

Supplementary Material

The importance of live coral for small sized herbivorous reef fishes in physically challenging environments

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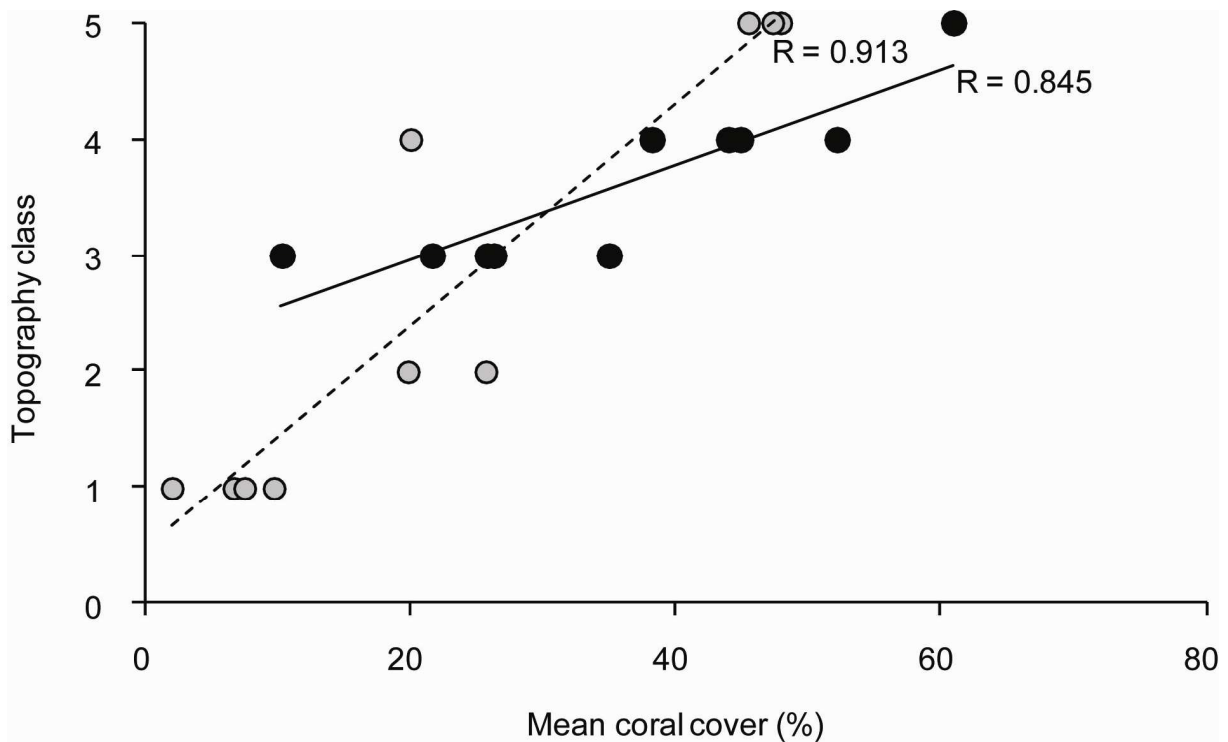


Fig S1. Correlation between live coral cover and topography class for back reef (black dots, solid line) and slope (grey dots, dotted line).

