

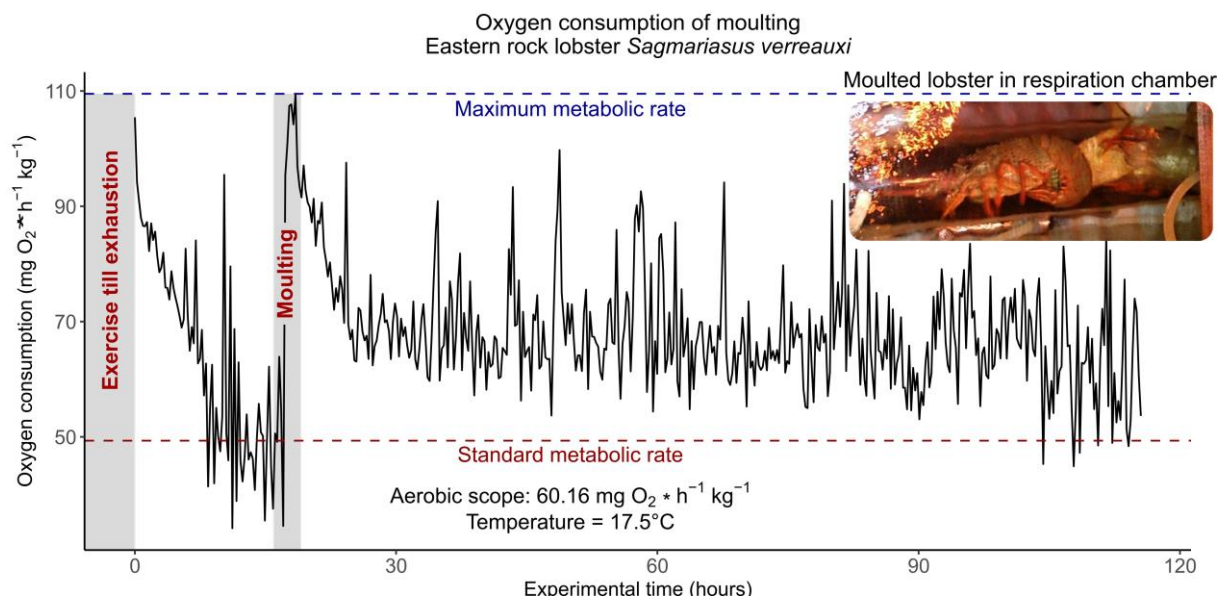
## Supplementary information

### Research Article:

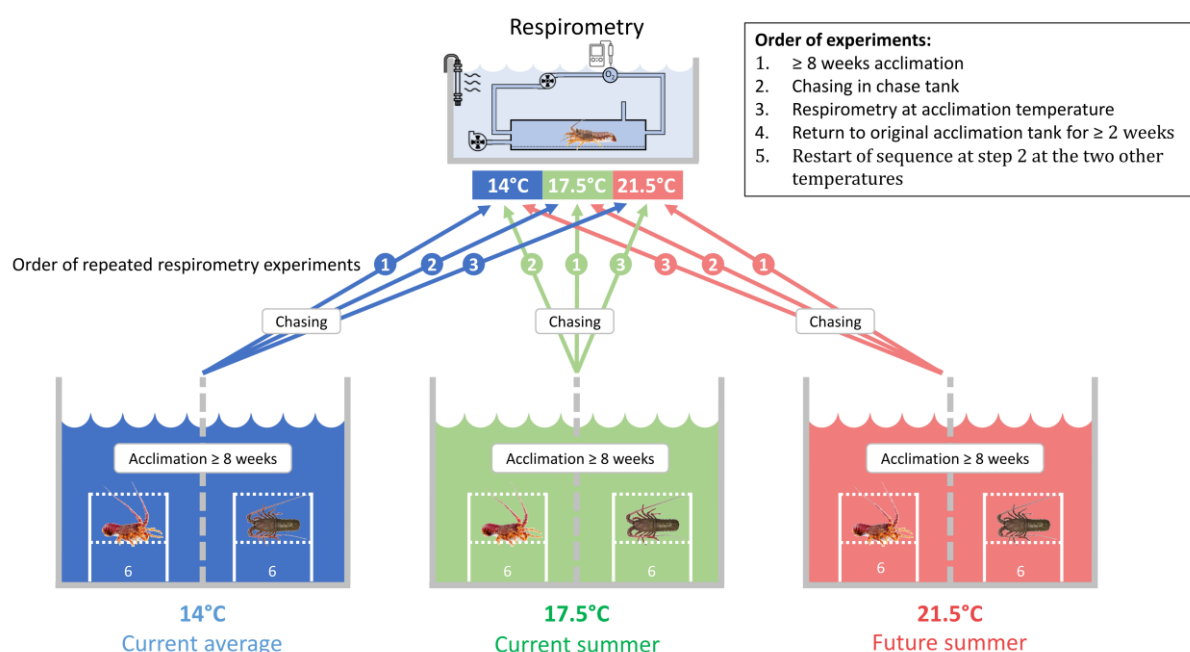
### Metabolic plasticity improves lobster's resilience to ocean warming but not to climate-driven novel species interactions

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**Supplementary Figure S1:** Oxygen consumption rate of moulting eastern rock lobster *S. verreauxi*, following exhaustive exercise and a recovery period. Moulting caused the exhaustion of the full aerobic scope and an elevation of post-moulting oxygen consumption above standard metabolic rate.



