Pacific herring spawn events influence nearshore subtidal and intertidal species

C. H. Fox*, P. C. Paquet, T. E. Reimchen

*Corresponding author: carolinehfox@gmail.com


Supplement

Table S1. Mean $\delta^{15}$N ± SE and $\delta^{13}$C ± SE isotopic values and C:N ratios for intertidal and nearshore subtidal invertebrate and macrophyte species before (0) and after (1) the Pacific herring (Clupea pallasii) spawn events on beaches in Quatsino Sound, British Columbia (2011 - 2012). Control beaches are sites that did not experience herring spawn events. At each beach location, five samples were collected, with exception to Traskorchestia spp., where 10 samples were collected.

<table>
<thead>
<tr>
<th>Species</th>
<th>Beach</th>
<th>Year</th>
<th>Spawn status (before = 0, after = 1)</th>
<th>$\delta^{15}$N ± SE (%)</th>
<th>$\delta^{13}$C ± SE (%)</th>
<th>C:N ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phyllospadix serrulatus</td>
<td>Control 1</td>
<td>2011</td>
<td>0</td>
<td>11.00 ± 0.53</td>
<td>-19.02 ± 0.51</td>
<td>11.73 ± 0.17</td>
</tr>
<tr>
<td></td>
<td>Control 1</td>
<td>2011</td>
<td>1</td>
<td>9.96 ± 0.57</td>
<td>-16.05 ± 0.76</td>
<td>11.58 ± 0.41</td>
</tr>
<tr>
<td></td>
<td>Control 2</td>
<td>2011</td>
<td>0</td>
<td>9.14 ± 0.45</td>
<td>-18.31 ± 0.46</td>
<td>13.86 ± 0.50</td>
</tr>
<tr>
<td></td>
<td>Control 2</td>
<td>2011</td>
<td>1</td>
<td>8.23 ± 0.33</td>
<td>-15.66 ± 0.32</td>
<td>11.03 ± 0.31</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>0</td>
<td>9.49 ± 0.50</td>
<td>-16.42 ± 0.68</td>
<td>11.66 ± 0.49</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>1</td>
<td>9.37 ± 0.35</td>
<td>-15.52 ± 0.42</td>
<td>8.62 ± 0.31</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>0</td>
<td>9.39 ± 0.45</td>
<td>-15.23 ± 0.29</td>
<td>11.18 ± 0.31</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>1</td>
<td>10.26 ± 0.16</td>
<td>-14.45 ± 0.62</td>
<td>8.70 ± 0.06</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>0</td>
<td>8.53 ± 0.54</td>
<td>-16.42 ± 0.59</td>
<td>12.15 ± 0.32</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>1</td>
<td>10.08 ± 0.18</td>
<td>-14.38 ± 0.65</td>
<td>9.39 ± 0.30</td>
</tr>
<tr>
<td></td>
<td>Control 1</td>
<td>2012</td>
<td>0</td>
<td>11.35 ± 0.80</td>
<td>-20.67 ± 0.50</td>
<td>12.09 ± 0.76</td>
</tr>
<tr>
<td></td>
<td>Control 1</td>
<td>2012</td>
<td>1</td>
<td>8.10 ± 0.15</td>
<td>-17.14 ± 0.44</td>
<td>11.69 ± 0.25</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2012</td>
<td>0</td>
<td>11.21 ± 0.47</td>
<td>-17.90 ± 0.39</td>
<td>13.86 ± 0.60</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2012</td>
<td>1</td>
<td>10.67 ± 0.21</td>
<td>-14.79 ± 0.43</td>
<td>9.26 ± 0.21</td>
</tr>
<tr>
<td>Macroystis pyriferas</td>
<td>Control 1</td>
<td>2011</td>
<td>0</td>
<td>5.30 ± 0.31</td>
<td>-13.72 ± 0.55</td>
<td>9.61 ± 0.98</td>
</tr>
<tr>
<td></td>
<td>Control 1</td>
<td>2011</td>
<td>1</td>
<td>6.04 ± 0.11</td>
<td>-13.57 ± 0.20</td>
<td>11.22 ± 0.24</td>
</tr>
<tr>
<td></td>
<td>Control 2</td>
<td>2011</td>
<td>0</td>
<td>6.63 ± 0.69</td>
<td>-15.32 ± 0.63</td>
<td>11.83 ± 1.22</td>
</tr>
<tr>
<td></td>
<td>Control 2</td>
<td>2011</td>
<td>1</td>
<td>5.98 ± 0.19</td>
<td>-13.14 ± 0.14</td>
<td>11.79 ± 0.59</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>0</td>
<td>4.54 ± 0.21</td>
<td>-14.20 ± 0.38</td>
<td>8.93 ± 0.34</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>1</td>
<td>9.48 ± 0.33</td>
<td>-13.48 ± 0.38</td>
<td>9.02 ± 0.14</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>0</td>
<td>4.93 ± 0.38</td>
<td>-15.10 ± 0.35</td>
<td>9.61 ± 0.36</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2011</td>
<td>1</td>
<td>7.77 ± 0.31</td>
<td>-12.77 ± 0.29</td>
<td>9.63 ± 0.22</td>
</tr>
<tr>
<td></td>
<td>Control 1</td>
<td>2012</td>
<td>0</td>
<td>4.59 ± 0.44</td>
<td>-14.88 ± 0.47</td>
<td>10.14 ± 0.15</td>
</tr>
<tr>
<td></td>
<td>Control 1</td>
<td>2012</td>
<td>1</td>
<td>5.83 ± 0.26</td>
<td>-13.72 ± 0.23</td>
<td>12.93 ± 0.25</td>
</tr>
<tr>
<td></td>
<td>Spawn</td>
<td>2012</td>
<td>0</td>
<td>4.87 ± 0.27</td>
<td>-16.50 ± 0.47</td>
<td>8.65 ± 0.14</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>1</td>
<td>9.22 ± .37</td>
<td>-14.07 ± 0.27</td>
<td>12.89 ± 0.47</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>----</td>
<td>------------</td>
<td>---------------</td>
<td>--------------</td>
<td></td>
</tr>
</tbody>
</table>

