

Small-scale spatial and temporal variability of larval fish assemblages at an isolated oceanic island

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Supplement. This supplement provides the complete list of species of fish larvae identified in plankton samples from Saint Paul's Rocks information about adult habitat, mode of spawning, number of larvae collected, larval abundance and frequency of occurrence.

Table S1. Fish larvae abundance (mean \pm SE) and frequency of occurrence (%) around Saint Paul's Rocks from 2003 to 2005, collected in the cove (CO), from up to 500 m away from the islets (D1) and at distances of more than 500 m away (D2). Adult habitats are R: reef; D: demersal; BD: bathydemersal; EP: epipelagic; MP: mesopelagic; BP: bathypelagic. Modes of spawning are P: pelagic eggs; P¹: assumed to be pelagic eggs; NP: non-pelagic eggs. Asterisk (*) represents total catch after subsample extrapolation

Species	Adult habitat	Mode of spawning	Total catch (no. larvae)	Abundance (no. larvae 100 m ⁻³)			Frequency (%)		
				CO	D1	D2	CO	D1	D2
Congridae									
<i>Gnathophis</i> sp.	D/BD	P	2		0.10 \pm 08			4.00	
Gonostomatidae									
<i>Cyclothone acclinidens</i> Garman, 1899	EP/MP	P	4	0.03 \pm 0.03	0.06 \pm 0.06	0.02 \pm 0.02	2.38	2.00	1.06
<i>Cyclothone alba</i> Brauer, 1906	MP	P	7	0.05 \pm 0.04	0.09 \pm 0.05	0.05 \pm 0.05	4.76	6.00	1.06
<i>Cyclothone braueri</i> Jespersen & Tåning, 1926	MP	P	2	0.03 \pm 0.03		0.03 \pm 0.03	2.38		1.06
<i>Cyclothone pallida</i> Brauer, 1902	MP	P	3		0.16 \pm 0.16	0.02 \pm 0.02		2.00	1.06
<i>Cyclothone pseudopallida</i> Mukhacheva, 1964	MP/BP	P	5	0.04 \pm 0.04	0.02 \pm 0.02	0.07 \pm 0.04	2.38	2.00	3.19
<i>Cyclothone</i> spp.	MP/BP	P	15		0.17 \pm 0.07	0.18 \pm 0.07		10.00	8.51

