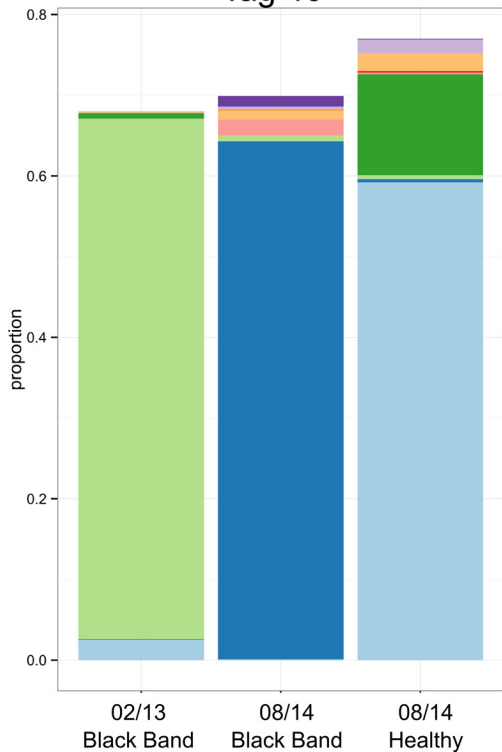


Tag 46



Tag 50

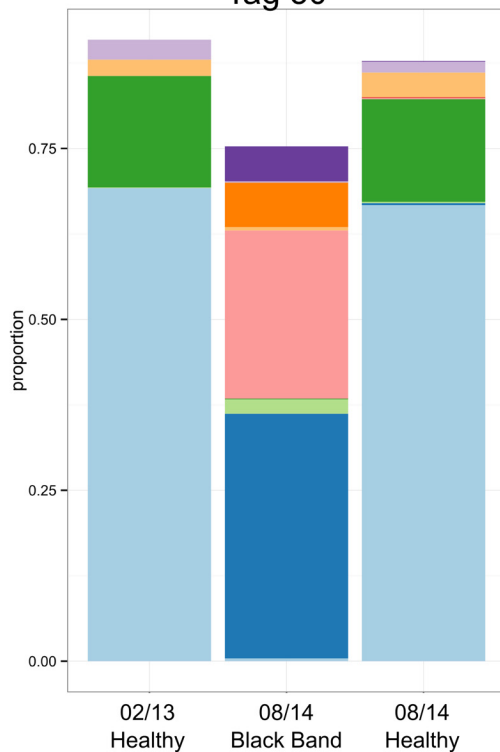
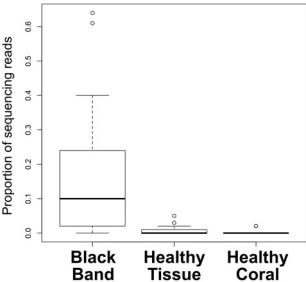


Fig. S1

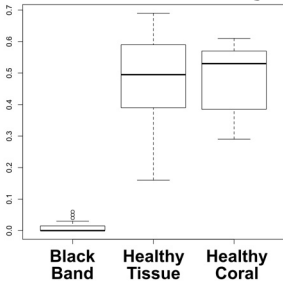
genera

- Halomonas*
- Roseofilum*
- Rhodobacteraceae (A)*
- Moritella*
- Bacteroidales*
- Kiloniellales*
- Marinobacter*
- Fusibacter*
- Enterobacteriaceae (A)*
- Desulfovibrio*

