

Effects of physical environmental conditions on the patch dynamics of *Dictyota pulchella* and *Lobophora variegata* on Caribbean coral reefs

Henk Renken¹, Peter J. Mumby^{1,2,*}, Iakovos Matsikis¹, Helen J. Edwards¹

¹Marine Spatial Ecology Lab, School of BioSciences, University of Exeter, Prince of Wales Road, Exeter EX4 4PS, UK

²Present address: School of Biological Sciences, Goddard Building, St. Lucia Campus, University of Queensland, Brisbane, Queensland 4072, Australia

*Corresponding author. Email: p.j.mumby@ex.ac.uk

Marine Ecology Progress Series 403: 63–74 (2010)

Supplement 1. *Dictyota pulchella* and *Lobophora variegata*. Matrices for the period May 2005 until January 2006 on the exposed and sheltered sides of Glovers Reef Atoll, Belize. Matrices are given for 4 different scenarios: (1) matrices in which both fragmentation and fusion events are incorporated explicitly into the matrices, (2) matrices where only fragmentation is incorporated, (3) matrices where only fusion is incorporated, and (4) matrices not including fragmentation and fusion events. Blank matrices are not constructed due to a lack of data

Table S1. *Dictyota pulchella*. Matrices on the exposed side, including fragmentation and fusion events

May									October								
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I	0.17	0.65	---	---	---	0.08	---		I	0.40	0.26	0.06	0.03	---	0.06	---
	II	0.49	0.32	0.15	0.03	---	---	---		II	0.31	0.26	0.10	0.10	0.05	---	---
	III	0.29	0.55	0.32	0.11	0.15	---	---		III	0.12	0.21	0.26	0.05	0.08	0.17	0.11
	IV	0.10	0.16	0.46	0.33	0.04	0.08	---		IV	0.02	0.11	0.48	0.48	0.39	0.17	0.52
	V	---	---	0.07	0.53	0.59	0.23	---		V	---	0.11	0.06	0.15	0.38	0.39	0.51
	VI	---	---	---	---	0.22	0.38	0.29		VI	---	---	---	0.26	0.28	0.33	0.41
	VII	---	---	---	---	---	0.23	0.71		VII	---	---	---	---	0.03	---	0.23
June									November								
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.50	0.22	0.10	0.02	---	---	---		I	0.41	0.07	0.04	0.01	---	---	---
	II	0.40	0.35	0.20	0.11	0.02	---	---		II	0.15	0.37	0.07	0.04	0.02	0.03	---
	III	0.20	0.32	0.31	0.24	0.02	---	---		III	0.26	0.26	0.14	0.06	0.04	0.05	---
	IV	0.10	0.05	0.22	0.33	0.15	---	---		IV	0.15	0.19	0.18	0.29	0.23	0.08	0.11
	V	---	0.03	0.14	0.20	0.51	0.08	---		V	---	0.23	0.33	0.31	0.27	0.59	0.11
	VI	---	---	0.04	0.02	0.17	0.08	0.13		VI	---	---	0.04	0.28	0.31	0.32	0.11
	VII	---	---	---	0.08	0.09	0.85	0.96		VII	---	---	---	0.05	0.31	0.05	0.98
July									December								
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.55	0.22	0.05	0.03	---	---	---		I	0.60	0.47	0.52	0.21	0.17	0.13	0.17
	II	0.35	0.31	0.18	0.03	---	---	---		II	0.07	0.21	0.24	0.47	0.31	0.37	0.33
	III	0.10	0.44	0.43	0.11	---	---	---		III	---	---	0.03	0.13	0.38	0.33	0.33
	IV	---	---	0.18	0.54	0.18	0.09	0.11		IV	---	---	---	0.06	0.11	0.13	---
	V	---	---	0.11	0.26	0.69	0.18	---		V	---	---	---	---	0.01	0.03	0.17
	VI	---	---	---	0.03	0.10	0.55	0.21		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	0.03	0.18	0.68		VII	---	---	---	---	---	---	---

