# Supplementary Material

**Table 2**: Similarity percentages (SIMPER) analysis of the fatty acid profile (%) of aquatic and terrestrial insects for each sampling month (April to October). Fatty acids are listed for each month in descending order of their contribution to the dissimilarity between the groups. P values are calculated from 1,000 permutations. Bold contribution values represent those that were statistically significant (p < 0.05); a “\*” mark refers to marginally significant values. The coeluting fatty acids 18:1n-9 and 18:1n-12 are collectively labelled as 18:1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **April** | | **May** | | **June** | | **July** | | **August** | | **September** | | **October** | |
| 20:5n-3 (EPA) | **13.5** | 20:5n-3 (EPA) | **12.3** | 20:5n-3 (EPA) | **13.8** | 20:5n-3 (EPA) | **13.2** | 20:5n-3 (EPA) | **12.2** | 20:5n-3 (EPA) | **10.3** | 20:5n-3 (EPA) | **12.1** |
| 18:1 | **11.1** | 18:1 | **10.4** | 18:1 | **8.3** | 18:1 | **8.9** | 18:1 | **10.0** | 18:3n-3 (ALA) | 9.6\* | 18:1 | 10.4 |
| 18:1n-7 | **9.4** | 18:1n-7 | **8.5** | 18:2n-6 (LIN) | **7.9** | 18:2n-6 (LIN) | **8.7** | 18:2n-6 (LIN) | **9.6** | 18:1 | 9.0 | 18:3n-3 (ALA) | 9.6 |
| 18:2n-6 (LIN) | **7.5** | 18:2n-6 (LIN) | **8.3** | 18:3n-3 (ALA) | **7.8** | 16:1 | **7.7** | 18:4n-3 | **7.5** | 18:2n-6 (LIN) | 8.5 | 16:1 | 8.8 |
| 18:3n-3 (ALA) | **7.5** | 18:3n-3 (ALA) | **7.8** | 16:1 | **7.4** | 18:3n-3 (ALA) | **7.3** | 18:3n-3 (ALA) | **7.5** | 18:4n-3 | **6.9** | 18:2n-6 (LIN) | 8.2 |
| 16:1n-7 | **7.1** | 16:1 | **6.7** | 18:4n-3 | **7.1** | 18:1n-7 | **6.5** | 20:4n-6 (ARA) | **7.2** | 16:1 | 6.6 | 18:1n-7 | **6.1** |
| 18:4n-3 | **5.7** | 18:4n-3 | **6.1** | 18:1n-7 | **6.6** | 18:4n-3 | **6.4** | 16:1 | **6.6** | 20:1n-7 | **6.6** | 18:4n-3 | **5.9** |
| 14:0 | **5.0** | 14:0 | **6.0** | 20:4n-6 (ARA) | **5.9** | 20:4n-6 (ARA) | **6.0** | 18:1n-7 | **5.6** | 18:1n-7 | **6.4** | 20:1n-7 | **5.1** |
| 20:4n-6 (ARA) | **4.7** | 16:0 | 5.7\* | 14:0 | **5.6** | 14:0 | **5.5** | 14:0 | **5.6** | 20:4n-6 (ARA) | **5.4** | 14:0 | 5.1 |
| 16:0 | **4.2** | 20:4n-6 (ARA) | **4.9** | 22:6n-3 (DHA) | **4.0** | 16:0 | 4.5 | 22:6n-3 (DHA) | **3.8** | 14:0 | 4.9 | 18:0 | 4.7 |
| 18:3n-6 | **4.2** | 18:3n-6 | **3.4** | 16:0 | **3.9** | 22:6n-3 (DHA) | **3.6** | 18:3n-6 | **3.1** | 18:0 | 4.8 | 22:2n-6 | 4.5 |
| 18:0 | **2.8** | 18:0 | 3.4 | 18:0 | **3.3** | 18:3n-6 | **3.6** | 18:0 | **2.9** | 16:0 | 4.2 | 20:4n-6 (ARA) | 4.5 |
| 15:0 | **2.8** | 20:0 | **2.8** | 18:3n-6 | **3.2** | 18:0 | 3.0 | 16:0 | **2.9** | 20:0 | **3.5** | 16:0 | **4.2** |
| 17:1n-7 | **2.6** | 15:0 | **2.6** | 17:1 | **2.9** | 20:0 | 2.6 | 15:0 | **2.7** | 18:3n-6 | **2.9** | 20:0 | 2.3 |
| 20:0 | **2.5** | 17:1 | **2.5** | 15:0 | **2.9** | 17:1 | **2.5** | 20:0 | **2.5** | 15:0 | **2.0** | 17:1 | 2.2 |
| 20:1n-7 | 2.3 | 20:1n-7 | **2.1** | 20:0 | **2.7** | 15:0 | **2.5** | 22:2n-6 | **2.4** | 17:1 | **1.9** | 18:3n-6 | **1.9** |
| 20:3n-3 | **1.5** | 22:6n-3 (DHA) | 1.3 | 20:4n-3 | 1.2 | 20:1n-7 | 1.8 | 17:1 | **2.4** | 22:2n-6 | 1.6 | 15:0 | **1.5** |
| 20:3n-6 | 1.0 | 21:0 | 0.9 | 22:5n-3 | 0.8 | 20:4n-3 | 1.2 | 20:1n-7 | 2.0 | 22:6n-3 (DHA) | **0.9** | 14:1 | 1.2 |
| 22:0 | 0.8 | 20:4n-3 | 0.8 | 22:0 | 0.8 | 20:3n-3 | **1.1** | 20:4n-3 | 0.7 | 22:0 | 0.8 | 20:4n-3 | 0.8 |
| 21:0 | 0.7\* | 20:3n-6 | **0.8** | 20:1n-7 | 0.7 | 22:5n-3 | **1.0** | 14:1 | 0.7\* | 14:1 | 0.8 | 20:1n-9 | 0.3 |
| 20:2n-6 | **0.6** | 14:1 | 0.7 | 20:3n-3 | 0.6 | 22:2n-6 | 0.6 | 22:5n-3 | 0.6 | 20:4n-3 | 0.7 | 20:3n-6 | 0.2 |
| 22:6n-3 (DHA) | 0.6 | 20:3n-3 | 0.6 | 22:2n-6 | 0.5 | 21:0 | 0.5 | 22:0 | 0.5 | 20:1n-9 | **0.7** | 21:0 | 0.1 |
| 20:1n-9 | 0.5 | 20:1n-9 | 0.6 | 14:1 | 0.5 | 20:3n-6 | 0.4 | 21:0 | 0.3\* | 20:3n-3 | 0.4 | 20:3n-3 | 0.1 |
| 22:2n-6 | 0.0 | 22:0 | 0.4 | 20:3n-6 | 0.4 | 14:1 | 0.3 | 20:2n-6 | 0.3\* | 24:0 | 0.2 |  |  |
| 22:5n-3 | 0.7 | 20:2n-6 | 0.3 | 21:0 | 0.4 | 22:0 | 0.3 | 20:3n-3 | 0.2 | 20:3n-6 | 0.1 |  |  |
| 20:4n-3 | 0.3\* | 22:2n-6 | 0.2 | 20:1n-9 | 0.4 | 20:1n-9 | 0.2 | 20:1n-9 | 0.2 | 22:5n-3 | **0.1** |  |  |
| 14:1n-7 | 0.2 | 22:5n-3 | 0.1 | 20:2n-6 | 0.3 | 24:0 | 0.1 | 20:3n-6 | 0.1 |  |  |  |  |
| 24:0 | 0.1 | 24:0 | 0.0 | 24:0 | 0.2 | 20:2n-6 | **0.1** | 24:0 | 0.0 |  |  |  |  |