Species	Adult habitat	Mode of spawning	Total catch (no. larvae)	Abundance (no. larvae 100 m ⁻³)			Frequency (%)		
				CO	D1	D2	CO	D1	D2
Phosichthyidae									
<i>Vinciguerria nimbaria</i> (Jordan & Williams, 1895)	MP/BP	P	3		0.12 ± 0.08	0.03 ± 0.03		4.00	1.06
Stomiidae									
<i>Astronesthes</i> sp.	MP/BP	P ¹	1			0.03 ± 0.03			1.06
Alepisauridae									
<i>Alepisaurus ferox</i> Lowe, 1833	MP	P ¹	1			0.02 ± 0.02			1.06
Paralepididae									
<i>Lestidium</i> sp.	MP	P ¹	4		0.06 ± 0.05	0.05 ± 0.03		4.00	2.13
<i>Sudis atrox</i> Rofen, 1963	MP/BP	P ¹	1	0.03 ± 0.03			2.38		
Myctophidae									
<i>Diogenichthys atlanticus</i> (Tåning, 1918)	MP	P	1			0.03 ± 0.03			1.06
<i>Electrona risso</i> (Cocco, 1829)	MP	P	1		0.04 ± 0.04			2.00	
<i>Hygophum taaningi</i> Becker, 1965	MP	P	1		0.03 ± 0.03			2.00	
<i>Hygophum</i> sp. 1	MP	P	2			0.06 ± 0.04			2.13
<i>Hygophum</i> sp. 2	MP	P	1			0.03 ± 0.03			1.06
<i>Hygophum</i> sp. 3	MP	P	1			0.02 ± 0.02			1.06
<i>Hygophum</i> sp. 4	MP	P	1	0.03 ± 0.03			2.38		
<i>Hygophum</i> sp. 5	MP	P	1		0.05 ± 0.05			2.00	
<i>Hygophum</i> sp. 6	MP	P	1		0.03 ± 0.03			2.00	
<i>Hygophum</i> spp.	MP	P	1		0.04 ± 0.04			2.00	
<i>Myctophum asperum</i> Richardson, 1845	MP	P	1			0.03 ± 0.03			1.06
<i>Myctophum nitidulum</i> Garman, 1899	MP	P	1		0.05 ± 0.05			2.00	
<i>Myctophum</i> sp.	MP	P	1	0.03 ± 0.03			2.38		
<i>Ceratoscopelus maderensis</i> (Lowe, 1839)	MP	P	24		0.43 ± 0.28	0.39 ± 0.20		6.00	5.32
<i>Ceratoscopelus warmingii</i> (Lütken, 1892)	MP	P	67	0.41 ± 0.22	1.01 ± 0.27	0.61 ± 0.19	11.90	28.00	17.02
<i>Ceratoscopelus</i> spp.	MP	P	10		0.20 ± 0.12	0.04 ± 0.04		6.00	1.06
<i>Diaphus metopoclampus</i> (Cocco, 1829)	MP	P	9	0.06 ± 0.06	0.11 ± 0.07	0.07 ± 0.04	2.38	6.00	3.19
<i>Diaphus rafinesquii</i> (Chevrolat, 1863)	MP	P	3	0.02 ± 0.02		0.05 ± 0.04	2.38		2.13
<i>Diaphus</i> sp. 1	MP	P	2		0.05 ± 0.05	0.03 ± 0.03		2.00	1.06
<i>Diaphus</i> sp. 2	MP	P	1			0.02 ± 0.02			1.06
<i>Diaphus</i> sp. 3	MP	P	1	0.02 ± 0.02			2.38		
<i>Diaphus</i> sp. 4	MP	P	4		0.03 ± 0.03	0.07 ± 0.04		2.00	3.19
<i>Lampadena luminosa</i> (Garman, 1899)	MP	P	52	0.24 ± 0.13	0.88 ± 0.31	0.36 ± 0.11	9.52	20.00	12.77
<i>Lampadena urophaos</i> Paxton, 1963	MP	P ¹	20	0.23 ± 0.23	0.20 ± 0.12	0.16 ± 0.06	2.38	8.00	7.45
<i>Lampanyctus alatus</i> Goode & Bean, 1896	MP	P	1			0.02 ± 0.02			1.06
<i>Lampanyctus nobilis</i> Tåning, 1928	MP	P	9	0.08 ± 0.07	0.03 ± 0.03	0.09 ± 0.07	4.76	2.00	2.13
<i>Lampanyctus</i> sp.	MP	P	2	0.03 ± 0.03		0.03 ± 0.03	2.38		1.06
<i>Lampanyctus</i> spp.	MP	P	4	0.03 ± 0.03	0.11 ± 0.11	0.03 ± 0.03	2.38	2.00	1.06
<i>Lepidophanes gaussi</i> (Brauer, 1906)	MP	P	2	0.04 ± 0.04		0.02 ± 0.02	2.38		1.06
<i>Lepidophanes guentheri</i> (Goode & Bean, 1896)	MP	P	34	0.06 ± 0.04	0.88 ± 0.27	0.12 ± 0.06	4.76	22.00	5.32
<i>Nannobranchium cuprarium</i> (Tåning, 1928)	MP	P	1	0.03 ± 0.03			2.38		
<i>Notoscopelus resplendens</i> (Richardson, 1845)	MP	P	4	0.18 ± 0.18		0.04 ± 0.03	2.38		2.13
<i>Myctophidae</i> spp.	MP	P	9		0.21 ± 0.14	0.07 ± 0.04		6.00	3.19