Table S2. *Dictyota pulchella*. Matrices on the exposed side, including fragmentation events

		May									October						
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I	0.17	0.06	---	---	---	0.07	---		I	0.41	0.29	0.07	0.03	---	---	---
	II	0.49	0.32	0.15	0.03	---	---	---		II	0.32	0.18	0.11	0.11	0.05	---	---
	III	0.29	0.55	0.32	0.11	0.15	0.07	---		III	0.12	0.24	0.30	0.06	0.08	0.11	0.11
	IV	0.10	0.16	0.46	0.33	0.04	0.27	---		IV	0.02	0.12	0.52	0.44	0.42	0.17	0.43
	V	---	---	0.07	0.53	0.59	0.20	---		V	---	0.12	0.07	0.17	0.36	0.44	0.59
	VI	---	---	---	---	0.22	0.33	0.29		VI	---	---	---	0.19	0.17	0.33	0.41
	VII	---	---	---	---	---	0.20	0.71		VII	---	---	---	---	0.03	---	0.19

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.50	0.22	0.10	0.02	---	---	---		I	0.48	0.09	0.05	0.02	---	---	---
	II	0.40	0.36	0.20	0.12	0.03	---	---		II	0.18	0.43	0.10	0.05	0.02	0.03	---
	III	0.20	0.33	0.33	0.26	0.03	---	---		III	0.30	0.30	0.20	0.08	0.04	0.05	---
	IV	0.10	0.06	0.22	0.35	0.16	---	---		IV	0.17	0.22	0.20	0.31	0.24	0.08	---
	V	---	0.03	0.10	0.23	0.58	0.09	---		V	---	0.17	0.35	0.39	0.29	0.62	0.11
	VI	---	---	0.04	0.02	0.19	0.09	0.13		VI	---	---	0.05	0.15	0.24	0.30	0.11
	VII	---	---	---	0.05	0.05	0.82	0.88		VII	---	---	---	0.02	0.16	0.05	0.78

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.55	0.22	0.05	0.03	---	---	---		I	0.60	0.47	0.52	0.21	0.18	0.19	0.42
	II	0.35	0.31	0.18	0.03	---	---	---		II	0.07	0.21	0.24	0.47	0.31	0.39	0.89
	III	0.10	0.44	0.43	0.17	0.07	---	---		III	---	---	0.03	0.13	0.39	0.36	0.79
	IV	---	---	0.18	0.50	0.28	0.17	0.09		IV	---	---	---	0.06	0.11	0.12	0.32
	V	---	---	0.11	0.28	0.67	0.25	0.14		V	---	---	---	---	0.01	0.03	0.16
	VI	---	---	---	0.03	0.09	0.55	0.28		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	0.02	0.17	0.64		VII	---	---	---	---	---	---	---

Table S3. *Dictyota pulchella*. Matrices on the exposed side, including fusion events

		May									October						
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I									I	0.40	0.26	0.03	0.03	---	---	---
	II									II	0.31	0.26	0.03	0.11	0.03	---	---
	III									III	0.12	0.21	0.24	0.05	0.03	0.06	0.05
	IV									IV	0.02	0.11	0.52	0.47	0.36	0.18	0.10
	V									V		0.11	0.07	0.16	0.37	0.41	0.33
	VI									VI	---	---	---	0.21	0.31	0.35	0.24
	VII									VII	---	---	---	---	0.03	---	0.33