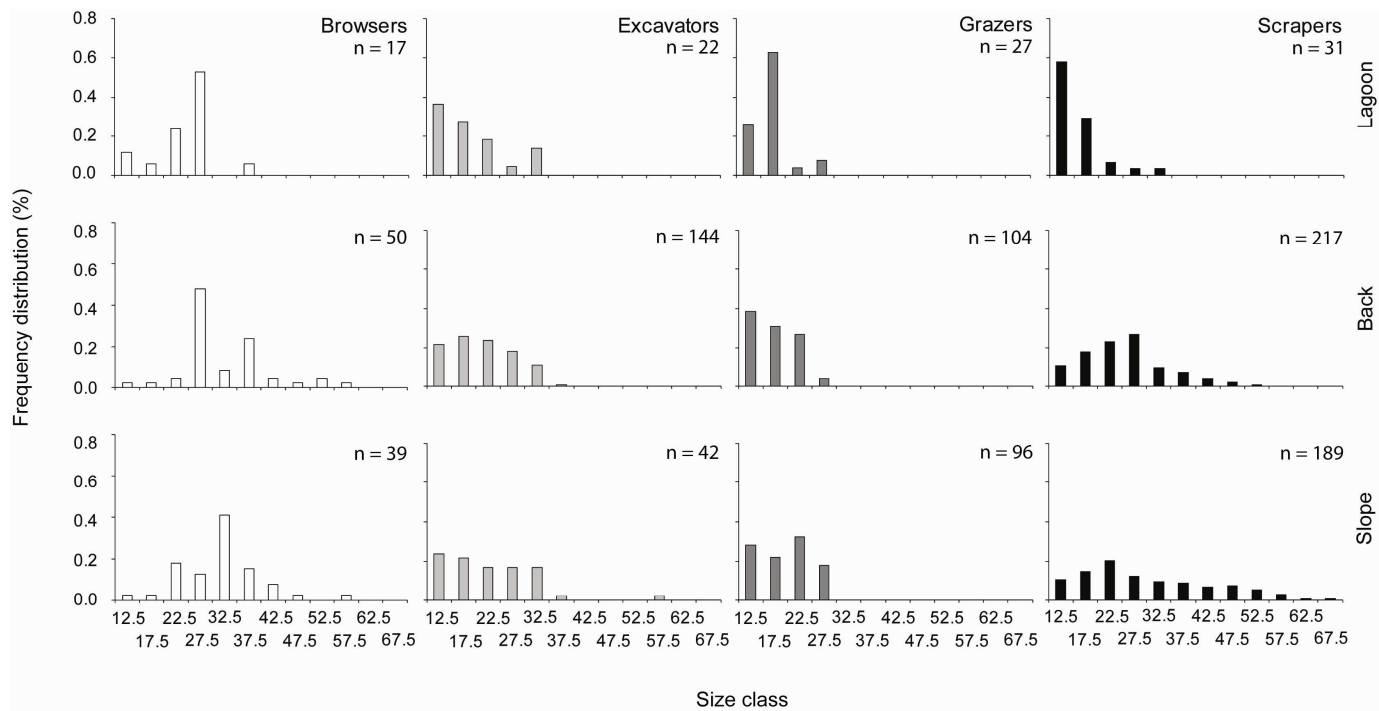


Fig S2. Size frequency distribution (%) for browsers, excavators, grazers and scrapers across three habitats (lagoon, back reef and slope). Fish are divided into 5 cm size classes with the average size of each size class being displayed (e.g. 10-15 cm size class is labelled 12.5 cm).

- 1 **Table S1. Proportion coral cover (%) and average densities 100 m⁻² for each functional group, further broken down into each size**
- 2 **functional group for each site and habitat separately**

Avg density 100m ⁻²	Coral cover	Browsers				Excavators				Grazers/detritivores				Scrapers			
		Small (BS)	Medium (BM)	Large (BL)	Total	Small (ES)	Medium (EM)	Large (EL)	Total	Small (GS)	Medium (GM)	Large (GL)	Total	Small (SS)	Medium (SM)	Large (SL)	Total
Back		1.328	1.120	0.176	2.624	1.888	1.088		2.976	3.904	2.632	0.280	6.816	1.064	1.512	0.136	2.712
1	21.6					2.800	0.800		3.600	6.480	1.680		8.160	0.320	1.280		1.600
3	26.3		2.400		2.400	1.520	1.600		3.120	1.280	2.480	1.600	5.360	0.080	0.560		0.640
4	43.9	0.080	0.400		0.480	0.400	1.600		2.000	0.640	13.680	1.200	15.520		1.120	0.080	1.200
5	25.8		0.960	1.600	2.560	1.760	1.120		2.880	0.400	0.640		1.040	0.320	1.920	0.240	2.480
6	10.3	3.600	0.240	0.080	3.920	1.760		1.760	3.520	2.640	4.720		7.360	1.280	0.560	0.560	2.400
7	38.2		0.720		0.720	0.800	0.640		1.440	0.320	0.080		0.400	0.880	1.440	0.080	2.400
8	60.9		0.160	0.080	0.240	3.920	1.520		5.440		0.480		0.480	1.120	2.320		3.440
9	52.1	1.040	3.600		4.640	1.920	1.600		3.520	5.920	1.600		7.520	1.600	2.000	0.240	3.840
10	44.8	8.080	1.600		9.680	2.560	1.200		3.760	8.560	0.240		8.800	0.880	1.760	0.080	2.720
11	34.9	0.480	1.120		1.600	1.440	0.800		2.240	12.800	0.720		13.520	4.160	2.160	0.080	6.400
Slope		0.016	0.992	0.040	1.048	1.272	0.264		1.544	1.600	1.456	0.776	3.832	1.328	0.984	0.552	2.864
1	20.0		2.880	0.080	2.960	0.640	0.960		1.600	0.480	2.160	0.480	3.120	1.520	2.720	0.320	4.560
3	45.5		0.480	0.080	0.560						2.000	2.640	4.640	0.560	0.880	0.800	2.240
4	47.9	0.080	0.240	0.160	0.480	2.240	1.360		3.600	0.080	0.400		0.480	3.520	1.440	0.480	5.440
5	6.7			0.080	0.080					1.920	1.120	1.520	4.560	0.320	0.720	1.200	2.240
6	2.0		2.400		2.400					2.400			2.400				
7	25.7		0.080		0.080	3.040	0.080		3.200	0.320	0.160		0.480	0.960	0.400	0.080	1.440
8	47.3					6.080	0.080		6.160	0.080			0.080	4.400	0.480	0.640	5.520
9	19.8	0.080	2.960		3.040	0.720	0.160		0.880	3.120	2.320		5.440	1.360	1.280	0.400	3.040
10	7.5		0.880		0.880					4.160	3.040	0.880	8.080	0.560	0.960	0.560	2.080
11	9.7									3.440	3.360	2.240	9.040	0.080	0.960	1.040	2.080