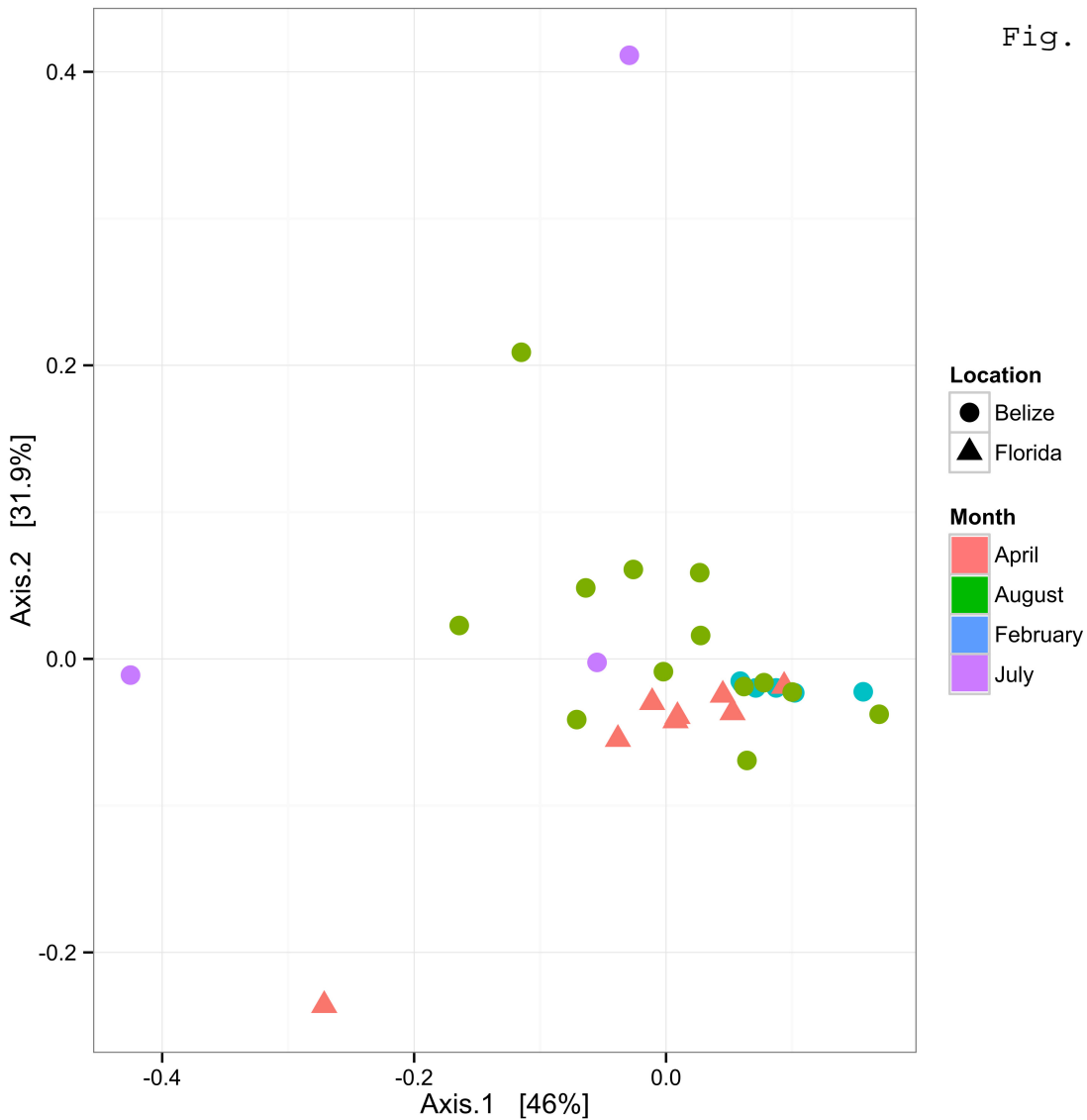
Roseofilum



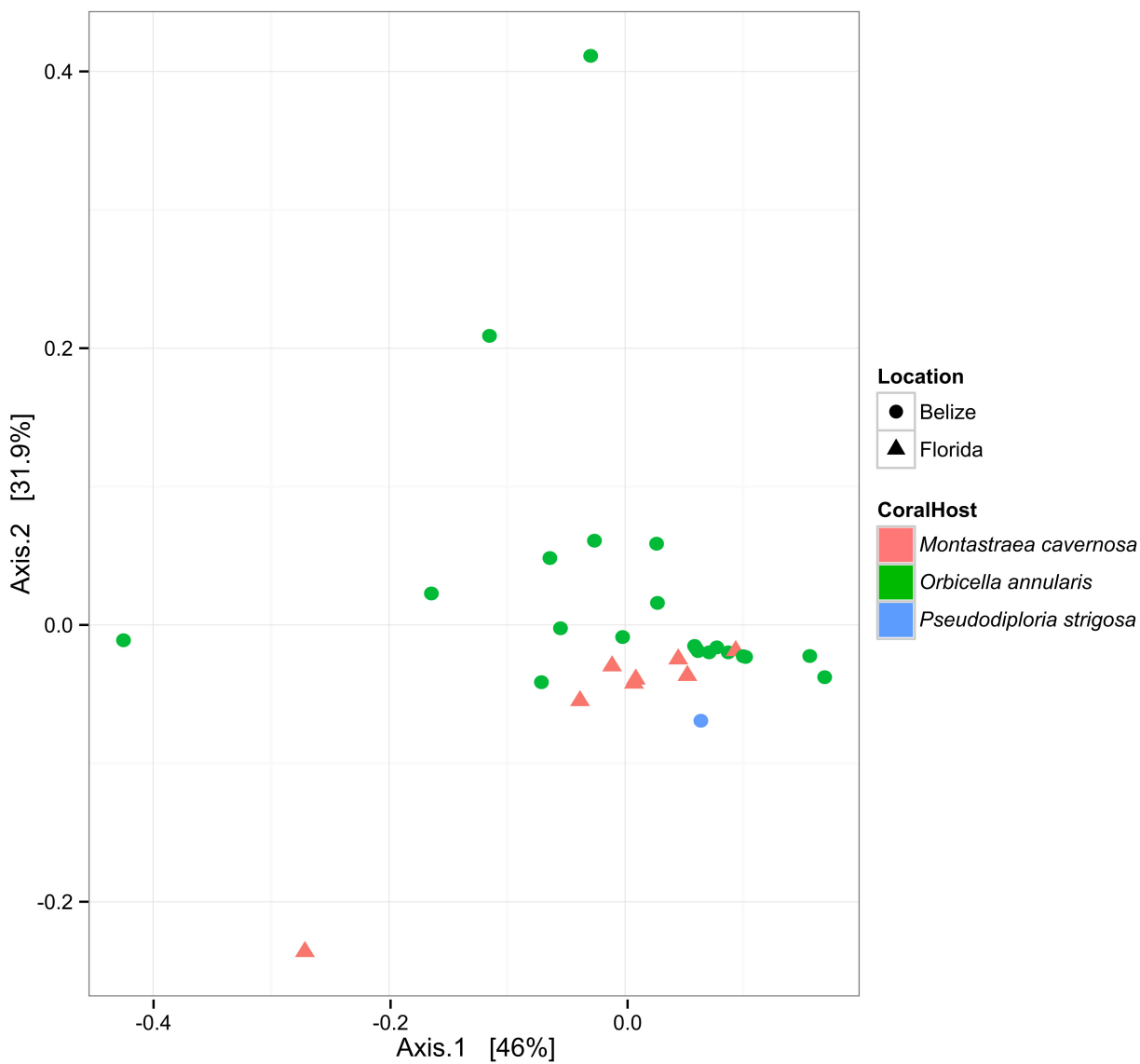
Halomonas Fig.S2



