

Table S1: Overview of numbers of specimens used per light treatment and per sampling timepoint. Timepoint 0 = Start of experiment; Timepoint 1 = 1 month; Timepoint 2 = 4 months (*O. cyanosoma*) / 6 months (*P. moluccensis*, *P. amboinensis*).

Species	Treatment												
	Baseline	Blue		Green		Red		No Filter		ND0.15		ND0.6	
	0	1	2	1	2	1	2	1	2	1	2	1	2
<i>O. cyanosoma</i>	18	8	8	7	5	8	5	6	n/a	10	n/a	7	n/a
<i>P. moluccensis</i>	18	3	3	3	5	3	9	6	n/a	6	n/a	5	n/a
<i>P. amboinensis</i>	8	5	5	13	5	4	5	n/a	n/a	n/a	n/a	n/a	n/a

Table S2: Primer names and sequences used for PCR and sequencing of the pool of opsins for *O. cyanosoma*; and summary of qPCR primer combinations and efficiencies for each species. Primer names and sequences for *P. amboinensis* and *P. moluccensis* were obtained from Stieb et al. (2016).

opsin	species	primer pool	sequence
SWS2Aα	<i>O. cyanosoma</i>	pSWS2AA_F1	5'-GCCATGGCTAACCTCATTGT-3'
		pSWS2AA_R4	5'-TTTGGAGACTTCAGTTACTGATGCT-3'
SWS2Aβ	<i>O. cyanosoma</i>	pSWS2AB_F3	5'-AACTTGGCCTTTTCCAACCT-3'
		pSWS2AB_R5	5'-ACTTCAGTCACCGACTGG-3'
RH2B	<i>O. cyanosoma</i>	pRH2B_F3	5'-CTCCGGCAACCTCTGAACCT-3'
		pRH2B_R3	5'-GTATGGGGTCCAAGCAACAA-3'
RH2A	<i>O. cyanosoma</i>	pSWS2AB_R5	5'-GGCAACCGCTGAACTACATC-3'
		pRH2A_R1	5'-AGCCAAAGACCATCAAGACG-3'
LWS	<i>O. cyanosoma</i>	pLWS_F1	5'-TCAGCGTATGCAACCAGTTC-3'
		pLWS_R1	5'-GGCATATCCAGGGTTAGCAG-3'
RH1	<i>O. cyanosoma</i>	pRH1_F2	5'-GCGTTGTCCGGAGTCCTTAT-3'
		pRH1_R2	5'-TCCACATGAGCACTGCATTC-3'
opsin	species with primer efficiencies (%)	primer qPCR	sequence
SWS1	<i>P. amboinensis</i> (90), <i>P. moluccensis</i> (94)	SWS1_forward_1	5'-CTCCAAGAGCTCCTGCGTCT-3'
		SWS1_reverse_1	5'-TGATGCAGGCGTTGAACTGTTT-3'
SWS2B	<i>P. amboinensis</i> (91), <i>P. moluccensis</i> (91)	SWS2B_forward_1	5'-GGTGAAGCGGTAGCAAAGG-3'
		SWS2B_reverse_1	5'-CCATCTTGGTCACCTCCCCTC-3'
SWS2Aα	<i>O. cyanosoma</i> (103)	SWS2AA_F3	5'-ATAAACAGTTCGGTGGGTGCATGAT-3'
		SWS2AA_R3	5'-TTGGAGACTTCAGTTACTGATGCTG-3'
SWS2Aβ	<i>O. cyanosoma</i> (100)	SWS2AB_F1	5'-TAACGCTTGGTGGGATGGTGAG-3'
		SWS2AB_R1	5'-GCTAAAGCGTGGTCAGTTTGAAC-3'
RH2B	<i>P. amboinensis</i>	RH2B_forward_1	5'-GGTGGGCTATTTCTCCTTGGG-3'
	<i>P. moluccensis</i>	RH2B_forward_2	5'-GATGGGCTATTTCTCCTTGGGG-3'
	<i>P. amboinensis</i> (93), <i>P. moluccensis</i> (96)	RH2B_reverse_1	5'-CACAGAGACTTGACCTCCG-3'
	<i>O. cyanosoma</i> (95)	RH2B_F1	5'-CTGCTTGGCTTACCATCACC-3'
RH2A	<i>P. amboinensis</i> (91), <i>P. moluccensis</i> (94)	RH2B_R5	5'-ACTTGACCTCCCAGTGTAGCCATG-3'
		RH2A_forward_1	5'-CATTCTTGGACCCACTTTCTGCG-3'
	<i>O. cyanosoma</i> (91)	RH2A_reverse_1	5'-CCAGAGAGCAACTTACCTCCA-3'
		RH2A_F2	5'-ATGCAGGAGCTGGAGTTGCTTTC-3'
LWS	<i>P. moluccensis</i>	RH2A_R2	5'-GGTACCTGGACCAGCCACC-3'
		LWS_forward_1	5'-ACACCAATCACACCAAAGATCCC-3'
	<i>P. amboinensis</i>	LWS_forward_3	5'-CCAATTACACCAAAGATCCC-3'
		<i>P. amboinensis</i> (96), <i>P. moluccensis</i> (95)	LWS_reverse_2
<i>O. cyanosoma</i> (96)	LWS_F2	5'-TTCGGATGGAGCAGGTAAGTGG-3'	
	LWS_R2	5'-ATCATGTACGACTGGACTCCAGG-3'	
RH1	<i>P. amboinensis</i> (91), <i>P. moluccensis</i> (90)	RH1_forward_1	5'-CCACTGCATGATCACCACCT-3'
		RH1_reverse_1	5'-GATGCTCCCTCCTTCTTCCG-3'
	<i>O. cyanosoma</i> (81)	RH1_F3	5'-CCATCAGCAACTTCCGCTTGG-3'
		RH1_R3	5'-GGGGTACGGAGCAAGCAGC-3'

