

Supporting Information

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Table S1. ANOVA testing the combined effects of canopy (present v absent), CO₂ (current v future) and temperature (ambient v elevated) on the percentage cover of mat-forming algae that recruited to initially unoccupied substratum. The magnitude of effects (ω^2) were calculated for each of the factors tested (Vaughan & Corballis, 1969; Graham & Edwards, 2001).

Source	df	MS	F	P	ω^2
Canopy	1	24510	73.72	0.001	0.41
CO ₂	1	7442	22.38	0.001	0.12
Temperature	1	11505	34.60	0.001	0.19
Canopy × CO ₂	1	35	0.11	0.728	0.00
Canopy × Temperature	1	1050	3.16	0.097	0.01
CO ₂ × Temperature	1	16217	48.77	0.002	0.27
Canopy × CO ₂ × Temperature	1	285	0.86	0.353	< 0.01
Tank (Canopy × CO ₂ × Temperature)*	16	333	2.18	0.011	0.01
Residual	96	152			

708 * Significant tank effects were found for the following treatment combinations: kelp present,
709 CO₂ current, temperature elevated; kelp absent, CO₂ future, temperature ambient.

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711 **Table S2.** ANOVA testing the combined effects of canopy (present v absent), CO₂ (current v
712 future) and temperature (ambient v elevated) on (a) the pre-dawn Maximum Quantum Yield
713 (MQY) and (b) midday Effective Quantum Yield (EQY) of mat-forming algae that recruited
714 to initially unoccupied substratum. The magnitude of effects (ω^2) were calculated for each of
715 the factors tested (Vaughan & Corballis, 1969; Graham & Edwards, 2001).
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Source	df	MS	F	P	ω^2
<i>a) Maximum Quantum Yield</i>					<i>b)</i>
Canopy	1	0.0235	8.21	0.020	0.35
CO ₂	1	0.0003	0.13	0.726	< 0.01
Temperature	1	0.0042	1.55	0.210	0.04
Canopy × CO ₂	1	0.0051	1.89	0.184	0.06
Canopy × Temperature	1	0.0009	3.43	0.091	0.13
CO ₂ × Temperature	1	0.0270	9.92	0.008	0.41
Canopy × CO ₂ × Temperature	1	0.0009	0.35	0.552	< 0.01
Tank (Canopy × CO ₂ × Temperature)*	16	0.0028	2.35	0.002	0.07
Residual	96	0.0011			
<i>b) Effective Quantum Yield</i>					
Canopy	1	0.5252	106.06	0.001	0.90
CO ₂	1	0.0322	6.50	0.028	0.04
Temperature	1	< 0.0001	< 0.01	0.976	< 0.01
Canopy × CO ₂	1	< 0.0001	< 0.01	0.975	< 0.01
Canopy × Temperature	1	0.0519	10.48	0.011	0.08

CO ₂ × Temperature	1	0.0061	1.24	0.256	< 0.01
Canopy × CO ₂ × Temperature	1	0.0036	0.74	0.373	< 0.01
Tank (Canopy × CO ₂ × Temperature)**	16	0.0050	0.85	0.665	< 0.01
Residual	96	0.0059			

717 * Significant tank effects were found for the following treatment combinations: kelp present,
718 CO₂ current, temperature ambient; kelp present, CO₂ current, temperature elevated; kelp
719 absent, CO₂ current, temperature ambient.

720 ** Significant tank effects were found within the following treatment combinations: kelp
721 present, current CO₂, elevated temperature; kelp present, future CO₂, elevated temperature.

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724 **Table S3.** ANOVA testing the combined effects of canopy (present v absent), CO₂ (current v
725 future) and temperature (ambient v elevated) on the ETR_{max} of mat-forming algae that
726 recruited to initially unoccupied substratum. The magnitude of effects (ω^2) were calculated
727 for each of the factors tested (Vaughan & Corballis, 1969; Graham & Edwards, 2001).
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Source	df	MS	F	P	ω^2
Canopy	1	445.79	11.39	0.008	0.52
CO ₂	1	212.65	5.43	0.033	0.24
Temperature	1	9.47	0.24	0.631	< 0.01
Canopy × CO ₂	1	38.23	0.98	0.343	0.02
Canopy × Temperature	1	3.76	0.09	0.763	< 0.01
CO ₂ × Temperature	1	71.57	1.83	0.208	0.06
Canopy × CO ₂ × Temperature	1	79.96	2.04	0.195	0.15
Tank (Canopy × CO ₂ × Temperature)*	16	39.14	2.55	0.008	0.10
Residual	48	15.34			

729 * Significant tank effects were not found within any treatment combinations.

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