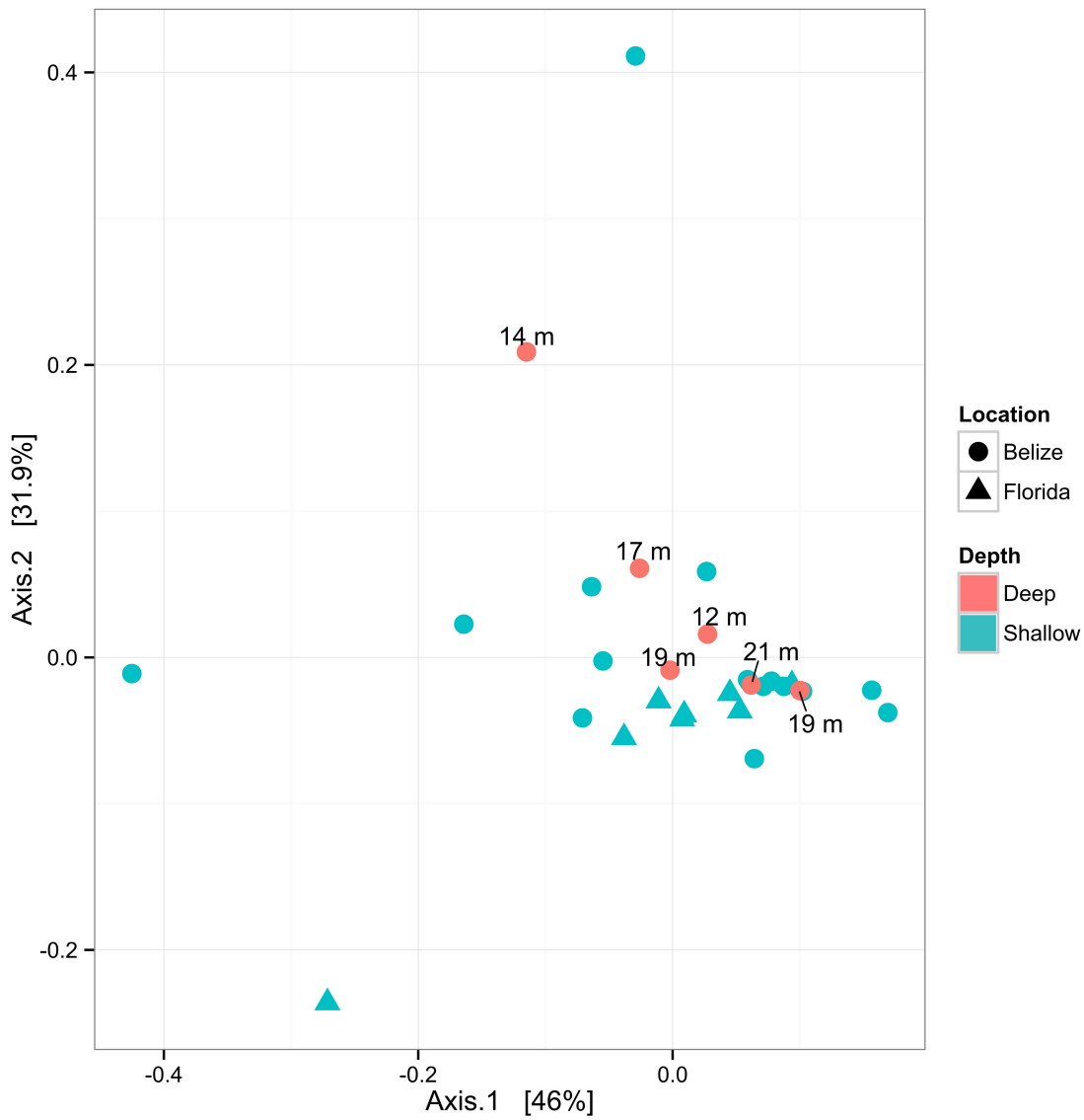
A

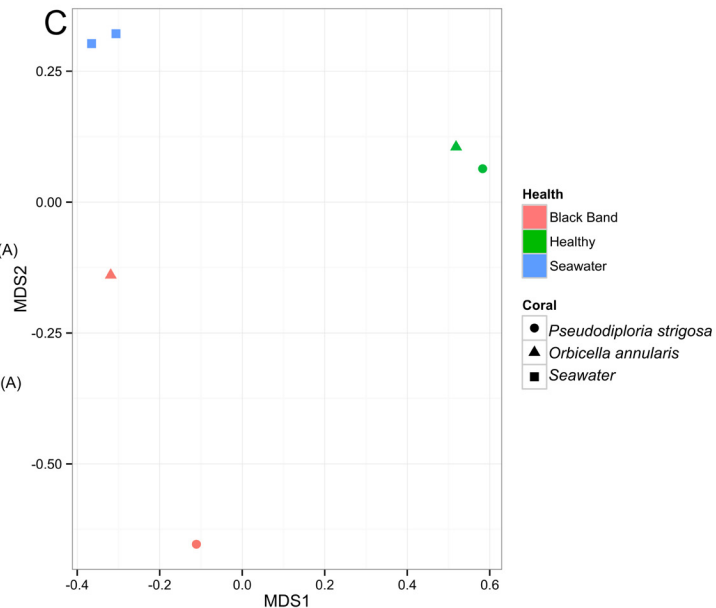
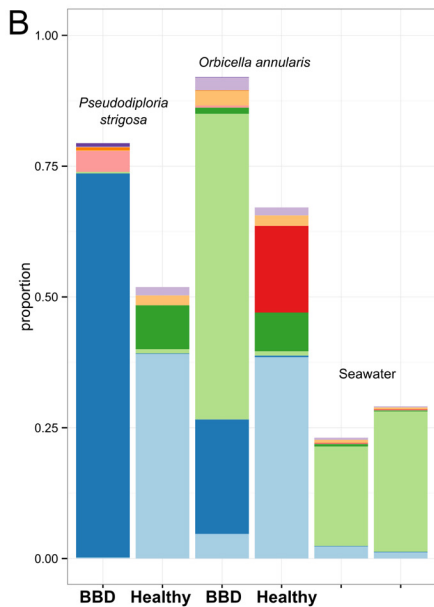