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.50	0.22	0.10	0.02	---	---	---		I	0.41	0.07	0.04	0.01	---	---	---
	II	0.40	0.35	0.20	0.09	---	---	---		II	0.15	0.37	0.07	0.04	0.02	0.03	---
	III	0.20	0.32	0.32	0.21	---	---	---		III	0.26	0.26	0.14	0.07	0.04	0.03	---
	IV	0.10	0.05	0.22	0.33	0.15	---	---		IV	0.15	0.19	0.18	0.24	0.24	0.03	---
	V	---	0.03	0.14	0.23	0.53	0.08	---		V	---	0.23	0.37	0.32	0.25	0.47	---
	VI	---	---	0.04	0.02	0.18	0.08	0.13		VI	---	---	0.04	0.28	0.32	0.36	0.13
	VII	---	---	---	0.09	0.09	0.86	0.96		VII	---	---	---	0.05	0.32	0.06	1.08

Table S4. *Dictyota pulchella*. Matrices on the exposed side, fragmentation and fusion not included

		May									October						
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I	0.17	0.65	---	---	---	0.08	---		I	0.41	0.29	0.04	0.03	---	---	---
	II	0.49	0.32	0.15	0.03	---	---	---		II	0.32	0.18	0.04	0.11	0.03	---	---
	III	0.29	0.55	0.32	0.11	0.15	---	---		III	0.12	0.24	0.28	0.06	0.03	0.12	---
	IV	0.10	0.16	0.46	0.33	0.04	0.08	---		IV	0.02	0.12	0.56	0.44	0.38	0.18	---
	V	---	---	0.07	0.53	0.59	0.23	---		V	---	0.12	0.08	0.17	0.35	0.35	0.31
	VI	---	---	---	---	0.22	0.38	0.29		VI	---	---	---	0.19	0.18	0.35	0.44
	VII	---	---	---	---	---	0.23	0.71		VII	---	---	---	---	0.03	---	0.25

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.50	0.22	0.10	0.02	---	---	---		I	0.48	0.09	0.05	0.02	---	---	---
	II	0.40	0.36	0.20	0.10	---	---	---		II	0.17	0.43	0.10	0.05	0.02	0.03	---
	III	0.20	0.33	0.33	0.24	---	---	---		III	0.30	0.30	0.20	0.08	0.04	0.03	---
	IV	0.10	0.06	0.22	0.32	0.17	---	---		IV	0.17	0.22	0.20	0.28	0.24	0.03	---
	V	---	0.03	0.10	0.24	0.58	0.09	---		V	---	0.17	0.35	0.39	0.29	0.50	---
	VI	---	---	0.04	0.02	0.19	0.09	0.13		VI	---	---	0.05	0.15	0.24	0.34	0.13
	VII	---	---	---	0.05	0.06	0.82	0.88		VII	---	---	---	0.02	0.16	0.06	0.88

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.55	0.22	0.05	0.03	---	---	---		I	0.60	0.47	0.52	0.21	0.17	0.13	0.17
	II	0.35	0.31	0.18	0.03	---	---	---		II	0.07	0.21	0.24	0.47	0.31	0.37	0.33
	III	0.10	0.44	0.43	0.11	---	---	---		III	---	---	0.03	0.13	0.38	0.33	0.33
	IV	---	---	0.18	0.54	0.18	0.09	0.11		IV	---	---	---	0.06	0.11	0.13	---
	V	---	---	0.11	0.26	0.69	0.18	---		V	---	---	---	---	0.01	0.03	0.17
	VI	---	---	---	0.03	0.10	0.55	0.21		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	0.03	0.18	0.68		VII	---	---	---	---	---	---	---

Table S5. *Dictyota pulchella*. Matrices on the sheltered side, including fragmentation and fusion events

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	1.61	0.44	0.33	---	---	---	---		I	0.60	0.13	---	---	---	---	---
	II	0.25	0.39	0.44	---	---	---	---		II	0.10	0.63	0.53	0.36	---	---	---
	III	0.11	0.22	0.17	---	---	---	---		III	0.20	0.25	0.18	0.36	---	---	---
	IV	---	---	---	---	---	---	---		IV	---	0.13	0.24	0.21	0.67	---	---
	V	---	---	---	---	---	---	---		V	---	---	0.06	0.07	0.33	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.60	0.17	0.17	---	---	---	---		I	0.79	0.40	0.24	0.23	0.17	---	---
	II	0.26	0.83	0.33	---	---	---	---		II	0.07	0.17	0.35	0.41	0.17	---	---
	III	0.21	0.33	0.08	---	---	---	---		III	---	0.05	0.22	0.27	0.33	---	---
	IV	0.05	0.08	0.50	---	---	---	---		IV	---	---	0.05	0.09	0.33	---	---
	V	---	---	---	---	---	---	---		V	---	---	---	---	---	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