**Table 3:** PERMANOVA pairwise comparison of within-group similarity in **(A)** aquatic and **(B)** terrestrial insects collected from April to October. Bold contribution values represent those that were statistically significant (p < 0.05); a “\*” mark refers to marginally significant values. P-values calculated using Bonferroni correction to reduce chances of obtaining false-positive results (type I errors) when multiple pairwise tests were performed.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **(A) Aquatic Insects** | | | | | | | |
|  | April | May | June | July | August | September | October |
| April |  |  |  |  |  |  |  |
| May | 0.504 |  |  |  |  |  |  |
| June | **0.028** | **0.028** |  |  |  |  |  |
| July | **0.020** | 0.084\* | 1.000 |  |  |  |  |
| August | **0.028** | **0.028** | 0.056\* | 0.252 |  |  |  |
| September | **0.028** | **0.028** | **0.028** | **0.028** | 0.056\* |  |  |
| October | 0.056\* | 0.056\* | **0.028** | **0.028** | **0.028** | 1.000 |  |
| **(B) Terrestrial Insects** | | | | | | | |
|  | April | May | June | July | August | September | October |
| April |  |  |  |  |  |  |  |
| May | 1.000 |  |  |  |  |  |  |
| June | 0.378 | 0.315 |  |  |  |  |  |
| July | 1.000 | 1.000 | 1.000 |  |  |  |  |
| August | 0.105 | 0.546 | 1.000 | 1.000 |  |  |  |
| September | 0.063\* | 0.105 | 1.000 | 1.000 | 0.777 |  |  |
| October | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.861 |  |

