

The following supplement accompanies the article

Symmetrical effects of interspecific competition on congeneric coral-reef fishes

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Table S1. Habitat parameters of ledges and initial densities of fairy and blackcap basslet in focal populations used for behavioral observations (A) and a manipulative experiment (B).

A. Observations of basslet behavior (July-August 2013)

Reef name	Reef area (m ²)	Ledge ID #	Ledge depth (m)	Ledge surface area (m ²)	Initial fairy (fish /m ²)	Initial blackcap (fish /m ²)
T08	533	64	15.5	0.90	13.3	11.1
		65	15.2	4.36	2.75	0.92
		83	14.6	9.99	2.30	1.20
Twin	322	3	13.1	2.10	4.29	0.95
		49	11.9	1.92	4.17	0.52
		74	11.9	7.92	4.17	0.21

B. Manipulative experiment (June-August 2014)

Reef name	Reef area (m ²)	Ledge ID #	Ledge depth (m)	Ledge surface area (m ²)	Initial fairy (fish /m ²)	Initial blackcap (fish /m ²)	Ledge treatment
Cathedral	1023	8	14.3	1.27	7.11	3.95	Control
		24	14.9	1.69	2.37	2.37	Fairy-removal
		4	13.4	1.22	4.94	1.65	Blackcap-removal
M02	344	14	15.5	1.90	12.6	11.1	Control
		15	15.5	1.92	6.27	1.04	Fairy-removal
		16	15.8	2.07	2.42	2.90	Blackcap-removal
T08	533	23	14.6	2.38	3.78	0.84	Control
		44	14.6	2.15	5.58	0.93	Fairy-removal
		65	15.2	4.36	6.74	0.88	Blackcap-removal

Table S2. Results of likelihood ratio tests (LRTs) of the hypothesized relationship between the relative frequency of chases between basslet species (fairy and blackcap) and the *size* class of fish (2-5 cm), *role* of fish (aggressor versus recipient), and/or *time of day* (dawn, midday, dusk) within local populations of both species (n=6 populations). All significant correlations and corresponding p-values are in bold.

Basslet species	Fixed effect	LRT p
Fairy	size × role × time of day	0.137
	role × time of day	0.624
	size × time of day	0.088
	size × role	0.161
	size	0.104
	time of day	0.553
	role	0.002
Blackcap	size × role × time of day	0.969
	role × time of day	0.209
	size × time of day	0.948
	size × role	0.611
	size	0.566
	time of day	0.182
	role	0.034

Table S3. Results of likelihood ratio tests (LRTs) of the hypothesized relationship between the number of chases in which fairy and blackcap basslets chased (aggressor) and were chased (recipient) by each species (*rec species* and *agg species*, respectively) in populations of both basslets (n=6 populations), given the size class of focal fishes (2-5 cm, *agg size* and *rec size*) and/or *time of day* (dawn, midday, dusk). In the instance when the interaction between *rec size* and *agg species* was significant, p-values from linear combinations testing the relationship of *agg species* with each *rec size* were adjusted to achieve an approximate family-wise error rate of 95 %. All significant correlations and p-values are in bold.

Basslet role	Basslet species	Fixed effect	LRT p	Contrasts	p _{cor}
Aggressor	Fairy	agg size × rec species × time of day	0.747		
		agg size × time of day	0.597		
		rec species × time of day	0.834		
		agg size × rec species	0.807		
		agg size	0.472		
		rec species	0.311		
		time of day	0.232		
	Blackcap	agg size × rec species × time of day	0.259		
		agg size × time of day	0.410		
		rec species × time of day	0.922		
		agg size × rec species	0.393		
		agg size	0.791		
		rec species	0.003		
		time of day	0.299		
Recipient	Fairy	rec size × agg species × time of day	0.468		
		rec size × time of day	0.196		
		agg species × time of day	0.916		
		rec size × agg species	<0.001	2 cm	<0.001
				3 cm	<0.001
				4 cm	<0.001
				5 cm	0.549
	time of day	0.253			
	Blackcap	rec size × agg species × time of day	0.457		
		rec size × time of day	0.350		
		agg species × time of day	0.735		
		rec size × agg species	0.907		
		rec size	0.060		
agg species		0.681			
	time of day	0.302			