Table S6. *Dictyota pulchella*. Matrices on the sheltered side, including fragmentation events

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I									I	0.60	0.13	---	0.07	---	---	---
	II									II	0.10	0.63	0.53	0.40	0.25	---	---
	III									III	0.20	0.25	0.18	0.33	0.13	---	---
	IV									IV	---	0.13	0.24	0.20	0.63	---	---
	V									V	---	---	0.06	0.67	0.25	---	---
	VI									VI	---	---	---	---	---	---	---
	VII									VII	---	---	---	---	---	---	---

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I									I							
	II									II							
	III									III							
	IV									IV							
	V									V							
	VI									VI							
	VII									VII							

Table S7. *Lobophora variegata*. Matrices on the exposed side, including fragmentation and fusion events

		May									October						
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I	0.72	0.08	0.03	0.05	---	---	---		I	0.32	0.18	0.13	0.03	---	---	---
	II	0.56	0.33	0.07	0.05	---	---	---		II	0.21	0.16	0.18	0.13	---	---	---
	III	0.11	0.46	0.40	0.24	---	---	---		III	0.05	0.34	0.29	0.23	0.22	---	---
	IV	---	0.42	0.40	0.43	---	---	---		IV	0.15	0.17	0.51	0.55	0.56	---	---
	V	---	---	0.03	0.14	0.71	---	---		V	---	0.07	0.09	0.15	0.22	0.50	---
	VI	---	---	---	0.05	0.18	---	---		VI	---	---	---	---	---	0.50	---
	VII	---	---	---	---	0.14	---	---		VII	---	---	---	---	---	---	---

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.79	0.33	0.23	0.04	0.08	0.33	---		I	0.45	0.09	0.20	0.08	---	---	---
	II	0.26	0.39	0.19	0.18	---	0.33	---		II	0.20	0.30	0.11	0.06	---	---	---
	III	0.11	0.22	0.31	0.32	0.23	0.33	---		III	0.05	0.39	0.38	0.27	---	---	---
	IV	0.05	0.06	0.12	0.39	0.38	0.67	0.50		IV	0.10	0.21	0.37	0.55	0.42	---	---
	V	---	---	---	---	0.46	0.33	0.50		V	---	0.04	0.03	0.18	0.67	0.50	---
	VI	---	---	---	---	---	0.33	---		VI	---	---	---	---	---	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.16	---	---	0.05	0.33	---	---		I	0.24	---	---	0.02	---	---	---
	II	0.19	0.43	0.22	0.05	---	---	---		II	0.19	0.06	0.12	0.02	---	---	---
	III	0.34	0.35	0.37	0.23	0.50	---	---		III	0.05	0.26	0.18	0.08	0.06	---	---
	IV	0.09	0.26	0.37	0.54	0.33	---	---		IV	---	0.20	0.38	0.54	0.06	---	---
	V	---	---	---	0.22	0.67	---	---		V	---	---	0.16	0.47	0.72	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	0.14	0.02	0.25	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	0.10	0.54	---

Table S8. *Lobophora variegata*. Matrices on the exposed side, including fragmentation events