**Table 4**: Similarity percentages (SIMPER) analysis of the fatty acid profile (%) of (A) aquatic and (B) terrestrial insects for each comparison of sampling season (spring: April, May; summer: June, July, August; autumn: September, October). Fatty acids are listed for each comparison in descending order of their contribution to the dissimilarity between the groups. P values are calculated from 1,000 permutations. Bold contribution values represent those that were statistically significant (p < 0.05); a “\*” mark refers to marginally significant values. The coeluting fatty acids 18:1n-9 and 18:1n-12 are collectively labelled as 18:1.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Aquatic** | | | | | | **Terrestrial** | | | | | |
| **Spring:Summer** | | **Spring:Autumn** | | **Summer:Autum** | | **Spring:Summer** | | **Spring:Autumn** | | **Summer:Autum** | |
| 16:1 | 8.1 | EPA | **10.4** | EPA | **9.9** | ALA | 11.7 | ALA | 11.5 | ALA | 12.4 |
| EPA | 8.0 | 16:1 | **7.9** | 20:1n-7 | **7.5** | LIN | 11.3 | 18:1n-9/n-12 | **11.4** | LIN | 11.6 |
| 18:1n-9/n-12 | 7.0 | ALA | **7.9** | ALA | 7.4\* | 18:1n-9/n-12 | 10.7 | LIN | 11.2 | 18:1n-9/n-12 | 11.6 |
| LIN | **6.8** | 18:1n-9/n-12 | **7.6** | 16:1 | 7.1 | 16:1 | 9.9 | 16:1 | 9.3 | 16:1 | 10.4 |
| ALA | 6.8 | 20:1n-7 | **7.6** | ARA | **6.9** | EPA | 7.3 | 18:1n-7 | 6.8\* | EPA | 7.1 |
| 18:1n-7 | 6.6 | 18:1n-7 | **7.4** | 18:1n-9/n-12 | 6.6 | 18:1n-7 | 6.8 | EPA | 6.6 | 18:0 | **6.3** |
| ARA | **6.5** | LIN | 6.3\* | LIN | 6.6\* | ARA | **6.0** | ARA | 5.6 | 14:0 | **5.7** |
| DHA | **6.2** | ARA | 5.5 | 18:1n-7 | 6.0 | 16:0 | 5.7 | 18:0 | **5.6** | 16:0 | 5.7 |
| 16:0 | 5.9 | 16:0 | 5.2 | DHA | 5.6\* | 18:0 | 4.6 | 16:0 | 5.5 | ARA | 5.5 |
| 18:4n-3 | 5.5 | 14:0 | 5.2\* | 18:4n-3 | 5.2 | 14:0 | 4.4 | 14:0 | 5.0 | 18:1n-7 | 5.3 |
| 14:0 | 5.0 | 18:4n-3 | 5.1 | 14:0 | 4.9 | 20:0 | 3.1\* | 22:2n-6 | **3.4** | 22:2n-6 | **4.2** |
| 18:0 | 3.8 | 18:0 | 4.0\* | 16:0 | 4.4 | 18:4n-3 | **2.6** | 20:0 | 2.9 | 20:0 | 2.6 |
| 20:0 | **3.6** | 18:3n-6 | **3.6** | 18:0 | 3.7 | 18:3n-6 | 2.3 | 18:3n-6 | 2.2 | 17:1 | 1.7 |
| 18:3n-6 | 3.5 | 20:0 | **3.4** | 18:3n-6 | 3.3 | 17:1 | **2.2** | 17:1 | 2.1\* | 18:4n-3 | 1.6 |
| 17:1 | 3.2 | 15:0 | **3.2** | 15:0 | **3.2** | 20:1n-7 | **2.1** | 20:1n-7 | 1.7 | 18:3n-6 | 1.6 |
| 15:0 | 3.2 | 17:1 | **3.2** | 20:0 | 3.2 | 20:3n-3 | **1.8** | 20:3n-3 | 1.6 | 14:1 | **1.3** |
| 20:1n-7 | 2.9 | DHA | 1.5 | 17:1 | **3.2** | 22:2n-6 | 1.1 | 18:4n-3 | 1.6 | 22:0 | 1.0 |
| 20:4n-3 | 1.5 | 20:4n-3 | 1.1 | 20:4n-3 | 1.5 | 21:0 | **1.1** | 14:1 | **1.1** | 20:3n-3 | 0.9 |
| 22:5n-3 | **1.1** | 20:1n-9 | 0.8 | 22:5n-3 | 1.0 | 20:4n-3 | 1.0 | 22:0 | 0.8 | 20:4n-3 | 0.9 |
| 20:3n-6 | **0.8** | 14:1 | 0.6 | 20:1n-9 | 0.8 | 22:0 | 0.9 | 20:3n-6 | 0.8 | 20:1n-7 | 0.8 |
| 20:1n-9 | 0.7 | 20:3n-6 | 0.6 | 14:1 | 0.5 | 20:3n-6 | **0.9** | 21:0 | 0.8 | 20:3n-6 | 0.5 |
| 14:1 | 0.6 | 22:0 | 0.4 | 20:3n-3 | 0.3 | 14:1 | 0.6 | 20:4n-3 | 0.7 | 21:0 | 0.5 |
| 22:0 | 0.6 | 21:0 | 0.4 | 22:0 | 0.3 | 20:2n-6 | **0.5** | 20:1n-9 | 0.5\* | 15:0 | 0.4 |
| 21:0 | 0.6 | 22:2n-6 | 0.3 | 22:2n-6 | 0.3 | DHA | **0.5** | DHA | 0.4 | 20:1n-9 | 0.2 |
| 20:3n-3 | **0.5** | 22:5n-3 | 0.2 | 20:3n-6 | 0.2 | 20:1n-9 | 0.4 | 20:2n-6 | 0.4 | 22:5n-3 | 0.2 |
| 22:2n-6 | 0.4 | 15:1 | 0.2 | 21:0 | 0.2 | 22:5n-3 | 0.3 | 15:0 | 0.4 | 20:2n-6 | 0.1 |
| 20:2n-6 | **0.2** | 20:3n-3 | 0.2 | 20:2n-6 | 0.2 | 15:0 | 0.3 | 22:5n-3 | 0.2 | DHA | 0.1 |
| 15:1 | 0.2 | 20:2n-6 | 0.1 | 15:1 | 0.1 | ALA | 11.7 | ALA | 11.5 | ALA | 12.4 |

