# Supplementary material for: "Seasonal changes in European whitefish muscle and invertebrate prey fatty acid composition in a subarctic lake"

Ossi Keva*, Patrik Tang, Reijo Käkelä, Brian Hayden, Sami J. Taipale, Chris Harrod & Kimmo K. Kahilainen

*Corresponding author: Ossi Keva, ossi.keva@jyu.fi

**This file contains 7 supplementary tables and 6 figures**

**Table S1** Whitefish basic ecological metrics (age, size, GSI, condition factor, gill rakers) by month and sex. Bold mean±SD (n) values indicate statistical difference between sexes in month columns separated with dashed vertical lines. T-test (normal font) or Mann Whitney U-test (*italics*) were used to test the differences in the distributions.

**Table S2** Whitefish muscle FA content (mg/g DW) by month and sex. Bold mean±SD (n) values indicate statistical difference between sexes in month columns separated with dashed vertical lines. T-test (normal font) or Mann Whitney U-test (*italics*) was used to test the differences in the distributions.

**Table S3** PERMANOVA results of invertebrate habitat group and whitefish muscle FA profile. Dissimilarities in FA profiles were compared against habitat, month, habitat*month (upper section of the table) and in a dataset only including fish data (lower section of the table) month, sex and month*sex.

**Table S4** Invertebrate mean±SD molar percent (mol%) of the selected FAs (contributing >0.5 of total LSR FA mol%). ANOVA ($^A$) or Welch ANOVA ($^W$) statistics (F, df between groups and df) and the corresponding p-value are shown in bold in the following column ($p_{anova}$) where asterisk (*) equals to $p<0.001$. Pairwise Bonferroni-corrected T-tests or Games Howell tests are shown in the final column where adj.p<0.05, where numbers indicate sampling months according to the head row.

**Table S5** Whitefish mean±SD molar percent values (mol%) of the FAs contributing >0.5 of total by month. ANOVA ($^A$) or Welch ANOVA ($^W$) statistics (F, df between groups and df) and the corresponding p-value are shown in bold in the following column ($p_{anova}$) where asterisk (*) equals to $p<0.001$. Pairwise Bonferroni-corrected T-tests or Games Howell tests are shown in final column (adj.p<0.05), where numbers indicate sampling months according to the header row.

**Table S6** Invertebrate mean±SD content (mg/g DW) of the selected FAs (contributing >0.5 of total LSR FA mol%). ANOVA ($^A$) or Welch ANOVA ($^W$) statistics (F, df between groups and df) and the corresponding p-value are shown in bold in the following column ($p_{anova}$) where asterisk (*) equals to $p<0.001$. Pairwise Bonferroni-corrected T-tests or Games Howell tests are shown in the final column (adj.p <0.05), where numbers indicate sampling months according to the head row.

**Table S7** Whitefish mean±SD content (mg/g DW) of the FAs contributing >0.5 of molar percent total by month. ANOVA ($^A$) or Welch ANOVA ($^W$) statistics (F, df between groups and df) and the corresponding p-value are shown in bold in the following column ($p_{anova}$) where asterisk (*) equals to $p<0.001$. Pairwise Bonferroni-corrected T-tests or Games Howell tests are shown in the final column (adj.p<0.05), where numbers indicate sampling months according to the head row.

**Figure S1** Bathymetric map of Lake Kilpisjärvi located in Northern Fennoscandia. The sampling site is marked with an ellipse labelled A. Different shades of grey indicate the different depth zones of the lake and indicates river flow directions.

**Figure S2** Invertebrate (A, B) and whitefish (C, D) mean mol% and content data, respectively, of the selected FAs. Grey hatching in the bars indicates A, B: different invertebrate groups (benthic algae, littoral benthic macroinvertebrates, profundal benthic macroinvertebrates and pelagic zooplankton); C, D: different months. The vertical line separates the eight most abundant FAs in whitefish muscle contributing >75% of all FAs and is provided to aid visual separation of FAs.

**Figure S3** Pelagic zooplankton mean mol% and content (mg/g DW) of the selected FAs by month (A and B respectively). The vertical line is included only to aid visual sorting of eight most abundant FAs according to whitefish muscle FA profiles.

**Figure S4** Littoral benthic macroinvertebrates mean mol% and content (mg/g DW) of the selected FAs by month (A and B respectively). The vertical line is included only to aid visual sorting of eight most abundant FAs according to whitefish muscle FA profiles.

**Figure S5** Profundal benthic macroinvertebrates mean mol% and content (mg/g DW) of the selected FAs by month (A and B respectively). The vertical line is included only to aid visual sorting of eight most abundant FAs according to whitefish muscle FA profiles.