		May									October							
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII	
	I									I	0.38	0.21	0.13	0.03	---	---	---	
	II									II	0.25	0.18	0.18	0.13	---	---	---	
	III									III	0.06	0.39	0.25	0.23	0.22	---	---	
	IV									IV	0.13	0.15	0.43	0.55	0.56	---	---	
	V									V	---	0.03	0.05	0.15	0.22	0.50	---	
	VI									VI	---	---	---	---	---	0.50	---	
	VII									VII	---	---	---	---	---	---	---	---
		June									November							
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII	
	I	0.79	0.35	0.23	0.04	0.08	0.33	---		I	0.53	0.10	0.20	0.08	---	---	---	
	II	0.26	0.41	0.19	0.18	---	0.33	---		II	0.24	0.33	0.11	0.06	---	---	---	
	III	0.11	0.24	0.31	0.32	0.23	0.33	---		III	0.06	0.38	0.34	0.26	---	---	---	
	IV	0.05	0.06	0.12	0.39	0.38	0.67	0.50		IV	0.12	0.19	0.37	0.48	0.42	---	---	
	V	---	---	---	---	0.46	0.33	0.50		V	---	0.05	0.03	0.18	0.67	0.50	---	
	VI	---	---	---	---	---	0.33	---		VI	---	---	---	---	---	---	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---	---
		July									December							
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII	
	I	0.16	---	---	0.05	0.33	---	---		I	0.31	---	---	0.03	---	---	---	
	II	0.19	0.48	0.22	0.05	---	---	---		II	0.25	0.08	0.14	0.03	---	---	---	
	III	0.35	0.38	0.37	0.24	0.50	---	---		III	0.06	0.42	0.21	0.10	0.05	---	---	
	IV	0.10	0.29	0.33	0.52	0.33	---	---		IV	---	0.25	0.45	0.60	0.05	---	---	
	V	---	---	---	0.14	0.67	---	---		V	---	---	0.14	0.23	0.67	---	---	
	VI	---	---	---	---	---	---	---		VI	---	---	0.07	0.03	0.17	0.50	---	
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	0.06	0.50	---	

Table S9. *Lobophora variegata*. Matrices on the exposed side, including fusion events

		May									October						
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I									I	0.32	0.16	0.10	0.03	---	---	---
	II									II	0.21	0.16	0.18	0.08	---	---	---
	III									III	0.05	0.34	0.27	0.18	0.11	---	---
	IV									IV	0.19	0.17	0.52	0.60	0.67	---	---
	V									V	---	0.07	0.09	0.16	0.22	0.50	---
	VI									VI	---	---	---	---	---	0.50	---
	VII									VII	---	---	---	---	---	---	---
		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.79	0.33	0.23	0.04	---	---	---		I	0.45	0.09	0.09	0.02	---	---	---
	II	0.26	0.39	0.19	0.18	---	---	---		II	0.20	0.30	0.12	0.04	---	---	---
	III	0.11	0.22	0.31	0.32	0.25	---	---		III	0.05	0.39	0.43	0.23	---	---	---
	IV	0.05	0.06	0.12	0.39	0.25	---	---		IV	0.10	0.21	0.36	0.57	0.36	---	---
	V	---	---	---	---	0.50	0.50	---		V	---	0.04	0.03	0.19	0.64	0.50	---
	VI	---	---	---	---	---	0.50	---		VI	---	---	---	---	---	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---
		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.16	---	---	0.05	---	---	---		I	0.24	---	---	0.02	---	---	---
	II	0.19	0.43	0.22	0.05	---	---	---		II	0.19	0.05	0.06	0.02	---	---	---
	III	0.34	0.35	0.37	0.23	---	---	---		III	0.05	0.26	0.18	0.08	0.06	---	---
	IV	0.09	0.26	0.37	0.54	0.50	---	---		IV	---	0.20	0.38	0.54	0.06	---	---
	V	---	---	---	0.22	0.50	---	---		V	---	---	0.16	0.47	0.72	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	0.14	0.02	0.25	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	0.10	0.54	---

Table S10. *Lobophora variegata*. Matrices on the exposed side, fragmentation and fusion not included