B



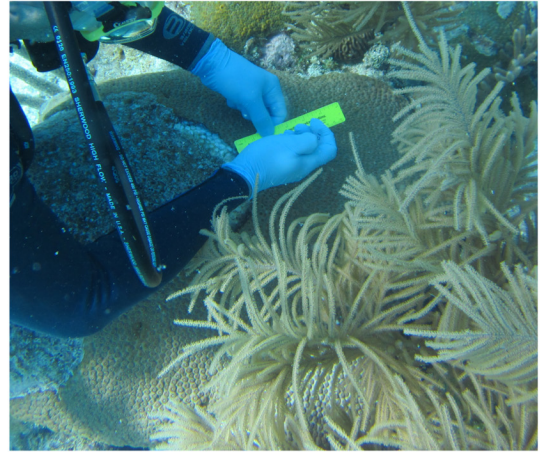
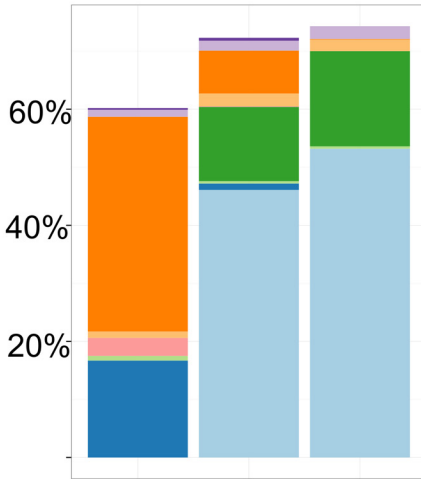
C



