

Table S1. Parameters for the multiple linear regression models corresponding to the different hypotheses concerning **blue crab claw pinch force** in 2018 and 2019. k = number of parameters, including variance (σ^2) as a parameter. Size = crab size (carapace width). ET = Exposure time. Sal = Salinity.

Model	k	intercept	Variables								
			x_1 Size	x_2 ET	x_3 Sal	x_4 pH	x_5 Sex	x_6 Year	x_3x_4 Sal * pH	$x_3x_4x_6$ Sal * pH * Year	
g^1	2	β_0									
g^2	3	β_0	β_1								
g^3	5	β_0	β_1			β_3	β_4				
g^4	6	β_0	β_1	β_2		β_3	β_4				
g^5	4	β_0	β_1			β_3					
g^6	4	β_0	β_1				β_4				
g^7	4	β_0	β_1	β_2							
g^8	4	β_0	β_1						β_6		
g^9	6	β_0	β_1			β_3	β_4		β_6		
g^{10}	7	β_0	β_1	β_2		β_3	β_4		β_6		
g^{11}	5	β_0	β_1			β_3			β_6		
g^{12}	5	β_0	β_1				β_4		β_6		
g^{13}	5	β_0	β_1	β_2					β_6		
g^{14}	8	β_0	β_1	β_2		β_3	β_4	β_5	β_6		
g^{15}	9	β_0	β_1	β_2		β_3	β_4	β_5	β_6	β_7	
g^{16}	12	β_0	β_1	β_2		β_3	β_4	β_5	β_6		β_8

Table S2. Parameters for the multiple linear regression models corresponding to the different hypotheses concerning **clam growth rate** in 2018 and 2019. k = number of parameters, including variance (σ^2) as a parameter. Starting length = initial clam shell length. Sal = Salinity. Year = 2018 or 2019.

Model	k	Variables				
		intercept	x_1 Sal	x_2 pH	x_3 Year	x_1x_2 Sal * pH
g^1	2	β_0				
g^2	3	β_0	β_2			
g^3	3	β_0		β_3		
g^4	4	β_0	β_2	β_3		
g^5	5	β_0	β_2	β_3		β_5
g^6	5	β_0	β_2	β_3	β_4	
g^7	6	β_0	β_2	β_3	β_4	β_5

Table S3. Parameters for the multiple linear regression models corresponding to the different hypotheses concerning **clam survival** in 2018 and 2019. k = number of parameters, including variance (σ^2) as a parameter. Starting length = initial clam shell length. Sal = Salinity. Year = 2018 or 2019.

Model	k	intercept	Variables							
			x_1 Starting length	x_2 Sal	x_3 pH	x_4 Year	x_2x_3 Sal * pH	x_2x_4 Sal * Year	x_3x_4 pH * Year	$x_2x_3x_4$ Sal * pH * Year
g_1	1	β_0								
g_2	2	β_0	β_1							
g_3	3	β_0	β_1		β_4					
g_4	5	β_0	β_1	β_2	β_3	β_4				
g_5	4	β_0	β_1	β_2	β_3					
g_6	4	β_0	β_1	β_2		β_4				
g_7	4	β_0	β_1		β_3	β_4				
g_8	3	β_0		β_2		β_4				
g_9	3	β_0			β_3	β_4				
g_{10}	4	β_0		β_2	β_3	β_4				
g_{11}	8	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	
g_{12}	7	β_0		β_2	β_3	β_4	β_5	β_6	β_7	
g_{13}	9	β_0	β_1	β_2	β_3	β_4				β_8

Table S4. Parameters for the multiple linear regression models corresponding to the different hypotheses concerning **clam ridge rugosity** in 2018. k = number of parameters, including variance (σ^2) as a parameter. Sal = Salinity.

Variables					
Model	k	intercept	x_1 Sal	x_2 pH	x_1x_2 Sal*pH
g^1	2	β_0			
g^2	3	β_0	β_1		
g^3	3	β_0		β_2	
g^4	4	β_0	β_1	β_2	
g^5	5	β_0	β_1	β_2	β_3

Table S5. Water quality and chemistry (\pm Standard Error) based on tank set-up for 2018 and 2019 pre-treatments and 2019 predator-prey interactions. DO = Dissolved oxygen. TA = Total alkalinity. H = High. L = Low. TA and pCO₂ were calculated using DIC, temperature, salinity, pH, and DO. TA and pCO₂ were not calculated for the predator-prey interactions.

