Table S1. Environmental parameters recorded at study area, Patong Bay, Phuket, Thailand during April - October 2021

Parameter	Min	1st quartile	Median	Mean	3rd quartile	Max
Dissolved oxygen (mgL^{-1})	3.36	6.13	6.50	6.38	6.76	6.99
Temperature (°C)	27.86	29.32	29.52	29.55	29.78	30.68
Salinity (ppt)	26.49	32.78	32.81	32.81	32.87	34.06
pH	7.65	8.17	8.18	8.18	8.20	8.22
Light intensity (µmol photons $m^{-2}s^{-1}$)	23.15	101.45	143.34	181.12	205.46	1,405.54

Table S2. Water quality parameters in the treatment tanks measured during experiment. Data are shown as Mean ± SE

Treatment	Day	Temperature (°C)	DO (mgL^{-1})	pH	Salinity (ppt)	Nitrate: NO_3^- ($mg\text{-}N\ L^{-1}$)	Ammonia: NH_3 ($mg\text{-}N\ L^{-1}$)
Ambient	1	29	6.37±0.013	8.30±0.003	31.5		
	2	29	6.37±0.018	8.32±0.006	32		
	3	29	6.27±0.060	8.30±0.006	32	2±0	0.22±0.033
	4	29	6.14±0.023	8.27±0.015	32		
	5	29	6.20±0.046	8.35±0.009	32		
	6	29	6.17±0.036	8.36±0.003	32	2±0	0.22±0.033
	7	29	6.17±0.025	8.35±0.012	32		
	8	29	6.21±0.024	8.44±0.006	32		
	9	29	6.17±0.036	8.16±0.003	32	4±1	0.15±0.000
Heat stress	1	32	6.39±0.018	8.25±0.020	32		
	2	32	6.27±0.044	8.27±0.003	32		
	3	32	6.22±0.069	8.24±0.015	32	2±0	0.18±0.033
	4	32	6.08±0.023	8.24±0.003	32		
	5	32	6.15±0.035	8.34±0.020	32		
	6	32	6.13±0.035	8.33±0.009	32	3±1	0.22±0.033
	7	32	6.13±0.024	8.30±0.006	32		
	8	32	6.16±0.020	8.38±0.015	32		
	9	32	6.11±0.037	8.17±0.003	32	5±0	0.15±0.000
Hypoxia	1	29	1.97±0.006	8.24±0.009	32		
	2	29	1.84±0.038	8.45±0.012	32		
	3	29	1.92±0.035	8.45±0.006	32	3±1	0.15±0.000
	4	29	1.90±0.050	8.45±0.003	32		
	5	29	1.97±0.007	8.50±0.026	32		
	6	29	1.98±0.012	8.49±0.020	32	5±0	0.17±0.083
	7	29	1.86±0.064	8.47±0.003	32		
	8	29	1.89±0.052	8.54±0.003	32		
	9	29	1.87±0.018	8.38±0.026	32	5±0	0.15±0.000
Heat stress + hypoxia	1	32	1.97±0.017	8.25±0.012	32		
	2	32	1.85±0.015	8.48±0.006	32		
	3	32	1.86±0.009	8.54±0.015	32	3±1	0.22±0.033
	4	32	1.94±0.039	8.55±0.003	32		
	5	32	1.99±0.009	8.58±0.026	32		
	6	32	1.94±0.034	8.50±0.017	32	3±1	0.22±0.033
	7	32	1.92±0.043	8.55±0.015	32		
	8	32	1.92±0.038	8.67±0.003	32		
	9	32	1.94±0.032	8.46±0.015	32	4±1	0.15±0.000

Note: The SE of temperature and salinity was zero

Table S3. Summary of different ANOVAs for photosynthesis, *Symbiodiniaceae* density, chlorophyll content and growth rate of *P. lutea*. Significant values ($p < 0.05$) are shown in bold.

