

Coral reef fish assemblages at Clipperton Atoll (Eastern Tropical Pacific) and their relationship with coral cover

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Supplementary material

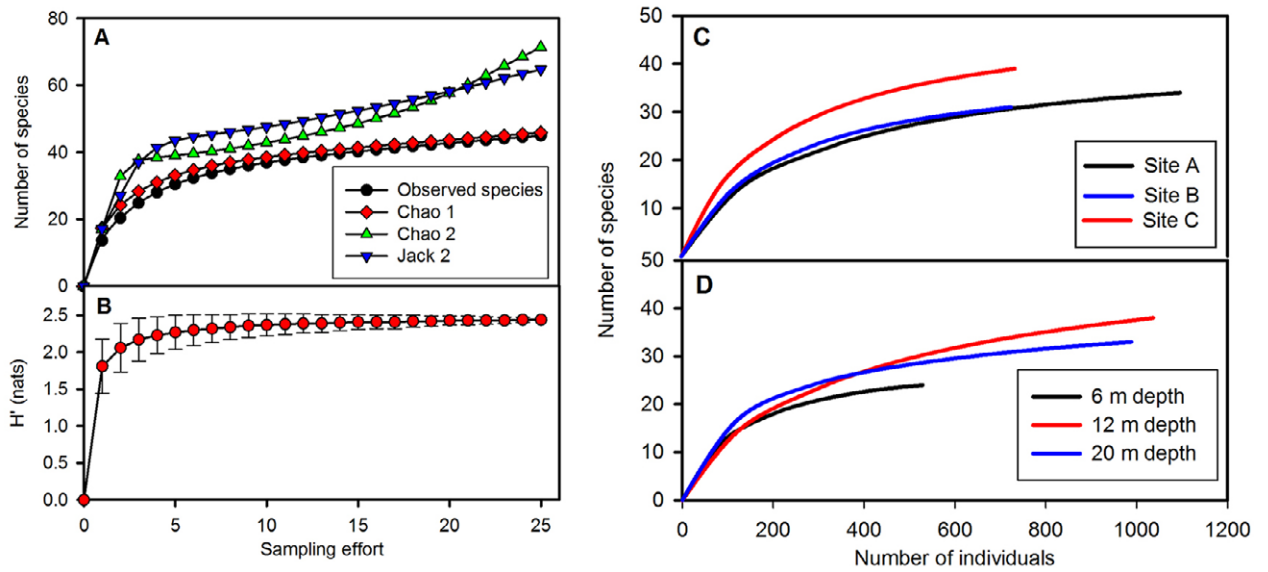


Fig. S1. – Evaluation of sampling effort and species richness for fish at the Clipperton Atoll. A, number of observed and estimated species using Chao 1, Chao 2, and Jackknife 2; B, Shannon diversity (H') accumulation curve; rarefaction curves by site (C) and depth (D).

Table S1. – Reef fish species composition, abundance and rarity at Clipperton Atoll.

