

Environmental determinants of motile cryptofauna on an eastern Pacific coral reef

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Supplement. Qualification method and categorization of coral-associated cryptofauna

Table S1. Wet weight to ash-free dry weight and conversions. 1: Ricciardi & Bourget (1998); 2: Dall et al. (1991); 3: Griffiths & Blaine (1988); 4: Vinogradov (1953)

Phylum	Taxon	Mean (%)	N	No. of species	Source
Annelida	Polychaeta	16.0	93	>83	1
Mollusca	Prosobranchia ^a	7.5	11	14	1
	Opisthobranchia (shelled) ^b	13.8	3	2	1
	Opisthobranchia (non-shelled) ^c	17.2 ^d	na	na	1
	Polyplacophora	27.2	1	3	1
	Bivalvia	5.5	66	47	1
	Cephalopoda	21.4	5	5	1
Arthropoda	Crustacea ^e	15.6	35	>27	1,2
	Amphipoda	16.0	14	>12	1
	Decapoda	16.5	17	11	1
	Isopoda	14.2	1	1	1
	Mysida	15.5	2	2	1
	Stomatopoda	10 ^f	1	1	3
Echinodermata	Tanaiacea	14.4	1	1	2
	Asteroidea	11.2	8	4	1
	Ophiuroidea	7.4	12	8	1
	Echinoidea	3.5	8	6	1
	Holothuroidea	10.9	3	3	1
Sipuncula	Sipuncula	11.2	3	2	1
Platyhelminthes	Turbellaria	25.2	1	1	1
Echiura	Echiura	10.0	1	1	4
Chordata	Ophidiiformes ^g	20.9	1	1	4
	Perciformes ^h	20.5	32	≥21	4
	Gobiidae	18.1	11	≥7	4
	Muraenidae	23.3	5	≥1	4
	Scorpaenidae	19.7	4	2	4
	Serranidae	20.3	3	3	4

^aGastropoda spp., Hypsogastropoda, lower Heterobranchia, Neritimorpha, Patellogastropoda, Sorbeoconcha, Vetigastropoda

^bCephalaspidia

^cAnaspidea, Nudibranchia, Pleurobranchomorpha, Sacoglossa

^dCalculated by multiplying dry weight to wet weight ratio by ash-free dry weight to wet weight ratio

^eMean value for all considered Crustacea

^fApproximate value

^gBythitidae, value from Ophidiidae

^hApogonidae, Labrisomidae, Scaridae; value from Gobiidae, Lutjanidae, Sciaenidae, Serranidae

Table S2. Trophic group assignments of collected taxa. CG: carnivorous grazer; CM: carnivorous multiple strategies; CP: carnivorous predator; DD: detritivorous deposit feeder; HG: herbivorous grazer; OO: omnivore opportunistic; SU: suspension feeder; 1: Fauchald & Jumars (1979); 2: Poore et al. (2008); 3: Taylor & Brown (2006); 4: Klumpp et al. (1988); 5: Zimmerman et al. (1979); 6: Hargrave (1985); 7: Fanelli et al. (2009); 8: Patton (1974); 9: Castro (1971); 10: Gore et al. (1978); 11: A. Baeza (pers. comm.); 12: Rothans & Miller (1991); 13: Barry (1965); 14: Glynn (pers. comm.); 15: Burkenroad (1939); 16: Hultgren & Stachowicz (2007); 17: Ambrose & Anderson (1990); 18: Barr (1975); 19: Kilar & Lou (1986); 20: Hazlett & Rittschof (1975); 21: Engstrom (1984); 22: Gotelli et al. (1985); 23: Abele (1976); 24: Thomassin (1974); 25: Knudsen (1964); 26: Zipser & Vermeij (1978); 27: Kropp (1981); 28: Hickman & Zimmerman (2000); 29: Saisho et al. (1983); 30: Morris et al. (1980); 31: Schembri (1982); 32: Shafir & Field (1980); 33: Mullin & Roman (1986); 34: Roman et al. (1990); 35: Holdich & Jones (1983); 36: Froese & Pauly (2010); 37: Prochazka (1998); 38: Cobb & Lawrence (2005); 39: De Ridder & Lawrence (1982); 40: Vance (1979); 41: Glynn et al. (1979); 42: Roberts & Bryce (1982); 43: Warner (1982 and references therein); 44: Diaz et al. (1990); 45: Budd et al. (2001 and references therein); 46: Behrens & Hermosillo (2005); 47: Taylor & Reid (1984); 48: Graham (1955); 49: deMaintenon (1999); 50: Taylor (1984); 51: Yonge (1953); 52: Glynn (2004); 53: Lubchenco et al. (1984); 54: Jörger et al. (2008); 55: Newman & Cannon (2003)