P. lutea									
Factor or interaction		F_v/F_m after dark condition	F_v/F_m after light condition	F_v/F_0 after dark condition	F_v/F_0 after light condition	*Symbiodiniaceae* density	Chl *a*	Chl c_2	Growth rate
	df	9	8	9	8	3	3	3	
Time	F	5.674	7.506	6.403	7.960	3.075	2.696	2.427	
	p	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**0.036***	0.056	0.077	
	df	1	1	1	1	1	1	1	1
Temperature	F	6.814	7.917	8.327	9.315	14.012	0.982	6.502	0.273
	p	**0.010***	**0.006***	**0.005***	**0.003***	**<0.001***	0.327	**0.014***	0.611
	df	1	1	1	1	1	1	1	1
DO	F	14.720	8.190	15.723	8.903	6.395	1.571	0.685	1.260
	p	**<0.001***	**0.005***	**<0.001***	**0.004***	**0.015***	0.216	0.412	0.284
	df	9	8	9	8	3	3	3	
Time x temperature	F	1.153	3.193	1.227	3.269	2.756	0.615	0.866	
	p	0.331	**0.003***	0.285	**0.002***	0.052	0.609	0.465	
	df	9	8	9	8	3	3	3	
Time x DO	F	0.841	2.456	0.925	2.692	0.691	2.421	0.628	
	p	0.579	**0.018***	0.506	**0.010***	0.562	0.077	0.601	
	df	1	1	1	1	1	1	1	1
Temperature x DO	F	1.572	9.755	0.940	8.136	0.213	0.002	0.532	0.196
	p	0.212	**0.002***	0.334	**0.005***	0.647	0.964	0.469	0.666
	df	9	8	9	8	3	3	3	
Time x temperature x DO	F	0.976	2.579	1.018	3.110	3.452	2.852	0.526	
	p	0.463	**0.013***	0.429	**0.003***	**0.024***	**0.047***	0.667	

Table S4. Summary of different ANOVAs for photosynthesis, *Symbiodiniaceae* density, chlorophyll content and growth rate of *M. tuberculosa*. Significant values ($p < 0.05$) are shown in bold.

M. tuberculosa									
Factor or interaction		F_v/F_m after dark condition	F_v/F_m after light condition	F_v/F_0 after dark condition	F_v/F_0 after light condition	*Symbiodiniaceae* density	Chl *a*	Chl c_2	Growth rate
	df	9	8	9	8	3	3	3	
Time	F	3.872	2.424	3.861	2.238	13.467	9.593	36.852	
	p	**<0.001***	**0.019***	**<0.001***	**0.03***	**<0.001***	**<0.001***	**<0.001***	
	df	1	1	1	1	1	1	1	1
Temperature	F	12.895	7.323	13.936	8.832	0.373	4.395	0.271	19.825
	p	**<0.001***	**0.008***	**<0.001***	**0.004***	0.544	**0.041***	0.605	**<0.001***
	df	1	1	1	1	1	1	1	1
DO	F	12.578	17.652	12.545	17.472	0.880	1.983	2.316	0.007
	p	**<0.001***	**<0.001***	**<0.001***	**<0.001***	0.353	0.166	0.135	0.936
	df	9	8	9	8	3	3	3	
Time x temperature	F	0.532	0.205	0.651	0.155	0.438	0.594	2.239	
	p	0.849	0.989	0.751	0.996	0.726	0.622	0.096	
	df	9	8	9	8	3	3	3	
Time x DO	F	0.464	0.670	0.447	0.654	0.827	1.140	3.085	
	p	0.896	0.717	0.907	0.731	0.486	0.343	**0.036***	
	df	1	1	1	1	1	1	1	1
Temperature x DO	F	0.041	2.405	0.045	2.092	4.975	0.022	3.495	0.623
	p	0.840	0.124	0.832	0.151	**0.030***	0.883	0.068	0.445
	df	9	8	9	8	3	3	3	
Time x temperature x DO	F	0.308	0.158	0.304	0.223	0.968	1.733	2.818	
	p	0.971	0.996	0.972	0.986	0.416	0.173	**0.049***	

Table S5. Summary of different ANOVAs for photosynthesis, *Symbiodiniaceae* density, chlorophyll content and growth rate of *P. verrucosa*. Significant values ($p < 0.05$) are shown in bold.

