

# Four-Year Field Survey of Black Band Disease and Skeletal Growth Anomalies in Encrusting *Montipora* spp. Corals around Sesoko Island, Okinawa

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**Table S1.** Likelihood ratio tests carried out on the final GLM models explaining Spatio-temporal variation in disease occurrence. Significant *p* values are italicised and *df* is degree of freedom.

Disease	Site-type	Variables	$\chi^2$	<i>df</i>	<i>p</i> value
BBD	Near shore (NS)	Site	83.0	7	<0.0001
		Year	34.5	3	<0.0001
		Site x Year	88.4	21	<0.0001
	Reef Edge (RE)	Site	173.3	3	<0.0001
		Year	26.2	2	<0.0001
		Site x Year			
GAs	Near shore	Site	6.2	7	0.5
		Year	18.2	3	0.0004
		Site x Year	66.2	21	<0.0001
	Reef edge	Site	33.7	3	<0.0001
		Year	6.6	2	0.04
		Site x Year	20.7	6	0.002

**Table S2.** BBD prevalence – numbers of BBD-infected colonies in comparison to healthy *Montipora* colonies per site, 2017–2020. (\*Near Shore Sites).

SITES*	No. of BBD colonies and BBD prevalence (%)			
--	2017	2018	2019	2020
S1*	30/267 (11.24)	4/239 (1.67)	7/385 (1.82)	7/186 (3.76)
S2*	23/250 (9.2)	7/307 (2.28)	7/350 (2)	1/171 (0.59)
S3*	13/268 (4.85)	2/169 (1.18)	15/384 (3.91)	9/176 (5.11)
S4*	43/278 (15.47)	19/255 (7.45)	2/181 (1.11)	9/183 (4.92)
S5*	23/146 (15.75)	7/86 (8.14)	3/96 (3.13)	10/93 (10.75)
S6*	42/112 (37.5)	7/163 (4.3)	4/117 (3.42)	2/129 (1.55)
S7*	7/138 (5.07)	13/389 (3.34)	3/480 (0.63)	7/256 (2.74)
S8*	3/65 (4.61)	42/451 (9.31)	4/253 (1.58)	18/300 (6.0)
S9	--	11/167 (6.59)	9/314 (2.87)	13/316 (4.12)
S10	--	7/239 (2.93)	12/374 (3.21)	4/241 (1.66)
S11	--	10/288 (3.47)	6/337 (1.78)	8/284 (2.82)
S12	--	129/647 (19.94)	80/601 (13.31)	32/369 (8.67)
Total	1524	3400	3872	2704

**Table S3.** GA prevalence – numbers of GAs-infected colonies in comparison to healthy *Montipora* colonies per site, 2017–2020. (\*Near Shore Sites)

SITES*	No. of GA colonies and GA prevalence			
--	2017	2018	2019	2020
S1*	4/267 (1.5)	4/239 (0.42)	10/385 (2.6)	13/186 (6.99)
S2*	5/250 (2)	7/307 (2.28)	14/350 (4)	13/171 (7.6)
S3*	5/268 (1.87)	2/169 (1.18)	14/384 (3.65)	26/176 (14.77)
S4*	3/278 (1.08)	0/255	4/181 (2.21)	19/183 (10.38)
S5*	3/146 (2.06)	6 (6.98)	6/96 (6.25)	8/93 (8.6)
S6*	0/112	0/86	5/117 (4.27)	7/129 (5.43)
S7*	1/138 (0.73)	0/163	13/480 (2.71)	29/256 (11.33)
S8*	2/65 (3.08)	0/389	9/253 (3.56)	1/300 (0.33)
S9	--	0/167	7/314 (2.23)	7/316 (2.22)
S10	--	1/239 (0.42)	6/374 (1.6)	7/241 (2.91)
S11	--	12/288 (4.17)	3/337 (0.89)	3/284 (1.06)
S12	--	0/647	0/601	0/369
<b>Total</b>	<b>1524</b>	<b>3400</b>	<b>3872</b>	<b>2704</b>

**Table S4.** Pairwise tests showing temporal variation in the probability of BBD occurrence on *Montipora* colonies at near-shore sites. *P* values are adjusted using the Holm method. The results are estimated marginal means on a logit scale. SE is standard error and *df* is degree of freedom. Significant *p* values are italicized and highlighted in blue color.

