# Supplementary material

# Impact of seawater warming and nutrient deprivation on the physiology and energy metabolism of corals

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**Table S1: Statistical comparison between the physiological and energy parameters of the octocoral (order: Malacalcyonacea) *Heteroxenia fuscescens* and the hexacoral (order: Scleractinia) *Stylophora pistillata* under control conditions (C25).** The analysis was performed using t-tests. Significant differences ($p < 0.05$) are displayed in bold. C25 = DINUt control, 25°C. DINut = dissolved inorganic nutrient.

| *Comparison between Heteroxenia fuscescens* and *Stylophora pistillata* under C25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Parameter** | ***H. fuscescens*** | | ***S. pistillata*** | | **df** | **t** | **p** |
| | mean | std error | mean | std error | | | |
| Symbiodiniaceae density | 5.9E+08 | 4.2E+07 | 9.3E+08 | 2.0E+08 | 2.41 | 1.824 | 0.188 |
| Chlorophyll concentration | 845 | 41 | 2949 | 1279 | 2.029 | 1.845 | 0.205 |
| **Fv/Fm** | 0.614 | 0.011 | 0.518 | 0.024 | 2.791 | -3.712 | **0.038** |
| **Gross photosynthesis rate** | 50 | 8 | 244 | 42 | 5.536 | 4.524 | **0.005** |
| **Respiration rate** | 26 | 5 | 114 | 20 | 5.663 | 4.255 | **0.006** |
| P:R | 0.997 | 0.108 | 1.096 | 0.085 | 6.388 | 0.728 | 0.493 |
| **Protein concentration** | 93 | 11 | 185 | 24 | 7.234 | 3.513 | **0.009** |
| **Carbohydrate concentration** | 86 | 10 | 34 | 2 | 2.215 | -5.016 | **0.03** |
| **Lipid concentration** | 499 | 4 | 102 | 13 | 2.013 | -12.747 | **0.006** |
| Lactate concentration | 74 | 14 | 114 | 4 | 2.259 | 2.824 | 0.092 |
| ATP concentration | 1694 | 173 | 1200 | 134 | 3.757 | -2.254 | 0.092 |

**Table S2: Statistical analysis for the physiological and energy descriptors of the octocoral (order: Malacalyconacea) *Heteroxenia fuscescens*.** Generalized linear models were used and followed by Tukey's HSD post-hoc testing when significant. Significant differences ($p < 0.05$) are displayed in bold.

| *Heteroxenia fuscescens* | | | | | | |
|---|---|---|---|---|---|---|
| **Symbiodiniaceae density - Figure 2A** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 3.05E+15 | 13 | 1.75E+17 | 0.563125 | |
| Temperature | 1 | 6.84E+16 | 12 | 1.06E+17 | **0.006225** | ** |
| DINut:Temperature | 1 | 5.77E+15 | 11 | 1.00E+17 | 0.426631 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 17587579 | 67576231 | 0.26 | 0.9938 | |
| | C25 - C30 | 172153099 | 67576231 | 2.548 | 0.0524 | |
| | D25 - C30 | 110665383 | 72990672 | 1.516 | 0.4272 | |
| | C25 - D30 | 154565520 | 67576231 | 2.287 | 0.1007 | |
| | D25 - D30 | 93077805 | 72990672 | 1.275 | 0.5783 | |
| | D25 - C25 | -61487715 | 72990672 | -0.842 | 0.8339 | |