**Figure S6** nMDS biplot of invertebrate (A) and whitefish muscle (B) FA profile data. Invertebrate groups are presented with colors and habitats with rasters (A). Whitefish are grouped by month indicated with gray shades, circles = females, squares = males. The most important fatty acids corresponding to 70-80% of the total dissimilarities between groups were identified using SIMPER results (Table 2) and they are presented as light gray text.

**Table S1**

| | Dec-11 | | Feb-12 | | May-12 | |
|---|---|---|---|---|---|---|
| | Female (3) | Male (3) | Female (3) | Male (3) | Female (3) | Male (3) |
| Age | 8±0 | 8±0 | 9±0 | 9±0 | 9±0 | 9±0 |
| Total length (mm) | 282±15 | 262±5 | 273±8 | 275±31 | 283±17 | 294±23 |
| Total mass (g) | 173±35 | 127±5 | 141±11 | 150±43 | 162±33 | 192±47 |
| GSI | 11.39±1.03 | 1.25±0.13 | 0.77±0.32 | 0.18±0.14 | 0.77±0.19 | 0.19±0.03 |
| Gill raker count | 25.67±1.53 | 27.33±1.53 | 23.67±0.58 | 23±3.46 | 24±1.73 | 23±1 |
| Condition factor | 0.77±0.04 | 0.71±0.02 | 0.69±0.05 | 0.71±0.04 | 0.71±0.03 | 0.75±0.04 |
| | Jun-12 | | Jul-12 | | Sep-12 | |
| | Female (4) | Male (2) | Female (3) | Male (3) | Female (3) | Male (3) |
| Age | 12±4 | 9±0 | 9±0 | 9±0 | 9±0 | 9±0 |
| Total length (mm) | 388±21 | 264±6 | 280±8 | 284±3 | 288±6 | 284±11 |
| Total mass (g) | 479±105 | 112±26 | 169±21 | 164±6 | 186±16 | 188±20 |
| GSI | 1.29±0.33 | 0.22±0.01 | 1.1±0.31 | 0.46±0.2 | 4.39±0.36 | 1.42±0.58 |
| Gill raker count | 24.75±1.26 | 24±1.41 | 23.33±3.06 | 24.33±1.53 | 24.67±1.15 | 25.67±1.53 |
| Condition factor | 0.81±0.08 | 0.61±0.1 | 0.77±0.05 | 0.71±0.02 | 0.78±0.03 | 0.82±0.04 |

