

Figure S1. A) Net photosynthesis and B) respiration rates ($\mu\text{mol O}_2 \text{ cm}^{-2} \text{ h}^{-1}$) for the different holobionts according to the light intensity (low light : LL, high light :HL) and clades. White and dark grey bars correspond to clade-A and clade-C holobionts respectively. Data are expressed as mean \pm SE.

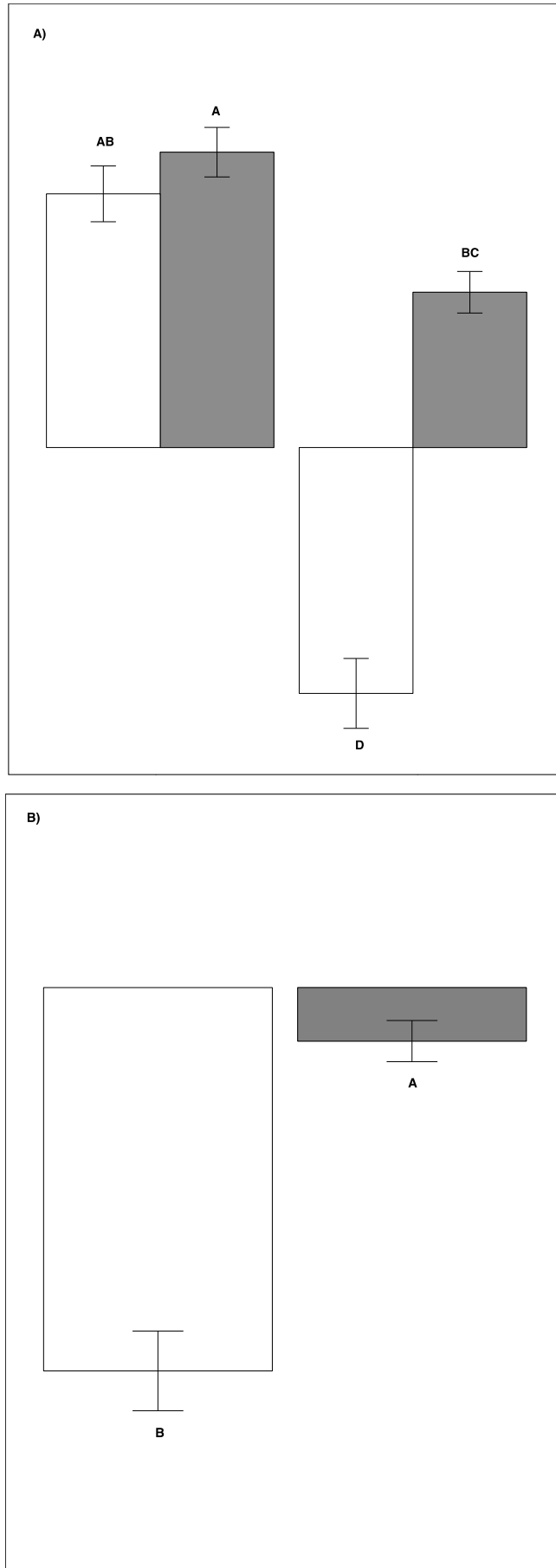


Figure S2. A) Carbon content ($\mu\text{mol C mg}^{-1}$) in algal and B) animal tissue fractions for the different holobionts according to the light intensity and clades. White and black bars correspond to the different incubation time periods (T_0 and T_{24} respectively). Data are expressed as mean \pm SE.