		P. verrucosa							
Factor or interaction		F_v/F_m after dark condition	F_v/F_m after light condition	F_v/F_0 after dark condition	F_v/F_0 after light condition	*Symbiodiniaceae* density	Chl *a*	Chl c_2	Growth rate
	df	9	8	9	8	3	3	3	
Time	F	2.873	2.620	7.077	1.726	2.060	0.853	0.900	
	p	**0.004***	**0.012***	**<0.001***	0.100	0.118	0.472	0.448	
	df	1	1	1	1	1	1	1	1
Temperature	F	19.782	17.202	54.731	15.946	16.810	2.463	2.874	3.232
	p	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***	0.123	0.096	0.097
	df	1	1	1	1	1	1	1	1
DO	F	2.437	1.010	6.482	7.720	7.134	0.001	0.132	3.319
	p	0.121	0.317	**0.012***	**0.006***	**0.010***	0.982	0.718	0.093
	df	9	8	9	8	3	3	3	
Time x temperature	F	1.200	0.975	0.684	0.404	2.807	0.648	0.462	
	p	0.301	0.460	0.722	0.916	**0.049***	0.588	0.710	
	df	9	8	9	8	3	3	3	
Time x DO	F	0.445	0.438	1.335	1.079	2.186	1.778	0.317	
	p	0.908	0.896	0.226	0.384	0.102	0.164	0.813	
	df	1	1	1	1	1	1	1	1
Temperature x DO	F	17.016	14.885	34.425	10.299	24.739	21.413	26.080	6.312
	p	**<0.001***	**<0.001***	**<0.001***	**0.002***	**<0.001***	**<0.001***	**<0.001***	**0.027***
	df	9	8	9	8	3	3	3	
Time x temperature x DO	F	1.322	1.282	0.602	0.609	2.949	9.368	7.344	
	p	0.233	0.260	0.794	0.768	**0.042***	**<0.001***	**<0.001***	

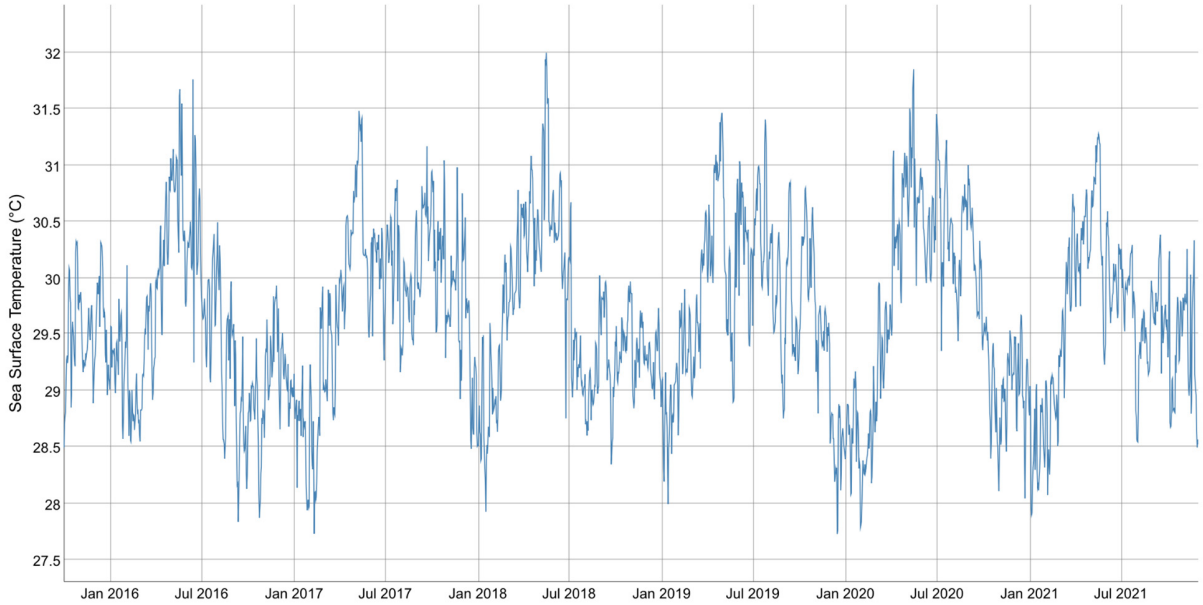

Figure S1. Sea surface temperature data for Patong Bay, Phuket, from 2016 - 2021. Data Source: Multi-scale Ultra-high Resolution (MUR) SST Analysis fv04.1, Global, 0.01°, 2002 - present, daily. These data were provided by JPL under support from NASA MEaSUREs program.