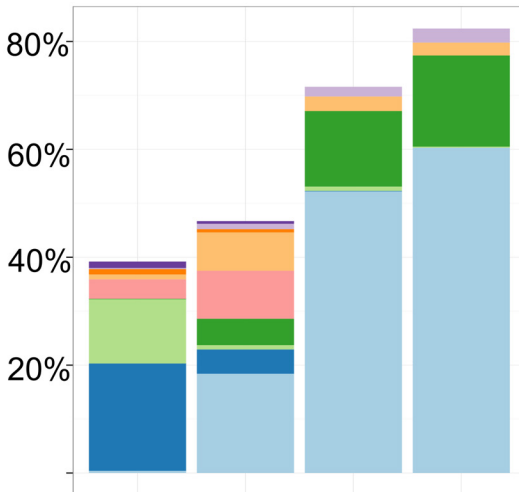


BBD 5 cm 10 cm 15 cm
away away away

Coral A



Coral B



Coral C

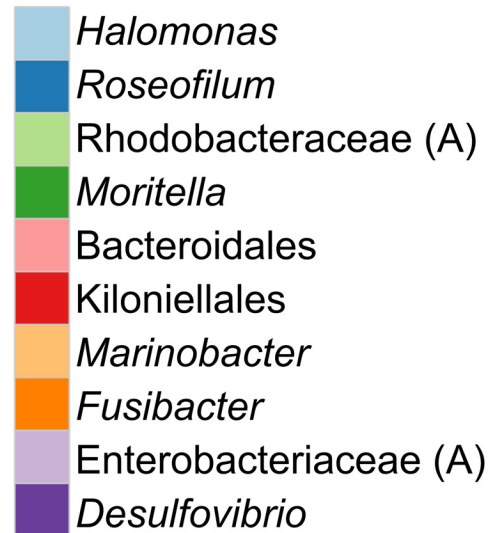
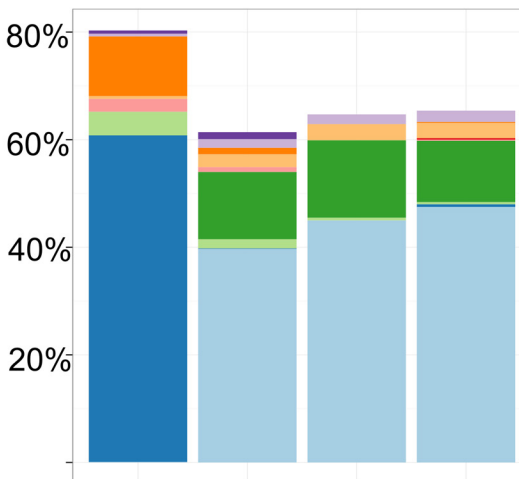
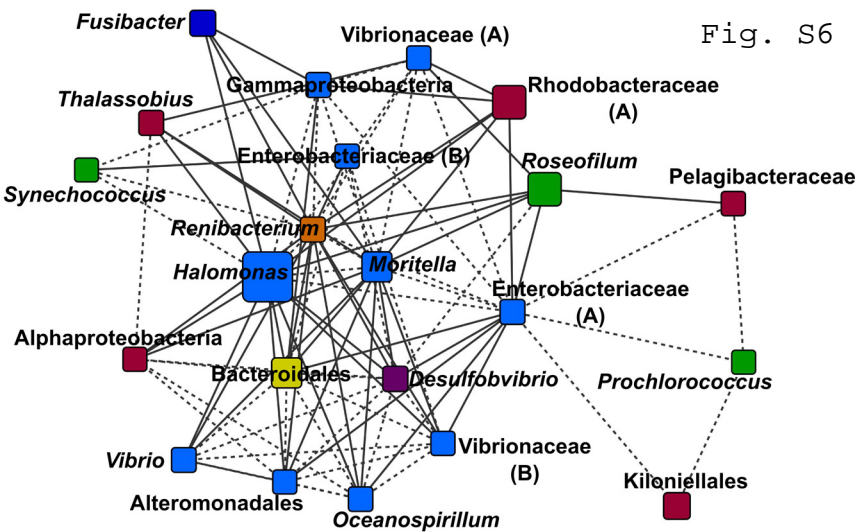
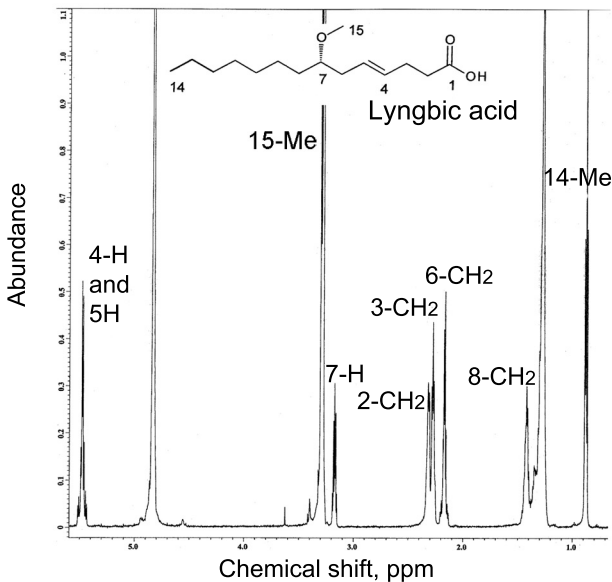
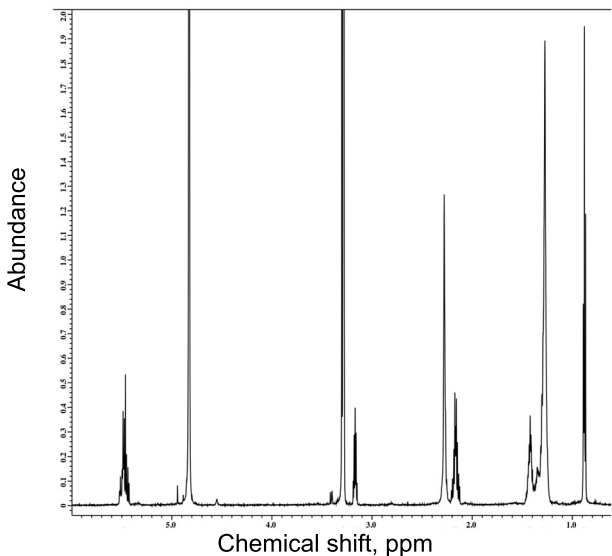