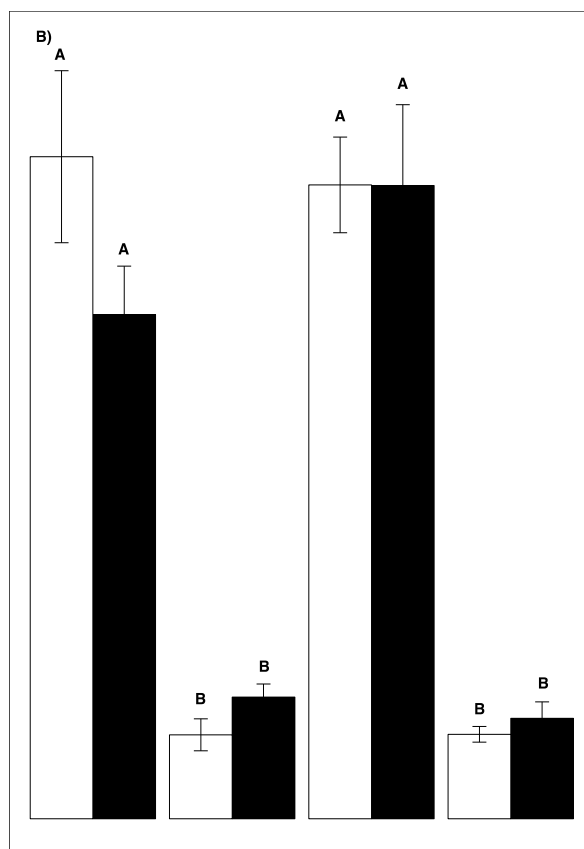
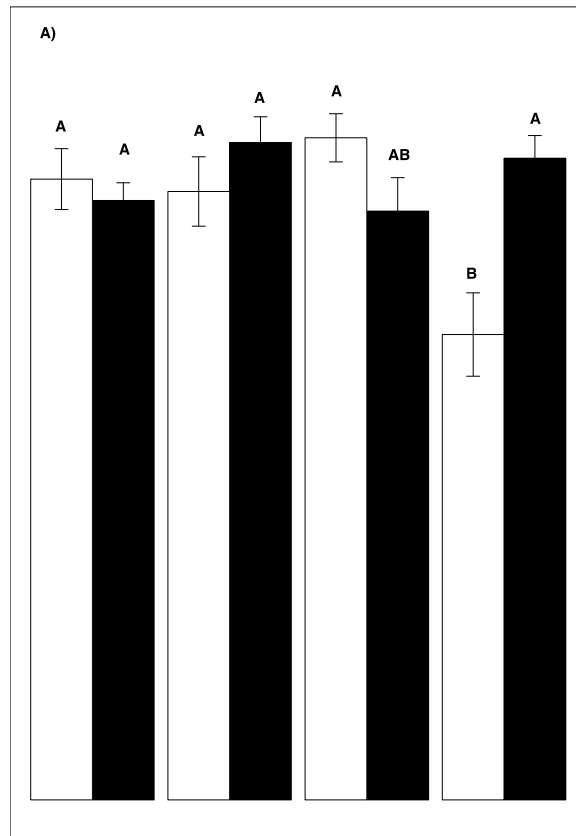


Figure S3. A) Ammonium content ($\mu\text{mol N mg}^{-1}$) in algal and B) animal tissues fractions for the different holobionts according to the light intensity and clades. White and black bars correspond to the different incubation time periods (T_0 and T_{24} respectively). Data are expressed as mean \pm SE.

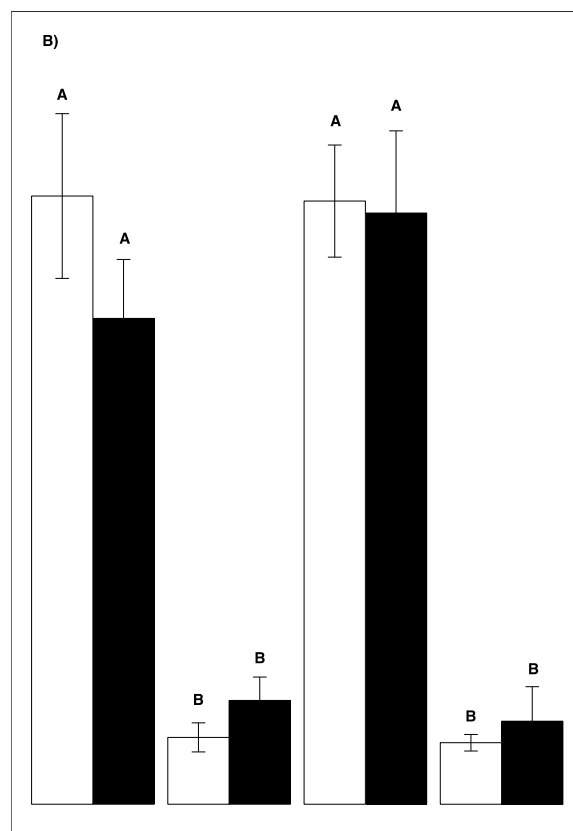
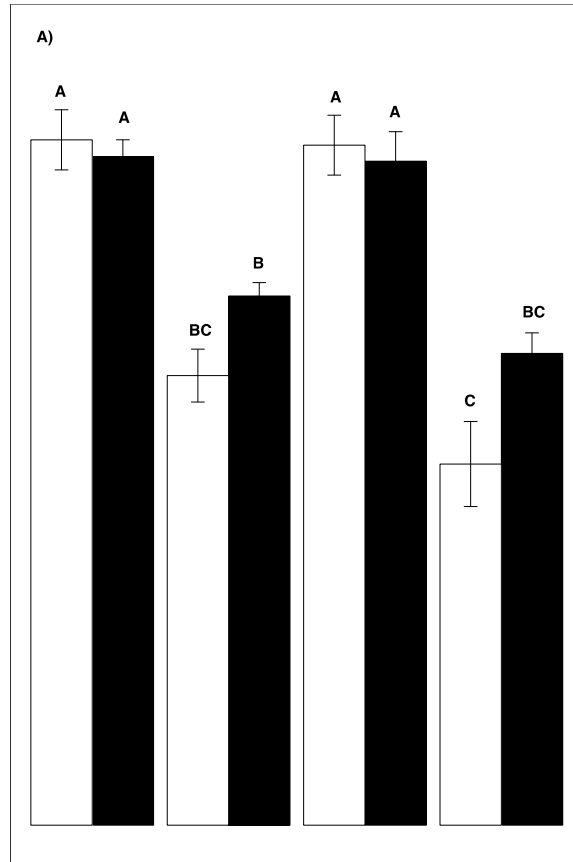


