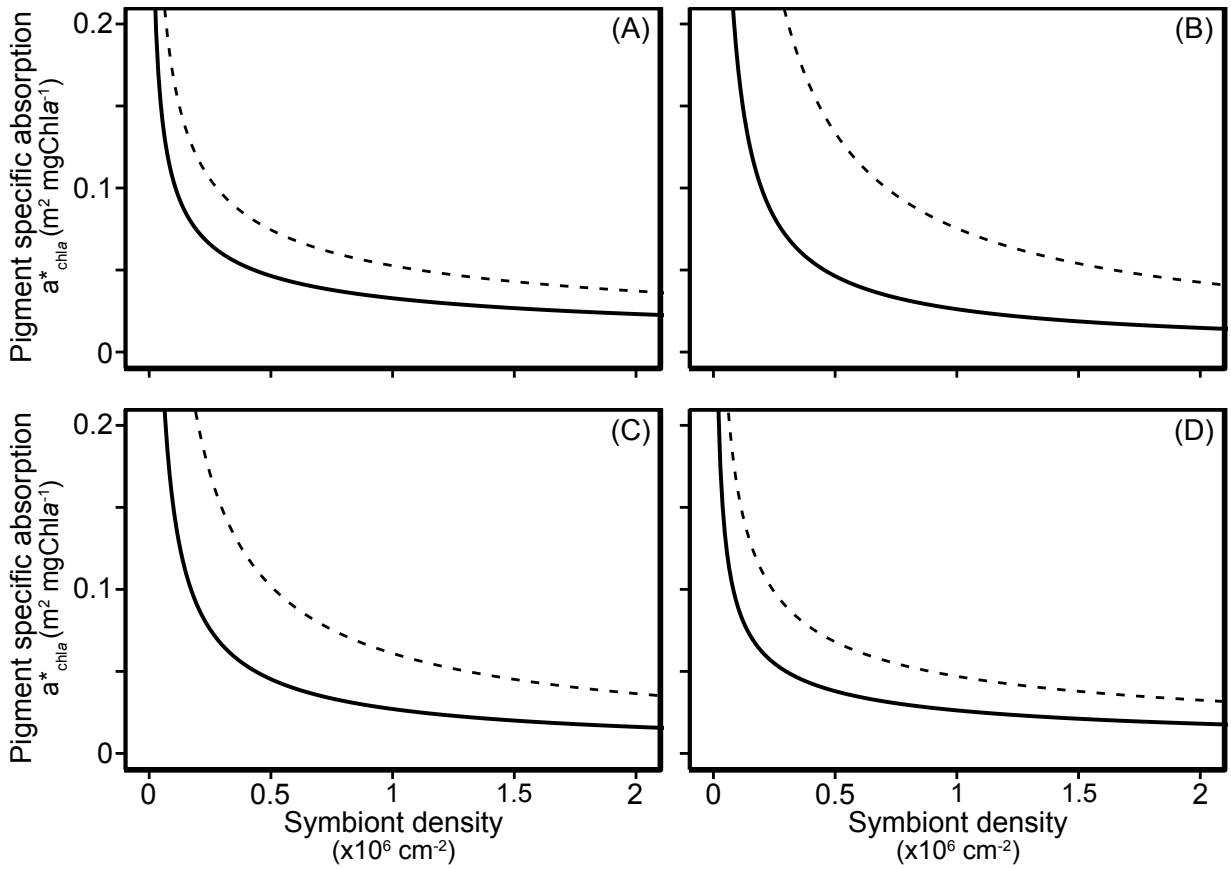

Supplementary Figure 1: Different trajectories of changes in a^*_{Chla} with decreasing symbiont density for a constant high Ci (mean Ci + one SD; solid line) and low Ci (mean Ci – one SD; dashed line) for (A) *O. annularis*, (B) *O. faveolata*, (C) *M. cavernosa*, and (D) *P. strigosa*

Supplementary table S1: Average values ± SE of all parameters analyzed in this study by species and coral phenotype. Different upper case letters indicate differences among species within the unstressed phenotype, while lower case latters indicate differences between coral phenotype within each species (one-way ANOVA, Tukey HSD, $p<0.05$). Number of observations (n) per species is indicated in the same order than species columns.

