Fig. S1. Mean and standard deviation across the days (S.D.) of the photosynthetically active radiation (PAR, µmol quanta m^{-2} s^{-1}) at 15 m water depth during the day, measured every 10 min for 4 days at the central island Ko Miang in the Similan Achipelago. Values obtained using the Fiber Quantum Sensor of the Diving PAM fluorometer (Walz, Germany) and calibrated against a Li-Cor Quantum sensor (Lincon, USA).

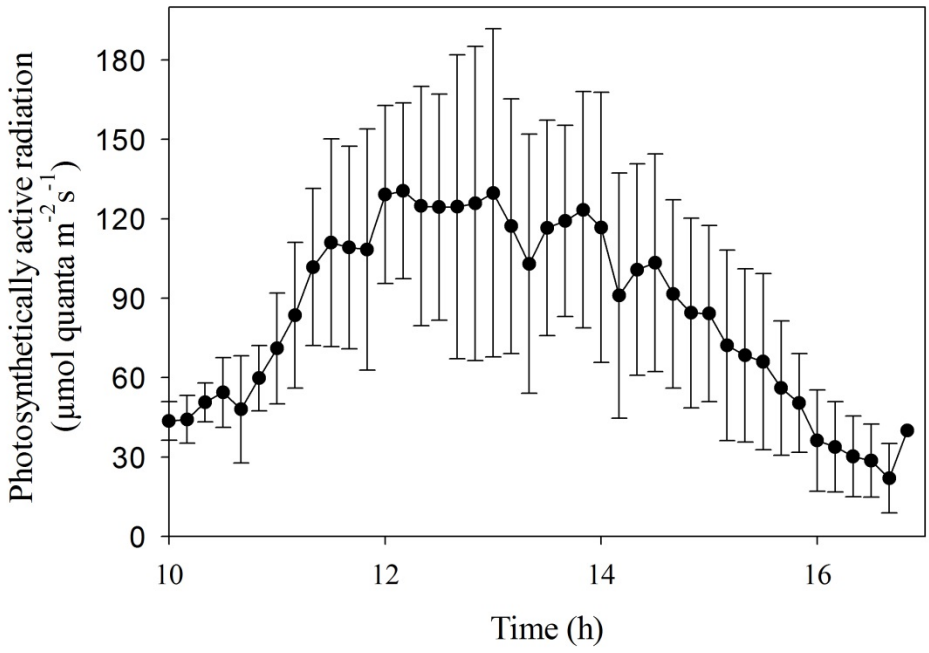

Fig. S2. Panels A-B: Monitoring temperature in the aquaria system at the Phuket Marine Biological Center (PMBC) of the West (A) and East (B) rearing tanks, from the arrival of the coral fragments until the end of the experimental period (15 Jan 2011 to the 03 Mar 2011). LAIW treatment started on 02 Feb 2011 after a 2 week acclimation period for the coral nubbins to the aquaria conditions. Experiments started in parallel on 10 Feb 2011. Panels C-D: *In situ* temperature of the West (C) and East (D) side of the central Similan Island Ko Miang (8°34`0”N, 97°37`60”E) from January to March 2011. Notice the arrival of cold temperature fronts (LAIW) on the west side of the islands.