**Table 5:** General linear model of α-linolenic acid (ALA; 18:3n-3) content by arthropod taxa. Values were compared to semi-aquatic insect order Psychodidae. Bold values represent coefficient variables that were statistically significant at the α = 0.05 level; a “\*” mark refers to marginally significant values.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | | t value | p |
| (Intercept) | 0.000 | 3.393 | | 0.000 | 1.000 |
| Coleoptera | 3.508 | 3.479 | | 1.008 | 0.314 |
| Collembola | 3.354 | 3.793 | | 0.884 | 0.377 |
| **Dermaptera** | **8.337** | **3.918** | | **2.128** | **0.034** |
| Diplopoda | 1.158 | 5.364 | | 0.216 | 0.829 |
| Diptera | 1.924 | 3.435 | | 0.560 | 0.576 |
| Diptera (Chaoborus) | 2.863 | 3.448 | | 0.831 | 0.406 |
| Diptera (Chironomidae) | 3.458 | 3.418 | | 1.012 | 0.312 |
| Diptera (Culicidae) | 1.116 | 4.291 | | 0.260 | 0.795 |
| **Diptera (Simuliidae)** | **10.970** | **3.627** | | **3.023** | **0.003** |
| Ephemeroptera | 3.003 | 3.524 | | 0.852 | 0.394 |
| Hemiptera\* | 6.327 | 3.470 | | 1.823 | 0.069 |
| **Hymenoptera** | **7.930** | **3.459** | | **2.293** | **0.022** |
| Isopoda | 1.661 | 4.488 | | 0.370 | 0.711 |
| Ixodida | 0.000 | 6.785 | | 0.000 | 1.000 |
| **Lepidoptera** | **11.040** | **3.607** | | **3.061** | **0.002** |
| Mecoptera | 2.821 | 4.155 | | 0.679 | 0.497 |
| Megaloptera | 1.501 | 3.918 | | 0.383 | 0.702 |
| Neuroptera | 1.049 | 4.155 | | 0.252 | 0.801 |
| Opiliones | 1.882 | 4.155 | | 0.453 | 0.651 |
| Orthoptera | 4.601 | 4.155 | | 1.107 | 0.268 |
| Plecoptera | 4.777 | 4.291 | | 1.113 | 0.266 |
| Pseudoscorpionida | 0.000 | 6.785 | | 0.000 | 1.000 |
| Psocoptera | 2.415 | 4.291 | | 0.563 | 0.574 |
| Psychodidae | 2.937 | 3.548 | | 0.828 | 0.408 |
| Raphidioptera | 0.527 | 6.785 | | 0.078 | 0.938 |
| **Thysanoptera** | **16.630** | **4.798** | | **3.466** | **0.001** |
| Trichoptera\* | 5.691 | 3.450 | | 1.650 | 0.099 |
| Trombidiformes | 1.932 | 4.798 | | 0.403 | 0.687 |
| Null deviance: 35633 on 897 df | | | Residual deviance: 30008 on 869 df | | |
| AIC: 5759.5 | | | | | |