Figure S4. A) Nitrate content ($\mu\text{mol N mg}^{-1}$) in algal and B) animal tissues fractions for the different holobionts according to the light intensity and clades. White and black bars correspond to the different incubation time periods (T_0 and T_{24} respectively). Data are expressed as mean \pm SE.

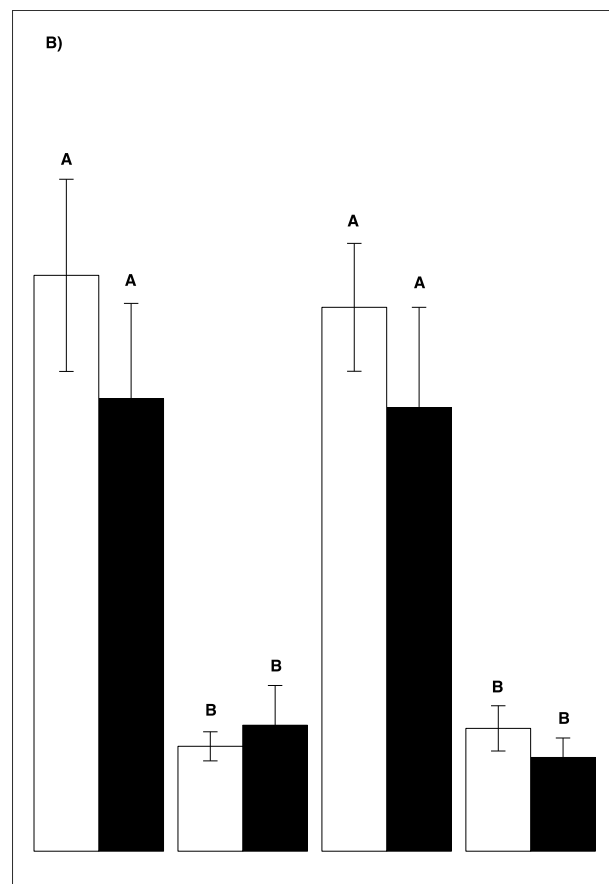
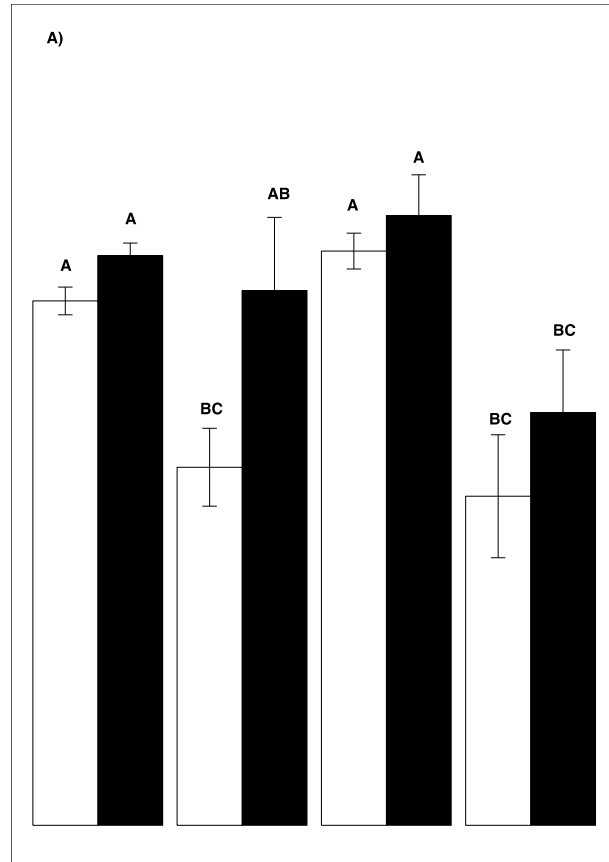
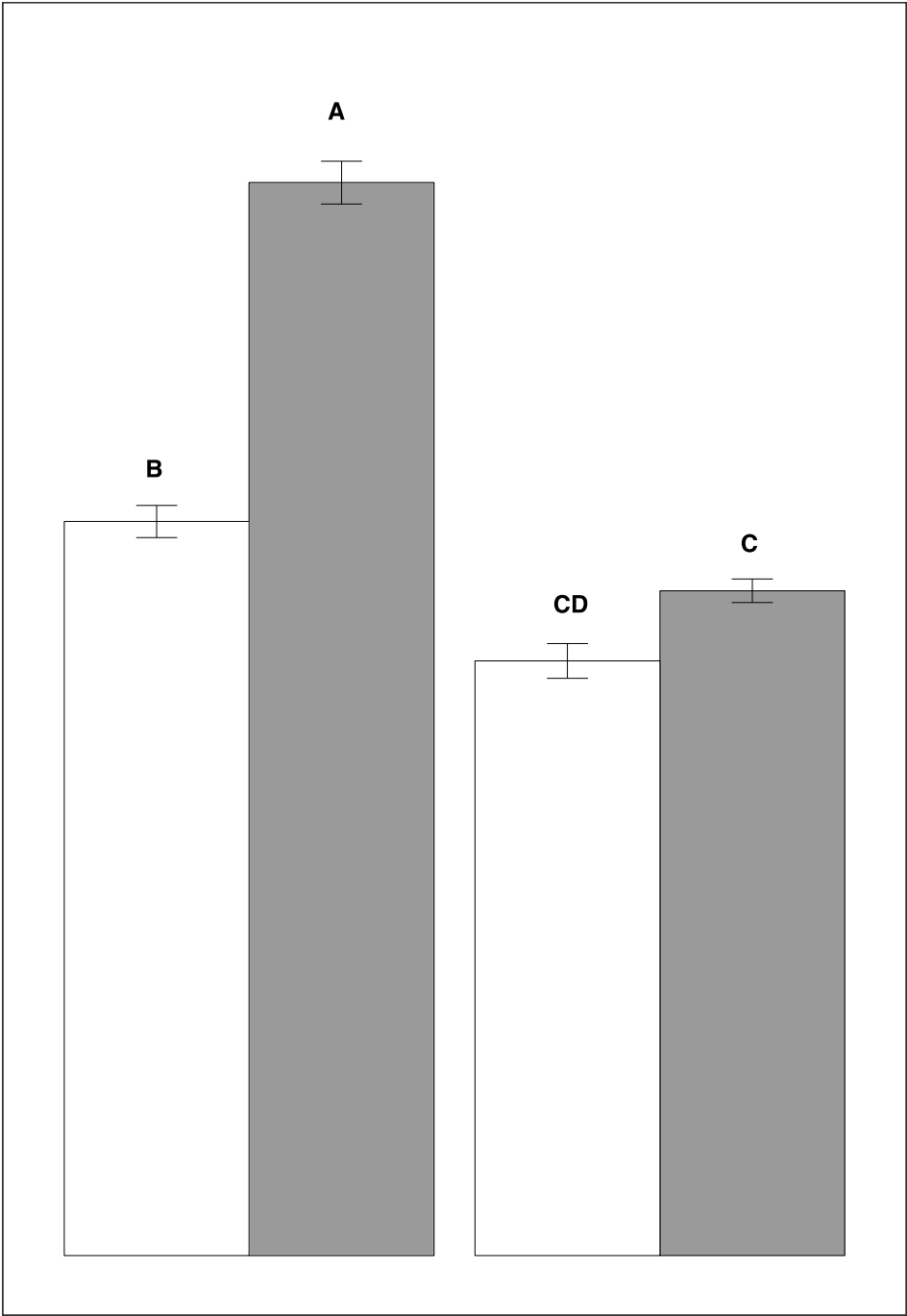


Figure S5. Structural C :N ratio according to the coral fraction and clade of *Symbiodinium*. White and dark grey bars correspond to clade-A and clade-C holobionts respectively.



