

Demographic responses of coexisting species to *in situ* warming

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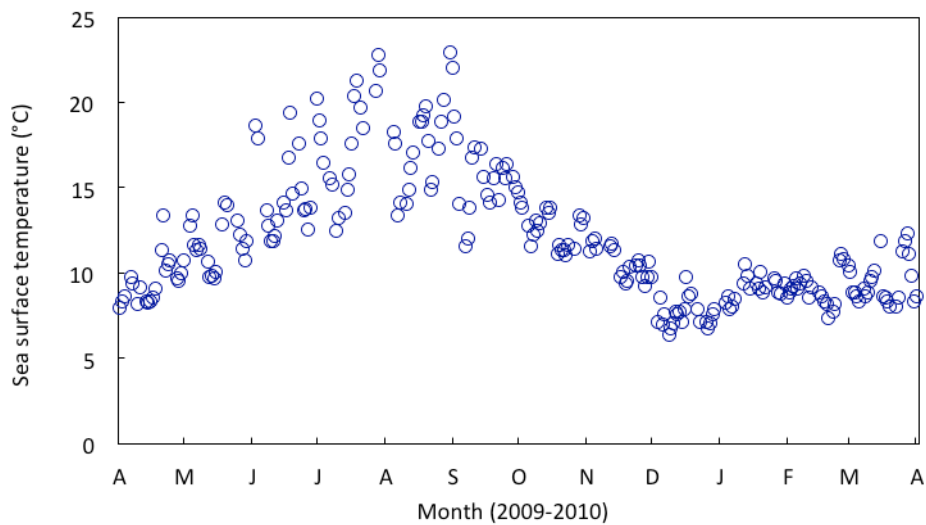


Figure S1. Sea surface temperature (°C) measured at Active Pass lighthouse, BC (15 km from the field site) during the experimental period (April 2009 – April 2010). The average temperature was 12.2°C (min 6.4°C, max 23.0°C). The apparent semi-monthly signal is due at least in part to the sampling methodology (water temperature was measured at low tide, the timing of which changed over the course of a fortnightly tidal cycle). Data accessed via the Fisheries and Oceans Canada website

Table S1. Summary statistics of plate and rock temperature. All statistics were calculated using the raw temperature data except where noted, when the average daily maximum (ADM) was used. Mean min. and mean max. values represent the minimum and maximum values ever recorded on the plate (or rock), averaged across replicates. Mean ADM values were determined by calculating the residual of the ADM for each plate (or logger on the rock) from the grand mean on each sampling date, then averaging across replicates. For ease of interpretation, mean ADM values in the table represent the sum of the residual and the grand mean (calculated over the entire period). Mean degree hours (DH) were calculated by summing all hours above important barnacle thermal thresholds (see text for explanation) for each logger in a plate or on the rock, and then averaging across replicates. Number of days when the ADM temperature was above thresholds, averaged across replicates (4–5 replicate records per treatment combination, for all metrics). Analyses for metrics with * can be found in Table S2

| Tidal height | Temp trmt | Mean min. | Mean | Mean max. | Mean (ADM) * | Mean variance * | Mean DH \geq 33°C * | Mean DH \geq 35°C * | Mean no. days \geq 33°C * | Mean no. days \geq 35°C * |
|--------------|-----------|-----------|------|-----------|--------------|-----------------|-----------------------|-----------------------|-----------------------------|-----------------------------|
| High | Black | 6.0 | 15.5 | 40.9 | 29.3 | 53.6 | 118.9 | 41.3 | 26.6 | 15.4 |
| | White | 5.4 | 14.8 | 36.4 | 26.4 | 39.7 | 16.7 | 1.5 | 12.4 | 3.6 |
| | Rock | 7.8 | 15.4 | 37.5 | 26.9 | 35.2 | 36.3 | 7.3 | 19.8 | 8.2 |
| Mid | Black | 7.6 | 13.3 | 37.8 | 23.7 | 18.1 | 13.0 | 5.3 | 7.8 | 6.0 |
| | White | 7.2 | 12.6 | 33.8 | 21.7 | 13.7 | 1.8 | 0.4 | 5.5 | 1.5 |
| | Rock | 9.1 | 13.3 | 32.4 | 20.8 | 15.7 | 0.6 | 0 | 3.0 | 1.0 |