**Table S2**

| | December-11 | | February-12 | | May-12 | | June-12 | | July-12 | | September-12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Female (3) | Male (3) | Female (3) | Male (3) | Female (3) | Male (3) | Female (4) | Male (2) | Female (3) | Male (3) | Female (3) | Male (3) |
| SFA | 6.75±0.14 | 6.98±2.94 | 6.23±1.84 | 5.82±0.64 | 5.71±0.96 | 7.13±0.25 | 7.04±1.53 | 5.95±0.87 | 5.84±2.6 | 6.85±2.98 | 5.05±1.89 | 8.44±2.47 |
| 14:0iso | 0.11±0.03 | 0.13±0.06 | 0.11±0.01 | 0.11±0.01 | 0.10±0.03 | 0.09±0.03 | 0.11±0.01 | 0.11±0.04 | 0.09±0.06 | 0.11±0.03 | 0.18±0.05 | 0.15±0.06 |
| 14:0 | 0.49±0.11 | 0.92±0.87 | 0.34±0.14 | 0.33±0.07 | 0.24±0.09 | 0.32±0.11 | 0.24±0.01 | 0.28±0.06 | 0.38±0.15 | 0.41±0.21 | 0.39±0.14 | 0.59±0.16 |
| 15:0 | 0.13±0.02 | 0.14±0.07 | 0.13±0.02 | 0.12±0.01 | 0.11±0.03 | 0.13±0.03 | 0.12±0.01 | 0.11±0.01 | 0.13±0.07 | 0.15±0.05 | 0.17±0.06 | 0.20±0.08 |
| 16:0 | 4.59±0.31 | 4.45±1.51 | 4.37±1.29 | 4.10±0.55 | 4.05±0.70 | 5.15±0.31 | 5.14±1.18 | 4.23±0.74 | 4.17±1.95 | 4.86±2.13 | 3.41±1.32 | 5.69±1.37 |
| 18:0 | 1.42±0.02 | 1.33±0.47 | 1.28±0.41 | 1.17±0.13 | 1.21±0.19 | 1.43±0.08 | 1.43±0.33 | 1.23±0.15 | 1.07±0.43 | 1.32±0.58 | 0.90±0.32 | 1.81±0.84 |
| MUFA | 3.07±0.91 | 3.34±2.09 | 2.09±0.65 | 2.24±0.55 | 1.97±0.51 | 2.76±0.03 | 3.69±1.39 | 2.64±1.24 | 2.94±1.87 | 2.59±1.14 | 2.12±0.92 | 4.46±1.40 |
| 16:1n-5 | 0.13±0.03 | 0.12±0.04 | 0.12±0.05 | 0.11±0.03 | 0.09±0.01 | 0.14±0.02 | 0.11±0.02 | 0.10±0.02 | 0.15±0.09 | 0.17±0.12 | 0.10±0.04 | 0.18±0.03 |
| 16:1n-7 | 0.46±0.23 | 0.51±0.36 | 0.20±0.09 | 0.34±0.17 | 0.20±0.09 | 0.47±0.04 | 0.73±0.38 | 0.45±0.42 | 0.64±0.53 | 0.42±0.19 | 0.46±0.23 | 1.04±0.31 |
| 16:1n-9 | 0.13±0.03 | 0.20±0.14 | 0.10±0.04 | 0.10±0.03 | 0.10±0.03 | 0.13±0.03 | 0.10±0.03 | 0.10±0.01 | 0.13±0.06 | 0.13±0.05 | 0.09±0.03 | 0.16±0.03 |
| 18:1n-7 | 0.75±0.32 | 0.65±0.37 | 0.44±0.17 | 0.49±0.18 | 0.48±0.19 | 0.66±0.06 | 0.68±0.22 | 0.49±0.25 | 0.61±0.30 | 0.61±0.30 | 0.50±0.21 | 1.16±0.37 |
| 18:1n-9 | 1.27±0.37 | 1.55±1.09 | 0.83±0.27 | 0.88±0.18 | 0.76±0.21 | 1.05±0.03 | 1.79±0.82 | 1.21±0.60 | 1.21±0.85 | 1.02±0.50 | 0.81±0.37 | 1.70±0.79 |
| 24:1n-9 | 0.34±0.05 | 0.30±0.11 | 0.40±0.08 | 0.32±0.05 | 0.35±0.05 | 0.31±0.03 | 0.29±0.04 | 0.30±0.06 | 0.21±0.06 | 0.25±0.12 | 0.16±0.06 | 0.22±0.01 |
| PUFA | 5.01±0.71 | 5.42±1.32 | 12.92±2.71 | 11.55±2.47 | 13.81±2.11 | 14.22±1.79 | 15.45±2.66 | 12.46±0.99 | 11.03±4.39 | 13.48±6.12 | 9.61±4.00 | 13.99±2.19 |
| n-3/n-6 | 2.68±0.34 | 2.75±0.68 | 3.60±0.39 | 3.72±0.42 | 3.85±0.23 | 3.60±0.25 | 3.18±0.53 | 3.30±0.21 | 3.37±0.24 | 3.89±0.30 | 4.12±0.30 | 3.70±0.21 |