Family	Species	Average biomass (g m ⁻²)	Total density (ind/1250 m ²)	Singletons	Doubletons	Unique species	Duplicate species
Serranidae	<i>Dermatolepis dermatolepis</i>	59.11	51				
Holocentridae	<i>Myripristis berndti</i>	46.09	126				
Acanthuridae	<i>Tenochaetus marginatus</i>	45.03	217				
Carangidae	<i>Caranx lugubris</i>	37.07	57				
Serranidae	<i>Epinephelus labriformis</i>	19.44	30				
Acanthuridae	<i>Acanthurus nigricans</i>	19.24	132				
Kyphosidae	<i>Kyphosus elegans</i>	17.91	35				
Carangidae	<i>Caranx melampygus</i>	15.65	28				
Scaridae	<i>Scarus rubroviolaceus</i>	14.41	22				
Serranidae	<i>Paranthias colonus</i>	11.85	120				
Aulostomidae	<i>Aulostomus chinensis</i>	10.80	13				
Balistidae	<i>Sufflamen verres</i>	9.34	17				
Labridae	<i>Bodianus diplotaenia</i>	7.02	16				
Balistidae	<i>Melichthys niger</i>	5.24	21				
Kyphosidae	<i>Kyphosus analogus</i>	5.02	11				
Carangidae	<i>Caranx sexfasciatus</i>	3.70	6				
Kyphosidae	<i>Sectator ocyurus</i>	3.48	2		X	X	
Muraenidae	<i>Enchelycore octaviana</i>	3.42	12				
Mullidae	<i>Mulloidichthys dentatus</i>	3.06	34				
Acanthuridae	<i>Acanthurus triostegus</i>	2.90	30				
Pomacanthidae	<i>Holacanthus limbaughi</i>	2.53	21				
Cirrhitidae	<i>Cirrhitus rivulatus</i>	2.14	4				
Zanclidae	<i>Zanclus cornutus</i>	1.95	27				
Lutjanidae	<i>Lutjanus viridis</i>	1.84	16				
Labridae	<i>Thalassoma grammaticum</i>	1.54	105				
Ostraciidae	<i>Ostracion meleagris</i>	0.78	9				
Pomacentridae	<i>Stegastes baldwini</i>	0.77	232				
Labridae	<i>Thalassoma robertsoni</i>	0.73	1042				
Tetraodontidae	<i>Arothron meleagris</i>	0.70	10				
Muraenidae	<i>Gymnothorax flavimarginatus</i>	0.58	2		X		X
Muraenidae	<i>Gymnothorax dovii</i>	0.58	2		X	X	
Holocentridae	<i>Sargocentron suborbitalis</i>	0.45	4			X	
Bothidae	<i>Bothus mancus</i>	0.44	1	X		X	
Labridae	<i>Thalassoma purpureum</i>	0.43	1	X		X	
Labridae	<i>Novaculichthys taeniouris</i>	0.40	1	X		X	
Chaetodontidae	<i>Johnrandallia nigrirostris</i>	0.25	29				
Labridae	<i>Xyrichtys wellingtoni</i>	0.17	1	X		X	
Acanthuridae	<i>Acanthurus xanthopterus</i>	0.16	2		X	X	
Acanthuridae	<i>Acanthurus achilles</i>	0.13	2		X	X	
Blenniidae	<i>Ophioblennius steindachneri</i>	0.08	7				
Chaetodontidae	<i>Forcipiger flavissimus</i>	0.08	18				
Cirrhitidae	<i>Cirrhitichthys oxycephalus</i>	0.04	19				
Tetraodontidae	<i>Canthigaster punctatissima</i>	0.023	4				
Gobiidae	<i>Bathygobius arundelii</i>	0.010	2		X	X	
Labridae	<i>Thalassoma virens</i>	0.002	12			X	

Table S2. – Results of two-way similarity percentage analysis (SIMPER) of reef fish species biomass found at each site at the Clipperton Atoll. B, biomass/species (g m⁻²); BSC, biomass/species (g m⁻²) for site C; BSA, biomass/species (g m⁻²) for site A; BSB, biomass/species (g m⁻²) for site B; CS, percentage of contribution to average similarity; UCS, cumulative percentage contribution to average similarity; CD, percentage of contribution to average dissimilarity; UCD, percentage of cumulative contribution to the average dissimilarity.