Table S2. Temperature differences between treatments. Statistical results of 2-way ANOVA for (A) average daily maximum (ADM) temperature, calculated from residuals; (B) variance in (residual) temperatures; cumulative degree hours (C) $\geq 33^{\circ}\text{C}$ and (D) $\geq 35^{\circ}\text{C}$; and number of days when ADM temperature (E) $\geq 33^{\circ}\text{C}$ and (F) $\geq 35^{\circ}\text{C}$. Temperature treatments include warm and cool plates and the nearby rock. See text for details of how metrics were calculated. For the degree hours and number of days analyses, data were $\log(x + 1)$ transformed to meet assumptions of normality and homoscedasticity. **Bold** values are significant at $\alpha = 0.05$

| Source | df | SS | F | p |
|--|----|---------|---------|------------------|
| (A) ADM temperature | | | | |
| temp trmt (t) | 2 | 41.447 | 34.674 | <0.001 |
| height (h) | 1 | 195.822 | 327.648 | <0.001 |
| t \times h | 2 | 2.025 | 1.694 | 0.208 |
| error | 21 | 12.551 | | |
| total | 26 | 248.875 | | |
| (B) Variance | | | | |
| temp trmt | 2 | 83.278 | 4.705 | 0.020 |
| height | 1 | 29.546 | 3.338 | 0.082 |
| t \times h | 2 | 43.728 | 2.470 | 0.109 |
| error | 21 | 185.856 | | |
| total | 26 | 333.334 | | |
| (C) Degree hours $\geq 33^{\circ}\text{C}$ | | | | |
| temp trmt | 2 | 18.509 | 8.711 | 0.002 |
| height | 1 | 37.658 | 35.448 | <0.001 |
| t \times h | 2 | 2.006 | 0.944 | 0.405 |
| error | 21 | 22.310 | | |
| total | 26 | 78.557 | | |
| (D) Degree hours $\geq 35^{\circ}\text{C}$ | | | | |
| temp trmt | 2 | 25.002 | 14.894 | <0.001 |
| height | 1 | 15.705 | 18.711 | <0.001 |
| t \times h | 2 | 3.005 | 1.790 | 0.192 |
| error | 21 | 17.626 | | |
| total | 26 | 60.943 | | |
| (E) Number of days $\geq 33^{\circ}\text{C}$ | | | | |
| temp trmt | 2 | 4.110 | 4.114 | 0.031 |
| height | 1 | 20.478 | 40.998 | <0.001 |
| t \times h | 2 | 0.617 | 0.618 | 0.549 |
| error | 21 | 10.490 | | |
| total | 26 | 34.855 | | |
| (F) Number of days $\geq 35^{\circ}\text{C}$ | | | | |
| temp trmt | 2 | 7.456 | 8.946 | 0.002 |
| height | 1 | 12.658 | 30.377 | <0.001 |
| t \times h | 2 | 0.463 | 0.556 | 0.582 |
| error | 21 | 8.751 | | |
| total | 26 | 28.809 | | |

Table S3. Summary of barnacle responses to experimental warming, over summer 2009 (22 May–15 August). Density and percent cover were highly variable over time (see Figures 7 and 8). Summary statistics and percentages are solely meant for ease of comparison; full statistical analyses are presented tables S4–S10. Confidence intervals (CI) encompass 95% of the data. The sample size (n) for density and percent cover represents the number of plates per treatment (initially = 7) × the number of sampling dates. For survivorship and growth rates, n = the number of replicate plates within each treatment. Statistics are given as in graphs (back transformed). **Bold** percentages represent the difference between cool and warm treatments when CIs do not overlap