Fig. S6





B. Lyngbic acid, Looe Key sample



Responses of a constitively luminescent construct

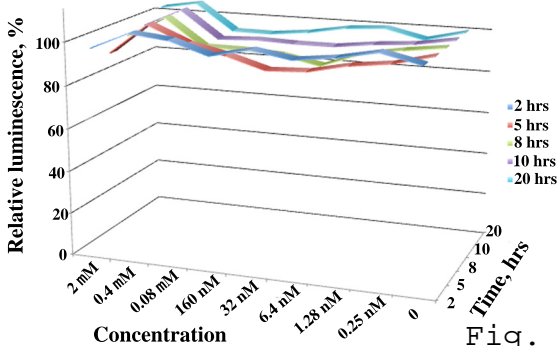


Fig. S8

SUPPLEMENTARY INFORMATION

Table S1. Summary of sample characteristics for 60 coral surface microbiomes and 2 surface seawater samples used to assess bacterial community structure based on the V6 hypervariable region of 16S rRNA genes.

Sample	Health	Location	Coral host	Collection date	# 16S rRNA sequences
BLZD	Black Band Winter	Belize ¹	<i>Pseudodiploria strigosa</i>	February 2013	161175
F28BB	Black Band Winter	Belize	<i>Orbicella annularis</i>	February 2013	437756
F28NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	February 2013	605646
F29BB	Black Band Winter	Belize	<i>Orbicella annularis</i>	February 2013	156581
F29NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	February 2013	750674
F32NC	Healthy Coral	Belize	<i>Orbicella annularis</i>	February 2013	591196
F33BB	Black Band Winter	Belize	<i>Orbicella annularis</i>	February 2013	197139
F33NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	February 2013	301370
F34BB	Black Band Winter	Belize	<i>Orbicella annularis</i>	February 2013	259348
F44BB	Black Band Winter	Belize	<i>Orbicella annularis</i>	February 2013	429660
F44NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	February 2013	477309
F46BB	Black Band Winter	Belize	<i>Orbicella annularis</i>	February 2013	509846
F50NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	February 2013	486978
BLZ2	Black Band	Belize	<i>Orbicella annularis</i>	July 2013	128828
BLZ4	Black Band	Belize	<i>Orbicella annularis</i>	July 2013	103769
BLZ5	Black Band	Belize	<i>Orbicella annularis</i>	July 2013	91008
J32BB	Black Band	Belize	<i>Orbicella annularis</i>	July 2013	232032
J32NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	July 2013	7497
J44HE	Healthy Tissue	Belize	<i>Orbicella annularis</i>	July 2013	82343
J44NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	July 2013	59427
A28NC	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	19668
A33NC	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	93483
A44NC	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	42441
A46BB	Black Band	Belize	<i>Orbicella annularis</i>	August 2014	420731
A46NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	August 2014	27887
A50BB	Black Band	Belize	<i>Orbicella annularis</i>	August 2014	197817
A50NC	Healthy Tissue	Belize	<i>Orbicella annularis</i>	August 2014	184663
DBB	Black Band	Belize	<i>Pseudodiploria strigosa</i>	August 2014	216239
DCL	Black Band	Belize	<i>Pseudodiploria clivosa</i>	August 2014	9894
DNC	Healthy Tissue	Belize	<i>Pseudodiploria strigosa</i>	August 2014	218996
M40FT	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	81349
M47FT	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	139338
M57FT	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	103810
M61FTA	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	107657
M61FTB	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	279217
M70FT	Healthy Coral	Belize	<i>Orbicella annularis</i>	August 2014	444668