	Acidified		Ambient	
	L-pH/H-salinity	L-pH/L-salinity	H-pH/L-salinity	H-pH/H-salinity
2018 – CLAMS & CRABS				
pH	7.05 (\pm 0.03)	7.07 (\pm 0.03)	8.18 (\pm 0.01)	8.27 (\pm 0.01)
Salinity (ppt)	30.50 (\pm 0.14)	16.00 (\pm 0.16)	15.87 (\pm 0.13)	30.46 (\pm 0.09)
DO (mg L ⁻¹)	5.20 (\pm 0.05)	5.19 (\pm 0.11)	5.70 (\pm 0.09)	5.04 (\pm 0.06)
Temperature (° C)	23.92 (\pm 0.18)	24.69 (\pm 0.29)	22.02 (\pm 0.43)	23.73 (\pm 0.21)
DIC (μ mol)	4037.10 (\pm 240.54)	2439.36 (\pm 191.53)	1559.47 (\pm 47.10)	2358.49 (\pm 57.22)
pCO ₂ (μ atm)	12847.83 (\pm 2020.17)	8094.50 (\pm 1261.36)	394.00 (\pm 22.77)	379.33 (\pm 29.02)
TA (μ mol kgSW ⁻¹)	3678.82 (\pm 204.89)	2186.8 (\pm 151.76)	1663.0 (\pm 52.62)	2707.4 (\pm 81.86)
2019 – CLAMS				
pH	7.06 (\pm 0.04)	7.14 (\pm 0.01)	8.07 (\pm 0.04)	8.26 (\pm 0.06)
Salinity (ppt)	30.38 (\pm 0.06)	16.49 (\pm 0.05)	16.44 (\pm 0.04)	30.48 (\pm 0.05)
DO (mg L ⁻¹)	5.49 (\pm 0.07)	6.18 (\pm 0.09)	6.22 (\pm 0.06)	5.72 (\pm 0.07)
Temperature (° C)	26.83 (\pm 0.17)	26.67 (\pm 0.17)	26.63 (\pm 0.17)	26.54 (\pm 0.19)
DIC (μ mol)	3178.26 (\pm 183.15)	2740.27 (\pm 43.92)	2075.58 (\pm 46.27)	2514.64 (\pm 68.60)
pCO ₂ (μ atm)	8094.08 (\pm 556.89)	6973.72 (\pm 142.77)	539.33 (\pm 51.80)	412.63 (\pm 40.50)
TA (μ mol kgSW ⁻¹)	2990.87 (\pm 174.98)	2553.66 (\pm 41.58)	2236.87 (\pm 39.44)	2924.55 (\pm 98.84)
2019 – CRABS				
pH	7.17 (\pm 0.02)	7.05 (\pm 0.03)	7.68 (\pm 0.02)	7.80 (\pm 0.03)
Salinity (ppt)	30.05 (\pm 0.04)	16.44 (\pm 0.03)	16.68 (\pm 0.16)	29.91 (\pm 0.07)
DO (mg L ⁻¹)	5.05 (\pm 0.09)	5.54 (\pm 0.08)	5.55 (\pm 0.07)	5.06 (\pm 0.08)
Temperature (° C)	27.26 (\pm 0.17)	27.26 (\pm 0.16)	26.91 (\pm 0.18)	26.92 (\pm 0.19)
DIC (μ mol)	1575.98 (\pm 44.90)	1415.89 (\pm 143.03)	919.65 (\pm 157.76)	1187.43 (\pm 106.49)
pCO ₂ (μ atm)	4419.17 (\pm 603.68)	4649.25 (\pm 792.07)	646.35 (\pm 28.69)	555.13 (\pm 35.57)
TA (μ mol kgSW ⁻¹)	1475.53 (\pm 34.49)	1288.25 (\pm 121.02)	941.633 (\pm 167.31)	1278.87 (\pm 126.29)
2019 – PREDATOR-PREY INTERACTIONS				
pH	7.11 (\pm 0.05)	7.09 (\pm 0.03)	7.71 (\pm 0.04)	7.79 (\pm 0.03)
Salinity (ppt)	30.10 (\pm 0.04)	16.23 (\pm 0.05)	16.58 (\pm 0.16)	29.93 (\pm 0.08)
DO (mg L ⁻¹)	5.25 (\pm 0.09)	5.32 (\pm 0.08)	5.58 (\pm 0.03)	5.09 (\pm 0.06)
Temperature (° C)	25.26 (\pm 0.21)	23.31 (\pm 0.16)	26.10 (\pm 0.19)	22.92 (\pm 0.17)

Table S6. AIC calculations for multiple linear regression models corresponding to hypotheses about **blue crab claw pinch force** in 2018 and 2019. k = number of parameters, including variance (σ^2) as a parameter. AICc = corrected AIC value. Δ_i = difference between model i and the best model in the set. w_i = model probability of fitting the observed data. SZ = crab size (carapace width). ET = Exposure time. Sal= Salinity. Best model in bold.