| n-6 PUFA | 1.36±0.09 | 1.44±0.20 | 2.83±0.69 | 2.43±0.33 | 2.86±0.58 | 3.08±0.23 | 3.77±0.96 | 2.90±0.37 | 2.54±1.06 | 2.75±1.25 | 1.86±0.70 | 2.98±0.50 |
| LIN | 0.40±0.08 | 0.42±0.18 | 0.38±0.16 | 0.38±0.10 | 0.34±0.07 | 0.5±0.03 | 0.80±0.44 | 0.52±0.22 | 0.51±0.32 | 0.46±0.24 | 0.40±0.18 | 0.64±0.11 |
| ARA | 0.65±0.05 | 0.72±0.10 | 1.71±0.42 | 1.39±0.17 | 1.72±0.37 | 1.83±0.26 | 2.17±0.38 | 1.70±0.07 | 1.46±0.56 | 1.62±0.67 | 1.04±0.35 | 1.66±0.38 |
| 22:4n-6 | 0.09±0.02 | 0.09±0.02 | 0.15±0.02 | 0.14±0.03 | 0.19±0.06 | 0.18±0.03 | 0.24±0.13 | 0.22±0.11 | 0.15±0.04 | 0.13±0.04 | 0.10±0.05 | 0.25±0.20 |
| 22:5n-6 | 0.22±0.09 | 0.21±0.06 | 0.59±0.09 | 0.52±0.06 | 0.62±0.15 | 0.57±0.02 | 0.55±0.05 | 0.48±0.02 | 0.42±0.16 | 0.54±0.31 | 0.31±0.13 | 0.43±0.08 |
| n-3 PUFA | 3.65±0.64 | 3.98±1.20 | 10.09±2.06 | 9.12±2.14 | 10.95±1.53 | 11.14±1.56 | 11.69±1.87 | 9.55±0.62 | 8.48±3.33 | 10.73±4.88 | 7.75±3.31 | 11.01±1.71 |
| ALA | 0.30±0.04 | 0.26±0.06 | 0.30±0.14 | 0.32±0.07 | 0.27±0.03 | 0.41±0.03 | 0.53±0.16 | 0.38±0.13 | 0.33±0.11 | 0.48±0.30 | 0.38±0.19 | 0.77±0.44 |
| SDA | 0.13±0.06 | 0.13±0.05 | 0.15±0.05 | 0.12±0.04 | 0.15±0.02 | 0.11±0.03 | 0.16±0.03 | 0.11±0.03 | 0.15±0.09 | 0.18±0.05 | 0.32±0.09 | 0.32±0.20 |
| 20:4n-3 | 0.10±0.03 | 0.11±0.02 | 0.18±0.06 | 0.16±0.04 | 0.14±0.04 | 0.17±0.02 | 0.12±0.01 | 0.12±0.01 | 0.17±0.04 | 0.22±0.12 | 0.14±0.05 | 0.28±0.14 |
| EPA | 0.81±0.07 | 0.85±0.23 | 2.08±0.64 | 1.86±0.37 | 2.05±0.54 | 2.42±0.95 | 2.69±0.59 | 2.08±0.06 | 2.06±0.67 | 2.59±1.07 | 1.88±0.92 | 2.70±0.50 |
| 22:5n-3 | 0.23±0.03 | 0.22±0.09 | 0.53±0.18 | 0.51±0.12 | 0.62±0.15 | 0.73±0.17 | 0.86±0.35 | 0.68±0.25 | 0.54±0.20 | 0.57±0.21 | 0.42±0.14 | 0.69±0.18 |
| DHA | 2.09±0.59 | 2.42±0.92 | 6.84±1.10 | 6.16±1.61 | 7.72±1.01 | 7.31±0.51 | 7.33±0.92 | 6.19±0.15 | 5.24±2.32 | 6.68±3.30 | 4.61±1.98 | 6.24±0.90 |
| DMA | 0.08±0.01 | 0.09±0.03 | 0.12±0.05 | 0.10±0.05 | 0.13±0.02 | 0.15±0.06 | 0.18±0.07 | 0.15±0.02 | 0.11±0.07 | 0.12±0.05 | 0.11±0.04 | 0.17±0.04 |
| DMA16:0 | 0.08±0.01 | 0.09±0.03 | 0.12±0.05 | 0.10±0.05 | 0.13±0.02 | 0.15±0.06 | 0.18±0.07 | 0.15±0.02 | 0.11±0.07 | 0.12±0.05 | 0.11±0.04 | 0.17±0.04 |
| UFA/SFA | 1.20±0.06 | 1.36±0.50 | 2.44±0.18 | 2.35±0.30 | 2.76±0.01 | 2.38±0.19 | 2.73±0.15 | 2.54±0.00 | 2.39±0.03 | 2.33±0.06 | 2.29±0.13 | 2.23±0.26 |
| Tot-FA | 14.9±0.10 | 15.82±4.71 | 21.36±5.21 | 19.71±3.65 | 21.63±3.58 | 24.26±2.06 | 26.36±5.37 | 21.19±3.13 | 19.92±8.91 | 23.04±10.28 | 16.89±6.83 | 27.06±5.58 |