| Parameter | Spp | Height | Trmt | Mean | lower CI | upper CI | n | Effect of warming |
|---------------------------|--------------------|--------|------|--------|----------|----------|----|-------------------|
| Recruitment (22 May) | <i>B. glandula</i> | High | Warm | 9.75 | 3.83 | 4.68 | 7 | -52.37% |
| | <i>B. glandula</i> | High | Cool | 20.46 | 10.65 | 14.25 | 6 | |
| | <i>C. dalli</i> | High | Warm | 5.24 | 5.61 | 10.36 | 7 | 16.70% |
| | <i>C. dalli</i> | High | Cool | 4.49 | 5.89 | 13.01 | 6 | |
| | <i>B. glandula</i> | Mid | Warm | 47.72 | 39.48 | 67.30 | 7 | -76.81% |
| | <i>B. glandula</i> | Mid | Cool | 205.82 | 120.73 | 171.93 | 6 | |
| | <i>C. dalli</i> | Mid | Warm | 22.27 | 23.04 | 46.56 | 7 | -54.03% |
| | <i>C. dalli</i> | Mid | Cool | 48.44 | 46.53 | 89.50 | 6 | |
| Survival (5–25 June) | <i>B. glandula</i> | High | Warm | 1.34 | 0.10 | 9.98 | 4 | -97.92% |
| | <i>B. glandula</i> | High | Cool | 64.20 | 8.32 | 7.91 | 6 | |
| | <i>C. dalli</i> | High | Warm | 53.71 | 32.28 | 30.61 | 6 | -44.28% |
| | <i>C. dalli</i> | High | Cool | 96.39 | 15.41 | 3.13 | 6 | |
| | <i>B. glandula</i> | Mid | Warm | 55.16 | 34.55 | 31.91 | 3 | -37.89% |
| | <i>B. glandula</i> | Mid | Cool | 88.80 | 28.31 | 11.20 | 4 | |
| | <i>C. dalli</i> | Mid | Warm | 34.27 | 28.70 | 37.67 | 3 | -10.90% |
| | <i>C. dalli</i> | Mid | Cool | 38.46 | 15.17 | 16.42 | 4 | |
| Growth (Summer) | <i>B. glandula</i> | High | Warm | 0.111 | 0.079 | 0.085 | 2 | -16.93% |
| | <i>B. glandula</i> | High | Cool | 0.133 | 0.055 | 0.058 | 7 | |
| | <i>C. dalli</i> | High | Warm | 0.027 | 0.005 | 0.005 | 7 | -50.62% |
| | <i>C. dalli</i> | High | Cool | 0.055 | 0.015 | 0.015 | 7 | |
| | <i>B. glandula</i> | Mid | Warm | 0.103 | 0.070 | 0.075 | 4 | -42.10% |
| | <i>B. glandula</i> | Mid | Cool | 0.179 | 0.039 | 0.041 | 6 | |
| | <i>C. dalli</i> | Mid | Warm | 0.043 | 0.023 | 0.023 | 6 | -33.69% |
| | <i>C. dalli</i> | Mid | Cool | 0.065 | 0.018 | 0.019 | 6 | |
| Density (Summer) | <i>B. glandula</i> | High | Warm | 3.24 | 1.35 | 1.99 | 49 | -85.16% |
| | <i>B. glandula</i> | High | Cool | 21.86 | 6.52 | 9.12 | 42 | |
| | <i>C. dalli</i> | High | Warm | 10.67 | 4.24 | 6.65 | 49 | -61.30% |
| | <i>C. dalli</i> | High | Cool | 27.57 | 11.16 | 18.31 | 42 | |
| | <i>B. glandula</i> | Mid | Warm | 7.59 | 3.05 | 4.74 | 50 | -92.93% |
| | <i>B. glandula</i> | Mid | Cool | 107.36 | 21.36 | 26.60 | 42 | |
| | <i>C. dalli</i> | Mid | Warm | 5.17 | 2.50 | 4.21 | 50 | -84.01% |
| | <i>C. dalli</i> | Mid | Cool | 32.36 | 11.35 | 17.20 | 42 | |
| Percent cover (Summer) | <i>B. glandula</i> | High | Warm | 0.10 | 0.09 | 0.09 | 49 | -94.46% |
| | <i>B. glandula</i> | High | Cool | 1.90 | 0.73 | 0.97 | 42 | |
| | <i>C. dalli</i> | High | Warm | 0.68 | 0.31 | 0.38 | 49 | -63.89% |
| | <i>C. dalli</i> | High | Cool | 1.87 | 0.70 | 0.93 | 42 | |
| | <i>B. glandula</i> | Mid | Warm | 0.83 | 0.35 | 0.43 | 49 | -95.46% |
| | <i>B. glandula</i> | Mid | Cool | 18.36 | 4.91 | 6.57 | 40 | |
| | <i>C. dalli</i> | Mid | Warm | 0.71 | 0.35 | 0.43 | 49 | -73.21% |
| | <i>C. dalli</i> | Mid | Cool | 2.67 | 0.93 | 1.24 | 40 | |