**Fucus spp.**

<table>
<thead>
<tr>
<th></th>
<th>Control 1 2011</th>
<th>0</th>
<th>6.48 ± 0.14</th>
<th>-18.05 ± 0.31</th>
<th>11.15 ± 0.31</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control 1 2011</td>
<td>1</td>
<td>8.57 ± 0.12</td>
<td>-16.25 ± 0.46</td>
<td>11.21 ± 0.36</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>0</td>
<td>6.82 ± 0.22</td>
<td>-17.51 ± 0.22</td>
<td>13.04 ± 0.39</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>1</td>
<td>7.51 ± 0.24</td>
<td>-15.09 ± 0.53</td>
<td>11.67 ± 0.24</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>0</td>
<td>7.56 ± 0.10</td>
<td>-18.50 ± 0.35</td>
<td>12.47 ± 0.14</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>1</td>
<td>11.20 ± 0.25</td>
<td>-15.87 ± 0.16</td>
<td>9.90 ± 0.27</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>0</td>
<td>7.16 ± 0.15</td>
<td>-20.21 ± 1.22</td>
<td>12.93 ± 0.40</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>1</td>
<td>9.80 ± 0.12</td>
<td>-16.08 ± 0.57</td>
<td>11.24 ± 0.62</td>
</tr>
<tr>
<td></td>
<td>Control 1 2012</td>
<td>0</td>
<td>5.58 ± 0.29</td>
<td>-20.27 ± 0.39</td>
<td>12.17 ± 0.30</td>
</tr>
<tr>
<td></td>
<td>Control 1 2012</td>
<td>1</td>
<td>7.57 ± 0.16</td>
<td>-16.61 ± 0.58</td>
<td>16.27 ± 1.02</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>0</td>
<td>6.49 ± 0.12</td>
<td>-18.24 ± 0.38</td>
<td>11.07 ± 0.33</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>1</td>
<td>12.03 ± 0.12</td>
<td>-14.79 ± 0.16</td>
<td>11.33 ± 0.55</td>
</tr>
</tbody>
</table>