**Table S3**

| Model: (Invert. +Fish data) | Df | Sums of sqs | Mean sqs | F-model | $R^2$ | p |
|---|---|---|---|---|---|---|
| Habitat | 3 | 2.84 | 0.947 | 26.9059 | 0.525 | 0.001 |
| Month | 5 | 0.275 | 0.055 | 1.5612 | 0.051 | 0.075 |
| Habitat:Month | 15 | 0.502 | 0.033 | 0.9507 | 0.093 | 0.575 |
| Residuals | 51 | 1.795 | 0.035 | | 0.332 | |
| Total | 74 | 5.411 | | | 1 | |
| **Model: (Invert. data)** | **Df** | **Sums of sqs** | **Mean sqs** | **F-model** | **$R^2$** | **p** |
| Habitat | 2 | 0.677 | 0.339 | 4.3272 | 0.24 | 0.003 |
| Month | 5 | 0.246 | 0.049 | 0.63 | 0.087 | 0.88 |
| Habitat:Month | 10 | 0.251 | 0.025 | 0.3205 | 0.089 | 1 |
| Residuals | 21 | 1.643 | 0.078 | | 0.583 | |
| Total | 39 | 2.817 | | | 1 | |
| **Model: (Fish data)** | **Df** | **Sums of sqs** | **Mean sqs** | **F-model** | **$R^2$** | **p** |
| Month | 5 | 0.279 | 0.056 | 11.1068 | 0.648 | 0.001 |
| Sex | 1 | 0.001 | 0.001 | 0.2713 | 0.003 | 0.887 |
| Month:Sex | 5 | 0.03 | 0.006 | 1.1765 | 0.069 | 0.302 |
| Residuals | 24 | 0.121 | 0.005 | | 0.28 | |
| Total | 35 | 0.431 | | | 1 | |