Taxon		Source	Included taxa and notes
Annelida			Polychaeta spp.
Amphinomidae	CM	1	Amphinomidae spp., <i>Eurythoe complanata</i> , <i>Notopygos ornata</i> , <i>Pherecardia striata</i>
Eunicidae		1	<i>Eunice</i> sp.; members belong to multiple guilds: CG, CP, HG
Nereididae	OO	1	<i>Ceratocephale</i> sp.
Oeononidae		1	cf. <i>Oeonone fulgida</i> ; poorly known
Phyllodoceidae	CM	1	<i>Phyllodoce</i> sp.; primarily a predator but may also scavenge
Polynoidae	CM	1	Polynoidae sp.
Syllidae	CM	1	<i>Odontosyllis</i> sp., <i>Trypanosyllis</i> sp.; primarily grazes on sessile taxa but may feed on motile prey as well
Terebellidae	DD	1	<i>Lanicola</i> sp.
Arthropoda			Crustacea spp.
Amphipoda			Amphipoda spp.
Ampithoidae	HG	2	Ampithoidae sp. A, Ampithoidae sp. B
Aoridae	OO	3	Aoridae sp.; may utilize suspension and deposit feeding though very important in herbivory
Gammaridea (unless noted)	OO	4,5	Amphipoda sp., Aoridae sp., cf. Hyalidae sp., <i>Leucothoe</i> sp.; many are herbivorous, see 5 and references therein
Lysianassidae	CM	6,7	Lysianassidae sp.; deep water, probably principle diet but 8 and references therein describe detrital sources
Decapoda			Brachyura spp.
Caridea	OO		Caridea spp.; all included taxa belonged to the OO category
Alpheidae	OO	8,9,10	Alpheidae spp., <i>Alpheus</i> spp., <i>Alpheus</i> cf. <i>fasciatus</i> , <i>Alpheus lottini</i> , <i>Alpheus panamensis</i> , <i>Alpheus utriensis</i> , <i>Synalpheus</i> spp., <i>Synalpheus</i> aff. <i>brevispinis</i> , <i>Synalpheus digueti</i>
Hippolytidae	OO	8,11,12	<i>Lysmata holthuisi</i> , <i>Thor</i> cf. <i>algicola</i>
Palaemonidae	OO	8,12,13,14	<i>Fennera chacei</i> , <i>Palaemonella</i> spp.
Rhynchocinetidae	OO	15	<i>Cinetorhynchus</i> cf. <i>hendersoni</i>
Dromiidae	OO		Dromiidae sp.; feeding behaviors assumed to be similar to Xanthoidea
Epialtidae	HG	16	<i>Herbstia pubescens</i> , <i>Herbstia tumida</i>
Inachidae (unless noted)	OO	17	Inachidae sp.
<i>Stenoryhnchus</i>	SU	18	<i>Stenoryhnchus debilis</i>
Majidae	HG	19,20,21,22	Majidae spp., <i>Hemus finneganae</i> , <i>Microphrys</i> cf. <i>weddelli</i> , <i>Microphrys platysoma</i> , <i>Mithraculus denticulatus</i> , <i>Mithrax pygmaeus</i> , <i>Teleophrys cristulipes</i> , <i>Thoe sulcata panamensis</i> ; other feeding strategies and sources exist though herbivory is likely dominant. <i>T. cristulipes</i> based on a single observation