**Callithamnion spp.**

<table>
<thead>
<tr>
<th></th>
<th>Control 1 2011</th>
<th>0</th>
<th>7.75 ± 0.26</th>
<th>-22.44 ± 0.44</th>
<th>6.87 ± 0.16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control 1 2011</td>
<td>1</td>
<td>8.10 ± 0.23</td>
<td>-18.67 ± 0.35</td>
<td>7.12 ± 0.08</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>0</td>
<td>7.62 ± 0.31</td>
<td>-21.76 ± 0.15</td>
<td>7.54 ± 0.07</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>1</td>
<td>6.26 ± 0.06</td>
<td>-19.74 ± 0.36</td>
<td>7.07 ± 0.09</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>0</td>
<td>8.60 ± 0.30</td>
<td>-21.69 ± 0.56</td>
<td>6.68 ± 0.16</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>1</td>
<td>8.63 ± 0.16</td>
<td>-19.74 ± 1.03</td>
<td>6.86 ± 0.08</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>0</td>
<td>7.39 ± 0.30</td>
<td>-21.75 ± 0.65</td>
<td>6.21 ± 0.17</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>1</td>
<td>10.27 ± 0.43</td>
<td>-20.16 ± 1.61</td>
<td>6.18 ± 0.28</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>0</td>
<td>6.90 ± 0.26</td>
<td>-21.55 ± 0.36</td>
<td>6.93 ± 0.14</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>1</td>
<td>8.90 ± 0.08</td>
<td>-19.30 ± 0.25</td>
<td>6.79 ± 0.13</td>
</tr>
<tr>
<td></td>
<td>Control 1 2012</td>
<td>0</td>
<td>6.85 ± 0.41</td>
<td>-23.31 ± 0.54</td>
<td>6.63 ± 0.13</td>
</tr>
<tr>
<td></td>
<td>Control 1 2012</td>
<td>1</td>
<td>6.45 ± 0.13</td>
<td>-20.22 ± 0.36</td>
<td>8.25 ± 0.09</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>0</td>
<td>7.51 ± 0.18</td>
<td>-22.49 ± 0.46</td>
<td>6.87 ± 0.10</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>1</td>
<td>10.02 ± 0.16</td>
<td>-18.47 ± 0.93</td>
<td>7.47 ± 0.07</td>
</tr>
</tbody>
</table>

**Ulva lactuca**

<table>
<thead>
<tr>
<th></th>
<th>Control 1 2011</th>
<th>0</th>
<th>7.27 ± 0.17</th>
<th>-20.23 ± 0.34</th>
<th>7.05 ± 0.07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control 1 2011</td>
<td>1</td>
<td>7.99 ± 0.08</td>
<td>-18.63 ± 0.20</td>
<td>7.32 ± 0.09</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>0</td>
<td>7.31 ± 0.04</td>
<td>-17.30 ± 0.54</td>
<td>6.72 ± 0.10</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>1</td>
<td>12.32 ± 0.18</td>
<td>-17.13 ± 0.48</td>
<td>6.43 ± 0.09</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Control 1 2012</td>
<td>0</td>
<td>7.09 ± 0.09</td>
<td>-19.52 ± 0.21</td>
<td>7.05 ± 0.11</td>
</tr>
<tr>
<td></td>
<td>Control 1 2012</td>
<td>1</td>
<td>8.04 ± 0.10</td>
<td>-18.53 ± 0.26</td>
<td>10.18 ± 0.19</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>0</td>
<td>7.29 ± 0.05</td>
<td>-19.79 ± 0.41</td>
<td>6.60 ± 0.03</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2012</td>
<td>1</td>
<td>12.73 ± 0.23</td>
<td>-16.23 ± 0.33</td>
<td>7.02 ± 0.08</td>
</tr>
</tbody>
</table>