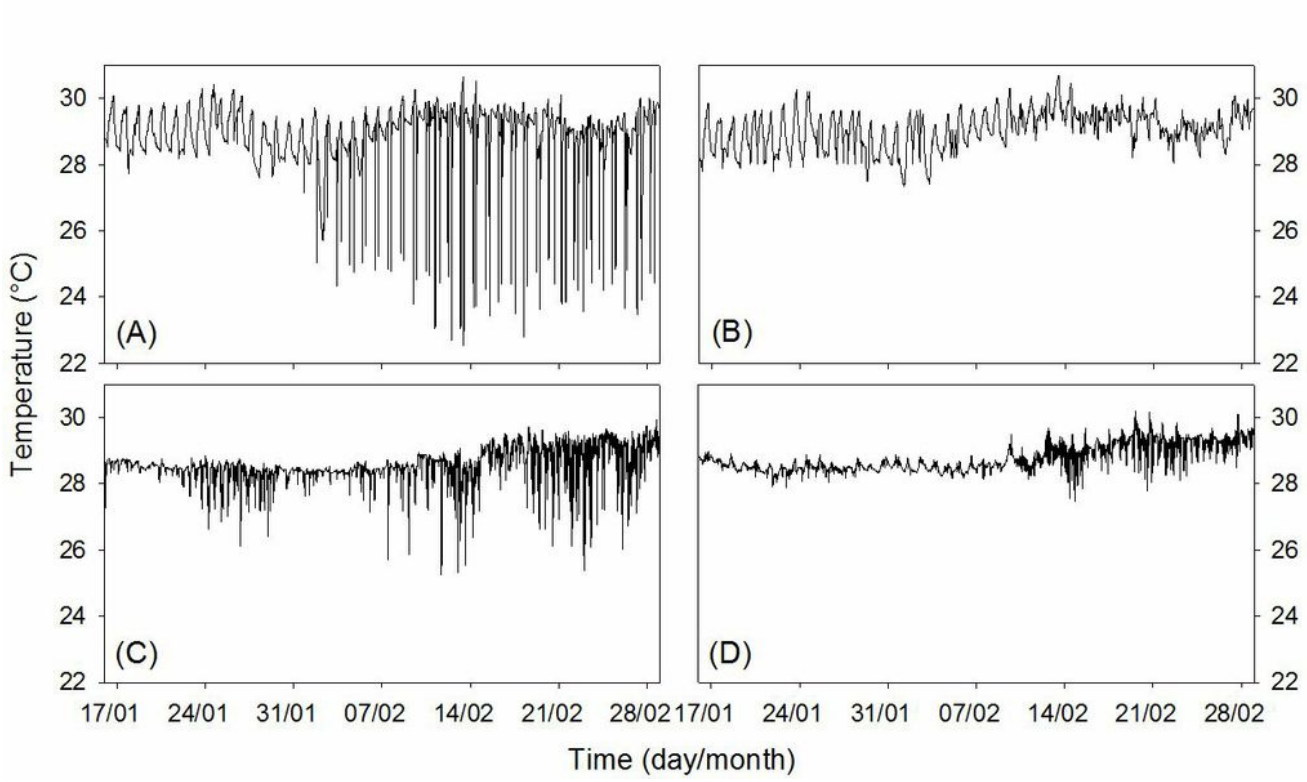

Fig. S3. Experimental design showing the arrangement of the flow-through chamber, the fiber optic lamp, the SONY HD camera, the PAM fluorometer and three *Porites lutea* nubbins in the flow-through chamber.

Fig. S4. Polyp expansion behaviour of *Porites lutea* in response to the partial LAIW-Temp. treatment (T° = 19.48 ± 0.56 °C). (A) Response of west nubbins to low temperature and flow (2 cm s^{-1}). (B) Response of west nubbins to low temperature and high flow (10 cm s^{-1}). (C) Response of east nubbins to low temperature and low flow (2 cm s^{-1}). (D) Response of east nubbins to low temperature and high flow (10 cm s^{-1}). RW: Racha West; RE: Racha East; SW: Similan West; SE: Similan East. Numbers correspond to the different colonies. In all cases *Artemia* was added to the water after 90 min. All fragments were under normal water conditions from min -20 to time 0, and changes in the water parameters started at time 0.