**Table 6:** General linear model of linoleic acid (LIN; 18:2n-6) content by arthropod taxa. Values were compared to semi-aquatic insect order Psychodidae. Bold values represent coefficient variables that were statistically significant at the α = 0.05 level; a “\*” mark refers to marginally significant values.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | | t value | p |
| (Intercept) | 2.630 | 5.342 | | 0.492 | 0.623 |
| Coleoptera | 8.352 | 5.478 | | 1.525 | 0.128 |
| Collembola | 8.315 | 5.972 | | 1.392 | 0.164 |
| **Dermaptera** | **14.890** | **6.168** | | **2.414** | **0.016** |
| Diplopoda | 0.615 | 8.446 | | 0.073 | 0.942 |
| Diptera | 6.421 | 5.408 | | 1.187 | 0.235 |
| Diptera (Chaoborus) | 1.453 | 5.428 | | 0.268 | 0.789 |
| Diptera (Chironomidae) | 4.571 | 5.382 | | 0.849 | 0.396 |
| Diptera (Culicidae) | -0.758 | 6.757 | | -0.112 | 0.911 |
| Diptera (Simuliidae) | 3.079 | 5.711 | | 0.539 | 0.590 |
| Ephemeroptera | 0.421 | 5.549 | | 0.076 | 0.940 |
| Hemiptera\* | 9.671 | 5.464 | | 1.770 | 0.077 |
| **Hymenoptera** | **13.241** | **5.446** | | **2.431** | **0.015** |
| Isopoda | 0.395 | 7.067 | | 0.056 | 0.956 |
| Ixodida | -1.795 | 10.684 | | -0.168 | 0.867 |
| Lepidoptera | 2.249 | 5.679 | | 0.396 | 0.692 |
| Mecoptera | 7.441 | 6.542 | | 1.137 | 0.256 |
| Megaloptera | 1.591 | 6.168 | | 0.258 | 0.797 |
| Neuroptera\* | 12.547 | 6.542 | | 1.918 | 0.056 |
| Opiliones | 3.772 | 6.542 | | 0.577 | 0.564 |
| **Orthoptera** | **14.037** | **6.542** | | **2.146** | **0.032** |
| Plecoptera | 6.482 | 6.757 | | 0.959 | 0.338 |
| Pseudoscorpionida | 0.977 | 10.684 | | 0.091 | 0.927 |
| Psocoptera | 6.531 | 6.757 | | 0.967 | 0.334 |
| Psychodidae | 3.228 | 5.587 | | 0.578 | 0.564 |
| Raphidioptera | 9.434 | 10.684 | | 0.883 | 0.378 |
| Thysanoptera | 2.270 | 7.554 | | 0.300 | 0.764 |
| Trichoptera | 2.239 | 5.432 | | 0.412 | 0.680 |
| Trombidiformes | 11.025 | 7.554 | | 1.459 | 0.145 |
| Null deviance: 87234 on 897 df | | | Residual deviance: 74388 on 869 df | | |
| AIC: 6574.8 | | | | | |