Site type	Site	Year pairs	Results	SE	df	Z ratio	<i>p</i> value
Near shore (NS)	S1	2017 – 2018	2.0	0.5	Inf	3.7	<i>0.001</i>
		2017 – 2019	1.9	0.4	Inf	4.5	<i>&lt;0.0001</i>
		2017 – 2020	1.2	0.4	Inf	2.7	<i>0.03</i>
		2018 – 2019	-0.1	0.6	Inf	-0.1	0.9
		2018 – 2020	-0.8	0.6	Inf	-1.3	0.5
		2019 – 2020	-0.7	0.5	Inf	-1.4	0.5
	S2	2017 – 2018	1.5	0.4	Inf	3.3	<i>0.004</i>
		2017 – 2019	1.6	0.4	Inf	3.6	<i>0.002</i>
		2017 – 2020	2.8	1.0	Inf	2.8	<i>0.02</i>
		2018 – 2019	0.1	0.5	Inf	0.2	0.8
		2018 – 2020	1.4	1.1	Inf	1.3	0.6
		2019 – 2020	1.2	1.1	Inf	1.2	0.6
	S3	2017 – 2018	1.4	0.8	Inf	1.9	0.3
		2017 – 2019	0.2	0.4	Inf	0.6	1.0
		2017 – 2020	-0.1	0.4	Inf	-0.1	1.0
		2018 – 2019	-1.2	0.8	Inf	-1.6	0.4
		2018 – 2020	-1.5	0.8	Inf	-1.9	0.3
		2019 – 2020	-0.3	0.4	Inf	-0.7	1.0
	S4	2017 – 2018	0.8	0.3	Inf	2.8	<i>0.02</i>
		2017 – 2019	2.8	0.7	Inf	3.8	<i>0.001</i>
		2017 – 2020	1.3	0.4	Inf	3.3	<i>0.004</i>
		2018 – 2019	2.0	0.7	Inf	2.6	<i>0.03</i>
		2018 – 2020	0.4	0.4	Inf	1.1	0.3
		2019 – 2020	-1.5	0.8	Inf	-1.9	0.1
	S5	2017 – 2018	0.7	0.5	Inf	1.6	0.4
		2017 – 2019	1.8	0.6	Inf	2.8	<i>0.03</i>
		2017 – 2020	0.4	0.4	Inf	1.1	0.6
		2018 – 2019	1.0	0.7	Inf	1.4	0.5
		2018 – 2020	-0.3	0.5	Inf	-0.6	0.6
		2019 – 2020	-1.3	0.7	Inf	-2.0	0.3
	S6	2017 – 2018	2.6	0.4	Inf	6.0	<i>&lt;0.0001</i>
		2017 – 2019	2.8	0.5	Inf	5.2	<i>&lt;0.0001</i>

S7	2017 – 2020	3.6	0.7	Inf	4.9	<i>&lt;0.0001</i>
	2018 – 2019	0.2	0.6	Inf	0.4	0.7
	2018 – 2020	1.0	0.8	Inf	1.3	0.6
	2019 – 2020	0.8	0.9	Inf	0.9	0.7
	2017 – 2018	0.4	0.5	Inf	0.9	0.7
	2017 – 2019	2.1	0.7	Inf	3.1	<i>0.01</i>
	2017 – 2020	0.6	0.5	Inf	1.2	0.7
	2018 – 2019	1.7	0.6	Inf	2.6	<i>0.04</i>
	2018 – 2020	0.2	0.5	Inf	0.4	0.7
	2019 – 2020	-1.5	0.7	Inf	-2.2	0.1
S8	2017 – 2018	-0.8	0.6	Inf	-1.2	0.5
	2017 – 2019	1.1	0.8	Inf	1.4	0.5
	2017 – 2020	-0.3	0.6	Inf	-0.4	0.7
	2018 – 2019	1.9	0.5	Inf	3.5	<i>0.003</i>
	2018 – 2020	0.4	0.3	Inf	1.64	0.4
	2019 – 2020	-1.4	0.6	Inf	-2.5	0.07

**Table S5.** Pairwise tests showing spatial variation in the probability of BBD occurrence on *Montipora* colonies of near-shore sites at each year. *P* values are adjusted using the Holm method. The results are estimated marginal means on a logit scale. SE is standard error and *df* is degree of freedom. Significant *p* values are italicized and highlighted in blue color.

Site type	Year	Site pair	Result	SE	df	Z ratio	<i>p</i> value
Near shore (NS)	2017	S1 – S2	0.2	0.3	Inf	0.8	1.0
		S1 – S3	0.9	0.3	Inf	2.6	0.1
		S1 – S4	-0.4	0.3	Inf	-1.4	1.0
		S1 – S5	-0.4	0.3	Inf	-1.3	1.0
		S1 – S6	-1.6	0.3	Inf	-5.7	<i>&lt;0.0001</i>
		S1 – S7	0.9	0.4	Inf	2.0	0.6
		S1 – S8	1.0	0.6	Inf	1.5	1.0
		S2 – S3	0.7	0.4	Inf	1.9	0.6
		S2 – S4	-0.6	0.3	Inf	-2.2	0.5
		S2 – S5	-0.6	0.3	Inf	-1.9	0.6
		S2 – S6	-1.8	0.3	Inf	-6.1	<i>&lt;0.0001</i>
		S2 – S7	0.6	0.4	Inf	1.4	1.0
		S2 – S8	0.7	0.6	Inf	1.2	1.0
		S3 – S4	-1.3	0.3	Inf	-3.9	<i>0.002</i>
		S3 – S5	-1.3	0.4	Inf	-3.6	<i>0.01</i>
		S3 – S6	-2.5	0.3	Inf	-7.1	<i>&lt;0.0001</i>
		S3 – S7	0.0	0.5	Inf	-0.1	1.0
		S3 – S8	0.1	0.7	Inf	0.1	1.0
		S4 – S5	0.0	0.3	Inf	-0.1	1.0
		S4 – S6	-1.2	0.3	Inf	-4.6	<i>&lt;0.0001</i>
	2018	S4 – S7	1.2	0.4	Inf	2.9	0.1
		S4 – S8	1.3	0.6	Inf	2.2	0.5
		S5 – S6	-1.2	0.3	Inf	-3.9	<i>0.002</i>
		S5 – S7	1.3	0.4	Inf	2.8	0.1
		S5 – S8	1.4	0.6	Inf	2.1	0.5
		S6 – S7	2.4	0.4	Inf	5.6	<i>&lt;0.0001</i>
		S6 – S8	2.5	0.6	Inf	4.0	<i>0.001</i>
		S7 – S8	0.1	0.7	Inf	0.1	1.0
		S1 – S2	-0.3	0.6	Inf	-0.5	1.0
		S1 – S3	0.4	0.9	Inf	0.4	1.0
		S1 – S4	-1.6	0.6	Inf	-2.8	0.1
		S1 – S5	-1.6	0.6	Inf	-2.6	0.2
		S1 – S6	-1.0	0.6	Inf	-1.5	1.0
		S1 – S7	-0.7	0.6	Inf	-1.2	1.0
		S1 – S8	-1.8	0.5	Inf	-3.4	<i>0.02</i>

