

## Impact of climate change on direct and indirect species interactions

Joshua P. Lord\*, James P. Barry, Dale Graves

\*Corresponding author: joshua.p.lord@gmail.com

Marine Ecology Progress Series 571: 1–11 (2017)

**Table S1.** Full ANOVA results for all major statistical tests described in the results section for crabs and whelk feeding and growth. Units for all shown variables are described in the methods and results sections. Symbols in the significance column indicate statistical significance at an alpha of 0.001 (\*\*\*), 0.01 (\*\*), 0.05 (\*), and 0.10 (~), as well as non-significant results (NS).

Response Variable	Test	Factor	DF	F	P	Sig
Crab Feeding	2-way ANOVA	Temperature	1	5.54	0.026	*
		CO <sub>2</sub>	1	50.5	< 0.001	***
		Temp x CO <sub>2</sub>	1	0.14	0.71	NS
<i>N. ostrina</i> caged feeding	3-way ANOVA	Crab	1	3.61	0.063	~
		Temperature	1	1.57	0.21	NS
		CO <sub>2</sub>	1	0.96	0.33	NS
		Crab x Temp	1	3.22	0.078	~
		Crab x CO <sub>2</sub>	1	0.039	0.84	NS
		Temp x CO <sub>2</sub>	1	0.17	0.68	NS
		Crab x Temp x CO <sub>2</sub>	1	0.055	0.82	NS
<i>N. ostrina</i> caged shell growth	3-way ANOVA	Crab	1	1.41	0.24	NS
		Temperature	1	0.015	0.90	NS
		CO <sub>2</sub>	1	0.34	0.57	NS
		Crab x Temp	1	2.04	0.16	NS
		Crab x CO <sub>2</sub>	1	0.04	0.84	NS
		Temp x CO <sub>2</sub>	1	4.58	0.037	*
		Crab x Temp x CO <sub>2</sub>	1	0.44	0.51	NS
<i>N. ostrina</i> caged tissue growth	3-way ANOVA	Crab	1	4.53	0.038	*
		Temperature	1	0.32	0.58	NS
		CO <sub>2</sub>	1	0.002	0.96	NS
		Crab x Temp	1	1.64	0.21	NS
		Crab x CO <sub>2</sub>	1	0.20	0.66	NS
		Temp x CO <sub>2</sub>	1	7.45	0.008	**
		Crab x Temp x CO <sub>2</sub>	1	<0.01	0.99	NS
<i>N. ostrina</i> uncaged feeding	3-way ANOVA	Crab	1	151.9	< 0.001	***
		Temperature	1	0.91	0.34	NS
		CO <sub>2</sub>	1	3.79	0.057	~
		Crab x Temp	1	1.31	0.26	NS
		Crab x CO <sub>2</sub>	1	0.03	0.85	NS
		Temp x CO <sub>2</sub>	1	0.31	0.58	NS
		Crab x Temp x CO <sub>2</sub>	1	1.47	0.23	NS
<i>N. ostrina</i> uncaged shell growth	3-way ANOVA	Crab	1	48.54	< 0.001	***
		Temperature	1	0.35	0.56	NS
		CO <sub>2</sub>	1	0.16	0.69	NS
		Crab x Temp	1	1.06	0.31	NS
		Crab x CO <sub>2</sub>	1	0.020	0.89	NS
		Temp x CO <sub>2</sub>	1	0.62	0.43	NS
		Crab x Temp x CO <sub>2</sub>	1	1.73	0.20	NS
<i>N. ostrina</i> uncaged tissue growth	3-way ANOVA	Crab	1	41.42	< 0.001	***
		Temperature	1	0.21	0.65	NS
		CO <sub>2</sub>	1	0.08	0.78	NS
		Crab x Temp	1	2.36	0.13	NS
		Crab x CO <sub>2</sub>	1	0.14	0.71	NS
		Temp x CO <sub>2</sub>	1	0.05	0.83	NS
		Crab x Temp x CO <sub>2</sub>	1	1.23	0.27	NS

**Table S2.** Full ANOVA results for all major statistical tests described in the results section for juvenile abalone feeding and growth. Units for all shown variables are described in the methods and results sections. Symbols in the significance column indicate statistical significance at an alpha of 0.001 (\*\*\*), 0.01 (\*\*), 0.05 (\*), and 0.10 (~), as well as non-significant results (NS).

Response Variable	Test	Factor	DF	F	P	Sig
<i>H. rufescens</i> feeding	3-way ANOVA	Crab	1	11.1	0.002	**
		Temperature	1	4.75	0.034	*
		CO <sub>2</sub>	1	0.053	0.82	NS
		Crab x Temp	1	2.13	0.15	NS
		Crab x CO <sub>2</sub>	1	0.36	0.55	NS
		Temp x CO <sub>2</sub>	1	3.83	0.055	~
		Crab x Temp x CO <sub>2</sub>	1	0.59	0.81	NS
<i>H. rufescens</i> shell growth	3-way ANOVA	Crab	1	0.32	0.57	NS
		Temperature	1	0.021	0.88	NS
		CO <sub>2</sub>	1	17.1	< 0.001	***
		Crab x Temp	1	0.18	0.67	NS
		Crab x CO <sub>2</sub>	1	0.041	0.84	NS
		Temp x CO <sub>2</sub>	1	4.62	0.036	*
		Crab x Temp x CO <sub>2</sub>	1	2.66	0.11	NS
<i>H. rufescens</i> tissue growth	3-way ANOVA	Crab	1	13.1	< 0.001	***
		Temperature	1	0.44	0.51	NS
		CO <sub>2</sub>	1	1.03	0.31	NS
		Crab x Temp	1	0.41	0.52	NS
		Crab x CO <sub>2</sub>	1	0.49	0.49	NS
		Temp x CO <sub>2</sub>	1	10.9	0.002	**
		Crab x Temp x CO <sub>2</sub>	1	0.074	0.79	NS
<i>H. rufescens</i> shell growth / Ulva eaten	3-way ANOVA	Crab	1	2.89	0.095	~
		Temperature	1	2.30	0.135	NS
		CO <sub>2</sub>	1	48.2	< 0.001	***
		Crab x Temp	1	3.24	0.077	~
		Crab x CO <sub>2</sub>	1	3.80	0.056	~
		Temp x CO <sub>2</sub>	1	4.95	0.030	*
		Crab x Temp x CO <sub>2</sub>	1	4.68	0.035	*
<i>H. rufescens</i> tissue growth / Ulva eaten	3-way ANOVA	Crab	1	9.21	0.004	**
		Temperature	1	4.68	0.035	*
		CO <sub>2</sub>	1	1.32	0.26	NS
		Crab x Temp	1	0.23	0.64	NS
		Crab x CO <sub>2</sub>	1	0.54	0.47	NS
		Temp x CO <sub>2</sub>	1	11.95	0.001	**
		Crab x Temp x CO <sub>2</sub>	1	0.45	0.50	NS
<i>H. rufescens</i> Δ shell : tissue ratio	3-way ANOVA	Crab	1	20.65	< 0.001	***
		Temperature	1	0.97	0.33	NS
		CO <sub>2</sub>	1	5.77	0.02	*
		Crab x Temp	1	1.70	0.20	NS
		Crab x CO <sub>2</sub>	1	1.64	0.21	NS
		Temp x CO <sub>2</sub>	1	7.79	0.007	**
		Crab x Temp x CO <sub>2</sub>	1	0.91	0.34	NS