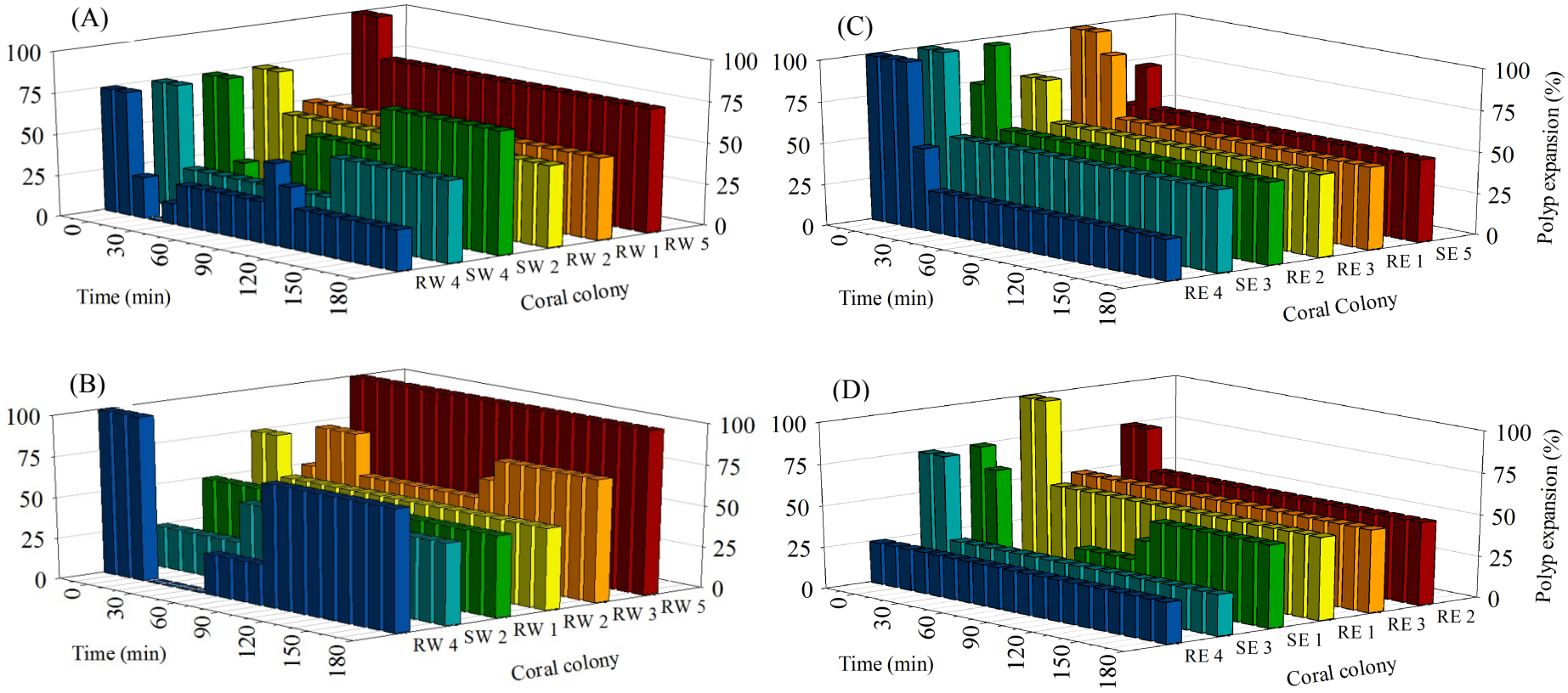

Fig.S5. Polyp expansion behaviour of *Porites lutea* in response to full LAIW-Temp. & pH treatment (T°: 19.16 ± 0.35 °C, pH: 7.82 ± 0.02). (A) Response of west nubbins to low temperature and low flow (2 cm s^{-1}). (B) Response of west nubbins to low temperature and high flow (10 cm s^{-1}). (C) Response of east nubbins to low temperature and low flow (2 cm s^{-1}). (D) Response of east nubbins to low temperature and high flow (10 cm s^{-1}). RW: Racha West; RE: Racha East; SW: Similan West; SE: Similan East. Numbers correspond to the different colonies. In all cases *Artemia* was added to the water after 90 min. All fragments were under normal water conditions from min -20 to time 0, and changes in the water parameters started at time 0.

