# Supplementary Material: Online Resource 1 and 2

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**Indirect effects of ocean acidification drive feeding and growth of juvenile crown of thorns starfish, *Acanthaster planci***

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# Online resource 1

**Table S1*a*.** Mean seawater treatment conditions for experiment with early juvenile *Acanthaster planci*: Temperature (°C), $pH_T$, $pCO_2$ values (µatm) and calcite saturation states ($\Omega_{Calcite}$). Values for $pCO_2$ and $\Omega_{Calcite}$ were calculated using $pH_T$, temperature, total alkalinity (mean 2185.32 µmol $kg^{-1} \pm 5.70$ SE, $n = 44$) and salinity (mean $36.04 \pm 0.17$ SE, $n = 44$) values in CO2SYS (Pierrot et al. 2006). Values in parentheses are standard errors, $n = 44$.

| pH | 7.9 | 7.8 | 7.6 |
|---|---|---|---|
| **Temperature (°C)** | 29.7 | 29.9 | 29.6 |
| | (0.1) | (0.1) | (0.1) |
| **$pH_T$** | 7.93 | 7.78 | 7.55 |
| | (<0.01) | (<0.01) | (<0.01) |
| **$pCO_2$** | 505.9 | 774.0 | 1414.4 |
| | (6.5) | (9.3) | (18.3) |
| **$\Omega_{Calcite}$** | 4.63 | 3.48 | 2.20 |
| | (0.04) | (0.04) | (0.02) |

**Table S1*b*.** Mean seawater treatment conditions during preconditioning of crustose coralline algae for four weeks: Temperature (°C), $pH_T$, $pCO_2$ values (µatm) and calcite saturation states ($\Omega_{Calcite}$). Values for $pCO_2$ and $\Omega_{Calcite}$ were calculated using $pH_T$, temperature, total alkalinity (mean 2273.36 µmol $kg^{-1} \pm 14.79$ SE, $n = 15$) and salinity (mean $35.59 \pm 0.02$ SE, $n = 15$) values in CO2SYS (Pierrot et al. 2006). Values in parentheses are standard errors, $n = 15$.

| pH | 7.9 | 7.7 | 7.6 |
|---|---|---|---|
| **Temperature (°C)** | 29.7 | 29.7 | 29.7 |
| | (0.1) | (0.1) | (0.1) |
| **$pH_T$** | 7.93 | 7.74 | 7.56 |
| | (<0.01) | (<0.01) | (0.01) |
| **$pCO_2$** | 497.4 | 839.7 | 1337.8 |
| | (3.5) | (7.4) | (21.3) |
| **$\Omega_{Calcite}$** | 4.38 | 3.05 | 2.13 |
| | (0.04) | (0.03) | (0.03) |

# Online resource 2

**Table S2.** Analysis of data on feeding rates, growth and the number of arms of *Acanthaster planci* juveniles reared under three pH conditions for six weeks and fed crustose coralline algae grown under three pH levels for four weeks; (a) ANCOVA of feeding with Bonferroni corrected values as post hoc analyses, (b) ANOVA of change in diameter calculated as a Linear Growth Rate (LGR) ($\mu$m week$^{-1}$) with pair-wise post-hoc analysis, (c) ANCOVA of change in area calculated as a Specific Growth Rate (SGR) (mm$^2$ week$^{-1}$) with Bonferroni corrected values as post hoc analyses, and (d) ANOVA of number of arms. *df*, degrees of freedom. MS, mean square. Post hoc tests: 7.9, 7.8, 7.7 and 7.6 correspond to pH$_T$ treatments (pH$_T$ 7.9, 7.8, 7.7 and 7.6, respectively).

| Parameters | Source | *df* | MS | F | p-value | Post hoc tests |
|---|---|---|---|---|---|---|
| (a) Cumulative feeding | Initial Area (Co-variate) | 1 | 3.20E7 | 48.66 | < 0.001 | |
| | **Juvenile** | **2** | **2.50E6** | **3.81** | **0.029** | **7.9 = 7.8 < 7.8 = 7.6** |
| | **CCA** | **2** | **3.70E6** | **5.62** | **0.006** | **7.9 = 7.7 < 7.6** |
| | Juvenile × CCA | 4 | 9.26E5 | 1.41 | 0.245 | |
| | Residual | 51 | 6.57E5 | | | |
| (b) LGR (Diameter) | Juvenile | 2 | 1.06E-3 | 0.17 | 0.842 | |
| | **CCA** | **2** | **2.46E-2** | **4.02** | **0.022** | **7.9 = 7.7 < 7.6** |
| | Juvenile × CCA | 4 | 8.56E-3 | 1.40 | 0.249 | |
| | Residual | 52 | 6.12E-3 | | | |
| (c) SGR (Area) | Initial Area (Co-variate) | 1 | 330.41 | 34.42 | < 0.001 | |
| | Juvenile | 2 | 13.57 | 1.41 | 0.257 | |
| | **CCA** | **2** | **38.41** | **4.00** | **0.022** | **7.9 = 7.7 < 7.6** |
| | Juvenile × CCA | 4 | 9.91 | 1.03 | 0.402 | |
| | Residual | 51 | 9.60 | | | |
| (d) Arms | Juvenile | 2 | 0.29 | 0.31 | 0.739 | |
| | CCA | 2 | 0.34 | 0.37 | 0.697 | |
| | Juvenile × CCA | 4 | 0.50 | 0.54 | 0.706 | |
| | Residual | 52 | 0.93 | | | |