**Supplemental Materials: Tables**

Table S1. A PERMANOVA and PERMDISP of total nitrogen on treatments: plant samples and sediment (upper) and cyanobacteria and sediment (lower), season, and their interaction. Column labels are as defined in Table 1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PERMANOVA** |  |  |  |  | **PERMDISP** |
| Factor | df | SS | MS | Pseudo-F | p-value | F | p-value |
| Treatment | 4 | 263.94 | 65.985 | 898.61 | 0.001 | 16.122 | 0.001 |
| Season | 3 | 1.1609 | 0.3869 | 5.27 | 0.003 | 5.432 | 0.003 |
| Treatment x Season | 12 | 8.4079 | 0.7006 | 9.5418 | 0.001 | 5.178 | 0.001 |
| Residuals | 188 | 13.805 | 0.0734 |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Factor | df | SS | MS | Pseudo-F | p-value | F | p-value |
| Treatment | 4 | 12.159 | 3.0397 | 133.92 | 0.001 | 20.729 | 0.001 |
| Season | 3 | 0.7674 | 0.2558 | 11.269 | 0.001 | 15.624 | 0.001 |
| Treatment x Season | 12 | 2.2889 | 0.1907 | 8.4034 | 0.001 | 5.388 | 0.001 |
| Residuals | 188 | 4.2672 | 0.0227 |  |  |  |  |

Table S2. Isotope δ15N (‰) pairwise PERMANOVA and PERMDISP for factor interaction (season and treatment) on plants vs. sediment (top) and cyanobacteria vs. sediment (bottom) by season. Column labels are pair = season/treatment comparison, t = t statistic, F = F statistic, p = probability. Calculated p values were compared against a Dunn-Sidak p = 0.0085. Treatments are: AD = adult mangrove, BMG = bare mangrove seedling, MGSW = saltwort-adjacent mangrove seedling, SW = saltwort, AC = cyanobacteria adjacent to adult mangrove, BC = cyanobacteria near a bare mangrove seedling, MPC = mid-pair cyanobacteria, SWC = cyanobacteria near a saltwort-associated mangrove seedling, and SED = sediment. Sample sizes (n) are as follows: n = 4 for AD and AC; n = 12 for all other treatments.

|  |  |  |
| --- | --- | --- |
|  | PERMANOVA | PERMDISP |
| Pair | AD |  | BMG |  | MGSW |  | SW |  | SED |  |  |  |
|  | t | p-value | t | p-value | t | p-value | t | p-value | t | p-value | F | p-value |
| Summer vs. Fall | 3.632 | 0.032 | 9.149 | 0.001 | 1.815 | 0.079 | 0.286 | 0.79 | 2.183 | 0.044 | 4.9677 | 0.001 |
| Summer vs. Winter | 3.887 | 0.035 | 7.885 | 0.001 | 1.836 | 0.072 | 1.863 | 0.097 | 2.886 | 0.007 | 4.8821 | 0.001 |
| Summer vs. Spring | 3.763 | 0.028 | 15.541 | 0.001 | 2.288 | 0.032 | 3.08 | 0.003 | 1.061 | 0.298 | 4.2134 | 0.001 |
| Fall vs. Winter | 0.485 | 0.74 | 1.642 | 0.116 | 0.109 | 0.94 | 0.938 | 0.39 | 0.952 | 0.351 | 0.37294 | 0.695 |
| Fall vs. Spring | 0.11 | 0.999 | 2.822 | 0.002 | 0.938 | 0.369 | 2.111 | 0.041 | 3.031 | 0.008 | 0.75994 | 0.435 |
| Winter vs. Spring | 0.615 | 0.528 | 5.042 | 0.001 | 0.828 | 0.428 | 1.655 | 0.113 | 3.606 | 0.003 | 0.45603 | 0.652 |

Table S2. Continued.

|  |  |  |
| --- | --- | --- |
|  | **PERMANOVA** | **PERMDISP** |
| **Pair** | AC | BC | MPC | SWC | SED |  |  |
|  | t | p-value | t | p-value | t | p-value | t | p-value | t | p-value | F | p-value |
| **Summer vs. Fall** | 0.389 | 0.719 | 0.961 | 0.337 | 0.764 | 0.641 | 0.766 | 0.451 | 2.183 | 0.029 | 1.677 | 0.273 |
| **Summer vs. Winter** | 4.501 | 0.038 | 2.456 | 0.021 | 1.801 | 0.086 | 4.039 | 0.001 | 2.886 | 0.007 | 3.239 | 0.044 |
| **Summer vs. Spring** | 2.315 | 0.099 | 0.652 | 0.529 | 4.685 | 0.001 | 0.388 | 0.706 | 1.061 | 0.278 | 0.889 | 0.527 |
| **Fall vs. Winter** | 4.385 | 0.024 | 1.229 | 0.254 | 1.694 | 0.097 | 3.286 | 0.005 | 0.952 | 0.368 | 1.497 | 0.353 |
| **Fall vs. Spring** | 1.791 | 0.147 | 0.254 | 0.846 | 2.952 | 0.009 | 1.116 | 0.293 | 3.031 | 0.003 | 2.585 | 0.057 |
| **Winter vs. Spring** | 5.361 | 0.035 | 1.482 | 0.167 | 5.343 | 0.001 | 4.191 | 0.001 | 3.606 | 0.003 | 4.205 | 0.008 |