| **Chlorophyll concentration - Figure 2B** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 50072 | 13 | 409295 | 0.098794 | |
| Temperature | 1 | 131047 | 12 | 278248 | **0.007574** | ** |
| DINut:Temperature | 1 | 76115 | 11 | 202134 | **0.041829** | * |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 30.14 | 95.85 | 0.314 | 0.98922 | |
| | C25 - C30 | 320.37 | 95.85 | 3.342 | **0.00461** | ** |
| | D25 - C30 | 63.35 | 103.53 | 0.612 | 0.92822 | |
| | C25 - D30 | 290.23 | 95.85 | 3.028 | **0.01312** | * |
| | D25 - D30 | 33.21 | 103.53 | 0.321 | 0.98857 | |
| | D25 - C25 | -257.02 | 103.53 | -2.482 | 0.06264 | |
| **Fv/Fm - Figure 2C** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.0209167 | 10 | 0.035778 | **0.01309** | * |
| Temperature | 1 | 0.0082687 | 9 | 0.027509 | 0.11874 | |
| DINut:Temperature | 1 | 0.0003308 | 8 | 0.027179 | 0.75503 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -0.073 | 0.04759 | -1.534 | 0.4171 | |
| | C25 - C30 | 0.063 | 0.04759 | 1.324 | 0.5477 | |
| | D25 - C30 | -0.031 | 0.04759 | -0.651 | 0.9151 | |
| | C25 - D30 | 0.136 | 0.04759 | 2.858 | **0.0222** | * |
| | D25 - D30 | 0.042 | 0.04759 | 0.883 | 0.814 | |
| | D25 - C25 | -0.094 | 0.04759 | -1.975 | 0.1974 | |
| **Gross photosynthesis rate - Figure 2D** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 642.92 | 13 | 6563 | 0.21215 | |
| Temperature | 1 | 382.1 | 12 | 6180.8 | 0.33612 | |
| DINut:Temperature | 1 | 1637.76 | 11 | 4543.1 | **0.04644** | * |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 31.8392 | 14.3702 | 2.216 | 0.118 | |
| | C25 - C30 | 9.2981 | 14.3702 | 0.647 | 0.916 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | D25 - C30 | -0.9844 | 15.5216 | -0.063 | 1 | |
| | C25 - D30 | -22.5411 | 14.3702 | -1.569 | 0.396 | |
| | D25 - D30 | -32.8236 | 15.5216 | -2.115 | 0.148 | |
| | D25 - C25 | -10.2825 | 15.5216 | -0.662 | 0.911 | |
| **Respiration rate - Figure 2E** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 862.46 | 13 | 3532.4 | 0.06109 | |
| Temperature | 1 | 572.54 | 12 | 2959.9 | 0.12703 | |
| DINut:Temperature | 1 | 255.05 | 11 | 2704.8 | 0.30847 | |
| **P:R - Figure 2D** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.1347 | 13 | 0.39261 | **0.007958** | ** |
| Temperature | 1 | 0.05793 | 12 | 0.33468 | 0.081795 | |
| DINut:Temperature | 1 | 0.1243 | 11 | 0.21038 | **0.010794** | * |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -0.01167 | 0.09779 | -0.119 | 0.99939 | |
| | C25 - C30 | 0.29425 | 0.09779 | 3.009 | **0.01423** | * |
| | D25 - C30 | -0.08437 | 0.10563 | -0.799 | 0.85479 | |
| | C25 - D30 | 0.30592 | 0.09779 | 3.128 | **0.00951** | ** |
| | D25 - D30 | -0.0727 | 0.10563 | -0.688 | 0.90144 | |
| | D25 - C25 | -0.37862 | 0.10563 | -3.585 | **0.00174** | ** |
| **Protein concentration - Figure 3A** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 1299.91 | 25 | 13951 | 0.142 | |