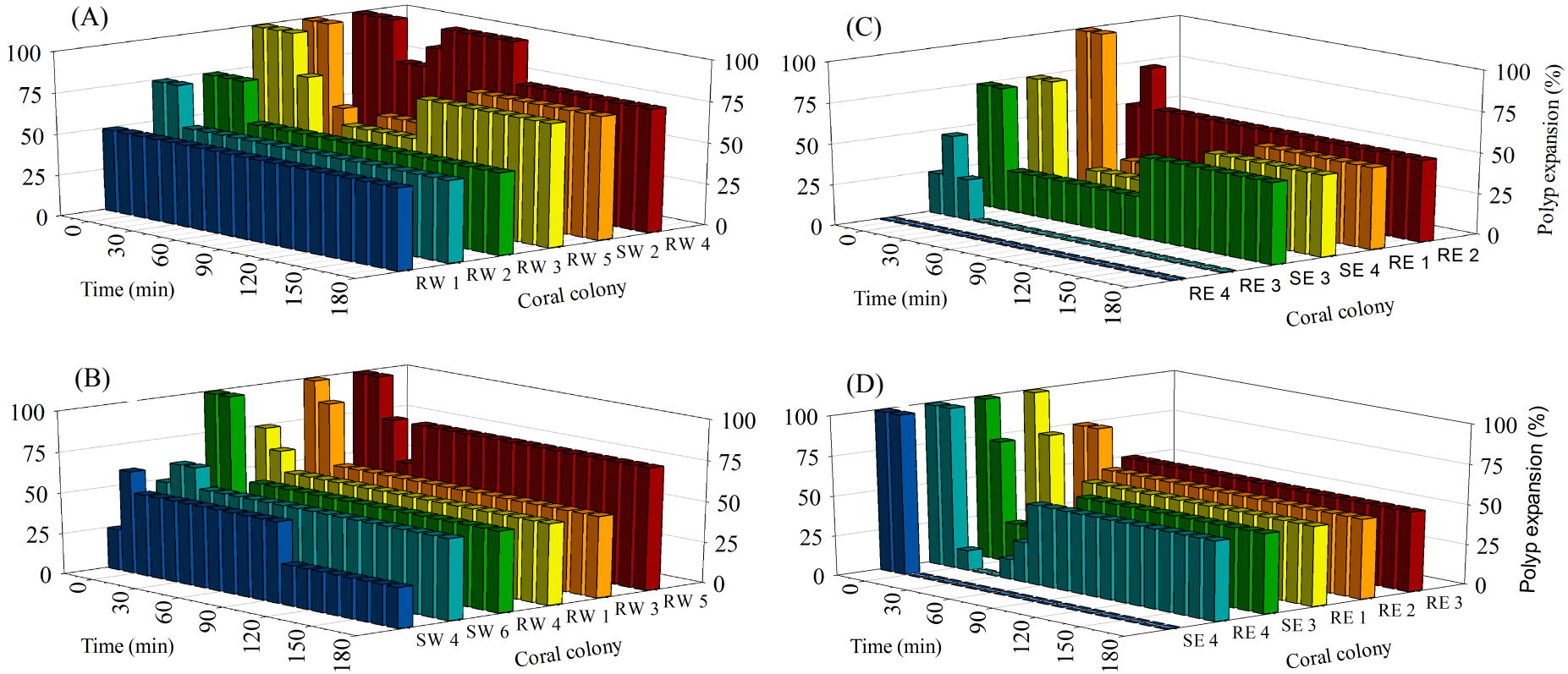

Fig. S6. Images of *Porites lutea* nubbins under Full LAIW-Temp. & pH conditions with *Artemia* nauplii present as food resource. The orange spots in the right-most image represent *Artemia* trapped in the mucus.