**Traskorchezia spp.**

<table>
<thead>
<tr>
<th></th>
<th>Control 1 2011</th>
<th>0</th>
<th>10.94 ± 0.20</th>
<th>-12.98 ± 0.08</th>
<th>6.21 ± 0.10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control 1 2011</td>
<td>1</td>
<td>11.37 ± 0.14</td>
<td>-12.95 ± 0.08</td>
<td>5.92 ± 0.10</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>0</td>
<td>11.20 ± 0.15</td>
<td>-13.11 ± 0.15</td>
<td>5.73 ± 0.12</td>
</tr>
<tr>
<td></td>
<td>Control 2 2011</td>
<td>1</td>
<td>11.03 ± 0.10</td>
<td>-13.05 ± 0.11</td>
<td>5.52 ± 0.12</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>0</td>
<td>11.95 ± 0.26</td>
<td>-12.40 ± 0.14</td>
<td>6.39 ± 0.14</td>
</tr>
<tr>
<td></td>
<td>Spawn 1 2011</td>
<td>1</td>
<td>12.34 ± 0.18</td>
<td>-12.96 ± 0.13</td>
<td>6.19 ± 0.12</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>0</td>
<td>11.04 ± 0.10</td>
<td>-12.36 ± 0.10</td>
<td>5.95 ± 0.08</td>
</tr>
<tr>
<td></td>
<td>Spawn 2 2011</td>
<td>1</td>
<td>11.34 ± 0.24</td>
<td>-12.79 ± 0.14</td>
<td>5.62 ± 0.11</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>0</td>
<td>11.57 ± 0.10</td>
<td>-11.68 ± 0.08</td>
<td>6.81 ± 0.09</td>
</tr>
<tr>
<td></td>
<td>Spawn 3 2011</td>
<td>1</td>
<td>11.76 ± 0.13</td>
<td>-11.70 ± 0.10</td>
<td>6.60 ± 0.09</td>
</tr>
</tbody>
</table>
### Tectura persona

| Control 1 | 2011   | 0  | 10.21 ± 0.22 | -17.25 ± 0.55 | 3.89 ± 0.19 |
| Control 1 | 2011   | 1  | 9.85 ± 0.18  | -16.54 ± 0.29 | 4.47 ± 0.36 |
| Control 2 | 2011   | 0  | 9.32 ± 0.20  | -15.27 ± 0.89 | 4.50 ± 0.21 |
| Control 2 | 2011   | 1  | 9.16 ± 0.15  | -15.26 ± 0.84 | 4.18 ± 0.20 |
| Spawn 1   | 2011   | 0  | 11.90 ± 0.51 | -15.72 ± 0.54 | 3.93 ± 0.11 |
| Spawn 1   | 2011   | 1  | 11.67 ± 0.18 | -16.49 ± 0.17 | 3.85 ± 0.11 |
| Spawn 2   | 2011   | 0  | 9.66 ± 0.13  | -14.60 ± 0.39 | 3.85 ± 0.05 |
| Spawn 2   | 2011   | 1  | 10.90 ± 0.17 | -12.01 ± 1.48 | 4.08 ± 0.14 |
| Spawn 3   | 2011   | 0  | 10.84 ± 0.07 | -18.63 ± 0.32 | 4.01 ± 0.19 |
| Spawn 3   | 2011   | 1  | 10.49 ± 0.19 | -15.69 ± 0.48 | 3.86 ± 0.11 |
| Control 1 | 2012   | 0  | 9.00 ± 0.12  | -17.12 ± 0.62 | 4.05 ± 0.09 |
| Control 1 | 2012   | 1  | 9.16 ± 0.08  | -15.37 ± 0.84 | 4.13 ± 0.15 |
| Spawn 1   | 2012   | 0  | 11.01 ± 0.23 | -15.96 ± 1.26 | 4.02 ± 0.13 |
| Spawn 1   | 2012   | 1  | 11.37 ± 0.26 | -17.48 ± 0.49 | 3.91 ± 0.10 |

### Nucella lamellosa

| Control 1 | 2011   | 0  |   |   |   |
| Control 1 | 2011   | 1  |   |   |   |
| Control 2 | 2011   | 0  | 13.18 ± 0.17 | -14.62 ± 0.16 | 3.79 ± 0.10 |
| Control 2 | 2011   | 1  | 12.27 ± 0.17 | -15.54 ± 0.10 | 3.77 ± 0.02 |
| Spawn 1   | 2011   | 0  |   |   |   |
| Spawn 1   | 2011   | 1  |   |   |   |
| Spawn 2   | 2011   | 0  | 11.93 ± 0.15 | -15.09 ± 0.06 | 3.85 ± 0.09 |
| Spawn 2   | 2011   | 1  | 12.22 ± 0.14 | -15.28 ± 0.05 | 3.80 ± 0.07 |
| Spawn 3   | 2011   | 0  |   |   |   |
| Spawn 3   | 2011   | 1  |   |   |   |
| Control 1 | 2012   | 0  | 11.73 ± 0.25 | -16.52 ± 0.27 | 4.45 ± 0.19 |
| Control 1 | 2012   | 1  | 12.00 ± 0.10 | -16.32 ± 0.13 | 3.76 ± 0.04 |
| Spawn 1   | 2012   | 0  | 13.34 ± 0.20 | -15.02 ± 0.25 | 4.03 ± 0.37 |
| Spawn 1   | 2012   | 1  | 12.97 ± 0.12 | -15.28 ± 0.08 | 3.87 ± 0.06 |