**Table S4**

| Invertebrate mol% | [1]BMI_littoral (21) | [2]BMI_profundal (12) | [3]ZPL_pelagial (6) | Benthic algae (1) | ANOVA | $p_{anova}$ | *post-hoc* tests |
|---|---|---|---|---|---|---|---|
| SFA | 25.45±7.94 | 22.7±7.24 | 38.16±11.65 | 27.33 | $^{W}F_{2,12.3}=4.200$ | **0.04** | 2-3 |
| 14:0*iso* | 1.95±1.48 | 2.94±1.28 | 1.18±0.50 | 2.83 | $^{W}F_{2,21.4}=8.913$ | * | 2-3 |
| 14:0 | 3.60±1.00 | 4.05±1.78 | 16.57±6.01 | 5.72 | $^{W}F_{2,10.1}=13.187$ | * | 1-3, 2-3 |
| 15:0 | 1.40±0.85 | 1.99±0.72 | 1.30±0.37 | 1.80 | $^{W}F_{2,19.8}=3.758$ | **0.04** | 2-3 |
| 16:0 | 14.29±8.13 | 9.76±8.07 | 15.91±4.71 | 15.56 | $^{W}F_{2,17.3}=2.064$ | 0.16 | |
| 18:0 | 4.21±1.77 | 3.96±1.65 | 3.21±1.32 | 1.43 | $^{W}F_{2,15.2}=1.109$ | 0.36 | |
| MUFA | 30.22±10.36 | 19.89±5.59 | 15.22±3.80 | 28.11 | $^{W}F_{2,19.9}=14.469$ | * | 1-2, 1-3 |
| 16:1n-9 | 0.73±0.35 | 0.71±0.14 | 0.70±0.16 | 1.01 | $^{W}F_{2,15.6}=0.054$ | 0.95 | |
| 16:1n-7 | 13.98±7.10 | 6.33±3.73 | 5.98±1.96 | 15.31 | $^{W}F_{2,22}=10.731$ | * | 1-2, 1-3 |
| 16:1n-5 | 0.66±0.23 | 1.27±0.36 | 0.79±0.21 | 0.58 | $^{W}F_{2,13.7}=13.201$ | * | 1-2, 2-3 |
| 18:1n-9 | 8.26±4.98 | 5.62±3.30 | 5.21±1.67 | 7.51 | $^{W}F_{2,21.3}=2.837$ | 0.08 | |
| 18:1n-7 | 6.11±2.67 | 5.17±2.23 | 1.53±0.27 | 2.71 | $^{A}F_{2,36}=8.935$ | **0.001** | 1-3, 2-3 |
| 24:1n-9 | 0.47±0.49 | 0.79±0.30 | 1.02±0.35 | 0.99 | $^{W}F_{2,14.7}=5.089$ | **0.02** | 1-3 |
| PUFA | 15.02±6.26 | 16.89±5.29 | 25.15±13.31 | 16.34 | $^{W}F_{2,36}=4.377$ | **0.02** | 1-3 |
| n-3/n-6 | 1.65±2.19 | 1.35±0.35 | 2.35±0.38 | 2.13 | $^{W}F_{2,16.8}=13.969$ | * | 2-3 |
| n-6 PUFA | 6.77±3.54 | 7.48±3.10 | 7.42±3.79 | 5.22 | $^{A}F_{2,36}=0.194$ | 0.825 | |
| LIN | 4.73±3.54 | 4.11±3.02 | 4.02±2.07 | 3.33 | $^{W}F_{2,17}=0.226$ | 0.8 | |
| ARA | 1.21±1.06 | 2.22±1.20 | 1.58±0.87 | 0.38 | $^{W}F_{2,14.6}=2.846$ | 0.09 | |
| 22:4n-6 | 0.43±0.4 | 0.56±0.31 | 0.30±0.09 | 0.98 | $^{W}F_{2,22.1}=4.138$ | **0.03** | 2-3 |
| 22:5n-6 | 0.40±0.43 | 0.58±0.31 | 1.52±0.84 | 0.54 | $^{W}F_{2,11.9}=5.04$ | **0.03** | 1-3 |
| n-3 PUFA | 8.24±4.04 | 9.41±2.54 | 17.73±9.73 | 11.12 | $^{W}F_{2,11.8}=2.762$ | 0.1 | |
| ALA | 1.67±0.99 | 1.39±0.54 | 4.11±2.27 | 4.00 | $^{W}F_{2,11.8}=4.268$ | **0.04** | |
| SDA | 1.01±0.80 | 1.60±0.78 | 1.32±1.52 | 1.60 | $^{W}F_{2,11.7}=2.012$ | 0.18 | |
| 20:4n-3 | 0.34±0.28 | 0.56±0.21 | 0.64±0.24 | 0.57 | $^{W}F_{2,14.1}=4.571$ | **0.03** | 1-2 |
| EPA | 3.25±2.66 | 3.61±2.33 | 5.09±3.07 | 2.01 | $^{W}F_{2,13}=0.850$ | 0.45 | |
| 22:5n-3 | 1.05±1.78 | 0.94±0.65 | 0.64±0.25 | 0.76 | $^{W}F_{2,23.2}=1.302$ | 0.29 | |
| DHA | 0.93±0.94 | 1.31±0.78 | 5.91±4.45 | 2.18 | $^{W}F_{2,11.3}=4.058$ | 0.05 | |
| DMA | 0.28±0.34 | 0.46±0.29 | 0.19±0.10 | 0.23 | $^{W}F_{2,21.9}=4.077$ | **0.03** | 2-3 |
| DMA16:0 | 0.28±0.34 | 0.46±0.29 | 0.19±0.10 | 0.23 | $^{W}F_{2,21.9}=4.077$ | **0.03** | 2-3 |
| UFA/SFA | 1.99±0.99 | 1.73±0.47 | 1.22±0.65 | 1.63 | $^{W}F_{2,14.4}=2.452$ | 0.12 | |
| Tot-FA | 70.96±13.78 | 59.94±12.71 | 78.73±5.67 | 72.01 | $^{W}F_{2,20.1}=9.303$ | * | 2-3 |