Parameter	n		*O. annularis*	*O. faveolata*	*M. cavernosa*	*P. strigosa*
Chlorophyll *a* (mg Chl*a* m^{-2})	51/43/49/44	Unstressed	$92 \pm 3.3^{A/a}$	$133.61 \pm 4.8^{B/a}$	$129.4 \pm 4.6^{BC/a}$	$113.14 \pm 5.5^{C/a}$
	11/22/16/20	Stressed	49.96 ± 8.1^{b}	64.89 ± 5.9^{b}	86.82 ± 8.32^{b}	64.61 ± 5.3^{b}
	8/0/6/3	Bleached	4.05 ± 1.4^{c}	-	12.63 ± 3.3^{c}	14.86 ± 3.96^{b}
Symbionts ($x10^6$ # sym cm^{-2})	51/43/49/44	Unstressed	$3.17 \pm 0.13^{A/a}$	$3.77 \pm 0.17^{B/a}$	$2.36 \pm 0.09^{C/a}$	$2.04 \pm 0.13^{C/a}$
	11/22/16/20	Stressed	1.57 ± 0.2^{b}	2.1 ± 0.19^{b}	1.59 ± 0.12^{b}	1.47 ± 0.09^{b}
	8/0/6/3	Bleached	0.17 ± 0.06^{c}	-	0.23 ± 0.09^{c}	0.27 ± 0.09^{b}
Ci (pg Chla sym^{-1})	51/43/49/44	Unstressed	3.07 ± 0.12^{A}	3.72 ± 0.12^{A}	5.76 ± 0.22^{B}	$5.98 \pm 0.24^{B/a}$
	11/22/16/20	Stressed	3.2 ± 0.41	3.31 ± 0.24	5.52 ± 0.44	4.47 ± 0.27^{a}
	8/0/6/3	Bleached	3.76 ± 1.01	-	6.62 ± 1.46	8.21 ± 1.76^{b}
Host soluble protein (mg protein cm^{-2})	51/43/49/44	Unstressed	$2.42 \pm 0.19^{A/a}$	3.69 ± 0.32^{A}	5.96 ± 0.68^{B}	3.5 ± 0.36^{A}
	11/22/16/20	Stressed	4.7 ± 0.72^{b}	4.12 ± 0.51	7.18 ± 1.21	3.53 ± 0.61
	8/0/6/3	Bleached	2.67 ± 0.6^{a}	-	5.71 ± 0.63	4.38 ± 1.83
Fv/Fm	51/43/49/44	Unstressed	$0.61 \pm 0.004^{A/a}$	$0.64 \pm 0.004^{B/a}$	$0.61 \pm 0.004^{A/a}$	$0.62 \pm 0.002^{A/a}$
	11/22/16/20	Stressed	0.5 ± 0.028^{b}	0.58 ± 0.021^{b}	0.48 ± 0.021^{b}	0.56 ± 0.009^{b}
	8/0/6/3	Bleached	0.43 ± 0.009^{c}	-	0.15 ± 0.044^{c}	0.36 ± 0.012^{c}
P_{max} (µmol O_2 cm^{-2} h^{-1})	51/43/49/44	Unstressed	$3.21 \pm 0.1^{A/a}$	$3.31 \pm 0.12^{A/a}$	$2.59 \pm 0.09^{B/a}$	$2.55 \pm 0.11^{B/a}$
	11/22/16/20	Stressed	2.21 ± 0.2^{b}	2.13 ± 0.17^{b}	1.41 ± 0.12^{b}	1.53 ± 0.13^{b}
	8/0/6/3	Bleached	0.07 ± 0.02^{c}	-	0.1 ± 0.03^{c}	0.14 ± 0.01^{b}