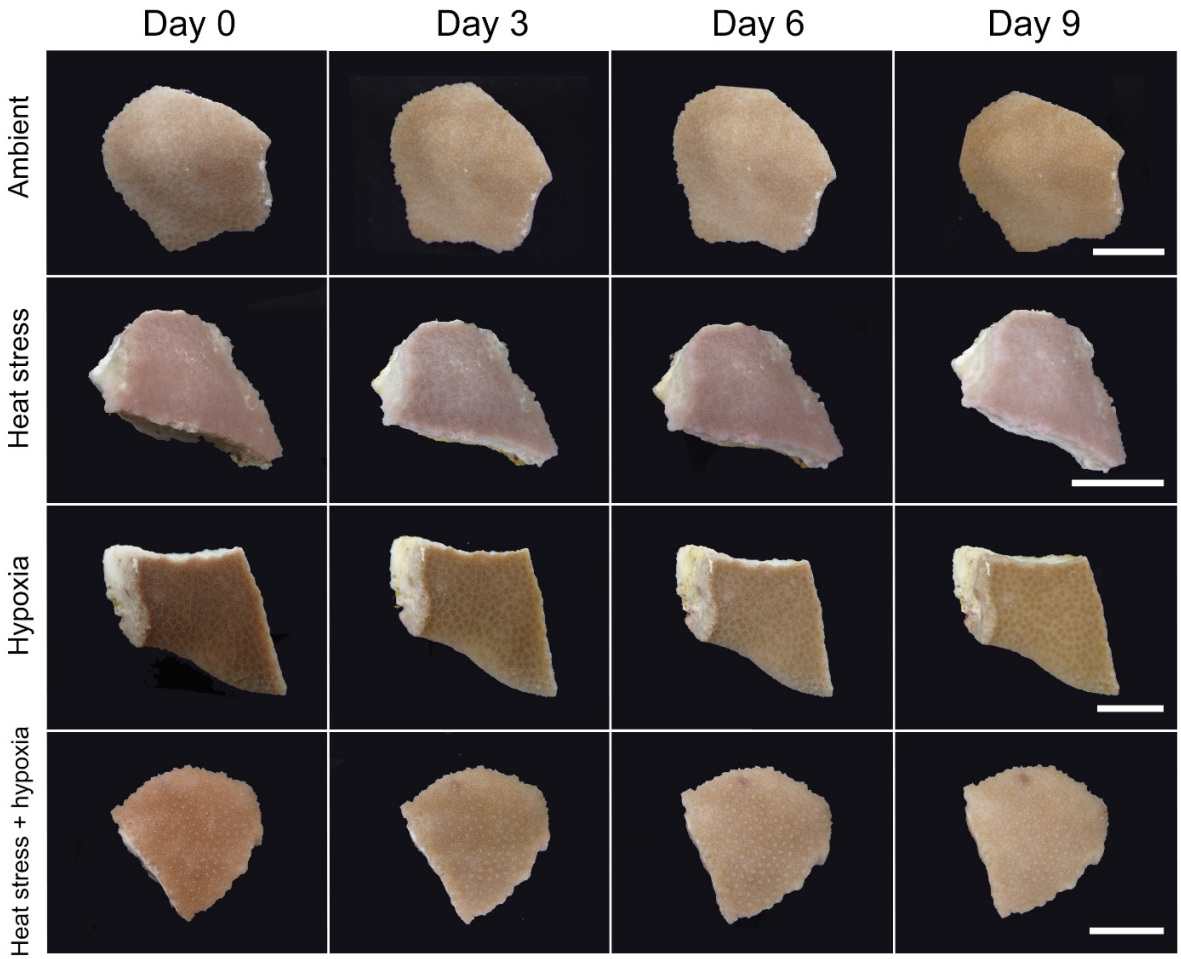

Figure S2. *P. lutea* samples from day 0 to day 9 under ambient, heat stress, hypoxia, and heat stress + hypoxia treatments. The white lines represent 1 cm scale bar.