| Temperature | 1 | 50.94 | 24 | 13900 | 0.7713 | |
| DINut:Temperature | 1 | 36.56 | 23 | 13863 | 0.8055 | |
| **Carbohydrate concentration - Figure 3B** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 635.7 | 10 | 20323.1 | 0.1068 | |
| Temperature | 1 | 18101.1 | 9 | 2222 | **<2e-16** | *** |
| DINut:Temperature | 1 | 267.3 | 8 | 1954.7 | 0.2956 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -23.996 | 12.763 | -1.88 | 0.237 | |
| | C25 - C30 | -87.116 | 12.763 | -6.826 | **<0.001** | *** |
| | D25 - C30 | -92.233 | 12.763 | -7.227 | **<0.001** | *** |
| | C25 - D30 | -63.121 | 12.763 | -4.946 | **<0.001** | *** |
| | D25 - D30 | -68.237 | 12.763 | -5.347 | **<0.001** | *** |
| | D25 - C25 | -5.117 | 12.763 | -0.401 | 0.978 | |
| **Lipid concentration - Figure 3C** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 7684 | 10 | 128145 | 0.1286 | |
| Temperature | 1 | 98660 | 9 | 29484 | **5.18E-08** | *** |
| DINut:Temperature | 1 | 2864 | 8 | 26620 | 0.3535 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -81.51 | 47.1 | -1.731 | 0.3077 | |
| | C25 - C30 | -212.25 | 47.1 | -4.506 | **<0.001** | *** |
| | D25 - C30 | -231.96 | 47.1 | -4.925 | **<0.001** | *** |
| | C25 - D30 | -130.74 | 47.1 | -2.776 | **0.0281** | * |
| | D25 - D30 | -150.45 | 47.1 | -3.194 | **0.0079** | ** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | D25 - C25 | -19.71 | 47.1 | -0.418 | 0.9753 | |
| **Lactate concentration - Figure 3E** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 5387.8 | 10 | 32054 | **0.04585** | * |
| Temperature | 1 | 20999.2 | 9 | 11055 | **8.08E-05** | *** |
| DINut:Temperature | 1 | 244.2 | 8 | 10811 | 0.67079 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 51.4 | 30.02 | 1.712 | 0.3171 | |
| | C25 - C30 | -74.64 | 30.02 | -2.487 | 0.062 | |
| | D25 - C30 | -41.29 | 30.02 | -1.375 | 0.5148 | |
| | C25 - D30 | -126.04 | 30.02 | -4.199 | **<0.001** | *** |
| | D25 - D30 | -92.69 | 30.02 | -3.088 | **0.0112** | * |
| | D25 - C25 | 33.36 | 30.02 | 1.111 | 0.6825 | |
| **ATP concentration - Figure 3F** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 45452 | 10 | 3039653 | 0.64504 | |
| Temperature | 1 | 1255701 | 9 | 1783951 | **0.01547** | * |
| DINut:Temperature | 1 | 70475 | 8 | 1713477 | 0.56623 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 30.18 | 377.88 | 0.08 | 1 | |
| | C25 - C30 | 800.24 | 377.88 | 2.118 | 0.148 | |
| | D25 - C30 | 523.88 | 377.88 | 1.386 | 0.508 | |
| | C25 - D30 | 770.06 | 377.88 | 2.038 | 0.174 | |
| | D25 - D30 | 493.7 | 377.88 | 1.307 | 0.559 | |
| | D25 - C25 | -276.36 | 377.88 | -0.731 | 0.885 | |