Table S4. Results of likelihood ratio tests (LRTs) of the hypothesized relationship between the feeding rate of 2.0-2.5 cm individuals (A) in local populations of both species (n=6 populations) and categorical variables, *ledge position*, *time of day* (dawn, midday, and dusk) and/or basslet *species* (fairy and blackcap). There was a significant interaction between *ledge position* and *time of day*, and p-values from linear combinations among ledge positions in each time of day (B) and among times of day in each ledge position (C) were adjusted (p_{cor}) to achieve an approximate family-wise error rate of 5%. All significant correlations and corresponding p-values are in bold.

(A)

Fixed effect	LRT p
ledge position × time of day × species	0.961
ledge position × species	0.241
time of day × species	0.067
ledge position × time of day	0.026
species	0.324

(B)

Time of day	Contrast	p_{cor}
Dawn	back vs. midback	0.020
	back vs. midfront	<0.001
	back vs. front	<0.001
	midback vs. midfront	0.020
	midback vs. front	<0.001
	midfront vs. front	0.019
Midday	back vs. midback	0.019
	back vs. midfront	<0.001
	back vs. front	<0.001
	midback vs. midfront	0.004
	midback vs. front	<0.001
	midfront vs. front	0.008
Dusk	back vs. midback	0.011
	back vs. midfront	<0.001
	back vs. front	<0.001
	midback vs. midfront	<0.001
	midback vs. front	<0.001
	midfront vs. front	<0.001

(C)

Ledge position	Contrast	p_{cor}
Back	dawn vs. midday	0.053
	dawn vs. dusk	<0.001
	midday vs. dusk	<0.001
Midback	dawn vs. midday	0.080
	dawn vs. dusk	<0.001
	midday vs. dusk	<0.001
Midfront	dawn vs. midday	0.725
	dawn vs. dusk	<0.001
	midday vs. dusk	<0.001
Front	dawn vs. midday	1.000
	dawn vs. dusk	<0.001
	midday vs. dusk	0.019

Table S5. Results of likelihood ratio tests (LRTs) of the hypothesized effect of the potential competitor (*comp*) and/or *time* on the change in ledge position and density of 4 and 5 cm basslets in a manipulative experiment. Response of basslets were compared between populations with the potential competitor removed versus unmanipulated populations of both species (n=3 populations per treatment). Variables with significant effects and corresponding p-values are in bold.

Basslet species	Response variable	Basslet size	Fixed effect	LRT p	
Fairy	Change in ledge position	4 cm	comp × time	0.648	
			comp	0.345	
			time	0.637	
		5 cm	comp × time	0.245	
				comp	0.761
				time	0.380
	Change in density	4 cm	comp × time	0.222	
			comp	0.400	
time			0.358		
5 cm		comp × time	0.072		
			comp	0.699	
			time	0.790	
Blackcap	Change in ledge position	4 cm	comp × time	0.280	
			comp	0.577	
			time	0.310	
		5 cm	comp × time	0.178	
				comp	0.316
				time	0.262
	Change in density	4 cm	comp × time	0.753	
			comp	0.431	
time			0.101		
5 cm		comp × time	0.073		
			comp	0.164	
			time	0.039	