		S2 – S3	0.7	0.8	Inf	0.8	1.0
		S2 – S4	-1.2	0.5	Inf	-2.7	0.1
		S2 – S5	-1.3	0.5	Inf	-2.4	0.3
		S2 – S6	-0.7	0.5	Inf	-1.2	1.0
		S2 – S7	-0.4	0.5	Inf	-0.8	1.0
		S2 – S8	-1.5	0.4	Inf	-3.6	0.01
		S3 – S4	-1.9	0.8	Inf	-2.5	0.2
		S3 – S5	-2.0	0.8	Inf	-2.5	0.3
		S3 – S6	-1.3	0.8	Inf	-1.6	1.0
		S3 – S7	-1.1	0.8	Inf	-1.4	1.0
		S3 – S8	-2.1	0.7	Inf	-2.9	0.1
		S4 – S5	-0.1	0.5	Inf	-0.2	1.0
		S4 – S6	0.6	0.5	Inf	1.3	1.0
		S4 – S7	0.8	0.4	Inf	2.3	0.4
		S4 – S8	-0.2	0.3	Inf	-0.8	1.0
		S5 – S6	0.7	0.6	Inf	1.2	1.0
		S5 – S7	0.9	0.5	Inf	1.9	0.8
		S5 – S8	-0.1	0.4	Inf	-0.3	1.0
		S6 – S7	0.3	0.5	Inf	0.5	1.0
		S6 – S8	-0.8	0.4	Inf	-2.0	0.8
		S7 – S8	-1.1	0.3	Inf	-3.3	0.02
2019		S1 – S2	-0.1	0.5	Inf	-0.2	1.0
		S1 – S3	-0.8	0.5	Inf	-1.7	1.0
		S1 – S4	0.5	0.8	Inf	0.6	1.0
		S1 – S5	-0.6	0.7	Inf	-0.8	1.0
		S1 – S6	-0.6	0.6	Inf	-1.0	1.0
		S1 – S7	1.1	0.7	Inf	1.6	1.0
		S1 – S8	0.1	0.6	Inf	0.2	1.0
		S2 – S3	-0.7	0.5	Inf	-1.5	1.0
		S2 – S4	0.6	0.8	Inf	0.7	1.0
		S2 – S5	-0.5	0.7	Inf	-0.7	1.0
		S2 – S6	-0.6	0.6	Inf	-0.9	1.0
		S2 – S7	1.2	0.7	Inf	1.7	1.0
		S2 – S8	0.2	0.6	Inf	0.4	1.0
		S3 – S4	1.3	0.8	Inf	1.7	1.0
		S3 – S5	0.2	0.6	Inf	0.4	1.0
		S3 – S6	0.1	0.6	Inf	0.2	1.0
		S3 – S7	1.9	0.6	Inf	2.9	0.1
		S3 – S8	0.9	0.6	Inf	1.6	1.0
		S4 – S5	-1.1	0.9	Inf	-1.2	1.0
		S4 – S6	-1.2	0.9	Inf	-1.3	1.0
		S4 – S7	0.6	0.9	Inf	0.6	1.0
		S4 – S8	-0.4	0.9	Inf	-0.4	1.0
		S5 – S6	-0.1	0.8	Inf	-0.1	1.0
		S5 – S7	1.6	0.8	Inf	2.0	1.0
2020		S5 – S8	0.7	0.8	Inf	0.9	1.0
		S6 – S7	1.7	0.8	Inf	2.2	0.7
		S6 – S8	0.8	0.7	Inf	1.1	1.0
		S7 – S8	-0.9	0.8	Inf	-1.2	1.0
		S1 – S2	1.9	1.1	Inf	1.8	1.0
		S1 – S3	-0.3	0.5	Inf	-0.6	1.0
		S1 – S4	-0.3	0.5	Inf	-0.5	1.0
		S1 – S5	-1.1	0.5	Inf	-2.2	0.7
		S1 – S6	0.9	0.8	Inf	1.1	1.0
		S1 – S7	0.3	0.5	Inf	0.6	1.0
		S1 – S8	-0.5	0.5	Inf	-1.1	1.0
		S2 – S3	-2.2	1.1	Inf	-2.1	0.8
		S2 – S4	-2.2	1.1	Inf	-2.1	0.9