Table S3: Summary of total relative opsin expression under different colour treatments and after different treatment durations in the three investigated reef fish species. Values are given as median fraction of total single cone opsin (%) and interquartile range for each of the SWS cone opsins present in each respective species (*O. cyanosoma*: SWS2A α , SWS2A β ; *P. amboinensis*/*P. moluccensis*: SWS1/SWS2B), as median fraction of total double cone opsin (RH2B, RH2A, LWS) and interquartile range, and as median fraction of cone and rod opsin of total opsin (%) and interquartile range.

Species	time spent in tank [months]	treatment	n	Opsin gene									
				SWS1	SWS2B	SWS2A α	SWS2A β	RH2B	RH2A	LWS	Total Cone	Total RH1	
<i>P. amboinensis</i>	0	baseline	8	86.6, 9.6	13.4, 9.6	-	-	45.0, 4.0	54.5, 3.9	0.4, 0.4	58.7, 6.5	41.3, 6.5	
	1	blue	5	84.2, 6.1	15.8, 6.1	-	-	45.4, 2.4	53.4, 1.6	1.3, 0.2	64.4, 3.1	35.6, 3.1	
		green	13	68.4, 4.1	31.6, 4.1	-	-	46.6, 5.4	46.6, 6.6	1.1, 4.9	63.9, 7.5	36.1, 7.5	
		red	4	68.8, 13.2	31.2, 13.2	-	-	46.0, 2.6	52.8, 1.8	1.1, 0.4	63.2, 4.5	36.8, 4.5	
	6	blue	5	75.7, 3.5	24.3, 3.5	-	-	45.6, 1.0	53.9, 0.9	0.5, 0.4	52.9, 6.1	47.1, 6.1	
		green	5	58.8, 12.9	41.2, 12.9	-	-	44.5, 4.4	54.5, 5.0	0.6, 0.6	56.3, 9.1	43.7, 9.1	
		red	5	45.8, 12.2	54.2, 12.2	-	-	45.3, 1.7	54.2, 1.0	0.6, 0.2	47.6, 7.9	52.4, 7.9	
	<i>P. moluccensis</i>	0	baseline	18	85.0, 12.5	15.0, 12.5	-	-	43.4, 3.1	52.2, 2.7	3.6, 2.1	63.2, 11.0	46.8, 11.0
		1	blue	3	87.8, 12.4	12.2, 12.4	-	-	44.3, 1.5	49.6, 1.4	6.6, 2.6	62.6, 1.8	37.4, 1.8
green			3	56.1, 8.9	43.9, 8.9	-	-	40.6, 2.0	50.8, 0.8	8.7, 2.7	58.3, 2.2	41.7, 2.2	
red			3	57.3, 6.2	42.7, 6.2	-	-	41.7, 4.0	51.3, 3.9	5.1, 1.0	56.6, 5.3	33.4, 5.3	
no filter			6	69.1, 21.9	30.9, 21.9	-	-	45.5, 2.1	49.0, 2.6	6.3, 2.2	65.7, 15.5	34.3, 15.5	
0.15 ND			6	69.8, 14.4	30.2, 14.4	-	-	47.0, 2.4	48.4, 2.6	5.5, 4.0	55.1, 8.2	44.9, 8.2	