Table S4. Effect of temperature on barnacle recruitment, assessed on 22 May (22 d after plate deployment). Data were log transformed prior to analyzing with 3-way ANOVA. Sample size (N) refers to the total number of plates. Effects that are significant following Bonferroni correction of α to 0.025 are indicated in **bold**

| Source | df | SS | F | p |
|--------------------------------------|----|--------|--------|----------------|
| Early recruit density, N = 52 | | | | |
| temp | 1 | 1.163 | 3.075 | 0.086 |
| height | 1 | 8.098 | 21.409 | < 0.001 |
| spp. | 1 | 2.532 | 6.695 | 0.013 |
| t × h | 1 | 0.408 | 1.077 | 0.305 |
| t × spp. | 1 | 0.348 | 0.921 | 0.343 |
| h × spp. | 1 | 0.011 | 0.028 | 0.868 |
| t × h × spp. | 1 | 0.002 | 0.007 | 0.936 |
| error | 44 | 16.643 | | |
| total | 51 | 28.848 | | |

Table S5. Effect of temperature on survival of juvenile barnacles. RM-ANOVA for summer dates (5 sampling dates between 25 June and 15 August 2009, inclusive). Survival for each plate was estimated by tracking the fate of 3 to 38 barnacles per plate—for *B. glandula*, 77 individuals (high) and 105 (mid); for *C. dalli*, 91 (high) and 75 (mid). Degrees of freedom and p-values were adjusted by Huynh-Feldt ϵ in RM-ANOVA. Degrees of freedom (df) listed as numerator, denominator. Sample size (N) refers to the total number of plates. **Bolded** values are significant at $\alpha = 0.05$. Data were arcsine transformed prior to analyses

| Source | df | F | p |
|--|----------|--------|----------------|
| Juvenile survival, N = 36 | | | |
| Between-subjects | | | |
| temperature (t) | 1,28 | 32.325 | < 0.001 |
| tidal height (h) | 1,28 | 4.396 | 0.045 |
| species (spp.) | 1,28 | 1.185 | 0.286 |
| t × h | 1,28 | 1.782 | 0.193 |
| t × spp. | 1,28 | 5.138 | 0.031 |
| h × spp. | 1,28 | 16.964 | < 0.001 |
| t × h × spp. | 1,28 | 0.002 | 0.965 |
| Within-subjects | | | |
| time | 1,9,52.6 | 20.665 | < 0.001 |
| temp × time | 1,9,52.6 | 0.517 | 0.588 |
| height × time | 1,9,52.6 | 4.671 | 0.015 |
| spp × time | 1,9,52.6 | 0.365 | 0.682 |
| t × h × time | 1,9,52.6 | 1.008 | 0.368 |
| t × spp. × time | 1,9,52.6 | 0.580 | 0.553 |
| h × spp. × time | 1,9,52.6 | 3.252 | 0.050 |
| t × h × spp. × time | 1,9,52.6 | 0.087 | 0.906 |
| Mauchly criterion = 0.0046, df = 9, p <0.001 | | | |

Table S6. Effect of temperature on growth rates of juvenile barnacles. Statistical results for the effect of the warming treatment and intertidal height on barnacle growth rates. ANOVA for (A) summer and (B) winter data. Data were $\log(x + 1)$ transformed prior to analyses. Effects that are significant following Bonferroni correction of α to 0.017 for (A) are indicated in **bold**. Significant p-values for (B) are in **bold** for $\alpha = 0.05$