S2 – S5	-3.0	1.1	Inf	-2.9	0.1
S2 – S6	-1.0	1.2	Inf	-0.8	1.0
S2 – S7	-1.6	1.1	Inf	-1.5	1.0
S2 – S8	-2.4	1.0	Inf	-2.34	0.54
S3 – S4	0.0	0.5	Inf	0.1	1.0
S3 – S5	-0.8	0.5	Inf	-1.7	1.0
S3 – S6	1.2	0.8	Inf	1.6	1.0
S3 – S7	0.7	0.5	Inf	1.3	1.0
S3 – S8	-0.2	0.4	Inf	-0.4	1.0
S4 – S5	-0.8	0.5	Inf	-1.8	1.0
S4 – S6	1.2	0.8	Inf	1.5	1.0
S4 – S7	0.6	0.5	Inf	1.2	1.0
S4 – S8	-0.2	0.4	Inf	-0.4	1.0
S5 – S6	2.0	0.8	Inf	2.6	0.3
S5 – S7	1.5	0.5	Inf	2.9	0.1
S5 – S8	0.6	0.4	Inf	1.5	1.0
S6 – S7	-0.6	0.8	Inf	-0.7	1.0
S6 – S8	-1.4	0.8	Inf	-1.9	1.0
S7 – S8	-0.8	0.5	Inf	-1.8	1.0

**Table S6.** Pairwise tests showing spatial and temporal variation in the probability of BBD occurrence on *Montipora* colonies at reef edge sites. *P* values are adjusted using the Holm method. The results are estimated marginal means on a logit scale. SE is standard error and *df* is degree of freedom. Significant *p* values are italicized and highlighted in blue color.

Site type	Year pairs	Result	SE	<i>df</i>	Z ratio	<i>p</i> value
Reef edge (RE)	2018 – 2019	0.5	0.1	Inf	3.7	0.0005
	2018 – 2020	0.8	0.2	Inf	4.6	<0.0001
	2019 – 2020	0.3	0.2	Inf	1.6	0.1
	Site pairs	Result	SE	<i>df</i>	Z ratio	<i>p</i> value
	S9 – S10	0.5	0.3	Inf	1.9	0.1
	S9 – S11	0.6	0.3	Inf	2.0	0.1
	S9 – S12	-1.3	0.2	Inf	-6.6	<0.0001
	S10 – S11	0.0	0.3	Inf	0.1	0.9
	S10 – S12	-1.8	0.2	Inf	-8.0	<0.0001
	S11 – S12	-1.8	0.2	Inf	-8.3	<0.0001

**Table S7.** Pairwise tests showing temporal variation in the probability of GAs occurrence on *Montipora* colonies at each site. *P* values are adjusted using the Holm method. The results are estimated marginal means on a logit scale. SE is standard error and *df* is degree of freedom. Significant *p* values are italicized and highlighted in blue color.

Site type	Site	Year pairs	Results	SE	<i>df</i>	Z ratio	<i>p</i> value
Near shore (NS)	S1	2017 – 2018	1.3	1.1	Inf	1.1	0.5
		2017 – 2019	-0.6	0.6	Inf	-0.9	0.5
		2017 – 2020	-1.6	0.6	Inf	-2.8	0.03
		2018 – 2019	-1.8	1.1	Inf	-1.8	0.2
		2018 – 2020	-2.9	1.0	Inf	-2.8	0.03
		2019 – 2020	-1.0	0.4	Inf	-2.4	0.1
	S2	2017 – 2018	-0.1	0.6	Inf	-0.2	0.8
		2017 – 2019	-0.7	0.5	Inf	-1.4	0.5
		2017 – 2020	-1.4	0.5	Inf	-2.6	0.051
		2018 – 2019	-0.6	0.5	Inf	-1.2	0.5
		2018 – 2020	-1.3	0.5	Inf	-2.6	0.051
		2019 – 2020	-0.7	0.4	Inf	-1.7	0.3