**Supplementary Figure S2:** Schematic diagram of the fully factorial experimental design. Eastern and southern rock lobsters were acclimated in pairs to current average (14°C), current summer (17.5°C) and future summer temperatures (21.5°C) for at least eight weeks. To detect differences between acclimation treatments, we measured oxygen consumption rates of each lobster, across all three acclimation temperatures, using intermittent respirometry.



**Supplementary Table S1:** Raw data table for all individuals used in this study available in the figshare repository ([LINK](#)).

**Supplementary File S1:** Python script to record total escapes and escape speed available in the figshare repository ([LINK](#)).

**Supplementary Files S2:** R Markdown files for data processing and statistical analysis available in the figshare repository ([LINK](#)).

**Supplementary Files S3:** R Markdown file for weight and sex distribution of animals available in the figshare repository ([LINK](#)).

**Supplementary Table S2:** Summary of the impact of main effects on various metabolic performance and escape parameters of Southern- and Eastern rock lobster using linear mixed effect models. Effect sizes of  $\eta^2 \leq 0.06$  indicate a small effect;  $\eta^2 > 0.06 < 0.14$  a medium effect; and  $\eta^2 \geq 0.14$  a large effect. Main effects with  $p \leq 0.05$  were shaded grey.

Factor	Main Effect	F (df)	Significance (p-value)	Partial Effect Size ( $\eta^2_p$ [C.I. 90%])	Effect Size Category
<b>Maximum metabolic rate</b>	Experimental Temp.	59.71 (2)	7.446 x 10 <sup>-15</sup>	0.67 [0.55-0.75]	large
	Acclimation Temp.	3.1 (2)	5.913 x 10 <sup>-15</sup>	0.17 [0.00-0.34]	large
	Species	9.54 (1)	0.004	0.23 [0.05-0.43]	large
	Body mass	4.13 (1)	0.050	0.10 [0.00-0.28]	medium
	Experimental x Acclimation Temp.	2.37 (4)	0.062	0.14 [0.00-0.27]	medium
	Experimental Temp. x Species	2.49 (2)	0.091	0.08 [0.00-0.19]	medium
	Acclimation Temp. x Species	1.05 (2)	0.361	0.06 [0.00-0.21]	medium
	Experimental x Acclimation Temp. x Species	0.45 (4)	0.775	0.03 [0.00-0.07]	small
<b>Aerobic scope</b>	Experimental Temp.	1.88 (2)	0.161	0.05 [0.00-0.15]	small
	Acclimation Temp.	0.59 (2)	0.562	0.03 [0.00-0.14]	small
	Species	5.85 (1)	0.021	0.15 [0.01-0.33]	large
	Experimental x Acclimation Temp.	3.62 (4)	0.010	0.18 [0.03-0.29]	large
<b>Factorial aerobic scope</b>	Experimental Temp.	44.51 (2)	2.929 x 10 <sup>-13</sup>	0.56 [0.43, 0.65]	large
	Acclimation Temp.	3.86 (2)	0.03	0.17 [0.01, 0.34]	large
<b>EPOC</b>	Experimental Temp.	18.07 (2)	7.102 x 10 <sup>-7</sup>	0.37 [0.21-0.50]	large
	Acclimation Temp.	10.93 (2)	2.298 x 10 <sup>-4</sup>	0.40 [0.17-0.56]	large
	Species	2.02 (1)	0.165	0.06 [0.00-0.22]	small
	Experimental x Acclimation Temp.	2.77 (4)	0.035	0.16 [0.01-0.26]	large
	Experimental Temp. x Species	0.15 (2)	0.859	0.01 [0.00-0.04]	small
	Acclimation Temp. x Species	0.27 (2)	0.763	0.02 [0.00-0.10]	small
	Experimental x Acclimation Temp. x Species	2.47 (4)	0.054	0.14 [0.00-0.25]	large
<b>Recovery time</b>	Experimental Temp.	6.64 (2)	0.002	0.16 [0.04-0.28]	large
	Acclimation Temp.	10.11 (2)	3.369 x 10 <sup>-4</sup>	0.36 [0.14-0.52]	large

**Supplementary Table S2 continued**

<b>Recovery rate</b>	Experimental Temp.	16.95 (2)	$1.167 \times 10^{-6}$	0.34 [0.18-0.47]	large
	Acclimation Temp.	2.61 (2)	0.088	0.13 [0.00-0.29]	large
	Experimental x Acclimation Temp.	4.84 (4)	0.002	0.23 [0.06-0.34]	large
<b>Escape speed (cm s<sup>-1</sup>)</b>	Experimental Temp.	5.23 (2)	0.008	0.14 [0.02-0.27]	large
	Species	11.85 (1)	0.002	0.26 [0.07-0.45]	large
<b>Total escapes</b>	Species	8.24 (1)	0.007	0.20 [0.04-0.38]	large
	Body mass	3.72 (1)	0.061	0.09 [0.00-0.26]	medium

**Supplementary Table S3:** Summary of the impact of main effects on standard metabolic rate of Southern- and Eastern rock lobster using general linear mixed effect models.

<b>Factor</b>	<b>Main effect</b>	<b>Beta [C.I. 95%]</b>	<b>Significance (p-value)</b>
SMR	Experimental Temp. (21.5°C)	26.97 [21.26, 32.68]	$2.0 \times 10^{-16}$
	Acclimation Temp. (21.5°C)	-5.01 [-8.33, -1.70]	0.003
	Sex (male)	-2.62 [-5.22, -0.02]	0.048
	Experimental (21.5°C) x Acclimation Temp. (21.5°C)	-10.48 [-17.28, -3.68]	0.003