| Source | df | SS | F | p |
|--|----|------------------------|--------|------------------|
| (A) Barnacle growth in summer, N = 45 | | | | |
| temperature (t) | 1 | 1.060×10^{-2} | 6.371 | 0.016 |
| tidal height (h) | 1 | 1.984×10^{-3} | 1.192 | 0.282 |
| species (spp.) | 1 | 5.670×10^{-2} | 34.071 | <0.001 |
| t × h | 1 | 9.542×10^{-4} | 0.574 | 0.454 |
| t × spp. | 1 | 8.959×10^{-4} | 0.538 | 0.468 |
| h × spp. | 1 | 2.952×10^{-5} | 0.017 | 0.895 |
| t × h × spp. | 1 | 1.586×10^{-3} | 0.953 | 0.335 |
| error | 37 | 6.156×10^{-2} | | |
| total | 44 | 1.566×10^{-1} | | |
| (B) Barnacle growth in winter, N = 24 | | | | |
| temperature | 1 | 3.267×10^{-5} | 0.020 | 0.888 |
| tidal height | 1 | 5.868×10^{-3} | 3.687 | 0.073 |
| spp. | 1 | 1.556×10^{-2} | 9.775 | 0.006 |
| t × h | 1 | 1.053×10^{-5} | 0.007 | 0.936 |
| t × spp. | 1 | 2.611×10^{-5} | 0.016 | 0.899 |
| h × spp. | 1 | 3.963×10^{-3} | 2.489 | 0.134 |
| t × h × spp. | 1 | 3.487×10^{-3} | 0.022 | 0.885 |
| error | 16 | 2.547×10^{-2} | | |
| total | 23 | 4.950×10^{-2} | | |

Table S7. Effect of temperature on growth rates of three *C. dalli* cohorts. Statistical analysis (RM-ANOVA) of the effects of the temperature treatment and different settlement periods on *C. dalli* growth rates in the high zone during summer (see Fig. 6A). Also listed are data used for each analysis. Effects were examined for (A) a seasonal signal, using data for barnacles of approximately the same age (solid grey boxes in Fig. 6A) and, (B) an age signal, using growth over the same time period (dashed grey boxes in Fig. 6A). Average growth rates (per plate) were calculated for barnacle cohorts that settled just prior to 22 May, 24 June, and 9 July 2009. Degrees of freedom (df) listed as numerator, denominator for RM-ANOVA. Degrees of freedom and p-values were adjusted by Huynh-Feldt ϵ for within-subjects effects. Effects that are significant following Bonferroni correction of α to 0.017 are indicated in **bold**. n = 3 to 7 plates per group (cohort \times temperature combination).

| (A) Seasonal timing (same age) | | | |
|--|----------|-----------------|------------------|
| | Cohort | Period analyzed | Age (d) |
| | May | 5 June–19 July | 58–80 |
| | June | 9 July–15 Aug | 52–85 |
| | July | 19 July–15 Sept | 68–82 |
| Source | df | <i>F</i> | p |
| Between-subjects | | | |
| temperature (t) | 1,25 | 22.314 | <0.001 |
| settlement period (sp) | 2,25 | 6.412 | 0.006 |
| t \times sp | 2,25 | 0.228 | 0.798 |
| Within-subjects | | | |
| time | 2.4,59.4 | 70.230 | <0.001 |
| t \times time | 2.4,59.4 | 4.966 | 0.007 |
| sp \times time | 4.8,59.4 | 5.391 | <0.001 |
| t \times sp \times time | 4.8,59.4 | 1.558 | 0.189 |
| Mauchly criterion = 0.321, df = 5, p < 0.001 | | | |
| (B) Age (same timing) | | | |
| | Cohort | Period analyzed | Age (d) |
| | May | 19 July–15 Sept | 116–138 |
| | June | 19 July–15 Sept | 83–115 |
| | July | 19 July–15 Sept | 68–82 |
| Source | df | <i>F</i> | p |
| Between-subjects | | | |
| temperature | 1,23 | 31.523 | <0.001 |
| settlement period | 2,23 | 5.588 | 0.010 |
| t \times sp | 2,23 | 1.564 | 0.231 |
| Within-subjects | | | |
| time | 2.7,62.8 | 80.143 | <0.001 |
| t \times time | 2.7,62.8 | 2.645 | 0.062 |
| sp \times time | 5.5,62.8 | 1.281 | 0.282 |
| t \times sp \times time | 5.5,62.8 | 1.580 | 0.174 |
| Mauchly criterion = 0.480, df = 5, p = 0.007 | | | |