**Table 7:** General linear model of eicosapentaenoic acid (EPA; 20:5n-3) content by arthropod taxa. Values were compared to semi-aquatic insect order Psychodidae. Bold values represent coefficient variables that were statistically significant at the α = 0.05 level; a “\*” mark refers to marginally significant values.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | | t value | p |
| (Intercept) | 0.000 | 4.899 | | 0.000 | 1.000 |
| Coleoptera | 0.810 | 5.024 | | 0.161 | 0.872 |
| Collembola | 5.677 | 5.477 | | 1.036 | 0.300 |
| Dermaptera | 1.083 | 5.657 | | 0.191 | 0.848 |
| Diplopoda | 0.186 | 7.746 | | 0.024 | 0.981 |
| Diptera | 2.007 | 4.959 | | 0.405 | 0.686 |
| **Diptera (Chaoborus)** | **10.830** | **4.978** | | **2.176** | **0.030** |
| Diptera (Chironomidae)\* | 8.380 | 4.936 | | 1.698 | 0.090 |
| Diptera (Culicidae) | 1.942 | 6.197 | | 0.313 | 0.754 |
| Diptera (Simuliidae) | 5.969 | 5.237 | | 1.140 | 0.255 |
| **Ephemeroptera** | **15.030** | **5.089** | | **2.953** | **0.003** |
| Hemiptera | 0.132 | 5.011 | | 0.026 | 0.979 |
| Hymenoptera | 5.149 | 4.995 | | 1.031 | 0.303 |
| Isopoda | 0.800 | 6.481 | | 0.124 | 0.902 |
| Ixodida | 0.000 | 9.798 | | 0.000 | 1.000 |
| Lepidoptera | 0.801 | 5.209 | | 0.154 | 0.878 |
| Mecoptera | 1.893 | 6.000 | | 0.316 | 0.752 |
| Megaloptera | 4.756 | 5.657 | | 0.841 | 0.401 |
| Neuroptera | 0.000 | 6.000 | | 0.000 | 1.000 |
| Opiliones | 1.808 | 6.000 | | 0.301 | 0.763 |
| Orthoptera | 0.154 | 6.000 | | 0.026 | 0.980 |
| Plecoptera | 4.525 | 6.197 | | 0.730 | 0.465 |
| Pseudoscorpionida | 3.795 | 9.798 | | 0.387 | 0.699 |
| Psocoptera | 0.000 | 6.197 | | 0.000 | 1.000 |
| Psychodidae | 2.442 | 5.123 | | 0.477 | 0.634 |
| Raphidioptera | 0.908 | 9.798 | | 0.093 | 0.926 |
| Thysanoptera | 0.652 | 6.928 | | 0.094 | 0.925 |
| Trichoptera\* | 9.473 | 4.982 | | 1.902 | 0.058 |
| Trombidiformes | 0.593 | 6.928 | | 0.086 | 0.932 |
| Null deviance: 78392 on 897 df | | | Residual deviance: 62564 on 869 df | | |
| AIC: 6419.3 | | | | | |