P_{sym} (pmol O_2 sym^{-1} h^{-1})	51/43/49/44	Unstressed	$1.18 \pm 0.07^{A/a}$	1 ± 0.06^{A}	1.21 ± 0.06^{A}	1.54 ± 0.13^{B}
	11/22/16/20	Stressed	1.61 ± 0.16^{b}	1.23 ± 0.15	1.08 ± 0.16	1.11 ± 0.1
	8/0/6/3	Bleached	0.6 ± 0.17^{a}	-	0.52 ± 0.11	0.57 ± 0.2
P_M (µmol O_2 $prot^{-1}$ h^{-1})	51/43/49/44	Unstressed	$1.72 \pm 0.1^{A/a}$	$1.23 \pm 0.08^{B/a}$	$0.82 \pm 0.08^{C/a}$	1.15 ± 0.09^{B}
	11/22/16/20	Stressed	0.65 ± 0.11^{b}	0.74 ± 0.1^{b}	0.38 ± 0.07^{b}	0.83 ± 0.15
	8/0/6/3	Bleached	0.03 ± 0.01^{b}	-	0.02 ± 0.01^{b}	0.04 ± 0.02
Absorptance	51/43/49/44	Unstressed	$92.06 \pm 0.35^{A/a}$	$90.37 \pm 0.44^{B/a}$	$91.47 \pm 0.25^{AB/a}$	$87.7 \pm 0.47^{C/a}$
	11/22/16/20	Stressed	74.39 ± 5.97^{b}	85.34 ± 1.42^{b}	80.15 ± 2.77^{b}	81.66 ± 1.18^{b}
	8/0/6/3	Bleached	40.87 ± 2.51^{c}	-	52.39 ± 2.95^{c}	61.24 ± 1.34^{c}
a^*_{Chla} (m^2 mg Chl*a*$^{-1}$)	51/43/49/44	Unstressed	$0.031 \pm 0.002^{A/a}$	$0.02 \pm 0.001^{B/a}$	$0.021 \pm 0.001^{B/a}$	$0.021 \pm 0.001^{B/a}$
	11/22/16/20	Stressed	0.038 ± 0.004^{a}	0.041 ± 0.006^{b}	0.023 ± 0.002^{a}	0.032 ± 0.003^{b}
	8/0/6/3	Bleached	0.18 ± 0.036^{b}	-	0.076 ± 0.033^{b}	0.059 ± 0.01^{c}
a^*_{sym} (m^2 sym^{-1})	51/43/49/44	Unstressed	$0.007 \pm 0.0003^{A/a}$	$0.006 \pm 0.0003^{A/a}$	$0.01 \pm 0.0004^{B/a}$	$0.009 \pm 0.0005^{B/a}$
	11/22/16/20	Stressed	0.009 ± 0.0012^{a}	0.009 ± 0.0009^{b}	0.011 ± 0.001^{a}	0.01 ± 0.0006^{a}
	8/0/6/3	Bleached	0.047 ± 0.0126^{b}	-	0.028 ± 0.0014^{b}	0.026 ± 0.0061^{b}
a^*_M (m^2 mg protein^{-1})	51/43/49/44	Unstressed	$0.12 \pm 0.008^{A/a}$	$0.08 \pm 0.007^{B/a}$	$0.06 \pm 0.006^{B/a}$	0.08 ± 0.008^{B}
	11/22/16/20	Stressed	0.03 ± 0.005^{b}	0.05 ± 0.006^{b}	0.04 ± 0.005^{b}	0.06 ± 0.007
	8/0/6/3	Bleached	0.02 ± 0.006^{b}	-	0.02 ± 0.002^{b}	0.02 ± 0.006