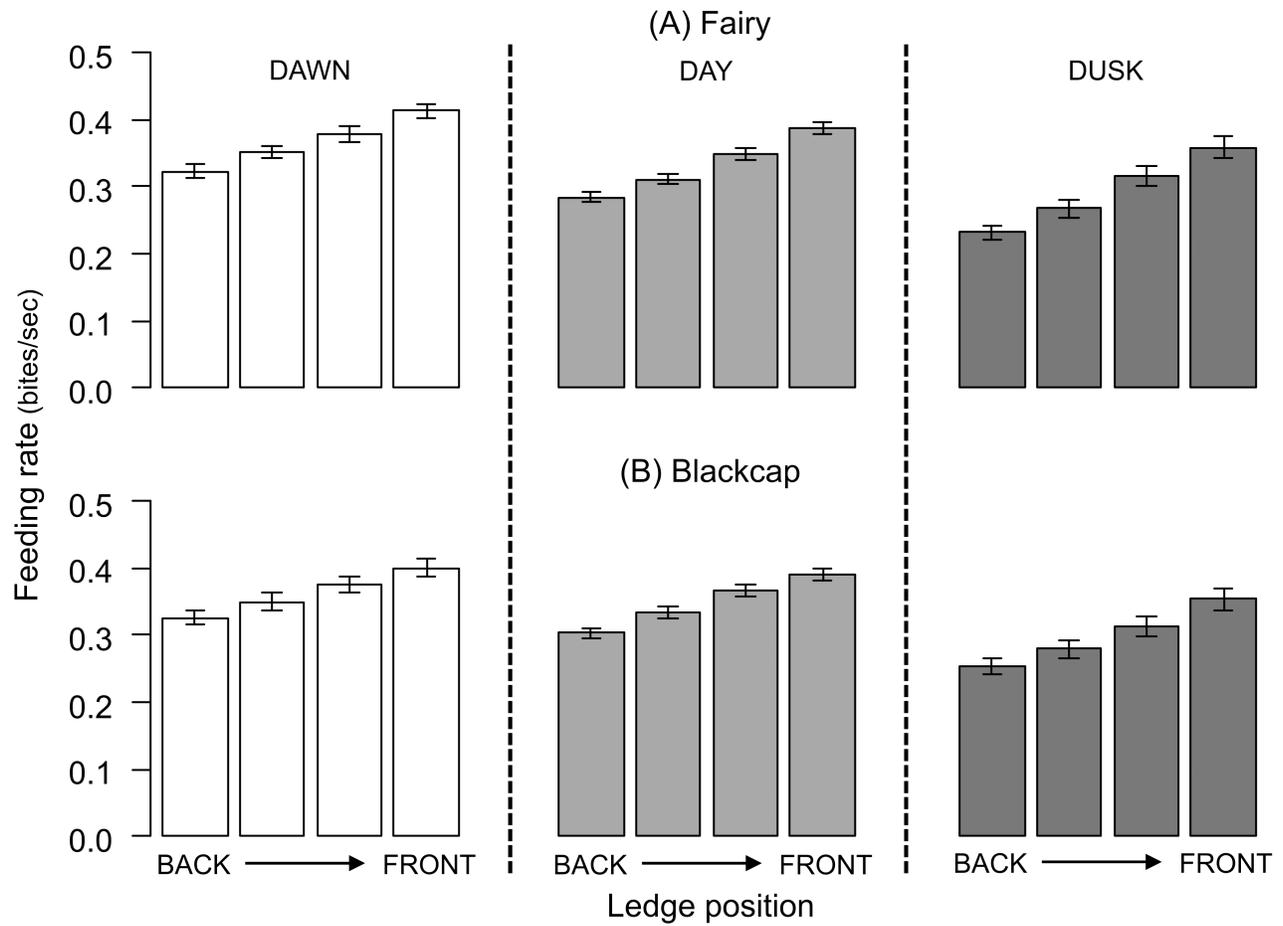


Fig. S1. Feeding rate of 2.0-2.5 cm fairy (A) and blackcap (B) basslets in positions from the back to front of ledges (*ledge position*) in local populations of both species (n=6) during dawn, midday, and dusk (*time of day*, indicated by shading). Error bars are standard error of the mean.