Species	Adult habitat	Mode of spawning	Total catch (no. larvae)	Abundance (no. larvae 100 m ⁻³)			Frequency (%)		
				CO	D1	D2	CO	D1	D2
Ophidiidae									
<i>Brotulotaenia</i> sp.	MP/BP	P ¹	1			0.05 ± 0.05			1.06
Bregmacerotidae									
<i>Bregmaceros</i> sp.	EP/MP	P ¹	1			0.03 ± 0.03			1.06
Gigantactinidae									
Gigantactinidae spp.	MP/BP	P ¹	4			0.07 ± 0.07	0.06 ± 0.04	2.00	3.19
Exocoetidae									
<i>Oxyporhamphus micropterus</i> (Cuvier & Valenciennes, 1847)	EP	NP	50			0.27 ± 0.11	0.96 ± 0.19	12.00	27.66
<i>Exocoetus volitans</i> Linnaeus, 1758	EP	NP	1				0.02 ± 0.02		1.06
<i>Cypselurus cyanopterus</i> (Cuvier & Valenciennes, 1847)	EP	NP	4				0.11 ± 0.05		4.26
<i>Hirundichthys</i> sp.	EP	NP	2			0.06 ± 0.04		4.00	
Exocoetidae spp.	EP	NP	843*	40.35 ± 35.27	0.48 ± 0.35	0.40 ± 0.19	9.52	8.00	6.38
Trachipteridae									
Trachipteridae sp.	EP/MP	P	1			0.02 ± 0.02			1.06
Dactylopteridae									
<i>Dactylopterus volitans</i> (Linnaeus, 1758)	D	P ¹	1			0.02 ± 0.02			1.06
Echeneidae									
<i>Remora</i> sp.	EP	P ¹	1			0.03 ± 0.03			1.06
Coryphaenidae									
<i>Coryphaena</i> sp.	EP	P	4	0.03 ± 0.03		0.07 ± 0.04	2.38		3.19
Bramidae									
<i>Brama brama</i> (Bonnaterre, 1788)	EP/MP	P	3			0.06 ± 0.05			2.13
Lutjanidae									
<i>Lutjanus jocu</i> (Bloch & Schneider, 1801)	R	P	1			0.03 ± 0.03		2.00	
Labridae									
<i>Halichoeres radiatus</i> (Linnaeus, 1758)	R	P	18			1.16 ± 1.12		4.00	
<i>Bodianus insularis</i> Gomon & Lubbock, 1980	R	P	24	3.10 ± 2.99			4.76		
<i>Thalassoma noronhanum</i> (Boulenger, 1890)	R	P	1	0.03 ± 0.03			2.38		
Scaridae									
<i>Sparisoma</i> sp.	R	P	83	3.16 ± 3.16			2.38		
Pomacentridae									
<i>Chromis multilineata</i> (Guichenot, 1853)	R	NP	1			0.06 ± 0.06		2.00	
<i>Abudefduf saxatilis</i> (Linnaeus, 1758)	R	NP	1			0.02 ± 0.02		2.00	
<i>Stegastes sanctipauli</i> Lubbock & Edwards, 1981	R	NP	25472*	995.41 ± 614.71	9.88 ± 4.86	1.81 ± 0.62	40.48	26.00	12.77
Labrisomidae									
<i>Malacoctenus triangulatus</i> Springer, 1959	R	NP	340*	10.03 ± 6.74	3.12 ± 2.38		26.19	8.00	
Labrisomidae spp.	R	NP	353*	19.73 ± 7.31	0.04 ± 0.04		40.48	2.00	
Blenniidae									
<i>Entomacrodus vomerinus</i> (Cuvier & Valenciennes, 1836)	R	NP	5955*	207.50 ± 70.48	3.03 ± 1.33	0.37 ± 0.20	45.24	16.00	6.38
<i>Ophioblennius trinitatis</i> Miranda Ribeiro, 1919	R	NP	42		0.61 ± 0.44	0.36 ± 0.28		8.00	4.26
Gobiidae									
<i>Bathygobius soporator</i> (Cuvier & Valenciennes, 1837)	R	NP	2	0.10 ± 0.10		0.01 ± 0.01	2.38		1.06
Gempylidae									

Species	Adult habitat	Mode of spawning	Total catch (no. larvae)	Abundance (no. larvae 100 m ⁻³)			Frequency (%)		
				CO	D1	D2	CO	D1	D2
<i>Gempylus serpens</i> Cuvier, 1829	EP/MP	P	15	0.04 ± 0.04	0.45 ± 0.19	0.07 ± 0.04	2.38	18.00	3.19
Scombridae									
<i>Katsuwonus pelamis</i> (Linnaeus, 1758)	EP	P	6		0.07 ± 0.04	0.08 ± 0.04		6.00	4.26
<i>Thunnus albacares</i> (Bonnaterre, 1788)	EP	P	5		0.05 ± 0.03	0.08 ± 0.05		4.00	3.19
<i>Thunnus obesus</i> (Lowe, 1839)	EP/MP	P	6	0.03 ± 0.03	0.08 ± 0.06	0.04 ± 0.03	2.38	4.00	2.13
Xiphiidae									
<i>Xiphias gladius</i> Linnaeus, 1758	EP/MP	P	1			0.03 ± 0.03			1.06
Nomeidae									
<i>Cubiceps pauciradiatus</i> Günther, 1872	EP/MP	P	5		0.03 ± 0.03	0.07 ± 0.05		2.00	3.19
Bothidae									
<i>Bothus ocellatus</i> (Spix & Agassiz, 1831)	D	P	12		0.05 ± 0.05	0.13 ± 0.08		2.00	3.19
<i>Bothus lunatus</i> (Linnaeus, 1758)	D	P	5		0.02 ± 0.02	0.07 ± 0.04		2.00	4.26
Ostraciidae									
Ostraciidae sp.	R	P	1			0.02 ± 0.02			1.06
Yolk sac larvae			1293*	41.25 ± 27.09	0.23 ± 0.13	0.81 ± 0.30	45.24	8.00	14.89
Unidentified leptocephalus			1		0.02 ± 0.02			2.00	
Unidentified larvae			1421*	50.33 ± 28.21	1.43 ± 0.41	1.69 ± 0.35			