Supplementary table S2: Pearson correlation between optical, structural, and photo-physiological descriptors by species.

	Optical				Structural			Photo-physiological	
O. annularis	log A	log a^*_{Chla}	log a^*_{sym}	log a^*_{M}	log Chl*a*	log sym	log Ci	log P_{max}	log P_{sym}
log A									
log a^*_{Chla}	-0.56***								
log a^*_{sym}	-0.36***	0.74***							
log a^*_{M}	0.59***	-0.19	-0.38***						
log Chl*a*	0.87***	-0.88***	-0.64***	0.47***					
log sym	0.76***	-0.78***	-0.87***	0.60***	0.89***				
log Ci	0.33**	-0.29**	0.41***	-0.28**	0.32**	-0.14			
log P_{max}	0.74***	-0.77***	-0.68***	0.39***	0.87***	0.85***	0.13		
log P_{sym}	0.11	-0.12	0.19	-0.29**	0.12	-0.1	0.47***	0.44***	
log P_{M}	0.70***	-0.59***	-0.70***	0.78***	0.76***	0.85***	-0.17	0.85***	0.16

O. faveolata	log A	log a^*_{Chla}	log a^*_{sym}	log a^*_{M}	log Chl*a*	log sym	log Ci	log P_{max}	log P_{sym}
log A									
log a^*_{Chla}	0.01								
log a^*_{sym}	-0.08	0.80***							
log a^*_{M}	0.56***	-0.12	-0.32**						
log Chl*a*	0.36***	-0.92***	-0.77***	0.35***					
log sym	0.53***	-0.69***	-0.86***	0.57***	0.85***				
log Ci	-0.27*	-0.48***	0.1	-0.38***	0.34**	-0.21			
log P_{max}	0.51***	-0.33**	-0.22*	0.09	0.49***	0.44***	0.11		
log P_{sym}	-0.08	0.40***	0.67***	-0.50***	-0.41***	-0.61***	0.31**	0.44***	
log P_{M}	0.56***	-0.33**	-0.46***	0.85***	0.53***	0.67***	-0.22*	0.54***	-0.19

M. cavernosa	log A	log a^*_{Chla}	log a^*_{sym}	log a^*_{M}	log Chl*a*	log sym	log Ci	log P_{max}	log P_{sym}
log A									
log a^*_{Chla}	-0.16								
log a^*_{sym}	-0.14	0.53***							
log a^*_{M}	0.28**	0.01	-0.42***						
log Chl*a*	0.71***	-0.80***	-0.41***	0.17					
log sym	0.65***	-0.61***	-0.77***	0.46***	0.81***				
log Ci	0.07	-0.26**	0.58***	-0.48***	0.27**	-0.33***			
log P_{max}	0.69***	-0.41***	-0.25*	0.32**	0.72***	0.68***	0.06		
log P_{sym}	0.22*	0.11	0.49***	-0.07	0.09	-0.17	0.44***	0.61***	
log P_{M}	0.40***	-0.21*	-0.49***	0.87***	0.40***	0.63***	-0.39***	0.70***	0.26*

P. strigosa	log A	log a^*_{Chla}	log a^*_{sym}	log a^*_{M}	log Chl*a*	log sym	log Ci	log P_{max}	log P_{sym}
log A									
log a^*_{Chla}	-0.27*								
log a^*_{sym}	-0.2	0.62***							
log a^*_{M}	0.28**	-0.39***	-0.26*						
log Chl*a*	0.64***	-0.90***	-0.58***	0.47***					
log sym	0.63***	-0.63***	-0.86***	0.34***	0.77***				
log Ci	-0.01	-0.44***	0.39***	0.19	0.35***	-0.30**			
log P_{max}	0.66***	-0.28**	-0.24*	0.07	0.48***	0.45***	-0.01		
log P_{sym}	0.18	0.22*	0.46***	-0.21*	-0.14	-0.35***	0.24*	0.68***	
log P_{M}	0.43***	-0.45***	-0.36***	0.82***	0.55***	0.44***	0.14	0.58***	0.25*

Significants levels: *** = 0.001, ** = 0.01, * = 0.05

Supplementary table S3: Statistics, intercept (±SE) and slopes (±SE) per species of the independent variables used in the linear regression equation between a^*_{chla} and chlorophyll *a* density.

