

Supplementary Materials

Deep Heat: A Comparison of Water Temperature, Anemone Bleaching, Anemonefish Density and Reproduction between Shallow and Mesophotic Reefs

Anne Haguenauer ¹, Frédéric Zuberer ¹, Gilles Siu ¹, Daphne Cortese ^{1,2}, Ricardo Beldade ^{3,*†} and Suzanne C. Mills ^{1‡}

¹ USR 3278 CRIOBE, PSL Université Paris: EPHE-UPVD-CNRS, BP 1013, Papetoai, 98729 Moorea, French Polynesia; anne.haguenauer@criobe.pf (A.H.); frederic.zuberer@criobe.pf (F.Z.); gilles.siu@criobe.pf (G.S.); daph.cortese@gmail.com (D.C.); suzanne.mills@univ-perp.fr (S.C.M.)

² Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow, Glasgow, UK

³ Estación Costera de Investigaciones Marinas, Pontificia Universidad Católica de Chile, FAC Ciencias Biol, 8331150, Santiago, Chile

* Correspondence: rbeldade@bio.puc.cl

† Millenium Nucleus for the Ecology and Conservation of Temperate Mesophotic Reef Ecosystems (NUTME), Chile.

‡ Laboratoire d'Excellence "CORAIL", France.

Table S1. Clownfish transects.

Island	Transect length (m)	Transect width (m)	Transects area	Transects area m2	Clownfish nbr	Clown density 100,000 m2	x diff by depth
Tahiti meso	6000	50	300,000				
	1000	100	100,000	400,000	3	0.075	
Tahiti shallow	6000	50	300,000				
	1000	100	100,000	400,000	76	1.90	25.33
Moorea meso	100	10	1000				
	200	100	20,000				
	150	30	4500				
	200	30	6000	31,500	6	1.90	
Moorea shallow	400	10	4000				
			16,000				
			2,800,000	2,800,000	500	1.79	0.94
Tikehau meso	800	20	16,000				
				16,000	2	0.0125	
Tikehau shallow lagon	800	20	16,000				
	50	5	750				
				16,750	2	1.19	95.5
Rangiroa meso	1000	50	50,000				
				50,000	0	0	

Rangiroa <i>shallow</i>	1000	50	50,000	55,000	2	0.36
	100	50	5000			
Fakarava <i>meso</i>	1000	50	50,000	55,000	0	0
	100	50	5000			
Fakarava <i>shallow</i>	1000	50	50,000	55,000	2	0.36
	100	50	5000			
Manihi <i>meso</i>	1000	50	50,000	55,000	0	0
	100	50	5000			
Manihi <i>shallow</i>	1000	50	50,000	55,000	0	0.00
	100	50	5000			
Tubuai <i>meso</i>	100	20	2000	9000	0	0
	100	20	2000			
	100	50	5000			
Tubuai <i>shallow</i>	500	5	2500	7500	0	0.00
	100	50	5000			

Table S2. Anemone bleaching.

	Date	Mesophotic		Shallow	
		Nbr anemones bleached	total Nbr anemones	% of anemone bleached	% of anemones bleached
Moorea	2019/8/9	6	18	33.33	53
	2020/2/7	0	18	0.00	0
	2020/6/18	0	18	0.00	26
	2020/7/30	0	18	0.00	26
	<i>Island mean</i>			8.3	26
Tikehau	2018/2/25	not documented			
	2021/2/17	not documented			
	<i>Island mean</i>				
Tahiti	2016/3/12	0	2	0.00	52
	2021/5/3	0	2	0.00	0
	<i>Island mean</i>			0	26
Total mean				5.6	26

Table S3. Clownfish reproduction.

Mesophotic:						Shallow:	
	Date visited	% of anemonefish couples with eggs	Date eggs laid	Date nearest Full moon	Date in relation to Full moon	photo	% of anemonefish couples with eggs
Moorea	2019/8/9	0		2019/8/15	6 days before full moon		17
	2020/2/7	0		2020/2/8	1 day before full moon		35
	2020/6/17	50	2020/6/11	2020/6/5	6 days after full moon	Figure S1	25
	2020/7/29	50	2020/7/26	2020/8/3	8 days before full moon	Figure S2	11
	<i>Island mean</i>	25					22
Tikehau	2018/2/25	0		2018/3/1	4 days before full moon		26
	2021/2/17	100	2021/2/11	2021/1/28	14 days after full moon	Figure S3a,b	9
	<i>Island mean</i>	50					17
Tahiti	2016/3/12	0		2016/3/23	11 days before full moon		6
	2021/5/3	0		2021/4/26	7 days before full moon		14
	<i>Island mean</i>	0					10
Total mean		25					18



Figure S1. Photograph of the nest at Moorea taken on 17th June 2020 at 48 m in the first large group of 16 anemones with eggs that had been laid 6 days prior on 11th June 2020.



Figure S2. Photograph of the nest at Moorea in the second group of two anemones at 50 m taken on the 29th July 2020 laid by the second anemonefish pair with eggs that had been laid 3 days prior on the 26th July 2020.





Figure S3. Photographs of the nest at Tikehau taken on 17th February 2021 at 55 m with eggs that had been laid 6 days prior on 11th February 2021.