0.6 ND			5	55.5, 5.2	44.5, 5.2	-	-	44.2, 2.0	50.1, 1.2	6.1, 3.3	61.3, 0.7	38.7, 0.7	
6		blue	3	70.3, 5.9	29.7, 5.9	-	-	43.5, 1.0	49.8, 1.3	5.0, 1.3	51.0, 11.4	49.0, 11.4	
		green	5	59.6, 14.3	40.4, 14.3	-	-	41.5, 0.9	52.4, 0.3	6.1, 1.0	53.1, 3.3	46.9, 3.3	
		red	9	66.6, 25.9	33.4, 25.9	-	-	41.5, 3.6	49.9, 4.4	6.0, 2.6	62.3, 12.1	37.7, 12.1	
<i>O. cyanosoma</i>		0	baseline	18	-	-	9.4, 7.5	90.6, 7.5	17.1, 8.5	82.5, 8.6	0.4, 0.9	91.2, 3.9	8.8, 3.9
		1	blue	8	-	-	9.4, 5.5	90.6, 5.5	16.5, 8.9	83.0, 8.5	0.7, 0.5	92.8, 0.8	7.2, 0.8
	green		7	-	-	6.2, 5.7	93.8, 5.7	14.5, 2.9	84.6, 4.1	0.8, 0.7	93.4, 1.3	6.6, 1.3	
	red		8	-	-	2.3, 2.4	97.7, 2.4	13.1, 5.1	86.6, 5.1	0.4, 0.2	92.9, 1.6	7.1, 1.6	
	no filter		6	-	-	16.6, 2.1	83.4, 2.1	33.4, 10.0	65.9, 9.4	0.5, 0.6	89.9, 3.3	10.1, 3.3	
	0.15 ND		10	-	-	16.7, 17.9	83.3, 17.9	20.5, 12.5	78.6, 11.3	0.4, 1.0	91.3, 1.3	8.7, 1.3	
	0.6 ND		7	-	-	13.9, 9.3	86.1, 9.3	42.0, 20.0	57.9, 19.7	0.1, 0.3	91.1, 5.6	8.9, 5.6	
	4	blue	8	-	-	11.3, 5.6	88.7, 5.6	4.1, 5.6	94.3, 6.6	1.5, 1.7	94.9, 1.5	5.1, 1.5	
		green	5	-	-	9.0, 6.4	91.0, 6.4	6.1, 6.2	92.2, 7.2	1.2, 0.5	95.5, 0.3	3.5, 0.3	
		red	5	-	-	3.3, 1.7	96.7, 1.7	3.3, 3.9	95.4, 3.4	0.6, 0.5	94.8, 1.1	5.2, 1.1	

Table S4: Summary of beta regression models showing results for baseline datasets tested against light treatments (blue, green, red, no filter, ND0.15, ND0.6) after different time points, and results for no filter datasets tested against light treatments (blue, green, red, ND0.15, ND0.6). After Bonferroni-Correction for six (baseline dataset) respectively five (no filter dataset) tested treatment hypotheses ($p = \alpha/m$, with $m=6$ resp. 5), p-values less than or equal to 0.0083, 0.0017, and 0.00017 resp. p-values less than or equal to 0.01, 0.002, and 0.0002 were considered significant and are marked with *, **, or ***, respectively. Statistically significant P-values are shown in bold.