Supplementary Table 1. Summary of ANOVA for the physiological measurements.

Significant p-values are indicated in bold.

Parameters	F-value	P-value
<i>Chlorophyll concentration (Chl a+c2 (cm⁻²))</i>		
<i>Clade</i>	7.515	0.0208
<i>Rates of net photosynthesis (μmol O₂ cm⁻² h⁻¹)</i>		
<i>Clade</i>	39.34	1.11e-05
<i>Light</i>	113.11	1.16e-08
<i>Clade * Light</i>	28.68	6.44e-05
<i>Respiration rates (μmol O₂ cm⁻² h⁻¹)</i>		
<i>Clade</i>	56.4	2.04e-05
<i>Feeding rates (Nb of Artemia nauplii mn⁻¹)</i>		
<i>Clade</i>	27.61	<0.0001
<i>Light</i>	1.35	0.268
<i>Clade * Light</i>	2.38	0.149

Supplementary Table 2. Summary of the factorial ANOVA for Carbon fixation, assimilation, translocation according to the different clades, light intensities and fraction (animal vs algal)

Parameters	F-value	P-value
<i>Gross Photosynthesis ($\mu\text{g C cm}^{-2} \text{h}^{-1}$)</i>		
<i>Clade</i>	5.69	0.03
<i>Light</i>	84.25	<0.0001
<i>Clade*Light</i>	12.40	0.0021
<i>Carbon incorporation ($\mu\text{g C cm}^{-2} \text{h}^{-1}$)</i>		
<i>Fraction</i>	215.9	<0.0001
<i>Clade</i>	0.053	0.818
<i>Light</i>	194.2	<0.0001
<i>Fraction*Clade</i>	0.212	0.647
<i>Fraction*Light</i>	59.98	<0.0001
<i>Clade*Light</i>	0.586	0.447
<i>Fraction*Clade*Light</i>	2.151	0.148
<i>Time</i>	0.014	0.905
<i>Time*Fraction</i>	40.763	<0.0001
<i>Time*Clade</i>	12.356	0.0009
<i>Time*Light</i>	33.254	<0.0001
<i>Time*Fraction*Clade</i>	2.151	0.148
<i>Time*Fraction*Light</i>	22.110	<0.0001
<i>Time*Clade*Light</i>	0.208	0.650
<i>Time*Fraction*Clade*Light</i>	0.941	0.336
<i>Carbon Translocation ($\mu\text{g C cm}^{-2} \text{h}^{-1}$)</i>		
<i>Clade</i>	13.291	0.0012
<i>Light</i>	674.37	<0.0001
<i>Light*Clade</i>	202.43	<0.0001
<i>Time</i>	23.09	0.00007
<i>Time*Clade</i>	0.002	0.97
<i>Time*Light</i>	15.535	0.0006
<i>Time*Clade*Light</i>	0.095	0.76
<i>P :R</i>		
<i>Clade</i>	48.79	<0.0001
<i>Light</i>	20.07	<0.001
<i>Clade*Light</i>	3.93	0.07

Supplementary Table 3. Summary of the factorial ANOVA for the nitrogen assimilation (either ammonium or nitrate) according to the different clades, light intensities, fractions (animal vs algal) and incubation time periods (T₀ and T₂₄)

Parameters	F-value	P-value
<i>Ammonium assimilation ($\mu\text{g N h}^{-1} \text{cm}^{-2}$)</i>		
<i>Fraction</i>	177.6	<0.0001
<i>Clade</i>	126.7	<0.0001
<i>Light</i>	3.46	0.068
<i>Fraction*Clade</i>	115.6	<0.0001
<i>Fraction*Light</i>	2.99	0.09
<i>Clade*Light</i>	0.36	0.55
<i>Fraction*Clade*Light</i>	0.53	0.47
<i>Time</i>	4.94	0.031
<i>Time*Fraction</i>	4.66	0.036
<i>Time*Clade</i>	19.7	<0.0001
<i>Time*Light</i>	0.41	0.52
<i>Time*Fraction*Clade</i>	16.07	<0.001
<i>Time*Fraction*Light</i>	0.43	0.51
<i>Time*Clade*Light</i>	0.24	0.63
<i>Time*Fraction*Clade*Light</i>	0.13	0.72
<i>Nitrate assimilation ($\mu\text{g N h}^{-1} \text{cm}^{-2}$)</i>		
<i>Fraction</i>	604.7	<0.0001
<i>Clade</i>	63.35	<0.0001
<i>Light</i>	0.71	0.403
<i>Fraction*Clade</i>	67.56	<0.0001
<i>Fraction*Light</i>	1.05	0.31
<i>Clade*Light</i>	0.93	0.34
<i>Fraction*Clade*Light</i>	0.77	0.38
<i>Time</i>	45.04	<0.0001
<i>Time*Fraction</i>	52.33	<0.0001
<i>Time*Clade</i>	0.2	0.66
<i>Time*Light</i>	2.1	0.15
<i>Time*Fraction*Clade</i>	0.35	0.56
<i>Time*Fraction*Light</i>	3.02	0.09
<i>Time*Clade*Light</i>	1.9	0.17
<i>Time*Fraction*Clade*Light</i>	2.19	0.15