**Table 8:** General linear model of arachidonic acid (ARA; 20:4n-6) content by arthropod taxa. Values were compared to semi-aquatic insect order Psychodidae. Bold values represent coefficient variables that were statistically significant at the α = 0.05 level; a “\*” mark refers to marginally significant values.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | | t value | p |
| (Intercept) | 0.000 | 1.555 | | 0.000 | 1.000 |
| Coleoptera | 0.516 | 1.595 | | 0.324 | 0.746 |
| **Collembola** | **3.742** | **1.739** | | **2.152** | **0.032** |
| Dermaptera | 0.507 | 1.796 | | 0.283 | 0.778 |
| Diplopoda | 0.680 | 2.459 | | 0.277 | 0.782 |
| Diptera | 1.287 | 1.574 | | 0.817 | 0.414 |
| **Diptera (Chaoborus)** | **3.275** | **1.580** | | **2.072** | **0.039** |
| Diptera (Chironomidae) | 1.305 | 1.567 | | 0.833 | 0.405 |
| Diptera (Culicidae) | 0.998 | 1.967 | | 0.507 | 0.612 |
| Diptera (Simuliidae) | 1.379 | 1.663 | | 0.830 | 0.407 |
| Ephemeroptera | 0.894 | 1.615 | | 0.554 | 0.580 |
| Hemiptera | 0.062 | 1.591 | | 0.039 | 0.969 |
| Hymenoptera | 1.365 | 1.586 | | 0.861 | 0.390 |
| Isopoda | 1.312 | 2.057 | | 0.638 | 0.524 |
| Ixodida | 0.848 | 3.110 | | 0.273 | 0.785 |
| Lepidoptera | 0.046 | 1.653 | | 0.028 | 0.978 |
| Mecoptera | 1.182 | 1.905 | | 0.620 | 0.535 |
| Megaloptera | 2.231 | 1.796 | | 1.242 | 0.215 |
| Neuroptera | 0.000 | 1.905 | | 0.000 | 1.000 |
| Opiliones | 0.961 | 1.905 | | 0.505 | 0.614 |
| Orthoptera | 0.259 | 1.905 | | 0.136 | 0.892 |
| Plecoptera | 0.917 | 1.967 | | 0.466 | 0.641 |
| Pseudoscorpionida | 2.284 | 3.110 | | 0.734 | 0.463 |
| Psocoptera | 0.106 | 1.967 | | 0.054 | 0.957 |
| Psychodidae | 1.059 | 1.626 | | 0.651 | 0.515 |
| Raphidioptera | 1.258 | 3.110 | | 0.404 | 0.686 |
| Thysanoptera | 0.000 | 2.199 | | 0.000 | 1.000 |
| Trichoptera | 2.046 | 1.581 | | 1.294 | 0.196 |
| Trombidiformes | 0.206 | 2.199 | | 0.094 | 0.926 |
| Null deviance: 7014.0 on 897 df | | | Residual deviance: 6305.1 on 869 df | | |
| AIC: 4358.6 | | | | | |

