performance of individual stony coral species in different 3-species combinations. Points from 1-12 were assigned based on the ascending net photosynthesis rate in % for the respective species. For each incubation combination, the contributing species received a rank in increasing order from lowest performing to highest performing combinations. Conditioning organisms are marked dark green and the incubated species *P. rus*, *P. verrucosa* and *S. pistillata* are marked light green. Data summarized from Vetter et al. (in preparation).

species/points	1	2	3	4	5	6	7	8	9	10	11	12	Total
<i>Montipora digitata</i>		x	x	x	x								14
<i>Porites rus</i>		x	x			x	x						18
<i>Stylophora pistillata</i>	x	x						x		x			21
<i>Pocillopora verrucosa</i>			x	x		x					x		24
<i>Acropora cytherea</i>	x					x		x				x	27
<i>Porites cylindrica</i>	x			x						x		x	27
<i>Pocillopora damicornis</i>					x		x		x			x	33
<i>Porites lobata</i>					x			x	x		x		33
<i>Acropora muricata</i>							x		x	x	x		37

Table S2: Biomass assessment of conditioning organisms. Surface area and volume of stony coral species and wetweight of the conditioning macroalgae, soft corals, and sponge in Experiment 1 with information on method for quantification.

Conditioning organism	Wetweight [g]	Volume [cm ³]	Surface area [cm ²]	Measurement method
<i>Caulerpa</i> sp.	28.38			wetweight
<i>H. cnidata</i>	18.87			wetweight
<i>Xenia</i> sp.	61.73			wetweight
<i>Sinularia</i> sp.	42.79			wetweight
<i>Halimeda</i> sp.	127.10			wetweight
Amu colony A		20.617	98.908	geometric approximation
Amu colony C		14.815	80.638	
Amu colony D		7.211	48.446	
Amu colony E		6.305	32.080	
<i>A. muricata</i> sum		48.950	260.072	
Mdi colony A		16.481	122.939	3D scan
Mdi colony B		18.781	160.027	
Mdi colony C		25.547	170.350	
Mdi colony D		8.037	69.435	
<i>M. digitata</i> sum		68.846	522.751	
Spi colony A		6.762	39.779	3D scan
Spi colony B		28.319	100.343	
Spi colony C		9.491	35.777	
Spi colony D		5.126	30.838	
<i>S. pistillata</i> sum		49.698	206.737	
Pru colony A		17.468	39.630	3D scan
Pru colony C		18.792	37.810	
Pru colony D		12.872	32.214	
Pru colony E		25.323	51.823	
<i>P. rus</i> sum		74.455	161.477	
Pve colony B		17.783	49.546	geometric approximation
Pve colony C		78.574	139.651	
Pve colony A		144.762	365.530	3D scan
Pve colony F		30.665	90.110	
<i>P. verrucosa</i> sum		271.784	644.838	

Table S3: Statistical test results of the differences in stony coral gross- and net photosynthesis and respiration between self- and external conditioned incubations, significant result ($p < 0.05$) in bold.

	<i>Porites rus</i>	Statistic	p-value	<i>Pocillopora verrucosa</i>	Statistic	p-value	<i>Stylophora pistillata</i>	Statistic	p-value
Net photosynthesis	Wilcoxon -test	133	0.066	Wilcoxon- test	351	0.010	Wilcoxon- test	167	0.251
Respiration	t-test	-2.90	0.020	Wilcoxon- test	255	0.536	t-test	-0.32	0.760
Gross photosynthesis	Wilcoxon -test	104	0.015	Wilcoxon- test	335	0.025	Wilcoxon- test	172	0.296

Table S4 Statistical test results of productivity changes (net photosynthesis, respiration and gross photosynthesis) in three stony coral species (*Porites rus*, *Pocillopora verrucosa*, and *Stylophora pistillata*) in response to contact-free interactions with conditioning organisms, significant result ($p < 0.05$) = bold.