**Table S3: Statistical analysis for the physiological and energy descriptors of the hexacoral (order: Scleractinia) *Stylophora pistillata*.** Generalized linear models were used and followed by Tukey's HSD post-hoc testing when significant. Significant differences ($p < 0.05$) are displayed in bold. Data are normalized by ash-free dry weight (AFDW) of the tissue.

| ***Stylophora pistillata* (data normalized by AFDW)** | | | | | | |
|---|---|---|---|---|---|---|
| **Symbiodiniaceae density - Figure 4A** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 2.75E+15 | 10 | 1.87E+18 | 0.9107 | |
| Temperature | 1 | 3.73E+15 | 9 | 1.86E+18 | 0.896 | |
| DINut:Temperature | 1 | 1.15E+17 | 8 | 1.75E+18 | 0.4683 | |
| **Chlorophyll concentration - Figure 4B** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 2224834 | 10 | 17643131 | 0.2753 | |
| Temperature | 1 | 182041 | 9 | 17461090 | 0.755 | |
| DINut:Temperature | 1 | 2503501 | 8 | 14957589 | 0.2472 | |
| **Fv/Fm - Figure 4C** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.0170253 | 10 | 0.066508 | 0.09233 | |
| Temperature | 1 | 0.0170253 | 9 | 0.049482 | 0.09233 | |
| DINut:Temperature | 1 | 0.0014083 | 8 | 0.048074 | 0.62831 | |
| **Gross photosynthesis rate - Figure 4D** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.15598 | 22 | 5.3625 | 0.3108701 | |
| Temperature | 1 | 0.34646 | 21 | 5.016 | 0.1309607 | |
| DINut:Temperature | 1 | 1.97831 | 20 | 3.0377 | **0.0003074** | *** |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 0.73545 | 0.22501 | 3.269 | **0.00578** | ** |
| | C25 - C30 | 0.33391 | 0.22501 | 1.484 | 0.44716 | |
| | D25 - C30 | -0.07906 | 0.22501 | -0.351 | 0.98512 | |
| | C25 - D30 | -0.40154 | 0.22501 | -1.785 | 0.28071 | |
| | D25 - D30 | -0.81451 | 0.22501 | -3.62 | **0.00162** | ** |
| | D25 - C25 | -0.41297 | 0.22501 | -1.835 | 0.25669 | |
| **Respiration rate - Figure 4E** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 1.305 | 22 | 4.6904 | **0.0006466** | *** |
| Temperature | 1 | 1.3324 | 21 | 3.358 | **0.000567** | *** |
| DINut:Temperature | 1 | 1.1151 | 20 | 2.2429 | **0.0016141** | ** |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 0.897469 | 0.193342 | 4.642 | **1.65E-05** | *** |
| | C25 - C30 | -0.040136 | 0.193342 | -0.208 | 0.997 | |
| | D25 - C30 | -0.004875 | 0.193342 | -0.025 | 1 | |
| | C25 - D30 | -0.937605 | 0.193342 | -4.849 | **< 1e-05** | *** |
| | D25 - D30 | -0.902343 | 0.193342 | -4.667 | **1.31E-05** | *** |
| | D25 - C25 | 0.035261 | 0.193342 | 0.182 | 0.998 | |
| **P:R - Figure 4D** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.41312 | 22 | 0.90147 | **0.0001306** | *** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Temperature | 1 | 0.21745 | 21 | 0.68402 | **0.0055143** | ** |
| DINut:Temperature | 1 | 0.11939 | 20 | 0.56463 | **0.0397404** | * |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -0.12134 | 0.09701 | -1.251 | 0.59438 | |