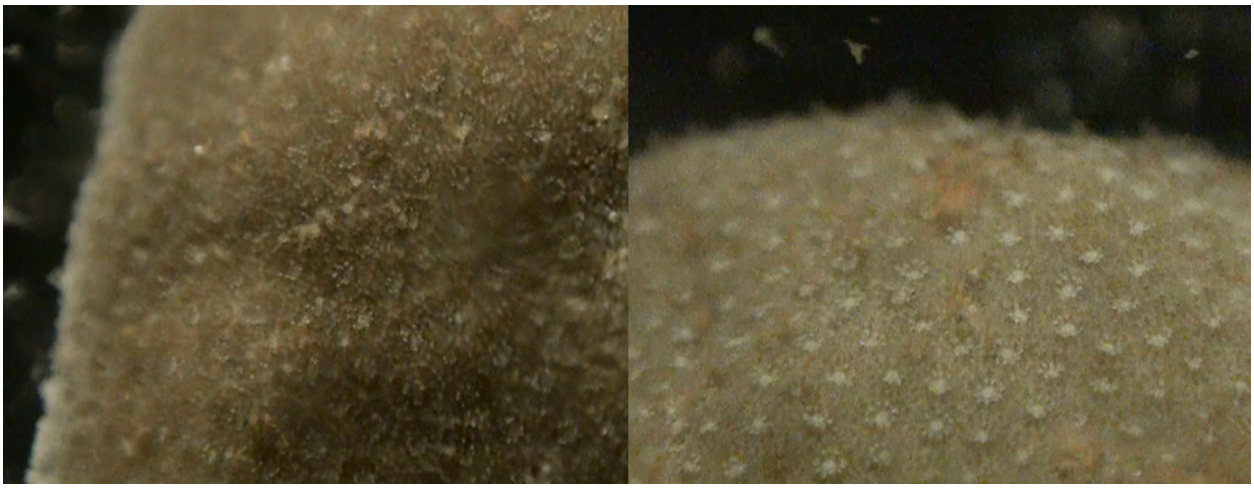

Table S1. Additional abiotic characteristics of the seawater for each experiment. Flow rate: Low = 2 cm s^{-1}; High= 10 cm s^{-1}. Values given in mean (S.D.).

Treatment	Flow rate	Fragment origin	Dissolved oxygen (µmol L^{-1})	Light (µmol quanta m^{-2} s^{-1})
Control	Low	E	236.11 (9.03)	1.34 (0.06)
		W	217.08 (10.41)	1.55 (0.07)
	High	E	227.63 (2.94)	1.42 (0.02)
		W	213.19 (0.98)	1.55 (0.35)
Partial LAIW-Temp.	Low	E	223.33 (3.54)	1.59 (0.18)
		W	217.08 (10.41)	1.4 (0.29)
	High	E	221.39 (5.89)	1.34 (0.08)
		W	218.75 (5.3)	1.55 (0.19)
Partial LAIW-pH	Low	E	222.87 (3.26)	1.3 (0.14)
		W	244.3 (1.76)	1.6 (0.14)
	High	E	235.37 (15.36)	1.4 (0.22)
		W	245.97 (2.16)	1.28 (0.1)
Full LAIW-Temp. & pH	Low	E	245.83 (5.49)	1.42 (0.09)
		W	250.41 (3.34)	1.65 (0.07)
	High	E	248.75 (6.09)	1.7 (0.16)
		W	250.41 (6.87)	1.2 (0.14)

Table S2. Diving PAM settings for measurements of maximum dark-adapted quantum yield (*Fv/Fm*).

Settings	Value
Meas-Int	4
Sat-Intensity	11
Sat-Width	0.8
Act-Int.	6
Act-Width	01:00
Al-Fact	0.9
Gain	2
Damp	2
Etr-Fac	1
FO	0
Clk-Time	00:30
CI	1
LC-Width	00:10
LC-Int.	3
Ind-Delay	00:40
Ind-Width	00:20
Dep. Offs	0
Dep. Gain	1

Table S3. General linear model (GLM) of the chamber effect on the polyp expansion behavior of *Porites lutea*.