Reef edge (RE)	S3	2017 – 2018	0.5	0.8	Inf	0.5	0.6
		2017 – 2019	-0.7	0.5	Inf	-1.3	0.4
		2017 – 2020	-2.2	0.5	Inf	-4.4	<i>0.000</i>
		2018 – 2019	-1.2	0.8	Inf	-1.5	0.4
		2018 – 2020	-2.7	0.7	Inf	-3.6	<i>0.001</i>
		2019 – 2020	-1.5	0.3	Inf	-4.4	<i>0.0001</i>
	S4	2017 – 2018	15.0	673.4	Inf	0.0	1.0
		2017 – 2019	-0.7	0.8	Inf	-0.9	1.0
		2017 – 2020	-2.4	0.6	Inf	-3.8	<i>0.001</i>
		2018 – 2019	-15.8	673.4	Inf	0.0	1.0
		2018 – 2020	-17.4	673.4	Inf	0.0	1.0
		2019 – 2020	-1.6	0.6	Inf	-2.9	<i>0.02</i>
	S5	2017 – 2018	-1.3	0.7	Inf	-1.8	0.4
		2017 – 2019	-1.2	0.7	Inf	-1.6	0.4
		2017 – 2020	-1.5	0.7	Inf	-2.2	0.2
		2018 – 2019	0.1	0.6	Inf	0.2	1.0
		2018 – 2020	-0.2	0.6	Inf	-0.4	1.0
		2019 – 2020	-0.3	0.6	Inf	-0.6	1.0
	S6	2017 – 2018	0.0	1319.9	Inf	0.0	1.0
		2017 – 2019	-16.5	1016.2	Inf	0.0	1.0
		2017 – 2020	-16.7	1016.2	Inf	0.0	1.0
		2018 – 2019	-16.5	842.3	Inf	0.0	1.0
		2018 – 2020	-16.7	842.3	Inf	0.0	1.0
		2019 – 2020	-0.3	0.6	Inf	-0.4	1.0
	S7	2017 – 2018	14.6	545.3	Inf	0.0	1.0
		2017 – 2019	-1.3	1.0	Inf	-1.3	0.8
		2017 – 2020	-2.7	1.0	Inf	-2.7	<i>0.04</i>
		2018 – 2019	-16.0	545.3	Inf	0.0	1.0
		2018 – 2020	-17.4	545.3	Inf	0.0	1.0
		2019 – 2020	-1.4	0.3	Inf	-4.0	<i>0.0004</i>
	S8	2017 – 2018	16.1	506.4	Inf	0.0	1.0
		2017 – 2019	-0.2	0.8	Inf	-0.2	1.0
		2017 – 2020	2.3	1.2	Inf	1.8	0.3
		2018 – 2019	-16.3	506.4	Inf	0.0	1.0
		2018 – 2020	-13.9	506.4	Inf	0.0	1.0
		2019 – 2020	2.4	1.1	Inf	2.3	0.1
	S9	2018 – 2019	-17.8	2262.1	Inf	0.0	1.0
		2018 – 2020	-17.8	2262.1	Inf	0.0	1.0
		2019 – 2020	0.0	0.5	Inf	0.0	1.0
	S10	2018 – 2019	-1.4	1.1	Inf	-1.3	0.4
		2018 – 2020	-2.0	1.1	Inf	-1.8	0.2
		2019 – 2020	-0.6	0.6	Inf	-1.1	0.4
	S11	2018 – 2019	1.6	0.7	Inf	2.4	<i>0.046</i>
		2018 – 2020	1.4	0.7	Inf	2.2	0.1
		2019 – 2020	-0.1	0.8	Inf	-0.2	0.9
	S12	2018 – 2019	0.0	1656.1	Inf	0.0	1.0
		2018 – 2020	0.0	1907.0	Inf	0.0	1.0
		2019 – 2020	0.0	1933.3	Inf	0.0	1.0

**Table S8.** Pairwise tests showing spatial variation in the probability of GAs occurrence on *Montipora* colonies in each year. *P* values are adjusted using the Holm method. The results are estimated marginal means on a logit scale. SE is standard error and *df* is degree of freedom. Significant *p* values are italicized and highlighted in blue color.

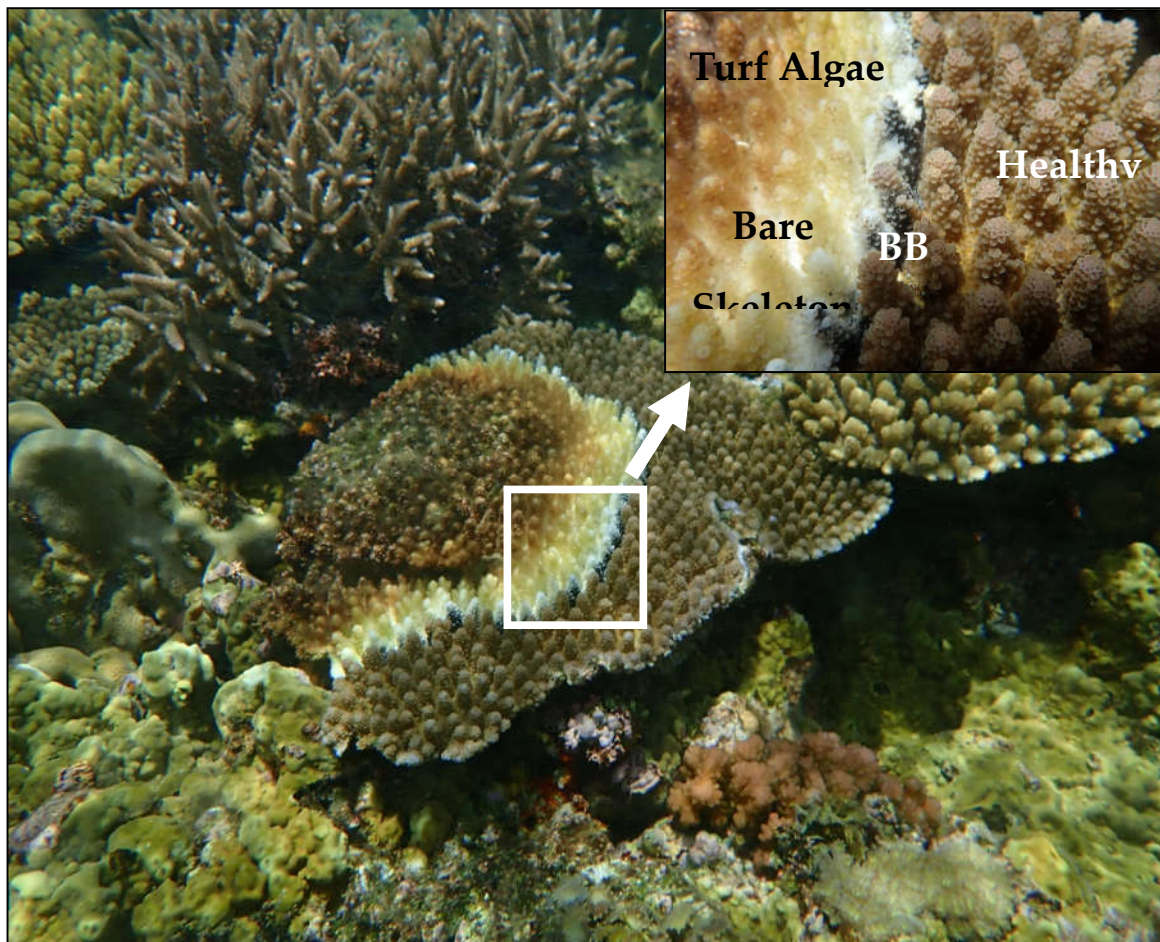
Site type	Year	Site pairs	Results	SE	<i>df</i>	Z ratio	<i>p</i> value
Near shore (NS)	2017	S1 – S2	-0.3	0.7	Inf	-0.4	1.0
		S1 – S3	-0.2	0.7	Inf	-0.3	1.0
		S1 – S4	0.3	0.8	Inf	0.4	1.0