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Table S2. The results from a series of one-way ANOVAs are shown for significant differences in fish densities (m^{-2}) between the back reef habitat and the slope habitat

	df	SS	MS	F	<i>p</i>	
Browsers Small (SM)						
Habitat	1	0.120	0.120	7.002	0.009	*
Error	98	1.679	0.017			
Total	99	1.799				
Excavators Medium (EM)						
Habitat	1	0.791	0.791	37.806	0.000	*
Error	98	2.050	0.021			
Total	99	2.841				
Excavators Small (ES)						
Habitat	1	0.822	0.822	24.173	0.000	*
Error	98	3.333	0.034			
Total	99	4.155				
Grazers Large (GL)						
Habitat	1	0.153	0.153	7.031	0.009	*
Error	98	2.130	0.022			
Total	99	2.283				
Scrapers Large (SL)						
Habitat	1	0.185	0.185	9.344	0.003	*
Error	98	1.944	0.020			
Total	99	2.130				
Scrapers Medium (SM)						
Habitat	1	0.187	0.187	6.737	0.011	*
Error	98	2.714	0.028			
Total	99	2.900				
All herbivores (m^{-2})						
Habitat	1	0.243	0.243	6.523	0.012	*
Error	98	3.650	0.037			
Total	99	3.892				

Table S3. Average densities 100 m⁻² for each species and functional group, broken down into each size functional group for each habitat separately