### Nucella ostrina

| Control 1 | 2011   | 0  |   |   |   |
| Control 1 | 2011   | 1  |   |   |   |
| Control 2 | 2011   | 0  |   |   |   |
| Control 2 | 2011   | 1  |   |   |   |
| Spawn 1   | 2011   | 0  |   |   |   |
| Spawn 1   | 2011   | 1  |   |   |   |
| Spawn 2   | 2011   | 0  |   |   |   |
| Spawn 2   | 2011   | 1  |   |   |   |
| Spawn 3   | 2011   | 0  |   |   |   |
| Spawn 3   | 2011   | 1  |   |   |   |
| Control 1 | 2012   | 0  | 12.11 ± 0.09 | -16.76 ± 0.06 | 3.76 ± 0.12 |
| Control 1 | 2012   | 1  | 12.10 ± 0.16 | -16.69 ± 0.12 | 3.74 ± 0.07 |
| Spawn 1   | 2012   | 0  | 13.49 ± 0.17 | -15.73 ± 0.24 | 4.07 ± 0.20 |
| Spawn 1   | 2012   | 1  | 13.80 ± 0.21 | -15.36 ± 0.11 | 3.72 ± 0.05 |
Table S2. Results of two General Linear Mixed Models (GLMMs) to explain variation in $\delta^{15}$N and $\delta^{13}$C levels in macrophyte and invertebrates species collected before and after (variable = time) Pacific herring (*Clupea pallasii*) spawn events on beaches with and without spawn (variable = spawn). Shown are results of type III tests of fixed effects and estimates of covariance parameters for random effects (species, location, and year), including Wald Z statistic and corresponding significance.

<table>
<thead>
<tr>
<th>Response variable</th>
<th>Effect</th>
<th>Variable</th>
<th>d.f.</th>
<th>F</th>
<th>Parameter estimate</th>
<th>SE</th>
<th>Wald Z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept</td>
<td>1,10.39</td>
<td>203.52</td>
<td>10.98</td>
<td>0.72</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>$\delta^{15}$N</td>
<td>Fixed</td>
<td>Time</td>
<td>1,505.45</td>
<td>0.02</td>
<td>0.02</td>
<td>0.13</td>
<td>0.883</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed</td>
<td>Spawn</td>
<td>1,370.33</td>
<td>83.77</td>
<td>1.58</td>
<td>0.17</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Species</td>
<td>4.62</td>
<td>2.19</td>
<td>2.10</td>
<td>0.035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Location</td>
<td>0.12</td>
<td>0.09</td>
<td>1.29</td>
<td>0.199</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Year</td>
<td>0.04</td>
<td>0.06</td>
<td>0.58</td>
<td>0.560</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Residual</td>
<td>1.15</td>
<td>0.07</td>
<td>16.77</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intercept</td>
<td>1,10.10</td>
<td>401.88</td>
<td>-15.56</td>
<td>0.81</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>$\delta^{13}$C</td>
<td>Fixed</td>
<td>Time</td>
<td>1,491.55</td>
<td>52.92</td>
<td>1.25</td>
<td>0.17</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed</td>
<td>Spawn</td>
<td>1,343.11</td>
<td>0.01</td>
<td>0.03</td>
<td>0.23</td>
<td>0.914</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Species</td>
<td>4.89</td>
<td>2.32</td>
<td>2.11</td>
<td>0.035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Location</td>
<td>0.20</td>
<td>0.16</td>
<td>1.22</td>
<td>0.224</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Year</td>
<td>0.23</td>
<td>0.34</td>
<td>0.70</td>
<td>0.503</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Random</td>
<td>Residual</td>
<td>1.98</td>
<td>0.12</td>
<td>16.78</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>