| | C25 - C30 | 0.33143 | 0.09701 | 3.417 | **0.00341** | ** |
| | D25 - C30 | -0.07203 | 0.09701 | -0.742 | 0.87989 | |
| | C25 - D30 | 0.45277 | 0.09701 | 4.667 | **< 0.001** | *** |
| | D25 - D30 | 0.04931 | 0.09701 | 0.508 | 0.95713 | |
| | D25 - C25 | -0.40346 | 0.09701 | -4.159 | **< 0.001** | *** |
| **Protein concentration - Figure 5A** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.004366 | 22 | 5.7516 | 0.9005 | |
| Temperature | 1 | 0.055298 | 21 | 5.6963 | 0.6563 | |
| DINut:Temperature | 1 | 0.113728 | 20 | 5.5826 | 0.5233 | |
| **Carbohydrate concentration - Figure 5B** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.325 | 10 | 280.98 | 0.8802948 | |
| Temperature | 1 | 165.675 | 9 | 115.3 | **0.0006706** | *** |
| DINut:Temperature | 1 | 0.74 | 8 | 114.56 | 0.8202085 | |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -0.1675 | 3.0898 | -0.054 | 0.9999 | |
| | C25 - C30 | -7.9279 | 3.0898 | -2.566 | 0.0505 | |
| | D25 - C30 | -7.1023 | 3.0898 | -2.299 | 0.0984 | |
| | C25 - D30 | -7.7604 | 3.0898 | -2.512 | 0.0583 | |
| | D25 - D30 | -6.9348 | 3.0898 | -2.244 | 0.1115 | |
| | D25 - C25 | 0.8256 | 3.0898 | 0.267 | 0.9933 | |
| **Lipid concentration - Figure 5C** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 2332.94 | 10 | 10156.1 | 0.1665 | |
| Temperature | 1 | 318.12 | 9 | 9837.9 | 0.6094 | |
| DINut:Temperature | 1 | 88.71 | 8 | 9749.2 | 0.7873 | |
| **Lactate concentration - Figure 5E** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 1709.2 | 10 | 10542.9 | **0.006358** | ** |
| Temperature | 1 | 5971.7 | 9 | 4571.2 | **3.39E-07** | *** |
| DINut:Temperature | 1 | 2734.9 | 8 | 1836.3 | **0.000557** | *** |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -54.062 | 12.37 | -4.37 | **<1e-04** | *** |
| | C25 - C30 | -74.809 | 12.37 | -6.047 | **<1e-04** | *** |
| | D25 - C30 | -68.485 | 12.37 | -5.536 | **<1e-04** | *** |
| | C25 - D30 | -20.747 | 12.37 | -1.677 | 0.336 | |
| | D25 - D30 | -14.423 | 12.37 | -1.166 | 0.648 | |
| | D25 - C25 | 6.324 | 12.37 | 0.511 | 0.956 | |
| **ATP concentration - Figure 5F** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>\|z\|)** | |
| DINut | 1 | 33577 | 10 | 3724641 | 0.72768 | |
| Temperature | 1 | 758367 | 9 | 2966274 | 0.09794 | |
| DINut:Temperature | 1 | 751027 | 8 | 2215248 | 0.09958 | |

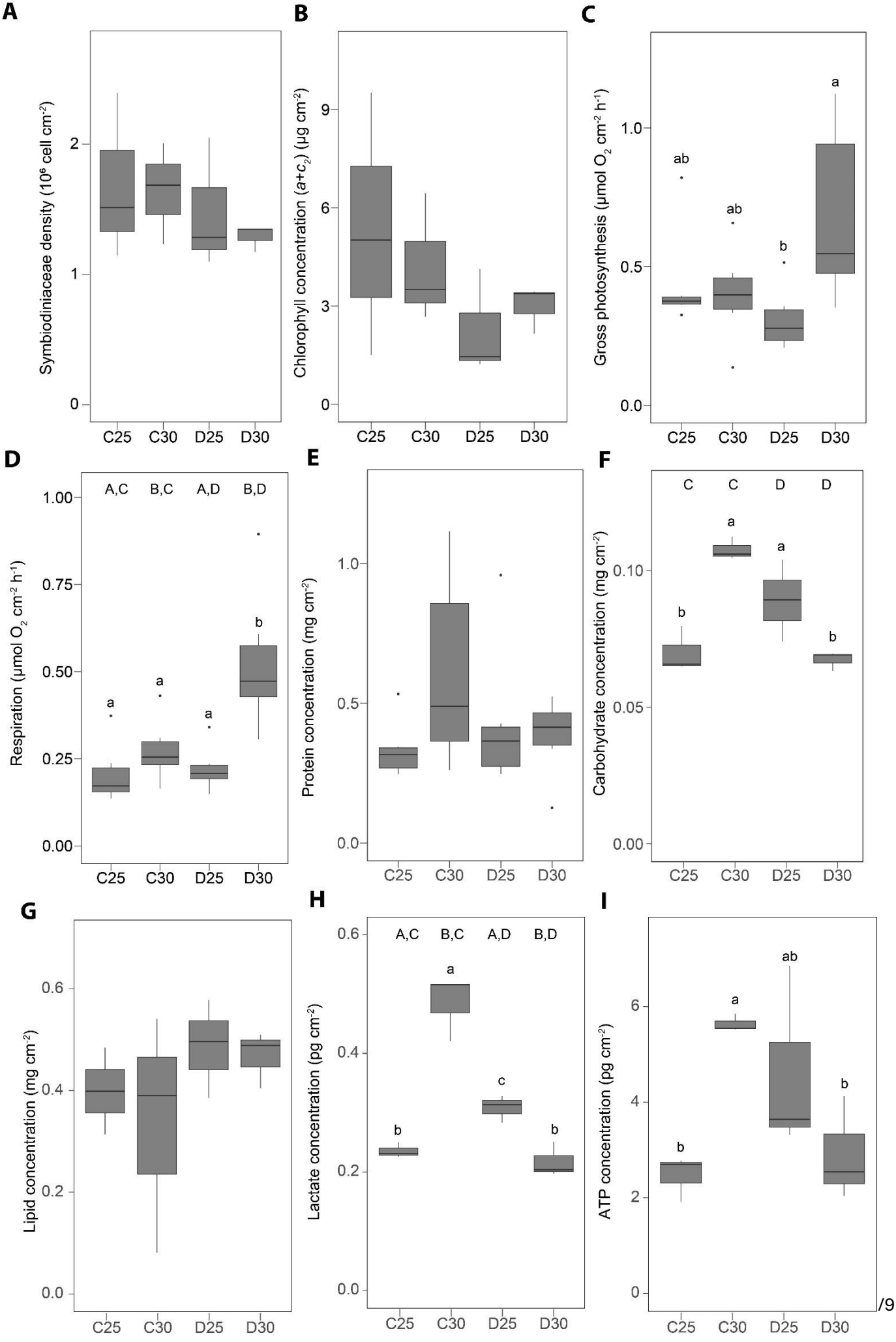
A
Symbiodiniaceae density (10⁶ cell cm⁻²)
B
Chlorophyll concentration (a+c2) (µg cm⁻²)
C
Gross photosynthesis (µmol O2 cm⁻² h⁻¹)
ab
ab
b
a
D
Respiration (µmol O2 cm⁻² h⁻¹)
A,C
B,C
A,D
B,D
E
Protein concentration (mg cm⁻²)
F
Carbohydrate concentration (mg cm⁻²)
C
C
D
D
G
Lipid concentration (mg cm⁻²)
H
Lactate concentration (pg cm⁻²)
I
ATP concentration (pg cm⁻²)
C25
C30
D25
D30