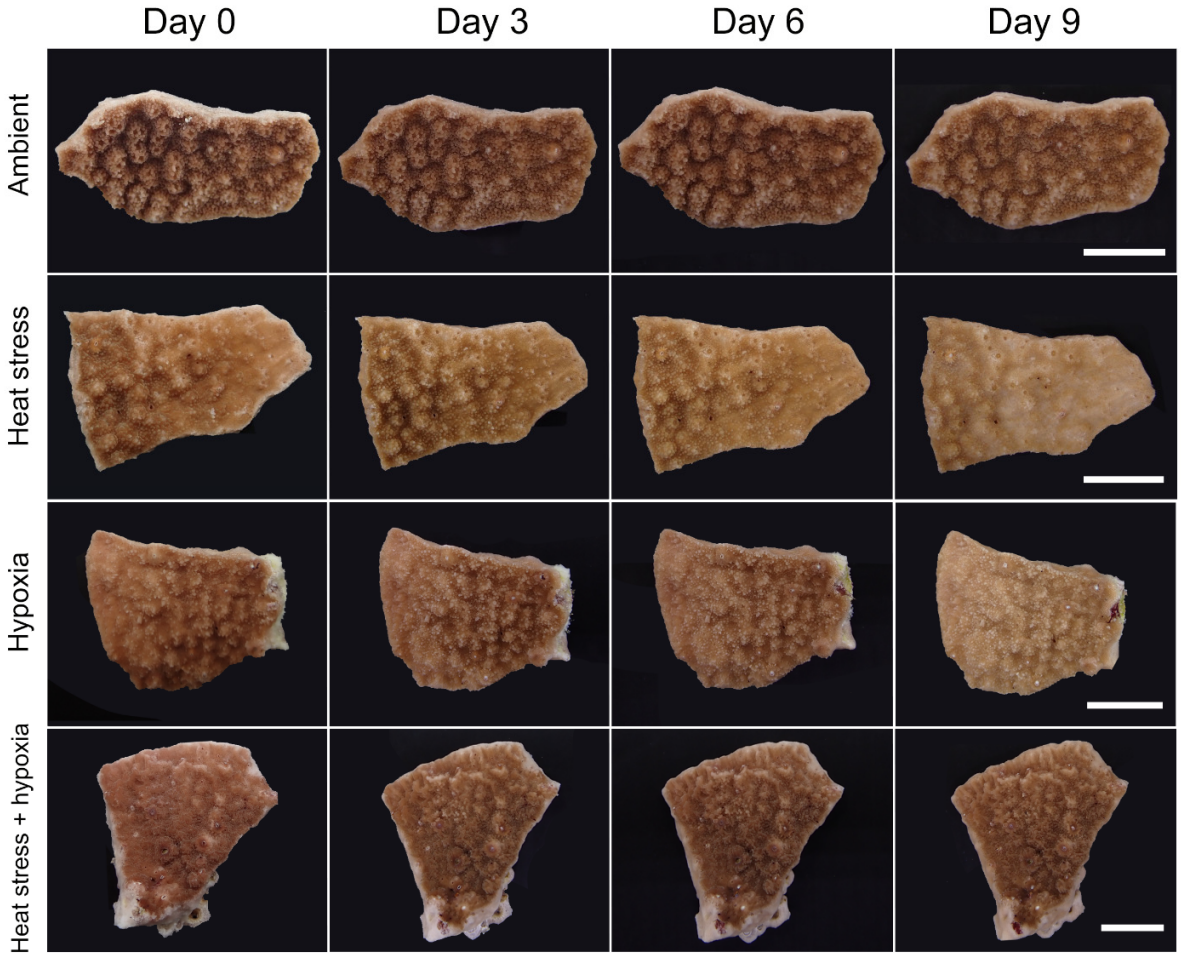

Figure S3. *M. tuberculosa* samples from day 0 to day 9 under ambient, heat stress, hypoxia, and heat stress + hypoxia treatments. The white lines represent 1 cm scale bar.