Species	B	CS	UCS	Species	B	CS	UCS	Species	B	CS	UCS
Site C											
<i>Ctenochaetus marginatus</i>	41.62	11.02	11.02	Site A				Site B			
<i>Acanthurus nigricans</i>	10.09	9.16	20.18	<i>Acanthurus nigricans</i>	31.95	15.85	15.85	<i>Ctenochaetus marginatus</i>	76.68	16.21	16.21
<i>Bodianus diplotaenia</i>	16.06	8.92	29.10	<i>Dermatolepis dermatolepis</i>	49.72	14.34	30.19	<i>Scarus rubroviolaceus</i>	21.78	10.49	26.70
<i>Myripristis bernadi</i>	30.61	7.39	36.49	<i>Epinephelus labriformis</i>	42.06	8.21	38.40	<i>Acanthurus nigricans</i>	14.66	8.98	35.68
<i>Stegastes baldwini</i>	0.90	6.75	43.23	<i>Thalassoma robertsoni</i>	0.84	6.74	45.15	<i>Dermatolepis dermatolepis</i>	114.50	8.62	44.30
<i>Acanthurus triostegus</i>	5.64	6.42	49.66	<i>Ctenochaetus marginatus</i>	23.81	6.74	51.89	<i>Kyphosus elegans</i>	48.55	8.07	52.37
<i>Kyphosus analogus</i>	13.95	5.48	55.14	<i>Stegastes baldwini</i>	0.51	5.98	57.86	<i>Thalassoma robertsoni</i>	0.92	6.50	58.87
<i>Paranthias colonus</i>	4.47	5.47	60.61	<i>Sufflamen verres</i>	16.23	5.06	62.92	<i>Paranthias colonus</i>	24.66	6.26	65.13
<i>Thalassoma grammaticum</i>	1.65	4.50	65.11	<i>Melichthys niger</i>	3.92	4.99	67.91				
Site C vs Site A											
<i>Epinephelus labriformis</i>	2.28	42.06	6.65	Site C vs Site B				Site A vs Site B			
<i>Caranx lugubris</i>	5.99	95.79	6.45	<i>Dermatolepis dermatolepis</i>	25.40	114.50	7.44	<i>Caranx lugubris</i>	95.79	1.52	6.34
<i>Ctenochaetus marginatus</i>	41.62	23.81	5.81	<i>Bodianus diplotaenia</i>	16.06	2.47	6.08	<i>Dermatolepis dermatolepis</i>	49.72	114.50	6.28
<i>Dermatolepis dermatolepis</i>	25.40	49.72	5.77	<i>Caranx melampygus</i>	11.02	15.80	6.04	<i>Ctenochaetus marginatus</i>	23.81	76.68	5.97
<i>Bodianus diplotaenia</i>	16.06	1.53	4.95	<i>Ctenochaetus marginatus</i>	41.62	76.68	5.78	<i>Caranx melampygus</i>	20.16	15.80	5.54
<i>Sufflamen verres</i>	7.32	16.23	4.86	<i>Kyphosus analogus</i>	13.95	0.00	5.27	<i>Melichthys niger</i>	3.92	2.16	5.36
<i>Caranx melampygus</i>	11.02	20.16	4.73	<i>Kyphosus elegans</i>	11.98	48.55	5.19	<i>Sufflamen verres</i>	16.23	3.09	5.34
<i>Scarus rubroviolaceus</i>	7.44	15.64	4.49	<i>Epinephelus labriformis</i>	2.28	12.43	4.87	<i>Autostomus chinensis</i>	15.59	17.40	4.71
<i>Melichthys niger</i>	8.97	3.92	3.88	<i>Myripristis bernadi</i>	30.61	0.33	4.62	<i>Epinephelus labriformis</i>	42.06	12.43	4.60
<i>Kyphosus elegans</i>	11.98	0.00	3.60	<i>Myripristis niger</i>	47.59	2.16	3.76	<i>Kyphosus elegans</i>	0.00	48.55	4.54
<i>Kyphosus analogus</i>	13.95	0.00	3.58	<i>Caranx lugubris</i>	51.20	1.52	3.75	<i>Paranthias colonus</i>	9.27	24.66	4.25
<i>Zanclus cornutus</i>	2.28	1.67	2.96	<i>Sufflamen verres</i>	7.32	3.09	3.16	<i>Myripristis bernadi</i>	97.16	0.33	3.60
<i>Acanthurus nigricans</i>	10.09	31.95	2.92	<i>Scarus rubroviolaceus</i>	7.44	21.78	3.07	<i>Scarus rubroviolaceus</i>	15.64	21.78	3.37
<i>Enchelycore octaviana</i>	2.77	2.94	2.91	<i>Enchelycore octaviana</i>	2.77	4.88	3.05	<i>Caranx sexfasciatus</i>	2.28	5.70	3.34
<i>Paranthias colonus</i>	4.47	9.27	2.75	<i>Zanclus cornutus</i>	2.28	1.90	2.80	<i>Zanclus cornutus</i>	1.67	1.90	3.25
				<i>Holacanthus limbaughi</i>	66.31	1.57	2.71				
Site C vs Site B											
<i>Epinephelus labriformis</i>	2.28	42.06	6.65	Site A vs Site B				Site C vs Site B			
<i>Caranx lugubris</i>	5.99	95.79	6.45	<i>Dermatolepis dermatolepis</i>	25.40	114.50	7.44	<i>Caranx lugubris</i>	95.79	1.52	6.34
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