**Figure S1. Physiological and energy parameters (normalized by skeletal surface area) measured in the hard coral *Stylophora pistillata* exposed to different DINut conditions and temperature treatments.** (A) Symbiodiniaceae density, (B) chlorophyll concentration, (C) and (D) oxygen fluxes, concentrations of (E) protein, (F) carbohydrate, (G) lipid, (H) lactate and (I) ATP. DINut = dissolved inorganic nutrient. C25 = Nutrient control water, 25°C. C30 = Nutrient control water, 30°C. D25 = Water depleted in nutrients, 25°C. D30 = Water depleted in nutrients, 30°C. Upper-case letters indicate significant main effects of temperature (A, B) and DINut (C, D) as determined by generalized linear models. Pairwise significant differences resulting from Tukey's HSD testing are displayed by lower-case letters ($P < 0.05$).

**Table S4: Statistical analysis for the physiological and energy descriptors (normalized by skeletal surface area) of the hexacoral (order: Scleractinia) *Stylophora pistillata*.** Generalized linear models were used and followed by Tukey's HSD post-hoc testing when significant. Significant differences ($p < 0.05$) are displayed in bold.

| ***Stylophora pistillata*** **(data normalized by surface area)** | | | | | | |
|---|---|---|---|---|---|---|
| **Symbiodiniaceae density - Figure S1A** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 2.34E+11 | 10 | 1.70E+12 | 0.2863 | |
| Temperature | 1 | 3.93E+10 | 9 | 1.67E+12 | 0.6623 | |
| DINut:Temperature | 1 | 1.58E+10 | 8 | 1.65E+12 | 0.7818 | |
| **Chlorophyll concentration - Figure S1B** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 13.8284 | 10 | 49.053 | 0.1223 | |
| Temperature | 1 | 0.1312 | 9 | 48.922 | 0.8804 | |
| DINut:Temperature | 1 | 2.5797 | 8 | 46.342 | 0.5046 | |
| **Gross photosynthesis rate - Figure S1C** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.05565 | 22 | 5.3437 | 0.57945 | |
| Temperature | 1 | 0.53636 | 21 | 4.8074 | 0.08533 | |
| DINut:Temperature | 1 | 1.18362 | 20 | 3.6237 | **0.01059** | * |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 0.5405 | 0.2458 | 2.199 | 0.1232 | |
| | C25 - C30 | 0.1452 | 0.2458 | 0.591 | 0.9349 | |
| | D25 - C30 | -0.2027 | 0.2458 | -0.825 | 0.8428 | |
| | C25 - D30 | -0.3953 | 0.2458 | -1.608 | 0.3738 | |
| | D25 - D30 | -0.7431 | 0.2458 | -3.024 | **0.0132** | * |
| | D25 - C25 | -0.3478 | 0.2458 | -1.415 | 0.4896 | |
| **Respiration rate - Figure S1D** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.82703 | 22 | 4.6447 | **0.006615** | ** |
| Temperature | 1 | 1.96161 | 21 | 2.6831 | **2.89E-05** | *** |
| DINut:Temperature | 1 | 0.44025 | 20 | 2.2429 | **0.047552** | * |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | 0.6421 | 0.1933 | 3.321 | **0.0049** | ** |
| | C25 - C30 | -0.3009 | 0.1933 | -1.556 | 0.4039 | |
| | D25 - C30 | -0.2005 | 0.1933 | -1.037 | 0.7276 | |
