Supplementary material

Photosynthetically stimulated bioerosion in symbiotic sponges: the role of glycerol and oxygen

Submitted to Coral Reefs

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Table S1: Seawater chemistry conditions in the various treatments at the beginning of the night-time bioerosion measurements. Diuron was not added during these incubations. Temperature (T), pH and total alkalinity (Alk) were measured, while the remaining parameters were calculated using the software CO2calc 1.2.0 (Robbins LL; Hansen ME; Kleypas JA; Meylan SC, 2010). Note that the addition of glycerol decreased the saturation state of aragonite (Ω_{arag}) in the incubation water, which nevertheless always remained > 1.50. Across the treatments, lower Ω_{arag} did not correspond to higher bioerosion. This strongly implies that any potential facilitation of bioerosion due to Ω_{arag} differences was minimal and unlikely to significantly influence the observed patterns.

Photosynthetically unaltered				
	[no glycerol, normoxia]	[glycerol, normoxia]	[no glycerol, hyperoxia]	[glycerol, hyperoxia]
T (°C)	28.0	28.7	28.6	28.7
pH (SW)	8.23	8.08	8.31	8.10
Alk (µmol kg^{-1})	2379.99	2365.18	2383.48	2346.85
pCO_2 (µatm)	464	677	377	639
HCO_3^- (µmol $kgSW^{-1}$)	2086	2146	2032	2120
CO_3^{2-} (µmol $kgSW^{-1}$)	144	108	173	112
Ω_{arag}	2.01	1.52	2.43	1.57

Photosynthetically inhibited				
	[no glycerol, normoxia]	[glycerol, normoxia]	[no glycerol, hyperoxia]	[glycerol, hyperoxia]
T (°C)	28.4	28.3	28.2	28.5
pH (SW)	8.24	8.09	8.31	8.13
Alk (µmol kg^{-1})	2374.53	2362.77	2383.90	2345.49
pCO_2 (µatm)	451	659	377	591
HCO_3^- (µmol $kgSW^{-1}$)	2072	2142	2037	2106
CO_3^{2-} (µmol $kgSW^{-1}$)	149	109	171	118
Ω_{arag}	2.09	1.52	2.39	1.65

Table S2: Results of statistical analyses performed for the main parameters of the experiment. Photosynthetic activity (Phot Activ: unaltered versus inhibited), oxygen saturation (Oxy: normoxia versus hyperoxia) and glycerol (Gly: no glycerol versus glycerol addition) are the independent factors. The effect size for each main effect, and the 95% confidence interval of that effect size, are also shown (Colegrave and Ruxton, 2002). Respiration is given as a negative flux (consumption of oxygen), and thus a positive effect size indicates a decrease in absolute respiration. Boldface indicates significant results at the 0.05 level.

Analysis of Variance											
	ANOVA	Source of variation	DF	SS	MS	F	p	Conclusions	Effect size	[-95%,	+95%]
Oxygen flux (µmol O_2 cm^{-2} h^{-1})											
Net Photosynthesis	1-way	Phot Activ	**1**	**638.35**	**638.35**	**47.70**	**<0.0001**	**Unaltered > Inhibited**	-12.633	-11.354	-13.912
		Error	14	187.34	13.38						
Dark respiration (control only)	1-way	Phot Activ	1	0.693	0.693	0.626	0.442		0.416	0.434	0.398
		Error	14	15.49	1.11						
Dark respiration (control and gly)	2-factorial	Phot Activ	1	1.38	1.38	1.60	0.216		0.416	0.416	0.415
		Gly	1	2.36	2.36	2.73	0.109		-0.543	-0.411	-0.675
		Phot Activ × Gly	1	0.00	0.00	0.00	>0.999				
		Error	28	24.19	0.86						
Bioerosion rates (mg $CaCO_3$ cm^{-2} h^{-1})											
Chemical bioerosion	3-factorial	Oxy	**1**	**0.006**	**0.006**	**23.52**	**<0.0001**	**Normoxia < Hyperoxia**	0.020	0.015	0.026
		Gly	**1**	**0.002**	**0.002**	**8.07**	**0.006**	**No glycerol < Glycerol**	0.012	0.010	0.014
		Phot Activ	**1**	**0.004**	**0.004**	**13.29**	**<0.0001**	**Unaltered > Inhibited**	-0.015	-0.012	-0.018
		Oxy × Gly	1	0.000	0.000	1.34	0.252				
		Oxy × Phot Activ	1	0.001	0.001	3.34	0.073				
		Gly × Phot Activ	1	0.001	0.001	2.99	0.089				
		Oxy × Gly × Phot Activ	1	0.001	0.001	2.26	0.138				
		Error	56	0.015	0.000						

References

Colegrave N, Ruxton GD (2002) Confidence intervals are a more useful complement to nonsignificant tests than are power calculations. Behav Ecol 14: 446–447

Robbins LL, Hansen ME, Kleypas JA, Meylan SC (2010) CO2calc - A user-friendly seawater carbon calculator for Windows, Max OS X, and iOS (iPhone). U.S. Geological Survey Open-File Report.