Avg density 100m ⁻²	Back				Slope			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Browser	1.328	1.120	0.176	2.624	0.016	0.992	0.040	1.048
<i>Acanthuridae</i>	0.320	0.544	0.176	1.040		0.632	0.024	0.656
<i>Naso annulatus</i>		0.096		0.096		0.008		0.008
<i>Naso brevirostris</i>		0.008		0.008		0.016		0.016
<i>Naso lituratus</i>		0.056		0.056		0.128		0.128
<i>Naso unicornis</i>	0.320	0.384		0.880		0.480	0.024	0.504
Epipphidae						0.024	0.008	0.032
<i>Platax orbicularis</i>						0.016		0.016
<i>Platax pinnatus</i>						0.008		0.008
<i>Platax teira</i>							0.008	0.008
Kyphosidae		0.304		0.304		0.336	0.008	0.344
<i>Kyphosus cornelii</i>		0.016		0.016				
<i>Kyphosus sydneyanus</i>		0.288		0.288		0.336	0.008	0.344
Siganidae	1.008	0.272		1.280	0.016			0.016
<i>Siganus fuscescens</i>	1.008	0.272		1.280	0.016			0.016
Excavator	1.888	1.088		2.976	1.272	0.264		1.536
Scaridae	1.888	1.088		2.976	1.272	0.264		1.536
<i>Chlorurus microrhinos</i>	0.016	0.024		0.040		0.024		0.024
<i>Chlorurus sordidus</i>	1.872	1.064		2.936	1.272	0.240		1.512
Grazer/detritivore	3.904	2.632	0.280	6.816	1.600	1.456	0.776	3.832
Acanthuridae	3.904	2.504	0.280	6.688	1.600	1.360	0.768	3.728
<i>Acanthurus dussumieri</i>	0.104	0.800	0.280	1.184	0.016	0.704	0.288	1.008
<i>Acanthurus grammoptilus</i>						0.024		0.024
<i>Acanthurus nigricans</i>		0.008		0.008		0.008		0.008
<i>Acanthurus nigricauda</i>						0.088		0.088
<i>Acanthurus nigrofuscus</i>		0.032		0.032	0.008	0.072		0.080
<i>Acanthurus olivaceus</i>							0.344	0.344
<i>Acanthurus triostegus</i>	3.632	1.448		5.080	1.520	0.016		1.536
<i>Ctenochaetus striatus</i>	0.072	0.168		0.240		0.424	0.136	0.560
<i>Ctenochaetus strigosus</i>		0.008		0.008				
<i>Zebrasoma scopas</i>	0.096	0.008		0.104	0.056			0.056
<i>Zebrasoma veliferum</i>		0.032		0.032		0.024		0.024
Siganidae		0.128		0.128		0.096	0.008	0.104
<i>Siganus laqueus</i>		0.008		0.008		0.016		0.016
<i>Siganus trispilos</i>		0.040		0.040			0.008	0.008
<i>Siganus virigatus</i>		0.080		0.080		0.080		0.080
Scraper	1.064	1.512	0.136	2.712	1.328	0.984	0.552	2.864
Scaridae	1.064	1.512	0.136	2.712	1.328	0.984	0.552	2.864
<i>Hipposcarus longiceps</i>	0.040	0.008		0.048			0.080	0.080
<i>Scarus chameleon</i>	0.216	0.096		0.312	0.120	0.040		0.160
<i>Scarus dimidiatus</i>	0.008	0.016		0.024		0.016		0.016
<i>Scarus frenatus</i>	0.080	0.408	0.024	0.512	0.072	0.176	0.040	0.288
<i>Scarus ghobban</i>	0.128	0.128	0.056	0.312		0.016	0.032	0.048
<i>Scarus globiceps</i>	0.008			0.008				
<i>Scarus oviceps</i>	0.032	0.032		0.064				
<i>Scarus prasiognathus</i>	0.024	0.224	0.040	0.288	0.024	0.256	0.152	0.432
<i>Scarus psittacus</i>	0.016			0.016	0.096	0.072		0.168
<i>Scarus rivulatus</i>	0.160	0.176		0.336	0.200	0.048		0.248
<i>Scarus rubroviolaceus</i>		0.048	0.016	0.064	0.016	0.136	0.240	0.392
<i>Scarus schlegeli</i>	0.352	0.376		0.728	0.800	0.224	0.008	1.032

Table S4. Results from one-way ANOVA examining similarities in abundance for size classes within each functional group for back reef and slope separately

	df	SS	MS	F	p	
Back						
Browsers						
Size class	2	0.626	0.313	12.425	0.000	*
Error	147	3.701	0.025			
Total	149	4.327				
Excavators						
Size class	1	0.030	0.030	1.047	0.309	
Error	98	2.773	0.028			
Total	99	2.803				
Grazers						
Size class	2	1.467	0.733	19.358	0.000	*
Error	147	5.570	0.038			
Total	149	7.037				
Scrapers						
Size class	2	1.317	0.658	27.472	0.000	*
Error	147	3.523	0.024			
Total	149	4.840				
Slope						
Browsers						
Size class	2	0.426	0.213	14.338	0.000	*
Error	147	2.181	0.015			
Total	149	2.607				
Excavators						
Size class	1	0.024	0.024	0.899	0.345	
Error	98	2.610	0.027			
Total	99	2.634				
Grazers						
Size class	2	0.268	0.134	3.395	0.036	*
Error	147	5.811	0.040			
Total	149	6.079				
Scrapers						
Size class	2	0.086	0.043	1.327	0.268	
Error	147	4.742	0.032			
Total	149	4.827				