| | C25 - D30 | -0.943 | 0.1933 | -4.878 | **<0.001** | *** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | D25 - D30 | -0.8427 | 0.1933 | -4.358 | **<0.001** | *** |
| | D25 - C25 | 0.1004 | 0.1933 | 0.519 | 0.9545 | |
| **Protein concentration - Figure S1E** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.08941 | 22 | 5.4296 | 0.5358 | |
| Temperature | 1 | 0.23178 | 21 | 5.1979 | 0.3189 | |
| DINut:Temperature | 1 | 0.53248 | 20 | 4.6654 | 0.1308 | |
| **Carbohydrate concentration - Figure S1F** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.00034354 | 10 | 0.0034589 | **0.0375** | * |
| Temperature | 1 | 0.00018712 | 9 | 0.0032718 | 0.1247 | |
| DINut:Temperature | 1 | 0.00263674 | 8 | 0.0006351 | **8.25E-09** | *** |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -0.040348 | 0.007275 | -5.546 | **<0.001** | *** |
| | C25 - C30 | -0.037544 | 0.007275 | -5.161 | **<0.001** | *** |
| | D25 - C30 | -0.018599 | 0.007275 | -2.557 | 0.0517 | |
| | C25 - D30 | 0.002803 | 0.007275 | 0.385 | 0.9806 | |
| | D25 - D30 | 0.021749 | 0.007275 | 2.99 | **0.0148** | * |
| | D25 - C25 | 0.018945 | 0.007275 | 2.604 | **0.0455** | * |
| **Lipid concentration – Figure S1G** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.035695 | 10 | 0.15539 | 0.1665 | |
| Temperature | 1 | 0.004867 | 9 | 0.15053 | 0.6094 | |
| DINut:Temperature | 1 | 0.001357 | 8 | 0.14917 | 0.7873 | |
| **Lactate concentration - Figure S1H** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.028461 | 10 | 0.1149 | **6.27E-07** | *** |
| Temperature | 1 | 0.018924 | 9 | 0.095976 | **4.84E-05** | *** |
| DINut:Temperature | 1 | 0.086805 | 8 | 0.00917 | **< 2.2e-16** | *** |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -0.2675 | 0.02764 | -9.677 | **<0.001** | *** |
| | C25 - C30 | -0.24953 | 0.02764 | -9.026 | **<0.001** | *** |
| | D25 - C30 | -0.17683 | 0.02764 | -6.397 | **<0.001** | *** |
| | C25 - D30 | 0.01798 | 0.02764 | 0.65 | 0.9155 | |
| | D25 - D30 | 0.09068 | 0.02764 | 3.28 | **0.0055** | ** |
| | D25 - C25 | 0.0727 | 0.02764 | 2.63 | **0.0426** | * |
| **ATP concentration - Figure S1I** | | | | | | |
| **Factor** | **Df** | **Deviance Residual** | **Df Residual** | **Dev** | **Pr(>Chi)** | |
| DINut | 1 | 0.2679 | 10 | 30.014 | 0.6522787 | |
| Temperature | 1 | 1.6388 | 9 | 28.375 | 0.265052 | |
| DINut:Temperature | 1 | 17.8208 | 8 | 10.554 | **0.0002375** | *** |
| | **Contrast** | **Estimate** | **Std. Error** | **z value** | **Pr(>\|z\|)** | |
| | D30 - C30 | -2.7361 | 0.9378 | -2.917 | **0.01833** | * |
| | C25 - C30 | -3.1764 | 0.9378 | -3.387 | **0.00375** | ** |
| | D25 - C30 | -1.0379 | 0.9378 | -1.107 | 0.6854 | |
| | C25 - D30 | -0.4403 | 0.9378 | -0.469 | 0.96576 | |
| | D25 - D30 | 1.6982 | 0.9378 | 1.811 | 0.26816 | |
| | D25 - C25 | 2.1385 | 0.9378 | 2.28 | 0.10254 | |