MBB	Healthy Tissue	Belize	<i>Orbicella annularis</i>	August 2014	89557
MNC	Black Band	Belize	<i>Orbicella annularis</i>	August 2014	265445
FL1	Black Band	Florida ²	<i>Montastraea cavernosa</i>	May 2013	116582
FL2	Black Band	Florida	<i>Montastraea cavernosa</i>	May 2013	405508
FL4	Black Band	Florida	<i>Montastraea cavernosa</i>	May 2013	329776
FL5	Black Band	Florida	<i>Montastraea cavernosa</i>	May 2013	57826
LK1	Black Band	Florida	<i>Montastraea cavernosa</i>	June 2013	244728
LK2	Black Band	Florida	<i>Orbicella faveolata</i>	June 2013	154344
LK4	Black Band	Florida	<i>Orbicella faveolata</i>	June 2013	218069
FLA	Black Band	Florida	<i>Montastraea cavernosa</i>	April 2014	229715
FLA1	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	159926
FLA2	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	133956
FLB	Black Band	Florida	<i>Montastraea cavernosa</i>	April 2014	152417
FLB1	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	70991
FLB2	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	185284
FLB3	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	356706
FLC	Black Band	Florida	<i>Montastraea cavernosa</i>	April 2014	342318
FLC1	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	137179
FLC2	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	360277
FLC3	Healthy Tissue	Florida	<i>Montastraea cavernosa</i>	April 2014	128188
Hon2	Black Band	Honduras ³	<i>Pseudodiploria strigosa</i>	May 2013	306458
HonC	Black Band	Honduras ⁴	<i>Pseudodiploria strigosa</i>	May 2013	351059
HonJ	Black Band	Honduras ⁵	<i>Pseudodiploria strigosa</i>	May 2013	216036
HonS	Black Band	Honduras ⁶	<i>Pseudodiploria strigosa</i>	May 2013	483653
SWA	Seawater	Belize	Seawater	August 2014	188732
SWB	Seawater	Belize	Seawater	August 2014	229048

¹ Carrie Bow Cay, Belize (16.797 N, 88.084 W)

² Looe Key Reef, Florida, USA (24.548 N, 81.406 W)

³ Vivorillos: 15.837 N, 83.292 W

⁴ Medialuna: 15.261 N, 82.631 W

⁵ Cajones: 16.085 N, 83.143 W

⁶ Caratasca: 16.025 N, 83.318 W

Table S2. Detection of lyngbic acid in Black Band Disease (BBD) mats collected in Belize and Florida from different corals

Place of collection	Date of collection	Coral host	Detection method	Compound name
Carrie Bow Cay, Belize	March 1, 2013	<i>Pseudodiploria strigosa</i> , <i>Orbicella annularis</i>	NMR	Lyngbic acid
Carrie Bow Cay, Belize	July 13-17, 2013	<i>O. annularis</i> , <i>P. strigosa</i> *	NMR/ HRMS	Lyngbic acid
Wonderland Key, Florida	June 10, 2013	<i>M. cavernosa</i> , <i>O.</i> <i>faveolata</i>	NMR	Lyngbic acid
Looe Key, Florida	May 17, 2013	<i>M. cavernosa</i> , <i>O.</i> <i>faveolata</i>	NMR	Lyngbic acid
Looe Key, Florida	September 12, 2013	<i>M. cavernosa</i> , <i>O.</i> <i>faveolata</i>	NMR	Lyngbic acid
Looe Key, Florida	November 20, 2013	<i>M. cavernosa</i> , <i>O.</i> <i>faveolata</i>	NMR	Lyngbic acid
Looe Key, Florida	April 23, 2014	<i>Montastraea cavernosa</i> *	NMR	Lyngbic acid

*NMR spectra in Figure S7.

Table S3. Responses of *V. harveyi* QS reporters to lyngbic acid. Three separate pathways control bioluminescence in *V. harveyi*: Autoinducer system 1 (AI-1), autoinducer system 2 (AI-2), and the cholerae autoinducer system (CAI-1), with LuxU serving as a signal integration point. The presence of autoinducer synthase or receptor for each strain is indicated by "s" and "r", respectively. Responses were calculated as a percentage of negative control exposed to the solvent only \pm standard deviation.