**Table S5**

| LSR mol% | [12]Dec-11 (6) | [2]Feb-12 (6) | [5]May-12 (6) | [6]Jun-12 (6) | [7]Jul-12 (6) | [9]Sep-12 (6) | ANOVA | $p_{anova}$ | *post-hoc* tests |
|---|---|---|---|---|---|---|---|---|---|
| SFA | 45.6±4.06 | 34.29±1.78 | 33.23±1.64 | 31.87±1.31 | 34.48±0.8 | 33.51±2.88 | $^{W}F_{5,13.5}=11.44$ | ***** | 12-2, 12-5, 6-7, 12-6, 12-7, 12-9 |
| 14:0*iso* | 1.00±0.17 | 0.82±0.24 | 0.65±0.13 | 0.68±0.14 | 0.72±0.36 | 1.17±0.56 | $^{W}F_{5,13.7}=3.686$ | **0.03** | 12-5, 12-6 |
| 14:0 | 5.44±2.88 | 2.46±0.47 | 1.90±0.65 | 1.61±0.54 | 2.77±0.46 | 3.17±0.59 | $^{W}F_{5,13.9}=6.271$ | ***** | 5-9, 6-7, 6-9 |
| 15:0 | 1.03±0.11 | 0.82±0.16 | 0.72±0.15 | 0.64±0.13 | 0.87±0.29 | 1.11±0.33 | $^{A}F_{5,30}=4.271$ | **0.005** | 5-9, 6-9 |
| 16:0 | 30.59±3.23 | 24.46±1.02 | 24.28±1.36 | 23.53±1.04 | 24.77±1.13 | 22.8±2.13 | $^{W}F_{5,13.8}=5.061$ | **0.01** | 12-2, 12-5, 12-6, 12-7, 12-9 |
| 18:0 | 7.54±0.94 | 5.73±0.39 | 5.69±0.20 | 5.41±0.33 | 5.34±0.42 | 5.26±0.34 | $^{W}F_{5,13.6}=6.343$ | ***** | 12-2, 12-5, 12-6, 12-7, 12-9 |
| MUFA | 17.38±4.3 | 10.05±1.45 | 10.17±1.51 | 13.3±3.24 | 12.66±2.29 | 13.58±2.28 | $^{W}F_{5,13.8}=5.056$ | **0.01** | 12-2, 12-5, 2-9 |
| 16:1n-9 | 1.08±0.31 | 0.61±0.13 | 0.59±0.11 | 0.48±0.09 | 0.73±0.09 | 0.65±0.12 | $^{W}F_{5,13.9}=5.942$ | ***** | 12-2, 12-5, 12-6, 6-7, |
| 16:1n-7 | 3.17±1.13 | 1.54±0.71 | 1.75±0.70 | 2.97±1.33 | 2.82±1.08 | 3.61±1.23 | $^{A}F_{5,30}=3.61$ | **0.011** | 2-9 |
| 16:1n-5 | 0.84±0.11 | 0.65±0.10 | 0.62±0.12 | 0.55±0.13 | 0.82±0.19 | 0.75±0.22 | $^{A}F_{5,30}=3.592$ | **0.012** | 12-6 |
| 18:1n-9 | 7.44±2.08 | 4.04±0.44 | 3.90±0.51 | 6.14±1.75 | 4.88±1.08 | 4.84±0.52 | $^{W}F_{5,13.6}=5.643$ | ***** | 12-2, 12-5, 5-9 |
| 18:1n-7 | 3.78±1.22 | 2.18±0.47 | 2.45±0.45 | 2.43±0.52 | 2.79±0.65 | 3.24±0.6 | $^{W}F_{5,13.9}=3.23$ | **0.04** | 2-9 |
| 24:1n-9 | 1.07±0.22 | 1.03±0.20 | 0.87±0.18 | 0.74±0.27 | 0.62±0.08 | 0.50±0.11 | $^{A}F_{5,30}=8.75$ | ***** | 12-7, 12-9, 2-7, 2-9, 5-9 |
| PUFA | 24.93±8.17 | 46.38±3.14 | 48.71±3.79 | 46.97±2.68 | 44.81±2.37 | 40.65±6.75 | $^{W}F_{5,13.7}=8.081$ | ***** | 12-2, 12-5, 12-6, 12-7, 12-9 |
| n-3/n-6 | 2.49±0.45 | 3.38±0.32 | 3.44±0.25 | 2.94±0.40 | 3.36±0.36 | 3.63±0.28 | $^{A}F_{5,30}=8.471$ | ***** | 12-2, 12-5, 12-7, 12-9, 6-9 |
| n-6 PUFA | 7.01±1.36 | 10.62±0.9 | 10.97±0.44 | 11.98±0.89 | 10.33±0.87 | 8.77±1.27 | $^{W}F_{5,13.5}=12.308$ | ***** | 12-2, 12-5, 12-6, 12-7, 5-9, 6-7, 6-9 |
| LIN | 2.28±0.22 | 1.81±0.23 | 1.82±0.28 | 2.73±0.94 | 2.17±0.36 | 2.23±0.65 | $^{W}F_{5,13.7}=3.515$ | **0.03** | 12-2, 12-5 |
| ARA | 3.44±1.02 | 6.37±0.79 | 6.65±0.56 | 7.01±0.51 | 6.11±0.63 | 4.90±0.72 | $^{W}F_{5,13.9}=13.882$ | ***** | 12-2, 12-5, 12-6, 12-7, 2-9, 5-9, 6-9, 7-9 |
| 22:4n-6 | 0.37±0.10 | 0.49±0.06 | 0.59±0.11 | 0.65±0.21 | 0.47±0.12 | 0.46±0.14 | $^{A}F_{5,30}=3.513$ | **0.013** | 12-6 |
| 22:5n-6 | 0.93±0.40 | 1.95±0.27 | 1.91±0.38 | 1.59±0.36 | 1.58±0.25 | 1.17±0.27 | $^{A}F_{5,30}=9.255$ | ***** | 12-2, 12-5, 12-6, 12-7, 2-9, 5-9 |
| n-3 PUFA | 17.93±6.84 | 35.75±2.74 | 37.74±3.47 | 34.99±3.03 | 34.48±2.21 | 31.88±5.58 | $^{W}F_{5,13.8}=7.236$ | ***** | 12-2, 12-5, 12-6, 12-7, 12-9 |
| ALA | 1.60±0.26 | 1.49±0.20 | 1.52±0.25 | 1.93±0.27 | 1.83±0.37 | 2.23±0.39 | $^{A}F_{5,30}=5.527$ | **0.001** | 12-9, 2-9, 5-9 |
| SDA | 0.73±0.24 | 0.74±0.34 | 0.59±0.21 | 0.61±0.22 | 0.87±0.52 | 1.46±0.62 | $^{A}F_{5,30}=4.159$ | **0.005** | 12-9, 2-9, 5-9, 6-9 |
| 20:4n-3 | 0.51±0.13 | 0.68±0.11 | 0.58±0.08 | 0.43±0.10 | 0.78±0.11 | 0.70±0.07 | $^{A}F_{5,30}=10.241$ | ***** | 12-7, 12-9, 2-6, 5-7, 6-7, 6-9 |
| EPA | 4.23±1.47 | 8.10±0.23 | 8.42±2.03 | 8.71±0.88 | 9.35±1.14 | 8.37±1.47 | $^{W}F_{5,12.3}=8.5$ | ***** | 12-2, 12-5, 12-6, 12-7, 12-9 |
| 22:5n-3 | 0.97±0.41 | 1.79±0.13 | 2.14±0.33 | 2.29±0.47 | 1.90±0.23 | 1.71±0.21 | $^{A}F_{5,30}=12.519$ | ***** | 12-2, 12-5, 12-6, 12-7, 12-9 |
| DHA | 9.89±4.86 | 22.95±2.62 | 24.49±3.07 | 21.03±2.8 | 19.74±1.7 | 17.41±4.19 | $^{W}F_{5,13.7}=8.148$ | ***** | 12-2, 12-5, 12-6, 12-7, 5-7, 5-9 |
| DMA | 0.61±0.12 | 0.62±0.15 | 0.75±0.21 | 0.80±0.21 | 0.64±0.10 | 0.75±0.22 | $^{A}F_{5,30}=1.368$ | 0.264 | |
| DMA16:0 | 0.61±0.12 | 0.62±0.15 | 0.75±0.21 | 0.80±0.21 | 0.64±0.10 | 0.75±0.22 | $^{A}F_{5,30}=1.368$ | 0.264 | |
| UFA/SFA | 0.94±0.22 | 1.65±0.15 | 1.78±0.15 | 1.90±0.13 | 1.67±0.05 | 1.62±0.12 | $^{W}F_{5,13.2}=15.147$ | ***** | 12-2, 12-5, 12-6, 12-7, 12-9, 2-6, 6-7, 6-9, |
| Tot-FA | 88.52±2.01 | 91.33±2.67 | 92.86±1.61 | 92.94±1.14 | 92.58±1.36 | 88.49±9.28 | $^{W}F_{5,13.7}=4.301$ | **0.01** | 12-5, 12-6, 12-7 |