**Table 9:** General linear model of docosahexaenoic acid (DHA; 22:6n-3) content by arthropod taxa. Values were compared to semi-aquatic insect order Psychodidae. Bold values represent coefficient variables that were statistically significant at the α = 0.05 level; a “\*” mark refers to marginally significant values.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | | t value | p |
| (Intercept) | 0.000 | 1.175 | | 0.000 | 1.000 |
| Coleoptera | 0.000 | 1.205 | | 0.000 | 1.000 |
| Collembola | 0.000 | 1.313 | | 0.000 | 1.000 |
| Dermaptera | 0.000 | 1.356 | | 0.000 | 1.000 |
| Diplopoda | 0.000 | 1.857 | | 0.000 | 1.000 |
| Diptera | 0.039 | 1.189 | | 0.033 | 0.974 |
| **Diptera (Chaoborus)** | **3.189** | **1.194** | | **2.672** | **0.008** |
| Diptera (Chironomidae) | 0.019 | 1.184 | | 0.016 | 0.987 |
| Diptera (Culicidae) | 0.000 | 1.486 | | 0.000 | 1.000 |
| Diptera (Simuliidae) | 0.162 | 1.256 | | 0.129 | 0.897 |
| Ephemeroptera | 0.002 | 1.220 | | 0.002 | 0.999 |
| Hemiptera | 0.053 | 1.201 | | 0.044 | 0.965 |
| Hymenoptera | 0.791 | 1.198 | | 0.661 | 0.509 |
| Isopoda | 0.000 | 1.554 | | 0.000 | 1.000 |
| Ixodida | 0.000 | 2.349 | | 0.000 | 1.000 |
| Lepidoptera | 0.000 | 1.249 | | 0.000 | 1.000 |
| Mecoptera | 0.072 | 1.439 | | 0.050 | 0.960 |
| Megaloptera | 0.000 | 1.356 | | 0.000 | 1.000 |
| Neuroptera | 0.000 | 1.439 | | 0.000 | 1.000 |
| Opiliones | 0.000 | 1.439 | | 0.000 | 1.000 |
| Orthoptera | 0.000 | 1.439 | | 0.000 | 1.000 |
| Plecoptera | 0.000 | 1.486 | | 0.000 | 1.000 |
| Pseudoscorpionida | 0.000 | 2.349 | | 0.000 | 1.000 |
| Psocoptera | 0.000 | 1.486 | | 0.000 | 1.000 |
| Psychodidae | 0.000 | 1.228 | | 0.000 | 1.000 |
| Raphidioptera | 0.000 | 2.349 | | 0.000 | 1.000 |
| Thysanoptera | 0.000 | 1.661 | | 0.000 | 1.000 |
| Trichoptera | 0.024 | 1.194 | | 0.020 | 0.984 |
| Trombidiformes | 0.000 | 1.661 | | 0.000 | 1.000 |
| Null deviance: 4427.6 on 897 df | | | Residual deviance: 3596.9 on 869 df | | |
| AIC: 3854.5 | | | | | |

Map

Description automatically generated**Fig. 1**: Map of Germany (left) with study area located within the square box. Zoomed in satellite image of Lake Mindelsee (left). Both images were obtained from Google Maps and illustrated using R packages ggplot2 and ggmap (Kahle and Wickham, 2013).

Chart, box and whisker chart

Description automatically generated

**Fig. 2**: Non-metric multidimensional scaling (NMDS) of arcsine-square-root-transformed fatty acid fractions (% of total fatty acids) of (**A**) aquatic and (**B**) terrestrial insects for each sampling season: spring (April, May), summer (June, July, August) and autumn (September and October). Vectors represent fatty acids that had a significant regression value (p < 0.001) and a vector length of 0.33 or greater. Ellipses represent 75 % confidence intervals. Stars represent significant p values for ANOSIM analysis: p > 0.01 (“\*”), p > 0.001 (“\*\*”), p > 0.0001 (“\*\*\*”). Multivariate comparisons of within-group FA profile similarity revealed, less pronounced, but significant separation between aquatic (ANOSIM: R = 0.097, p < 0.001) and terrestrial insects (ANOSIM: R = 0.029, p < 0.01) sampled in different months. (**C**) Mean EPA proportions of aquatic and terrestrial insects collected in spring (April, May), summer (June, July, August), and autumn (September and October). The box represents the first quartile to the third quartile with a line representing the median value, and the whiskers represent the minimum and maximum value. Different letters above boxes represent statistically significant groups as determined by Pairwise Wilcoxon Rank Sum comparisons; aquatic and terrestrial insects were analyzed separately (upper case and lowercase letters, respectively).

Chart, box and whisker chart

Description automatically generated

**Fig. 3:** DHA content of aquatic, semi-aquatic, and terrestrial arthropod orders. The box represents the first quartile to the third quartile with a line representing the median value, and the whiskers represent the minimum and maximum value. Only taxa with DHA content were presented.

# References

Kahle, D. J., and Wickham, H. (2013). ggmap: spatial visualization with ggplot2. *R J.* 5, 144.