Paguroidea	OO	23,24	Paguroidea spp., <i>Calcinus obscurus</i> , cf. <i>Dardanus</i> sp., <i>Paguristes</i> sp., cf. <i>Pagurus</i> sp. A, <i>Pagurus</i> sp. B, cf. <i>Pylopagurus</i> sp.; not all collected genera mentioned in literature
Panopeidae	OO	25	<i>Lophopanopeus maculatus</i>
Parthenopidae	CP	26	<i>Daldorfia garthi</i>
Pilumnidae	OO	10	<i>Pilumnus pygmaeus</i>
Porcellanidae	SU	23,25,27,28	Porcellanidae spp., <i>Petrolisthes agassizii</i> , <i>Petrolisthes edwardsii</i> , <i>Petrolisthes glasselli</i> , <i>Petrolisthes haigae</i> , <i>Petrolisthes polymitus</i> , <i>Pisidia magdalenensis</i>
Xanthoidea	OO	29,30	Xanthoidea spp., <i>Heteractaea lunata</i> , <i>Lipaesthesius leeanus</i> , <i>Lophoxanthus lamellipes</i> , <i>Microcassiope xantusii</i> , <i>Paractaea sulcata</i> , <i>Platyactaea dovii</i> , <i>Xanthodius stimpsoni</i> , Xanthoidea sp. A, Xanthoidea sp. B, Xanthoidea sp. C, Xanthoidea sp. D, Xanthoidea sp. E
Leucosiidae	CM	31	<i>Uhlias ellipticus</i> ; predation and scavenging
Isopoda	CM	32	Isopoda sp.; collected specimens are similar to Cirolanidae
Mysida	OO	33,34	Mysida sp.
Stomatopoda	CP	28	Gonodactylidae spp., <i>Neogonodactylus bahiahondensis</i> , <i>Neogonodactylus zaca</i>
Tanaidacea	DD	35	Tanaidacea spp.; other feeding behaviours observed but deposit feeding is likely dominant
Chordata			
Apogonidae	CP	36	<i>Apogon dovii</i>
Bythitidae	CP	37	<i>Ogilbia sedorae</i> ; proportionally insignificant quantities of fleshy algae found in gut
Gobiidae	CP	36,37	<i>Coryphopterus urospilus</i> ; proportionally insignificant quantities of fleshy algae found in gut
Labrisomidae	CP	36	<i>Paraclinus monophthalmus</i> , <i>Starksia fulva</i>
Muraenidae	CP	36	Muraenidae spp., <i>Gymnothorax panamensis</i>
Scorpaenidae	CP	36	<i>Scorpaenodes xyris</i>
Serranidae	CP	36	<i>Cephalopholis panamensis</i> , <i>Pseudogramma thaumasium</i>
Scaridae	HG	36	cf. <i>Scarus compressus</i>
Echinodermata			
Echinoidea			Echinoidea spp.
<i>Arbacia</i>	OG	38,39	<i>Arbacia stellata</i>
<i>Centrostephanus coronatus</i>	OG	39,40	
<i>Eucidaris thouarsii</i>	OG	39,41	
Holothuroidea			Holothuroidea spp., Holothuroidea sp.
Apodida			
Aspidochirotida	DD	42	<i>Chiridota aponocrita</i> , <i>Polyplectana oculata</i> , <i>Arbacia stellata</i> , <i>Holothuria difficilis</i> , <i>Holothuria hilla</i> , <i>Holothuria impatiens</i> , <i>Isostichopus fuscus</i>
Ophiuroidea			Ophiuroidea spp.
<i>Amphipholis squamata</i>	SU	43	May also utilize deposit feeding
<i>Ophiactis</i>	SU	43	<i>Ophiactis savignyi</i> , <i>Ophiactis simplex</i>
Ophiocomidae (unless noted)	SU	43	<i>Ophiocomella</i> sp. A; some species engage in predation, scavenging, deposit feeding and browsing
<i>Ophiocoma</i>	OO	43	<i>Ophiocoma aethiops</i> , <i>Ophiocoma alexandri</i> ; suspension, deposit, scavenging and predation observed
<i>Ophioderma</i>	OO	43	<i>Ophioderma sodipallaresi</i> , <i>Ophioderma</i> sp.; predation, scavenging, deposit feeding observed
<i>Ophionereis</i>	SU	43	<i>Ophionereis annulata</i> ; infrequent accounts of deposit feeding and scavenging recorded
<i>Ophiothrix</i>	SU	43	<i>Ophiothrix spiculata</i> ; may also exhibit predation, scavenging and deposit feeding
Mollusca			
Bivalvia	SU		Bivalvia spp.; all families collected in the present study are suspension feeders
Arcidae	SU	44	<i>Acar bailyi</i> , <i>Acar gradata</i>
Isognomonidae	SU	45	<i>Isognomon</i> spp., <i>Isognomon</i> cf. <i>janus</i>
Mytilidae	SU	45	<i>Septifer zeteki</i>