Table S8. Effect of temperature on the body size of three *C. dalli* cohorts. Statistical analysis (RM-ANOVA) of the effects of temperature treatment and different settlement periods on *C. dalli* size (basal area; mm²) in the high zone during summer (see Fig. 6B). Also listed are data used for each analysis. Effects were examined for (A) a seasonal signal, using data for barnacles of approximately the same age (solid grey boxes in Fig. 6B) and, (B) an age signal, using growth over the same period (dashed grey boxes in Fig. 6B). Average body size (per plate) was calculated for barnacle cohorts that settled just prior to 22 May, 24 June, and 9 July 2009. n = 3-7 plates / treatment. Degrees of freedom and p-value adjusted by Huynh-Feldt ϵ for within-subjects effects in RM-ANOVA. (C) Statistical results (ANOVA) of temperature treatment and settlement dates on body size at the end of the experiment (March 2010), N = 13 plates. Effects that are significant following Bonferroni correction of α to 0.025 are indicated in **bold** for (A–B)

| (A) Seasonal timing (same age) | | | |
|--|----------|-----------------|------------------|
| | Cohort | period analyzed | Age (d) |
| | May | 22 May–19 July | 58–80 |
| | June | 24 June–15 Aug | 52–85 |
| | July | 9 July–15 Sept | 68–82 |
| Source | df | F | p |
| Between-subjects | | | |
| temp (t) | 1,25 | 16.227 | <0.001 |
| settlement period (sp) | 2,25 | 3.586 | 0.043 |
| t × sp | 2,25 | 1.254 | 0.303 |
| Within-subjects | | | |
| time | 3.0,74.9 | 490.474 | <0.001 |
| temp × time | 3.0,74.9 | 24.375 | <0.001 |
| sp × time | 6.0,74.9 | 28.508 | <0.001 |
| t × sp × time | 6.0,74.9 | 1.163 | 0.335 |
| Mauchly criterion = 0.080, df = 9, p < 0.001 | | | |
| (B) Age (same timing) | | | |
| | Cohort | Period analyzed | Age (d) |
| | May | 9 July–15 Sept | 116-138 |
| | June | 9 July–15 Sept | 83-115 |
| | July | 9 July–15 Sept | 68-82 |
| Source | df | F | p |
| Between-subjects | | | |
| temp | 1,23 | 27.524 | <0.001 |
| settlement period | 2,23 | 31.005 | <0.001 |
| t × sp | 2,23 | 4.324 | 0.026 |
| Within-subjects | | | |
| time | 3.1,70.4 | 676.981 | <0.001 |
| temp × time | 3.1,70.4 | 9.576 | <0.001 |
| sp × time | 6.1,70.4 | 4.706 | <0.001 |
| t × sp × time | 6.1,70.4 | 1.271 | 0.282 |
| Mauchly criterion = 0.080, df = 9, p < 0.001 | | | |
| (C) Adult size (after 1 yr) | | | |
| | Cohort | Period analyzed | Age (d) |
| | May | 24 Mar | 306–328 |
| | June | 24 Mar | 273–305 |
| | July | 24 Mar | 258–272 |
| Source | df | F | p |
| temp | 1 | 4.886 | 0.063 |
| settlement period | 2 | 0.818 | 0.480 |
| t × sp | 2 | 2.457 | 0.156 |

Table S9. Effect of temperature on barnacle density. (A) Repeated measures ANOVA for summer data (May to August 2009) and (B) ANOVA on the last sampling date (March 2010). Data were log transformed prior to analyses. N refers to the total number of plates. Degrees of freedom and p-values were adjusted by Huynh-Feldt ϵ in RM-ANOVA. Degrees of freedom (df) listed as numerator, denominator for RM-ANOVA. Effects that are significant following Bonferroni correction of α to 0.025 for (A) are indicated in **bold**. Significant p-values for (B) are in **bold** for $\alpha = 0.05$