Source of Variation	Sum of squares	DF	Mean square	F	*p*
Intercept	90.34	1	90.34	567.970	0.000
Chamber	0.50	1	0.50	3.163	0.077
Error	30.22	190	0.16		
Total	121.058	192			

Table S4. Results of ANOVA with interactions among the variables of food presence, fragment origin, treatment and flow on the polyp expansion behavior of *Porites lutea*.

Source of Variation	Sum of squares	DF	Mean square	F	*p*
Treatment	7.48	3	2.49	20.27	0.00
Food	0.89	1	0.89	7.23	0.01
Origin	0.21	1	0.21	1.72	0.19
Flow	0.13	1	0.13	1.01	0.32
Treatment × Food	0.23	3	0.08	0.62	0.61
Treatment × Origin	1.22	3	0.41	3.31	0.02
Treatment × Flow	0.16	3	0.05	0.44	0.72
Food × Origin	0.02	1	0.02	0.13	0.72
Food × Flow	0.02	1	0.02	0.13	0.72
Origin × Flow	0.02	1	0.02	0.14	0.71
Treatment × Food × Origin	0.11	3	0.04	0.29	0.83
Treatment × Food × Flow	0.10	3	0.03	0.27	0.85
Treatment × Origin × Flow	0.44	3	0.15	1.19	0.31
Food × Origin × Flow	0.00	1	0.00	0.00	0.96
Treatment × Food × Origin × Flow	0.02	3	0.01	0.06	0.98

Table S5. Results of repeated measures ANOVA with interactions among the variables of fragment origin, temperature, pH and flow on the maximum quantum yield of photosystem II (*Fv/Fm*) of *Symbiodinium* residing within *Porites lutea*.

Source of Variation	Sum of squares	DF	Mean square	F	*p*
Origin	0.79	1	0.79	6.00	0.02
Flow	0.01	1	0.01	0.11	0.74
pH	0.07	1	0.07	0.50	0.48
Temperature	0.09	1	0.09	0.67	0.42
Origin × Flow	0.07	1	0.07	0.54	0.46
Origin × pH	0.01	1	0.01	0.09	0.76
Origin × Temperature	0.96	1	0.96	7.27	0.01
Flow × pH	0.04	1	0.04	0.29	0.59
Flow × Temperature	0.10	1	0.10	0.74	0.39
pH × Temperature	0.01	1	0.01	0.08	0.78
Origin × Flow × pH	0.03	1	0.03	0.26	0.61
Origin × Flow × Temperature	0.00	1	0.00	0.01	0.94
Origin × pH × Temperature	0.00	1	0.00	0.00	0.97
Flow × pH × Temperature	0.00	1	0.00	0.00	0.97
Origin × Flow × pH × Temperature	0.02	1	0.02	0.12	0.73

Table S6. General linear model (GLM) of the island effect (Racha vs. Miang Island) and the treatment on the expansion behavior of *Porites lutea*

Source of variation	Sum of squares	DF	Mean square	F	*p*
Intercept	72.56	1	72.56	584.63	0.00
Treatment	7.19	3	2.40	19.31	0.00
Island	0.08	1	0.08	0.61	0.44
Treatment × Island	0.32	3	0.11	0.85	0.47
Error	22.84	184	0.12		
Total	121.06	192			

Table S7. Tukey's letter group for the effect of temperature (control ± S.D. = 29.11 ± 0.62 °C; LAIW Temp. = 19.48 ± 0.56 °C) and nubbin origin (E = east, W = west) on the *Fv/Fm* of *Symbiodinium* within *Porites lutea*.

		Groups	
	N	A	B
LAIW temperature E	24	0.472	
Control W	24	0.501	
Control E	24	0.505	
LAIW temperature W	24		0.562