Pteriidae	SU	45	Pteriidae sp.
Gastropoda			Gastropoda spp., Opisthobranchia spp.
Aplysiidae	HG	46	<i>Dolabella auricularia</i> , <i>Dolabrifera dolabrifera</i> , <i>Stylocheilus striatus</i>
Barleeiidae	HG	45	<i>Amphithalamus inclusus</i>
Buccinidae	CP	44,47	<i>Cantharus</i> cf. <i>janellii</i> , <i>Cantharus</i> nsp., <i>Cantharus sanguinolentus</i> , <i>Engina</i> spp., <i>Engina maura</i> , <i>Engina pulchra</i> , <i>Engina solida</i> , <i>Engina tabogaensis</i>
Bursidae	CP	45,46	<i>Bursa corrugata</i>
Calyptraeidae	SU	46,48	Calyptraeidae sp., <i>Crepidula</i> sp., <i>Crucibulum scutellatum</i> , <i>Crucibulum spinosum</i>
Cephalaspidea	CP	46	Cephalaspidea sp.
Cerithiidae	HG	44	<i>Cerithium</i> cf. <i>adustum</i> , <i>Cerithium uncinatum</i> , <i>Triphora</i> sp. A, <i>Triphora</i> sp. B
Cerithiopsidae	CG	44	<i>Seila</i> cf. <i>assimilata</i> , <i>Seila</i> sp.; often parasitic
Columbellidae			
<i>Aesopus</i>	CP	45	<i>Aesopus</i> cf. <i>sanctus</i>
<i>Columbella</i>	HG	47	<i>Columbella sonsonatensis</i>
<i>Decipifus</i>	CP	45	<i>Decipifus</i> sp.
<i>Nassarina</i>	CP	44,45	<i>Nassarina melanosticta</i> , <i>Nassarina tinctoria</i>
<i>Parametaria</i>	CP	45	<i>Parametaria macrostoma</i>
<i>Parvanachis</i>	CP	45	<i>Parvanachis dalli</i>
<i>Steironepion</i>	CP	45	<i>Steironepion melanostica</i>
<i>Zafrona</i>	OG	49	<i>Zafrona incerta</i>
Conidae	CP	44	<i>Agathotoma finitima</i> , <i>Clathurella rigida</i> , <i>Conus nux</i> , <i>Mitromorpha carpenteri</i>
Cypraeidae	OG	44,47	<i>Cypraea cervinetta</i> , <i>Cypraea</i> cf. <i>arabica</i> ; herbivory but likely uncommon
Drillidae	CP	50	<i>Iredalea ella</i>
Epitoniidae	CG	45,46	<i>Opalia bullata</i> ; often parasitic
Eulimidae	CG	45,48	<i>Balcis</i> sp. <i>Eulima</i> sp. A, <i>Eulima</i> sp., B, <i>Eulimidae</i> sp., <i>Sabinella</i> cf. <i>opalina</i> ; parasitic
Fasciolaridae	CP	44,45	cf. <i>Fusinus</i> sp., <i>Latirus mediamericus</i> , <i>Pustulaturus mediamericus</i>
Hipponicidae	SU	44,51	<i>Hipponix pilosus</i>
Lottiidae	HG	45	Lottiidae sp. A
Mitridae	CP	44,45	<i>Mitra</i> cf. <i>inca</i> , <i>Mitra crenata</i>
Modulidae	HG	45	<i>Modulus disculus</i>
Muricidae (unless noted)	CP	45	<i>Aspella pyramidalis</i> , cf. <i>Murexsul zeteki</i>
<i>Coralliophila</i>	CG	45	<i>Coralliophila nux</i>
Nassariidae	CP	45	<i>Nassarius</i> spp.
Olividae	CP	45	Olividae sp.
Ovulidae	CG	52	<i>Jenneria pustulata</i>
Pleurobranchidae	CM	46	Pleurobranchidae sp.
Pyramidellidae	CG	45	<i>Turbonilla</i> sp.
Rissoidae	HG	45	<i>Rissoina effusa</i> , <i>Rissoina stricta</i>
Triviidae	CG	48	<i>Erato</i> cf. <i>scabriuscula</i> , <i>Erato</i> sp., <i>Trivia pacifica</i>
Turridae	CP	45	<i>Microdaphne trichodes</i>
Turritellidae	SU	44	<i>Vermicularia pellucida eburnea</i>
Polyplacophora	HG	50,53,54	<i>Acanthochitona hirudiniformis</i> , <i>Lepidochitona beanii</i>
Platyhelminthes			
Polycladida	CM	55	Polycladida spp., Polycladida sp. A-F

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