	S1 – S5	-0.3	0.8	Inf	-0.4	1.0
	S1 – S6	15.4	1016.2	Inf	0.0	1.0
	S1 – S7	0.7	1.1	Inf	0.7	1.0
	S1 – S8	-0.7	0.9	Inf	-0.8	1.0
	S2 – S3	0.1	0.6	Inf	0.1	1.0
	S2 – S4	0.6	0.7	Inf	0.9	1.0
	S2 – S5	0.0	0.7	Inf	0.0	1.0
	S2 – S6	15.7	1016.2	Inf	0.0	1.0
	S2 – S7	1.0	1.1	Inf	0.9	1.0
	S2 – S8	-0.4	0.8	Inf	-0.5	1.0
	S3 – S4	0.6	0.7	Inf	0.8	1.0
	S3 – S5	-0.1	0.7	Inf	-0.1	1.0
	S3 – S6	15.6	1016.2	Inf	0.0	1.0
	S3 – S7	1.0	1.1	Inf	0.9	1.0
	S3 – S8	-0.5	0.8	Inf	-0.6	1.0
	S4 – S5	-0.7	0.8	Inf	-0.8	1.0
	S4 – S6	15.0	1016.2	Inf	0.0	1.0
	S4 – S7	0.4	1.2	Inf	0.3	1.0
	S4 – S8	-1.1	0.9	Inf	-1.2	1.0
	S5 – S6	15.7	1016.2	Inf	0.0	1.0
	S5 – S7	1.1	1.2	Inf	0.9	1.0
	S5 – S8	-0.4	0.9	Inf	-0.4	1.0
	S6 – S7	-14.6	1016.2	Inf	0.0	1.0
	S6 – S8	-16.1	1016.2	Inf	0.0	1.0
	S7 – S8	-1.5	1.2	Inf	-1.2	1.0
2018	S1 – S2	-1.7	1.1	Inf	-1.6	1.0
	S1 – S3	-1.0	1.2	Inf	-0.9	1.0
	S1 – S4	14.1	673.4	Inf	0.0	1.0
	S1 – S5	-2.9	1.1	Inf	-2.6	0.2
	S1 – S6	14.1	842.3	Inf	0.0	1.0
	S1 – S7	14.1	545.3	Inf	0.0	1.0
	S1 – S8	14.1	506.4	Inf	0.0	1.0
	S2 – S3	0.7	0.8	Inf	0.8	1.0
	S2 – S4	15.8	673.4	Inf	0.0	1.0
	S2 – S5	-1.2	0.6	Inf	-2.0	1.0
	S2 – S6	15.8	842.3	Inf	0.0	1.0
	S2 – S7	15.8	545.3	Inf	0.0	1.0
	S2 – S8	15.8	506.4	Inf	0.0	1.0
	S3 – S4	15.1	673.4	Inf	0.0	1.0
	S3 – S5	-1.8	0.8	Inf	-2.2	0.7
	S3 – S6	15.1	842.3	Inf	0.0	1.0
	S3 – S7	15.1	545.3	Inf	0.0	1.0
	S3 – S8	15.1	506.4	Inf	0.0	1.0
	S4 – S5	-17.0	673.4	Inf	0.0	1.0
	S4 – S6	0.0	1078.4	Inf	0.0	1.0
	S4 – S8	0.0	842.6	Inf	0.0	1.0
	S5 – S6	17.0	842.3	Inf	0.0	1.0
	S5 – S7	17.0	545.3	Inf	0.0	1.0
	S5 – S8	17.0	506.4	Inf	0.0	1.0
	S6 – S7	0.0	1003.4	Inf	0.0	1.0
	S6 – S8	0.0	982.8	Inf	0.0	1.0
	S7 – S8	0.0	744.1	Inf	0.0	1.0
2019	S1 – S2	-0.4	0.4	Inf	-1.1	1.0
	S1 – S3	-0.3	0.4	Inf	-0.8	1.0
	S1 – S4	0.2	0.6	Inf	0.3	1.0
	S1 – S5	-0.9	0.5	Inf	-1.7	1.0
	S1 – S6	-0.5	0.6	Inf	-0.9	1.0
	S1 – S7	0.0	0.4	Inf	-0.1	1.0