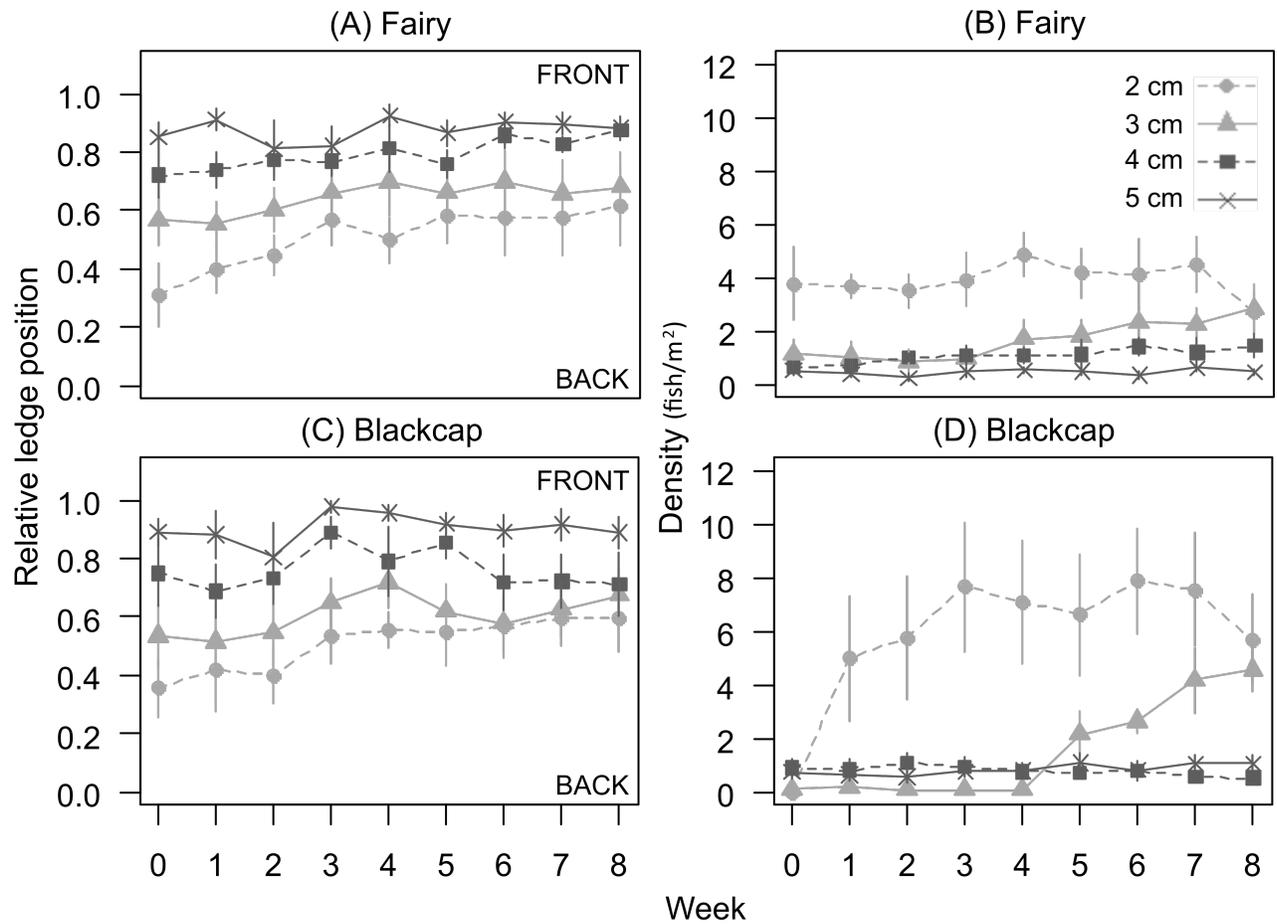


Fig. S2. Ledge position (left plots) and density (right plots) of 2-5 cm fairy basslet (A and B) and blackcap basslet (C and D) through time (week) during the manipulative experiment. Size classes of basslets are indicated by combinations of symbols and shading (see legend), and error bars are standard error of the mean.