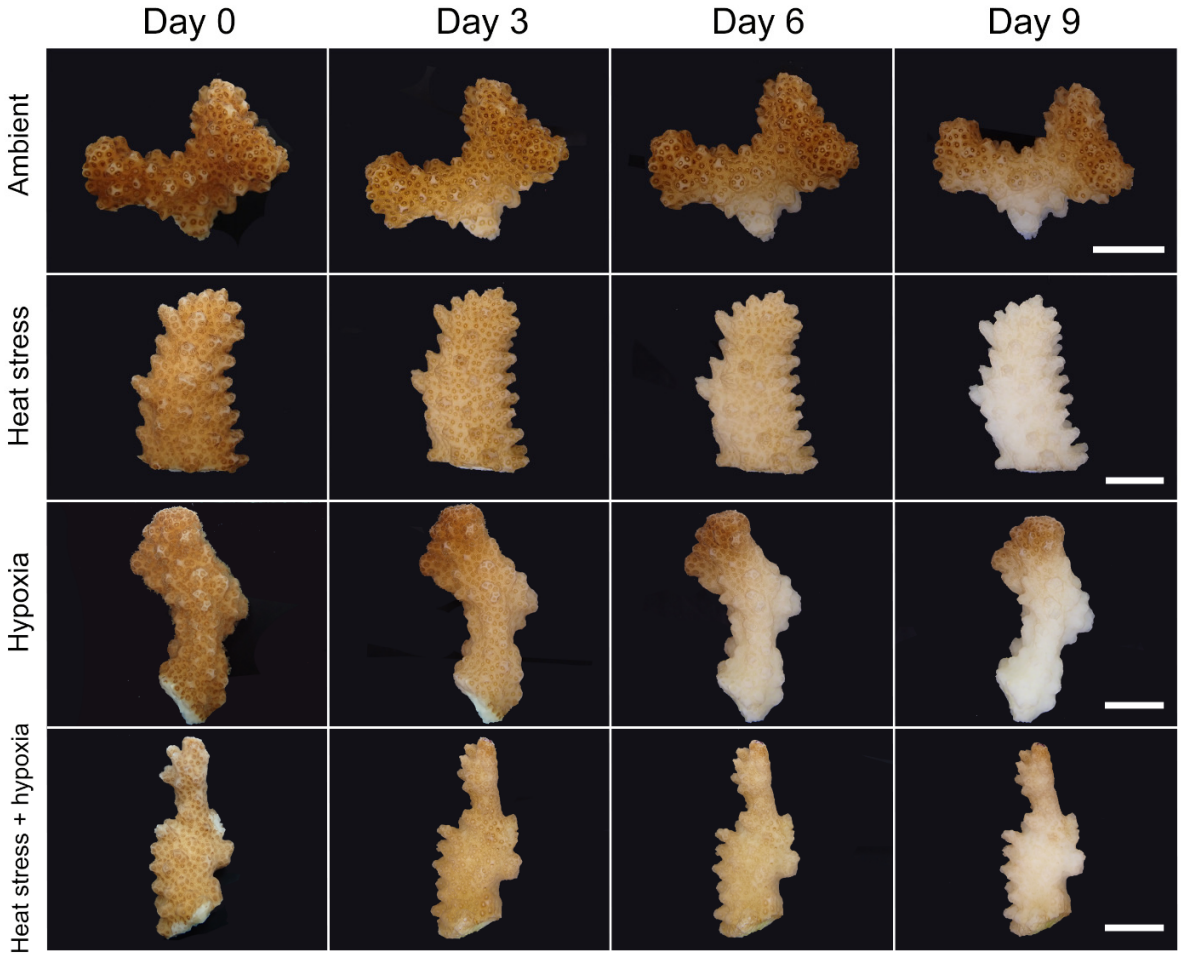

Figure S4. *P. verrucosa* samples from day 0 to day 9 under ambient, heat stress, hypoxia, and heat stress + hypoxia treatments. The white lines represent 1 cm scale bar.