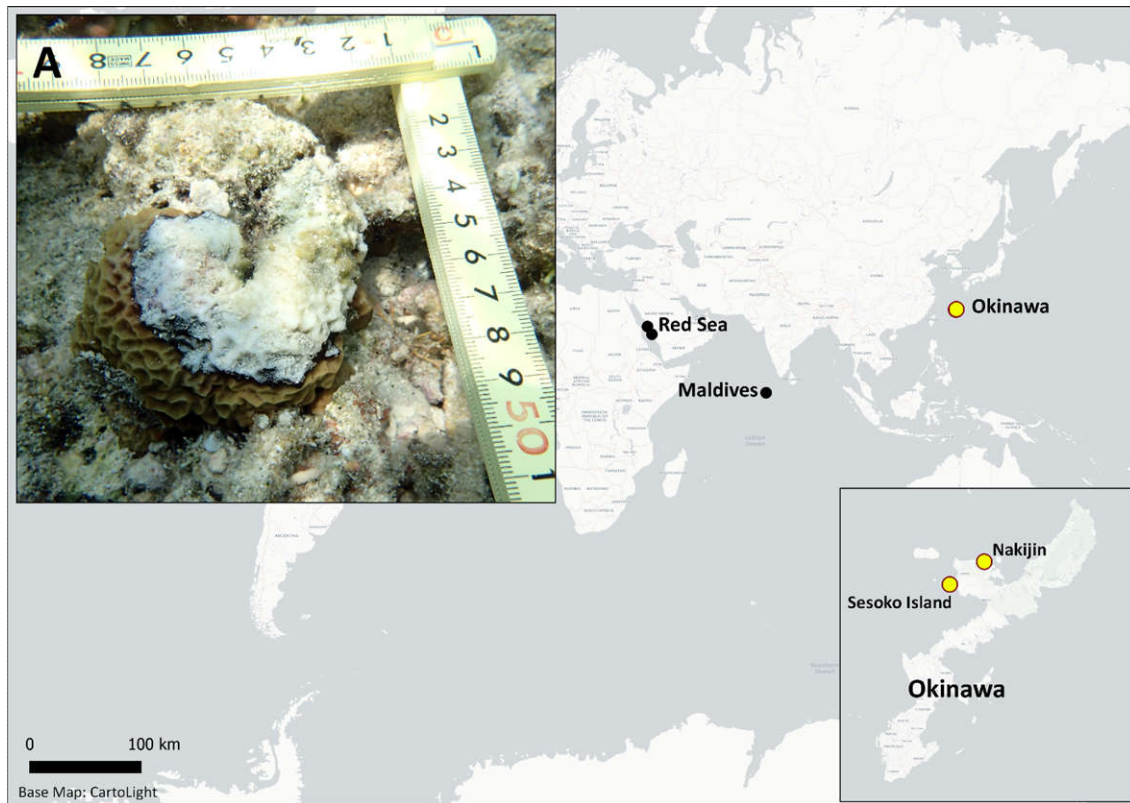
Reef edge (RE)	2020	S1 – S8	-0.3	0.5	Inf	-0.7	1.0
		S2 – S3	0.1	0.4	Inf	0.3	1.0
		S2 – S4	0.6	0.6	Inf	1.1	1.0
		S2 – S5	-0.5	0.5	Inf	-0.9	1.0
		S2 – S6	-0.1	0.5	Inf	-0.1	1.0
		S2 – S7	0.4	0.4	Inf	1.0	1.0
		S2 – S8	0.1	0.4	Inf	0.3	1.0
		S3 – S4	0.5	0.6	Inf	0.9	1.0
		S3 – S5	-0.6	0.5	Inf	-1.1	1.0
		S3 – S6	-0.2	0.5	Inf	-0.3	1.0
		S3 – S7	0.3	0.4	Inf	0.8	1.0
		S3 – S8	0.0	0.4	Inf	0.1	1.0
		S4 – S5	-1.1	0.7	Inf	-1.6	1.0
		S4 – S6	-0.7	0.7	Inf	-1.0	1.0
		S4 – S7	-0.2	0.6	Inf	-0.4	1.0
		S4 – S8	-0.5	0.6	Inf	-0.8	1.0
		S5 – S6	0.4	0.6	Inf	0.6	1.0
		S5 – S7	0.9	0.5	Inf	1.7	1.0
		S5 – S8	0.6	0.5	Inf	1.1	1.0
		S6 – S7	0.5	0.5	Inf	0.9	1.0
		S6 – S8	0.2	0.6	Inf	0.3	1.0
		S7 – S8	-0.3	0.4	Inf	-0.6	1.0
		S1 – S2	-0.1	0.4	Inf	-0.2	1.0
		S1 – S3	-0.8	0.4	Inf	-2.3	0.4
		S1 – S4	-0.4	0.4	Inf	-1.2	1.0
		S1 – S5	-0.2	0.5	Inf	-0.5	1.0
		S1 – S6	0.3	0.5	Inf	0.6	1.0
		S1 – S7	-0.4	0.4	Inf	-1.2	1.0
		S1 – S8	3.1	1.0	Inf	3.0	0.1
		S2 – S3	-0.7	0.4	Inf	-2.1	0.7
		S2 – S4	-0.3	0.4	Inf	-0.9	1.0
		S2 – S5	-0.1	0.5	Inf	-0.3	1.0
		S2 – S6	0.4	0.5	Inf	0.7	1.0
		S2 – S7	-0.3	0.4	Inf	-0.9	1.0
		S2 – S8	3.2	1.0	Inf	3.1	0.1
		S3 – S4	0.4	0.3	Inf	1.3	1.0
		S3 – S5	0.6	0.4	Inf	1.4	1.0
		S3 – S6	1.1	0.4	Inf	2.5	0.3
		S3 – S7	0.4	0.3	Inf	1.4	1.0
		S3 – S8	3.9	1.0	Inf	3.9	0.004
		S4 – S5	0.2	0.4	Inf	0.5	1.0
		S4 – S6	0.7	0.5	Inf	1.5	1.0
		S4 – S7	0.0	0.3	Inf	0.1	1.0
		S4 – S8	3.5	1.0	Inf	3.4	0.02
		S5 – S6	0.5	0.5	Inf	0.9	1.0
		S5 – S7	-0.2	0.4	Inf	-0.4	1.0
		S5 – S8	3.3	1.1	Inf	3.1	0.04
		S6 – S7	-0.7	0.4	Inf	-1.5	1.0
		S6 – S8	2.8	1.1	Inf	2.6	0.2
		S7 – S8	3.5	1.0	Inf	3.4	0.02
2018	2018	S9 – S10	-16.1	2262.1	Inf	0.0	1.0
		S9 – S11	-18.4	2262.1	Inf	0.0	1.0
		S9 – S12	0.0	2537.3	Inf	0.0	1.0
		S10 – S11	-2.3	1.0	Inf	-2.2	0.2
		S10 – S12	16.1	1149.2	Inf	0.0	1.0
		S11 – S12	18.4	1149.2	Inf	0.0	1.0
2019	2019	S9 – S10	0.3	0.6	Inf	0.6	1.0
		S9 – S11	0.9	0.7	Inf	1.3	1.0