<i>Porites rus</i>				
Conditioning organism	Parameter	Test	t-value	p-value
<i>Acropora muricata</i>	Net photosynthesis	paired t-test	-4.980	0.002
	Respiration	paired t-test	-4.310	0.004
	Gross photosynthesis	paired t-test	-4.820	0.002
<i>Montipora digitata</i>	Net photosynthesis	paired t-test	-4.120	0.005
	Respiration	paired t-test	-4.060	0.005
	Gross photosynthesis	paired t-test	-5.010	0.005
<i>Sinularia</i> sp.	Net photosynthesis	paired t-test	-2.830	0.026
	Respiration	paired t-test	-6.930	<0.001
	Gross photosynthesis	paired t-test	-5.040	0.002
<i>Xenia</i> sp.	Net photosynthesis	paired t-test	-0.845	0.426
	Respiration	paired t-test	-3.600	0.009
	Gross photosynthesis	paired t-test	-1.720	0.129
<i>Caulerpa</i> sp.	Net photosynthesis	paired t-test	-4.670	0.002
	Respiration	paired t-test	-2.420	0.046
	Gross photosynthesis	paired t-test	-3.780	0.007
<i>Halimeda</i> sp.	Net photosynthesis	paired t-test	-2.760	0.028
	Respiration	paired t-test	-6.260	<0.001
	Gross photosynthesis	paired t-test	-4.860	0.002
<i>Haliclona cnidata</i>	Net photosynthesis	paired t-test	-1.300	0.235
	Respiration	paired t-test	-3.780	0.007
	Gross photosynthesis	paired t-test	-2.480	0.043
<i>Pocillopora verrucosa</i>				
Conditioning organism	Parameter	Test	Statistic	p-value
<i>Acropora muricata</i>	Net photosynthesis	paired t-test	0.074	0.943
	Respiration	paired t-test	-0.459	0.660
	Gross photosynthesis	paired t-test	-0.168	0.871
<i>Montipora digitata</i>	Net photosynthesis	paired t-test	3.140	0.016
	Respiration	paired t-test	0.490	0.639
	Gross photosynthesis	paired wilcoxon-test	36.000	0.008
<i>Sinularia</i> sp.	Net photosynthesis	paired t-test	2.530	0.039
	Respiration	paired wilcoxon-test	12.000	0.461
	Gross photosynthesis	paired t-test	2.500	0.041
<i>Xenia</i> sp.	Net photosynthesis	paired t-test	2.950	0.021
	Respiration	paired t-test	1.420	0.198
	Gross photosynthesis	paired t-test	3.240	0.014
<i>Caulerpa</i> sp.	Net photosynthesis	paired t-test	7.010	<0.001
	Respiration	paired t-test	0.891	0.403
	Gross photosynthesis	paired t-test	11.900	<0.001
<i>Halimeda</i> sp.	Net photosynthesis	paired wilcoxon-test	28.00	0.195
	Respiration	paired t-test	3.570	0.009
	Gross photosynthesis	paired wilcoxon-test	29.000	0.148
<i>Haliclona cnidata</i>	Net photosynthesis	paired t-test	5.570	<0.001
	Respiration	paired t-test	1.100	0.308

	Gross photosynthesis	paired t-test	5.100	0.001
<i>Stylophora pistillata</i>				
Conditioning				
organism	Parameter	Test	Statistic	p-value
<i>Acropora muricata</i>	Net photosynthesis	paired t-test	-1.590	0.155
	Respiration	paired t-test	-0.474	0.650
	Gross photosynthesis	paired t-test	-1.580	0.158
<i>Montipora digitata</i>	Net photosynthesis	paired t-test	-1.950	0.092
	Respiration	paired t-test	-0.513	0.624
	Gross photosynthesis	paired t-test	-1.960	0.091
<i>Sinularia</i> sp.	Net photosynthesis	paired t-test	-2.700	0.031
	Respiration	paired t-test	-1.980	0.088
	Gross photosynthesis	paired t-test	-2.890	0.023
<i>Xenia</i> sp.	Net photosynthesis	paired t-test	-2.020	0.083
	Respiration	paired t-test	-0.422	0.686
	Gross photosynthesis	paired t-test	-2.380	0.049
<i>Caulerpa</i> sp.	Net photosynthesis	paired t-test	-2.310	0.054
	Respiration	paired t-test	0.035	0.973
	Gross photosynthesis	paired t-test	-1.280	0.240
<i>Halimeda</i> sp.	Net photosynthesis	paired t-test	-1.350	0.218
	Respiration	paired t-test	0.319	0.759
	Gross photosynthesis	paired t-test	-1.120	0.302
<i>Haliclona cnidata</i>	Net photosynthesis	paired t-test	0.274	0.792
	Respiration	paired t-test	-0.685	0.515
	Gross photosynthesis	paired t-test	-0.106	0.919

Table S5: Statistical test results on long-term changes in stony coral productivity (net photosynthesis, respiration, gross photosynthesis, calcification and number of symbionts) between mono- and polyculture conditions (**Error! Reference source not found.**), significant result ($p < 0.05$) = bold.

<i>Acropora muricata</i>			
Parameter	Test	Statistic	p-value
Net photosynthesis	paired t-test	-1.110	0.304
Respiration	paired wilcoxon-test	27.000	0.250
Gross photosynthesis	paired t-test	-0.236	0.820
Calcification	paired t-test	2.880	0.024
Symbionts	wilcoxon-test	47.000	0.029
<i>Montipora digitata</i>			
Parameter	Test	Statistic	p-value
Net photosynthesis	paired t-test	1.680	0.137
Respiration	paired wilcoxon-test	16.000	0.844
Gross photosynthesis	paired t-test	0.626	0.551
Calcification	paired t-test	1.200	0.269
Symbionts	wilcoxon-test	49.000	0.083
<i>Porites rus</i>			
Parameter	Test	Statistic	p-value
Net photosynthesis	paired t-test	-3.820	0.007
Respiration	paired wilcoxon-test	21.000	0.742
Gross photosynthesis	paired t-test	-2.260	0.058
Calcification	paired t-test	-2.670	0.032
Symbionts	wilcoxon-test	14.000	0.228
<i>Pocillopora verrucosa</i>			
Parameter	Test	Statistic	p-value
Net photosynthesis	paired t-test	-4.090	0.005
Respiration	paired wilcoxon-test	10.000	0.313
Gross photosynthesis	paired t-test	-3.370	0.012
Calcification	paired t-test	-1.290	0.244
Symbionts	wilcoxon-test	18.000	0.456
<i>Stylophora pistillata</i>			
Parameter	Test	Statistic	p-value
Net photosynthesis	paired t-test	-0.629	0.553
Respiration	paired wilcoxon-test	13.000	0.938
Gross photosynthesis	paired t-test	-0.722	0.497
Calcification	paired t-test	0.503	0.633
Symbionts	wilcoxon-test	34.000	0.878