		May									October						
J u n e		I	II	III	IV	V	VI	VII	N o v e m b e r		I	II	III	IV	V	VI	VII
	I	0.76	0.08	0.04	0.05	---	---	---		I	0.38	0.21	0.10	0.03	---	---	---
	II	0.59	0.33	0.07	0.05	---	---	---		II	0.25	0.18	0.18	0.08	---	---	---
	III	0.12	0.42	0.43	0.25	---	---	---		III	0.06	0.39	0.23	0.19	0.22	---	---
	IV	---	0.42	0.43	0.45	---	---	---		IV	0.13	0.15	0.44	0.54	0.56	---	---
	V	---	---	0.04	0.15	0.71	---	---		V	---	0.03	0.05	0.16	0.22	0.50	---
	VI	---	---	---	0.05	0.14	---	---		VI	---	---	---	---	---	0.50	---
	VII	---	---	---	---	0.14	---	---		VII	---	---	---	---	---	---	---
		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.79	0.35	0.23	0.04	---	---	---		I	0.53	0.10	0.09	0.04	---	---	---
	II	0.26	0.41	0.19	0.18	---	---	---		II	0.24	0.33	0.12	0.02	---	---	---
	III	0.11	0.24	0.31	0.32	0.25	---	---		III	0.06	0.38	0.36	0.24	---	---	---
	IV	0.05	0.06	0.12	0.39	0.25	---	0.50		IV	0.12	0.19	0.39	0.50	0.36	---	---
	V	---	---	---	---	0.50	0.50	0.50		V	---	0.05	0.03	0.20	0.64	0.50	---
	VI	---	---	---	---	---	0.50	---		VI	---	---	---	---	---	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---
		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	0.17	---	---	0.05	---	---	---		I	0.31	---	---	0.03	---	---	---
	II	0.19	0.48	0.22	0.05	---	---	---		II	0.25	0.08	0.07	0.03	---	---	---
	III	0.35	0.38	0.37	0.24	---	---	---		III	0.06	0.42	0.21	0.10	0.06	---	---
	IV	0.10	0.29	0.33	0.52	0.50	---	---		IV	---	0.25	0.46	0.60	0.06	---	---
	V	---	---	---	0.14	0.50	---	---		V	---	---	0.14	0.23	0.67	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	0.07	0.03	0.17	0.50	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	0.06	0.50	---

Table S11. *Lobophora variegata*. Matrices on the sheltered side, including fragmentation and fusion events

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.91	0.24	0.14	0.13	---	---	---		I	0.39	0.23	0.03	---	---	---	---
	II	0.36	0.36	0.33	0.16	0.21	---	---		II	0.42	0.29	0.10	0.23	0.33	---	---
	III	---	0.12	0.29	0.38	0.07	0.40	---		III	0.06	0.43	0.38	0.31	0.33	---	---
	IV	---	0.08	0.05	0.41	0.29	0.20	---		IV	---	0.03	0.45	0.46	0.33	---	---
	V	---	---	---	---	0.33	0.40	---		V	---	---	0.07	---	0.33	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	1.00	0.36	0.14	0.04	---	---	---		I	0.52	0.15	---	---	---	---	---
	II	0.29	0.24	0.21	0.07	---	---	---		II	0.41	0.21	0.07	---	---	---	---
	III	0.06	0.28	0.39	0.15	0.50	---	---		III	0.19	0.30	0.51	0.04	---	---	---
	IV	---	0.12	0.25	0.59	0.13	---	---		IV	0.04	0.15	0.37	0.71	0.20	---	---
	V	---	---	---	0.07	0.50	---	---		V	---	0.06	0.02	0.25	0.20	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	0.60	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

Table S12. *Lobophora variegata*. Matrices on the sheltered side, including fragmentation events