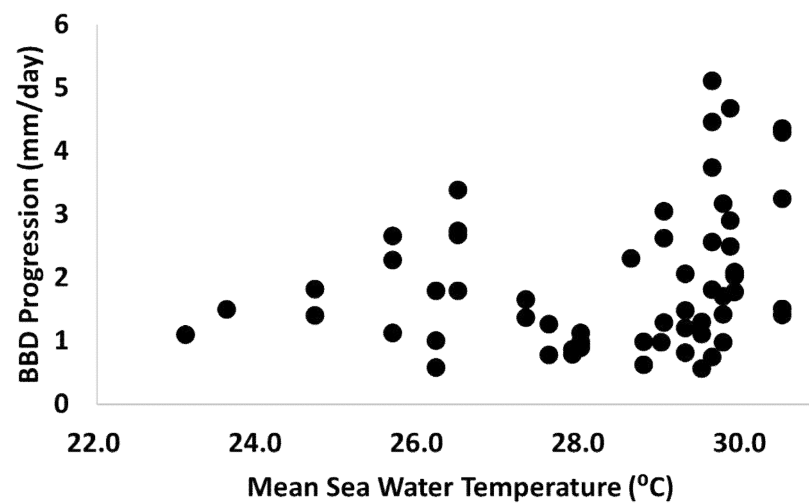
2020	S9 – S12	17.8	1192.4	Inf	0.0	1.0
	S10 – S11	0.6	0.7	Inf	0.8	1.0
	S10 – S12	17.4	1192.4	Inf	0.0	1.0
	S11 – S12	16.9	1192.4	Inf	0.0	1.0
	S9 – S10	-0.3	0.5	Inf	-0.5	1.0
	S9 – S11	0.8	0.7	Inf	1.1	1.0
	S9 – S12	17.8	1521.8	Inf	0.0	1.0
	S10 – S11	1.0	0.7	Inf	1.5	0.8
	S10 – S12	18.1	1521.8	Inf	0.0	1.0
	S11 – S12	17.0	1521.8	Inf	0.0	1.0



**Figure S1.** BBD in-situ on *Acropora hyacinthus* sp. complex at southern reef of Sesoko Island, Okinawa, Japan. September 2020. Photograph: Rocktim Ramen Das.



**Figure S2.** First report of *Gardineroseris planulata* (A) affected by BBD in the Pacific Ocean, Red Sea [67]; Indian Ocean (Maldives) [68]. Photograph: Rocktim Ramen Das.



**Figure S3.** Positive correlation between BBD progression on *Montipora* colonies and mean sea water temperature. Mean difference between two observations is 6.6 days (Spearman's rho (57) = .3,  $p < 0.05$ ).