species	time spent in tank [months]	light & control treatment	opsin gene							
			SWS1	SWS2B	SWS2A α	SWS2A β	RH2B	RH2A	LWS	RH1
			baseline	baseline	baseline	baseline	baseline	baseline	baseline	baseline
<i>P. amboinensis</i>	1	blue	0.385	0.385	n/a	n/a	0.508	0.865	0.002*	0.337
		green	2.77E-08***	2.77E-08***	n/a	n/a	0.09	0.004*	0.007*	0.277
		red	7.02E-05***	7.02E-05***	n/a	n/a	0.404	0.245	0.009	0.194
	6	blue	1.05E-04***	1.05E-04***	n/a	n/a	0.922	0.982	0.169	0.071
		green	1.01E-14***	1.01E-14***	n/a	n/a	0.78	0.676	0.046	0.091
		red	2.67E-13***	2.67E-13***	n/a	n/a	0.697	0.823	0.999	0.015
<i>P. moluccensis</i>	1	blue	0.947	0.947	n/a	n/a	0.465	0.16	0.715	0.683
		green	1.85E-05***	1.85E-05***	n/a	n/a	0.108	0.452	2.23E-04**	0.222
		red	5.83E-06***	5.83E-06***	n/a	n/a	0.902	0.22	0.009	0.126
		no filter	7.65E-04**	7.65E-04**	n/a	n/a	0.09	7.68E-04**	0.002*	0.349
		0.15 ND	4.00E-05***	4.00E-05***	n/a	n/a	0.019	6.13E-04**	0.13	0.044
		0.6 ND	3.5E-10***	3.5E-10***	n/a	n/a	0.414	0.051	0.05	0.257
	6	blue	0.01	0.01	n/a	n/a	0.863	0.151	0.008*	0.076
		green	4.96E-09***	4.96E-09***	n/a	n/a	0.235	0.849	0.006*	7.38E-05***
		red	3.64E-04**	3.64E-04**	n/a	n/a	0.14	0.12	8.25E-08***	0.058
<i>O. cyanosoma</i>	1	blue	n/a	n/a	0.521	0.521	0.63	0.602	0.357	0.204
		green	n/a	n/a	0.109	0.109	0.204	0.213	0.145	0.076
		red	n/a	n/a	1.74E-05***	1.74E-05***	0.184	0.134	0.527	0.416
		no filter	n/a	n/a	0.003*	0.003*	1.01E-04***	9.68E-05***	0.75	0.417
		0.15 ND	n/a	n/a	0.002*	0.002*	0.627	0.609	0.834	0.707
		0.6 ND	n/a	n/a	0.343	0.343	0.003*	0.003*	0.001*	0.156
	4	blue	n/a	n/a	0.227	0.227	2.41E-04**	7.62E-04**	0.029	0.015
		green	n/a	n/a	0.736	0.736	0.002*	0.002*	0.029	0.011
		red	n/a	n/a	2.01E-04**	2.01E-04**	3.43E-05***	2.73E-05***	0.836	0.013
			no filter	no filter	no filter	no filter	no filter	no filter	no filter	
<i>P. moluccensis</i>	1	blue	0.046	0.046	n/a	n/a	0.514	0.18	0.306	
		green	0.183	0.183	n/a	n/a	0.002*	0.03	0.349	
		red	0.121	0.121	n/a	n/a	0.365	0.304	0.995	
		0.15 ND	0.606	0.606	n/a	n/a	0.435	0.528	0.477	
		0.6 ND	0.011	0.011	n/a	n/a	0.323	0.259	0.591	
<i>O. cyanosoma</i>	1	blue	n/a	n/a	5.44E-04**	5.44E-04**	1.25E-08***	9.86E-09***	0.147	
		green	n/a	n/a	3.34E-06***	3.34E-06***	6.49E-09***	8.03E-09***	0.061	
		red	n/a	n/a	2.97E-14***	2.97E-14***	4.52E-12***	7.63E-13***	0.748	
		0.15 ND	n/a	n/a	0.004*	0.004*	5.7E-04**	3.44E-04**	0.895	
		0.6 ND	n/a	n/a	0.178	0.178	0.782	0.751	0.037	

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