| Source | df | SS | F | p |
|--|-------|--------|--------|------------------|
| (A) Summer density, N = 48 | | | | |
| Between-subjects | | | | |
| temperature (t) | 1,40 | | 29.427 | <0.001 |
| tidal height (h) | 1,40 | | 1.496 | 0.228 |
| species (spp.) | 1,40 | | 0.352 | 0.556 |
| t × h | 1,40 | | 0.928 | 0.341 |
| t × spp. | 1,40 | | 2.781 | 0.103 |
| h × spp. | 1,40 | | 7.440 | 0.009 |
| t × h × spp. | 1,40 | | 0.092 | 0.763 |
| Within-subjects | | | | |
| time | 6,240 | | 7.893 | <0.001 |
| temp × time | 6,240 | | 4.364 | <0.001 |
| height × time | 6,240 | | 18.464 | <0.001 |
| spp × time | 6,240 | | 2.773 | 0.013 |
| t × h × time | 6,240 | | 1.531 | 0.169 |
| t × spp. × time | 6,240 | | 0.710 | 0.642 |
| h × spp. × time | 6,240 | | 4.532 | <0.001 |
| t × h × spp. × time | 6,240 | | 0.679 | 0.666 |
| Mauchly criterion = 0.428, df = 20, p = 0.043 | | | | |
| (B) Adult density (after 1 yr), N = 30 | | | | |
| temp | 1 | 3.446 | 9.57 | 0.005 |
| height | 1 | 0.494 | 1.367 | 0.255 |
| spp | 1 | 0.536 | 1.483 | 0.236 |
| t × h | 1 | 0.217 | 0.600 | 0.447 |
| t × spp. | 1 | 0.306 | 0.848 | 0.367 |
| h × spp. | 1 | 0.400 | 1.109 | 0.304 |
| t × h × spp. | 1 | 0.237 | 0.656 | 0.426 |
| error | 22 | 7.948 | | |
| total | 29 | 17.174 | | |

Table S10. Effect of temperature on barnacle percent cover. (A) RM-ANOVA for summer data (May to August 2009) and (B) ANOVA on last sampling date (March 2010). Data were log transformed prior to analyses. N refers to the total number of plates. Degrees of freedom and p-values were adjusted by Huynh-Feldt ϵ in RM-ANOVA. Degrees of freedom (df) listed as numerator, denominator for RM-ANOVA. **Bolded** values are significant at $\alpha = 0.05$

| Source | df | SS | F | p |
|---|-----------|--------|--------|------------------|
| (A) Summer percent cover, N = 48 | | | | |
| Between-subjects | | | | |
| temperature (t) | 1,40 | 48.734 | | <0.001 |
| tidal height (h) | 1,40 | 14.368 | | <0.001 |
| species (spp) | 1,40 | 6.713 | | 0.013 |
| t × h | 1,40 | 4.138 | | 0.049 |
| t × spp | 1,40 | 14.099 | | <0.001 |
| h × spp | 1,40 | 15.520 | | <0.001 |
| t × h × spp | 1,40 | 5.447 | | 0.025 |
| Within-subjects | | | | |
| time | 5.6,225.2 | 12.299 | | <0.001 |
| temp × time | 5.6,225.2 | 9.934 | | <0.001 |
| height × time | 5.6,225.2 | 5.252 | | <0.001 |
| spp. × time | 5.6,225.2 | 0.454 | | 0.831 |
| t × h × time | 5.6,225.2 | 1.536 | | 0.172 |
| t × spp. × time | 5.6,225.2 | 3.857 | | 0.001 |
| h × spp. × time | 5.6,225.2 | 4.046 | | <0.001 |
| t × h × spp. × time | 5.6,225.2 | 2.150 | | 0.053 |
| Mauchly criterion = 0.181, df = 20, p < 0.001 | | | | |
| (B) Adult percent cover (after 1 yr), N = 30 | | | | |
| temp | 1 | 3.298 | 25.051 | <0.001 |
| height | 1 | 0.016 | 0.122 | 0.730 |
| species | 1 | 0.020 | 0.152 | 0.700 |
| t × h | 1 | 0.058 | 0.444 | 0.512 |
| t × spp. | 1 | 0.004 | 0.029 | 0.865 |
| h × spp. | 1 | 0.002 | 0.012 | 0.915 |
| t × h × spp. | 1 | 0.098 | 0.743 | 0.398 |
| error | 22 | 2.897 | | |
| total | 29 | 8.616 | | |