Supplementary Table 4. Summary of the factorial ANOVA for the carbon and nitrogen contents according to the different clades, light intensities, fractions (animal vs algal) and time of the incubation periods (T₀ and T₂₄)

Parameters	F-value	P-value
<i>¹³C (μmol C mg⁻¹)</i>		
<i>Fraction</i>	2956.44	<0.0001
<i>Clade</i>	8.85	0.004
<i>Light</i>	0.758	0.39
<i>Fraction*Clade</i>	3.01	0.082
<i>Fraction*Light</i>	1.09	0.29
<i>Clade*Light</i>	3.34	0.072
<i>Fraction*Clade*Light</i>	2.35	0.13
<i>Time</i>	0.76	0.39
<i>Time*Fraction</i>	1.22	0.27
<i>Time*Clade</i>	12.05	0.001
<i>Time*Light</i>	0.25	0.62
<i>Time*Fraction*Clade</i>	8.82	0.004
<i>Time*Fraction*Light</i>	2.36	0.13
<i>Time*Clade*Light</i>	1.84	0.18
<i>Time*Fraction*Clade*Light</i>	3.11	0.08
<i>¹⁵N₃ (μmol N mg⁻¹)</i>		
<i>Fraction</i>	1119.1	<0.0001
<i>Clade</i>	55.23	<0.0001
<i>Light</i>	0.252	0.617
<i>Fraction*Clade</i>	17.23	0.0001
<i>Fraction*Light</i>	0.15	0.7
<i>Clade*Light</i>	4.27	0.042
<i>Fraction*Clade*Light</i>	4.51	0.037
<i>Time</i>	7.29	0.009
<i>Time*Fraction</i>	10.14	0.002
<i>Time*Clade</i>	2.83	0.1
<i>Time*Light</i>	1.35	0.25
<i>Time*Fraction*Clade</i>	1.51	0.22
<i>Time*Fraction*Light</i>	1.22	0.27
<i>Time*Clade*Light</i>	1.06	0.31
<i>Time*Fraction*Clade*Light</i>	0.77	0.38
<i>¹⁵NH₄ (μmol N m-g⁻¹)</i>		
<i>Fraction</i>	1552.1	<0.0001
<i>Clade</i>	145.1	<0.0001
<i>Light</i>	4.32	0.04
<i>Fraction*Clade</i>	42.18	<0.0001
<i>Fraction*Light</i>	5.23	0.025
<i>Clade*Light</i>	4.72	0.034
<i>Fraction*Clade*Light</i>	3.3	0.07
<i>Time</i>	4.38	0.04
<i>Time*Fraction</i>	5.32	0.024
<i>Time*Clade</i>	9.67	0.003
<i>Time*Light</i>	1.25	0.27
<i>Time*Fraction*Clade</i>	6.59	0.012
<i>Time*Fraction*Light</i>	0.72	0.39
<i>Time*Clade*Light</i>	0.62	0.43
<i>Time*Fraction*Clade*Light</i>	1.31	0.26
<i>C :N Structural</i>		
<i>Fraction</i>	553.21	<0.0001
<i>Clade</i>	307.31	<0.0001
<i>Fraction*Clade</i>	61.08	<0.0001

Supplementary Table 5. Determination of *Symbiodinium* clade for deep holobiont *S.pistillata* via BLASTn

Chloroplast Partial 23S rRNA gene	Accession number	Identity(%)	Site(bp)	E-value
<i>Symbiodinium</i> sp. Clade C1	FN298482.1	100%	603	0.0
<i>Symbiodinium</i> sp. Clade C3	KR996387.1	100%	618	0.0