Table S3. Isotope δ15N (‰) pairwise PERMANOVA and PERMDISP for factor interaction (season and treatment) on plants vs. sediment (top) and cyanobacteria vs. sediment (bottom) by treatment. Column labels and sample sizes are as defined in Table S2. Calculated p values were compared against a Dunn-Sidak p = 0.0051.

|  |  |  |
| --- | --- | --- |
|  | PERMANOVA | PERMDISP |
|  | Summer | Fall | Winter | Spring |  |  |
| Pair | t | p-value | t | p-value | t | p-value | t | p-value | F | p-value |
| AD vs. BMG | 10.316 | 0.004 | 2.509 | 0.034 | 4.409 | 0.002 | 0.906 | 0.415 | 4.515 | 0.001 |
| AD vs. MGSW | 2.021 | 0.072 | 2.589 | 0.024 | 2.508 | 0.026 | 0.966 | 0.325 | 2.663 | 0.013 |
| AD vs. SW | 3.681 | 0.005 | 0.145 | 0.895 | 1.686 | 0.133 | 1.844 | 0.084 | 0.905 | 0.397 |
| AD vs. SED | 0.712 | 0.498 | 4.259 | 0.001 | 7.345 | 0.002 | 0.06 | 0.958 | 2.326 | 0.049 |
| BMG vs. MGSW | 7.214 | 0.001 | 0.176 | 0.871 | 1.92 | 0.071 | 0.918 | 0.403 | 3.287 | 0.004 |
| BMG vs. SW | 19.613 | 0.001 | 3.169 | 0.001 | 5.332 | 0.001 | 1.593 | 0.146 | 6.137 | 0.001 |
| BMG vs. SED | 11.138 | 0.001 | 0.188 | 0.855 | 1.871 | 0.07 | 0.819 | 0.401 | 4.026 | 0.001 |
| MGSW vs. SW | 6.16 | 0.001 | 3.135 | 0.003 | 2.571 | 0.012 | 0.105 | 0.93 | 2.916 | 0.002 |
| MGSW vs. SED | 3.452 | 0.001 | 0.022 | 0.985 | 0.737 | 0.457 | 1.353 | 0.179 | 0.713 | 0.526 |
| SW vs. SED | 1.583 | 0.126 | 3.846 | 0.002 | 5.899 | 0.001 | 1.839 | 0.063 | 2.267 | 0.032 |

Table S3. Continued.

|  |  |  |
| --- | --- | --- |
|  | PERMANOVA | PERMDISP |
|  | Summer | Fall | Winter | Spring |  |  |
| Pair | t | p-value | t | p-value | t | p-value | t | p-value | F | p-value |
| AC vs. BC | 6.274 | 0.002 | 4.103 | 0.001 | 10.082 | 0.001 | 1.573 | 0.127 | 3.413 | 0.001 |
| AC vs. MPC | 7.647 | 0.001 | 2.032 | 0.055 | 10.614 | 0.001 | 1.530 | 0.162 | 0.532 | 0.700 |
| AC vs. SWC | 1.332 | 0.201 | 1.585 | 0.162 | 9.649 | 0.002 | 1.162 | 0.305 | 1.762 | 0.088 |
| AC vs. SED | 4.388 | 0.001 | 10.914 | 0.001 | 7.896 | 0.001 | 3.506 | 0.003 | 1.059 | 0.335 |
| BC vs. MPC | 1.599 | 0.126 | 0.592 | 0.655 | 0.368 | 0.736 | 4.041 | 0.001 | 3.156 | 0.017 |
| BC vs. SWC | 3.639 | 0.003 | 3.104 | 0.009 | 1.160 | 0.262 | 3.783 | 0.002 | 2.410 | 0.017 |
| BC vs. SED | 10.479 | 0.001 | 20.989 | 0.001 | 28.788 | 0.001 | 6.991 | 0.001 | 5.284 | 0.001 |
| MPC vs. SWC | 4.727 | 0.001 | 1.600 | 0.117 | 1.565 | 0.140 | 1.060 | 0.305 | 1.345 | 0.251 |
| MPC vs. SED | 11.023 | 0.001 | 14.936 | 0.001 | 29.915 | 0.001 | 4.069 | 0.002 | 2.270 | 0.033 |
| SWC vs. SED | 8.135 | 0.001 | 17.542 | 0.001 | 28.335 | 0.001 | 5.049 | 0.001 | 3.711 | 0.003 |