Species	Variables	Estimate	F	p-value	R^2
O. annularis	Intercept	-0.57 ± 0.05	-12.24	<0.001	
	log(Chl*a*)	-0.5 ± 0.03	-19.82	<0.001	0.77
O. faveolata	Intercept	0.12 ± 0.09	1.38	0.2	
	log(Chl*a*)	-0.89 ± 0.04	-19.87	<0.001	0.85
M. cavernosa	Intercept	-0.57 ± 0.08	-6.83	<0.001	
	log(Chl*a*)	-0.55 ± 0.04	-13.44	<0.001	0.63
P. strigosa	Intercept	-0.23 ± 0.09	-2.59	<0.05	
	log(Chl*a*)	-0.73 ± 0.05	-15.93	<0.001	0.81

Supplementary table S4: Statistics, intercept (±SE) and slopes (±SE) per species of the independent variables used in the linear regression equation between a^*_{chla} and symbiont density.

Species	Variables	Estimate	F	p-value	R^2
O. annularis	Intercept	-1.32 ± 0.02	-62.88	<0.001	
	log(Chl*a*)	-0.47 ± 0.04	-11.58	<0.001	0.61
O. faveolata	Intercept	-1.33 ± 0.04	-36.75	<0.001	
	log(Chl*a*)	-0.69 ± 0.07	-9.75	<0.001	0.48
M. cavernosa	Intercept	-1.56 ± 0.02	-69.17	<0.001	
	log(Chl*a*)	-0.41 ± 0.06	-6.74	<0.001	0.37
P. strigosa	Intercept	-1.53 ± 0.02	-67.09	<0.001	
	log(Chl*a*)	-0.55 ± 0.08	-7.29	<0.001	0.39

Supplementary table S5: Statistics and slopes (±SE) per species of the independent variables used in the multiple linear regression equation between absorptance and symbiont density and Ci.

Species	Variables	Log-log slope	F	p-value	R^2
O. annularis	Symbiont density (x10^6 cm^{-2})	0.26 ± 0.02	15.38	<0.001	
	Ci (pg Chla sym^{-1})	0.29 ± 0.04	8.37	<0.001	0.77
O. faveolata	Symbiont density (x10^6 cm^{-2})	-0.05 ± 0.04	-1.19	0.24	
	Ci (pg Chla sym^{-1})	-0.12 ± 0.04	-3.28	<0.01	
	Symbiont density : Ci	0.22 ± 0.08	2.73	<0.01	0.36
M. cavernosa	Symbiont density (x10^6 cm^{-2})	0.21 ± 0.02	9.80	<0.001	
	Ci (pg Chla sym^{-1})	0.16 ± 0.04	4.15	<0.001	0.52
P. strigosa	Symbiont density (x10^6 cm^{-2})	-0.08 ± 0.06	-1.33	0.19	
	Ci (pg Chla sym^{-1})	0.01 ± 0.02	0.56	0.58	
	Symbiont density : Ci	0.26 ± 0.08	3.31	<0.01	0.50

Supplementary table S6: Statistics and slopes (±SE) per species of the independent variables used in the multiple linear regression equation between $a^*_{chl\,a}$ and symbiont density and Ci.

Species	Variables	Log-log slope	F	p-value	R2
O. annularis	Symbiont density (x10^6 cm^{-2})	-0.5 ± 0.03	-15.66	<0.001	
	Ci (pg Chla sym^{-1}	-0.51 ± 0.07	-7.59	<0.001	0.77
O. faveolata	Symbiont density (x10^6 cm^{-2})	-0.83 ± 0.04	-21.92	<0.001	
	Ci (pg Chla sym^{-1})	-1.15 ± 0.07	-17.30	<0.001	0.88
M. cavernosa	Symbiont density (x10^6 cm^{-2})	-0.53 ± 0.05	-11.38	<0.001	
	Ci (pg Chla sym^{-1})	-0.63 ± 0.08	-7.65	<0.001	0.62
P. strigosa	Symbiont density (x10^6 cm^{-2})	-0.74 ± 0.04	-18.02	<0.001	
	Ci (Chl a $Symbiont^{-1}$)	-0.88 ± 0.06	-14.90	<0.001	0.83