Model	Variables	k	AICc	Δ_i	w_i	Residual deviance	% deviance explained
g_1	NULL	2	208.82	9.57	< 0.01	5.8	0.00%
g_2	SZ	3	204.77	5.51	0.03	4.81	16.93%
g_3	SZ + Sal + pH	5	204.18	4.92	0.04	4.06	29.97%
g_4	SZ + ET + Sal + pH	6	206.65	7.40	0.01	4	30.96%
g_5	SZ + Sal	4	205.88	6.63	0.02	4.62	20.36%
g_6	SZ + pH	4	202.06	2.81	0.10	4.14	28.65%
g_7	SZ + ET	4	205.84	6.59	0.02	4.61	20.45%
g_8	SZ + Yr	4	202.91	3.65	0.07	4.24	26.89%
g_9	SZ + Sal + pH + Yr	6	201.50	2.24	0.14	3.45	40.51%
g_{10}	SZ + ET + Sal + pH + Yr	7	203.94	4.69	0.04	3.37	41.79%
g_{11}	SZ + Sal + Yr	5	204.10	4.85	0.04	4.05	30.12%
g_{12}	SZ + pH + Yr	5	199.25	0.00	0.43	3.52	39.25%
g_{13}	SZ + ET + Yr	5	203.86	4.61	0.04	4.02	30.61%
g_{14}	SZ + ET + Sal + pH + Sex + Yr	8	205.98	6.73	0.01	3.24	44.12%
g_{15}	SZ + ET + Sal*pH + Sex + Yr	9	207.75	8.49	< 0.01	3.06	47.23%
g_{16}	SZ + ET + Sal*pH*Yr + Sex	12	220.42	21.17	< 0.01	3	48.26%

Table S7. AIC calculations for multiple linear regression models corresponding to hypotheses about **clam growth rate** in 2018 and 2019. k = number of parameters, including variance (σ^2) as a parameter. AICc = corrected AIC value. Δ_i = difference between model i and the best model in the set. w_i = model probability of fitting the observed data. SZ = Initial shell length. Sal = Salinity. Best model in bold.

Model	Variables	k	AICc	Δ_i	w_i	Residual deviance	% deviance explained
g_1	NULL	2	-747.37	33.95	< 0.01	0.04	0.00%
g_2	Sal	3	-748.72	32.59	< 0.01	0.04	2.41%
g_3	pH	3	-777.19	4.13	0.06	0.03	20.25%
g_4	Sal + pH	4	-779.22	2.10	0.17	0.03	22.57%
g_5	Sal*pH	5	-777.10	4.22	0.06	0.03	22.58%
g_6	Sal + pH + Yr	5	-781.32	0.00	0.50	0.03	24.96%
g_7	Sal*pH + Yr	6	-779.52	1.80	0.20	0.03	24.97%

Table S8. AIC calculations for multiple linear regression models (g_i) corresponding to hypotheses about **clam survival** in 2018 and 2019. k = number of parameters, including variance (σ^2) as a parameter. AICc = corrected AIC value. Δ_i = difference between model i and the best model in the set. w_i = model probability of fitting the observed data. S.L = Initial shell length. Sal = Salinity. Best model in bold.

Model	Variables	k	AICc	Δ_i	w_i	Residual deviance	% deviance explained
g_1	NULL	1	264.35	13.37	< 0.01	262.33	0.00%
g_2	S.L	2	263.10	12.13	< 0.01	259.04	1.25%
g_3	S.L + Yr	3	264.89	13.92	< 0.01	258.78	1.35%
g_4	S.L + Sal + pH + Yr	5	252.77	1.79	0.09	242.49	7.56%
g_5	S.L + Sal + pH	4	250.97	0.00	0.23	242.79	7.45%
g_6	S.L + Sal + Yr	4	254.64	3.67	0.04	246.46	6.05%
g_7	S.L + pH + Yr	4	263.23	12.26	< 0.01	255.05	2.78%
g_8	Sal + Yr	3	255.12	4.15	0.03	249.01	5.08%
g_9	pH + Yr	3	263.48	12.51	< 0.01	257.37	1.89%
g_{10}	Sal + pH + Yr	4	253.13	2.15	0.08	244.94	6.63%
g_{11}	S.L + Sal*pH + Sal*Yr + pH*Yr	8	251.08	0.11	0.22	234.41	10.64%
g_{12}	Sal*pH + Sal*Yr + pH*Yr	7	251.24	0.26	0.20	236.72	9.76%
g_{13}	S.L + Sal*pH*Yr	9	252.51	1.54	0.11	233.67	10.92%

Table S9. AIC calculations for multiple linear regression models corresponding to hypotheses about **clam ridge rugosity** in 2018. k = number of parameters, including variance (σ^2) as a parameter. AICc = corrected AIC value. Δ_i = difference between model i and the best model in the set. w_i = model probability of fitting the observed data. Sal = Salinity. Best model in bold.

Model	Variables	k	AICc	Δ_i	w_i	Residual deviance	% deviance explained
g_1	Intercept	2	40.11	11.13	< 0.01	2.85	0.00%
g_2	Sal	3	42.02	13.03	< 0.01	2.77	2.92%
g_3	pH	3	28.98	0.00	0.62	1.62	43.15%
g_4	Sal + pH	4	30.38	1.40	0.31	1.52	46.57%
g_5	Sal*pH	5	33.43	4.45	0.07	1.51	46.97%

Figure S1 A-B. Figure showing where on clam shell each image was taken (inner green square) (A) and how ridge was drawn (B). Blue line is the standardized (ideal) ridge and the red line is the actual (traced) ridge; rugosity = (length of red line)/(length of blue line).