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.90	0.25	0.15	0.13	---	---	---		I	0.44	0.23	0.04	---	---	---	---
	II	0.36	0.38	0.35	0.16	0.21	---	---		II	0.41	0.30	0.11	0.23	0.33	---	---
	III	---	0.13	0.30	0.38	0.07	0.40	---		III	0.06	0.40	0.39	0.31	0.33	---	---
	IV	0.09	0.04	0.05	0.41	0.29	0.20	---		IV	---	0.03	0.43	0.46	0.33	---	---
	V	---	---	---	---	0.29	0.40	---		V	---	---	0.04	---	0.33	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	1.06	0.36	0.14	0.04	---	---	---		I							
	II	0.31	0.24	0.21	0.07	---	---	---		II							
	III	0.06	0.28	0.39	0.15	0.50	---	---		III							
	IV	---	0.08	0.25	0.59	0.13	---	---		IV							
	V	---	---	---	0.07	0.50	---	---		V							
	VI	---	---	---	---	---	---	---		VI							
	VII	---	---	---	---	---	---	---		VII							

Table S13. *Lobophora variegata*. Matrices on the sheltered side, including fusion events

		June									November							
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII	
	I	0.91	0.24	0.14	0.10	---	---	---		I	0.39	0.23	0.03					
	II	0.36	0.36	0.33	0.13	0.21	---	---		II	0.42	0.29	0.10	0.23				
	III	---	0.12	0.29	0.37	0.07	0.40	---		III	0.06	0.43	0.38	0.31	0.33			
	IV	0.09	0.08	0.05	0.40	0.29	0.20	---		IV		0.03	0.45	0.46	0.33			
	V	---	---	---	---	0.33	0.40	---		V			0.07		0.33			
	VI	---	---	---	---	---	---	---		VI								
	VII	---	---	---	---	---	---	---		VII								

		July									December						
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII
	I	1.00	0.36	0.14	0.04	---	---	---		I	0.47	0.12	---	---	---	---	---
	II	0.29	0.24	0.21	0.07	---	---	---		II	0.41	0.21	0.07	---	---	---	---
	III	0.06	0.28	0.39	0.15	0.29	---	---		III	0.17	0.24	0.54	0.03	---	---	---
	IV	---	0.12	0.25	0.59	0.15	---	---		IV	0.03	0.12	0.36	0.67	0.14	---	---
	V	---	---	---	0.07	0.57	---	---		V	---	0.09	0.02	0.39	0.14	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	0.55	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

Table S14. *Lobophora variegata*. Matrices on the sheltered side, fragmentation and fusion not included

		June									November						
J u l y		I	II	III	IV	V	VI	VII	D e c e m b e r		I	II	III	IV	V	VI	VII
	I	0.91	0.25	0.15	0.10	---	---	---		I	0.44	0.23	0.04	---	---	---	---
	II	0.36	0.38	0.35	0.13	0.21	---	---		II	0.41	0.30	0.11	0.23	---	---	---
	III	---	0.13	0.30	0.37	0.07	0.40	---		III	0.06	0.40	0.39	0.31	0.33	---	---
	IV	0.09	0.04	0.05	0.40	0.29	0.20	---		IV	---	0.03	0.43	0.46	0.33	---	---
	V	---	---	---	---	0.29	0.40	---		V	---	---	0.04	---	0.33	---	---
	VI	---	---	---	---	---	---	---		VI	---	---	---	---	---	---	---
	VII	---	---	---	---	---	---	---		VII	---	---	---	---	---	---	---

		July									December							
A u g u s t		I	II	III	IV	V	VI	VII	J a n u a r y		I	II	III	IV	V	VI	VII	
	I	1.06	0.36	0.14	0.04	---	---	---		I								
	II	0.31	0.24	0.21	0.07	---	---	---		II								
	III	0.06	0.28	0.39	0.15	0.29	---	---		III								
	IV	---	0.08	0.25	0.59	0.14	---	---		IV								
	V	---	---	---	0.07	0.57	---	---		V								
	VI	---	---	---	---	---	---	---		VI								
	VII	---	---	---	---	---	---	---		VII								