Strain name	Genotype (reference)	AI-1	AI-2	CAI-1	Lyngbic acid concentration								
					2mM	0.4mM	0.08mM	160nM	32nM	6.4nM	1.28nM	0.25nM	0
JAF633	<i>luxM</i> linked to Kan ^r (2)	r	s, r	s, r	21 \pm 2	29 \pm 0	40 \pm 7	48 \pm 6	102 \pm 16	82 \pm 11	100 \pm 20	107 \pm 10	100 \pm 14
BB170	<i>luxN::Tn5</i> (3)	s	s, r	s, r	42 \pm 0	72 \pm 6	80 \pm 9	91 \pm 1	101 \pm 11	101 \pm 10	102 \pm 8	100 \pm 5	100 \pm 3
JMH603	<i>cqsA::Cm^r</i> (1)	s, r	s, r	r	3 \pm 1	17 \pm 2	40 \pm 1	61 \pm 12	78 \pm 1	71 \pm 11	80 \pm 14	79 \pm 10	100 \pm 0
JMH598	<i>cqsS::Cm^r</i> (1)	s, r	s, r	s	65 \pm 6	88 \pm 10	97 \pm 4	105 \pm 11	104 \pm 9	104 \pm 8	105 \pm 12	99 \pm 5	100 \pm 4
KM387	Δ <i>luxS</i> (1)	s, r	r	s, r	1 \pm 0	19 \pm 4	42 \pm 7	71 \pm 16	87 \pm 9	70 \pm 0	77 \pm 13	85 \pm 21	100 \pm 8
BB886	<i>luxPQ::Tn5</i> (4)	s, r	s	s, r	18 \pm 0	45 \pm 2	63 \pm 2	83 \pm 3	91 \pm 5	91 \pm 3	96 \pm 0	98 \pm 3	100 \pm 3
JAF536	<i>luxU::Tn5</i> (2)	s, r	s, r	s, r	46 \pm 3	78 \pm 3	83 \pm 0	95 \pm 3	99 \pm 1	96 \pm 1	99 \pm 4	100 \pm 0	100 \pm 3
BB120	wild type	s, r	s, r	s, r	47 \pm 2	64 \pm 1	81 \pm 5	98 \pm 0	103 \pm 4	113 \pm 10	104 \pm 0	105 \pm 1	100 \pm 2
BBD33	wild type, coral-associated				0 \pm 0	8 \pm 3	58 \pm 12	55 \pm 26	41 \pm 14	68 \pm 23	n/d	n/d	100 \pm 28
BBD69	wild type, coral-associated				0 \pm 0	2 \pm 0	35 \pm 1	54 \pm 7	37 \pm 5	64 \pm 3	n/d	n/d	100 \pm 48

n/a not applicable

n/d not determined

1. Henke JM & Bassler BL (2004) Three parallel quorum-sensing systems regulate gene expression in *Vibrio harveyi*. *J Bacteriol* 186(20):6902-6914.
2. Freeman JA & Bassler BL (1999) Sequence and function of LuxU: a two-component phosphorelay protein that regulates quorum sensing in *Vibrio harveyi*. *J Bacteriol* 181(3):899-906.
3. Bassler BL, Wright M, Showalter RE, & Silverman MR (1993) Intercellular signalling in *Vibrio harveyi*: sequence and function of genes regulating expression of luminescence. *Mol Microbiol* 9(4):773-786.
4. Bassler BL, Wright M, & Silverman MR (1994) Multiple signalling systems controlling expression of luminescence in *Vibrio harveyi*: sequence and function of genes encoding a second sensory pathway. *Mol Microbiol* 13(2):273-286.

Table S4. **Production of CAI-1 signal by coral-associated *Vibrio* strains.** Vibrios were isolated from either Black Band Disease (BBD) mats or from the healthy surface mucus layer from *Montastraea cavernosa* corals collected from Looe Key, Florida in April 2014. The production of the CAI-1 signal was assessed by measuring the bioluminescence of the *V. harveyi* strain JMH626 ($\Delta luxN luxO::Tn5$ *cqsA::cam*, which does not produce any quorum sensing signals of its own and detects only the CAI-1 signal) with the addition of 1/3 volume of culture filtrates from individual coral vibrios 4 hrs after the initiation of the experiment.

Strain	Source	Luminescence of JMH626, counts per second
BBD13	BBD mat	92
BBD28	BBD mat	12,533
BBD33	BBD mat	477,248
BBD34	BBD mat	45,158
BBD37	BBD mat	163,763
BBD38	BBD mat	104,534
BBD39	BBD mat	51,721
BBD40	BBD mat	51,787
BBD51	healthy coral mucus	26,128
BBD52	healthy coral mucus	25
BBD53	healthy coral mucus	45,882
BBD54	healthy coral mucus	79,104
BBD55	healthy coral mucus	49,878
BBD56	healthy coral mucus	3,611
BBD57	healthy coral mucus	773
BBD58	healthy coral mucus	38,235
BBD59	healthy coral mucus	58,854
BBD60	healthy coral mucus	89,494
BBD61	healthy coral mucus	46,157
BBD62	healthy coral mucus	100,913
BBD69	healthy coral mucus	82,732
BBD85	healthy coral mucus	87,409
BBD86	healthy coral mucus	97,494
BBD87	healthy coral mucus	43,946
BBD88	healthy coral mucus	43,946
BBD89	healthy coral mucus	47,158
BBD90	healthy coral mucus	96,866
BBD91	healthy coral mucus	119,031
BBD92	healthy coral mucus	134,269