**Table S6**

| Invertebrate (mg/g DW) | [1]BMI_littoral (21) | [2]BMI_profundal (12) | [3]ZPL_pelagial (6) | Benthic algae (1) | ANOVA | $p_{anova}$ | *post-hoc* tests |
|---|---|---|---|---|---|---|---|
| SFA | 27.00±25.00 | 27.48±28.19 | 61.05±32.89 | 1.33 | ${}^{W}F_{2,12.4}$=2.716 | 0.11 | |
| 14:0*iso* | 2.10±3.63 | 2.31±2.25 | 1.57±0.77 | 0.12 | ${}^{W}F_{2,22.6}$=0.608 | 0.55 | |
| 14:0 | 3.08±2.92 | 4.29±4.54 | 22.87±13.79 | 0.23 | ${}^{W}F_{2,10.4}$=5.936 | **0.02** | 1-3, 2-3 |
| 15:0 | 1.66±2.64 | 1.83±1.59 | 1.98±0.86 | 0.08 | ${}^{W}F_{2,21.3}$=0.116 | 0.89 | |
| 16:0 | 14.94±16.38 | 15.13±18.72 | 27.98±15.23 | 0.80 | ${}^{W}F_{2,13.8}$=1.691 | 0.22 | |
| 18:0 | 5.22±5.21 | 3.92±2.39 | 6.65±3.08 | 0.09 | ${}^{W}F_{2,14.9}$=1.848 | 0.19 | |
| MUFA | 30.38±21.70 | 27.19±26.40 | 34.54±23.45 | 1.61 | ${}^{W}F_{2,13}$=0.172 | 0.84 | |
| 16:1n-9 | 0.96±1.36 | 0.77±0.67 | 1.38±0.98 | 0.05 | ${}^{W}F_{2,14.1}$=0.93 | 0.42 | |
| 16:1n-7 | 10.92±8.61 | 8.49±8.98 | 11.64±8.55 | 0.78 | ${}^{W}F_{2,13.5}$=0.353 | 0.71 | |
| 16:1n-5 | 0.7+±0.69 | 1.60±1.97 | 1.42±0.80 | 0.03 | ${}^{W}F_{2,12}$=2.733 | 0.11 | |
| 18:1n-9 | 9.29±7.76 | 9.18±11.71 | 12.77±9.54 | 0.47 | ${}^{W}F_{2,12.3}$=0.334 | 0.72 | |
| 18:1n-7 | 7.18±5.99 | 5.34±3.94 | 3.61±2.39 | 0.17 | ${}^{W}F_{2,19.9}$=2.367 | 0.12 | |
| 24:1n-9 | 1.33±2.66 | 1.82±2.08 | 3.72±1.80 | 0.10 | ${}^{W}F_{2,15.7}$=3.304 | 0.06 | |
| PUFA | 22.62±26.15 | 24.6±21.61 | 75.66±62.41 | 1.14 | ${}^{W}F_{2,11.7}$=1.954 | 0.19 | |
| n-3/n-6 | 1.74±2.40 | 1.38±0.32 | 2.43±0.49 | 2.13 | ${}^{W}F_{2,14.1}$=10.989 | * | 2-3 |
| n-6 PUFA | 8.05±6.92 | 10.93±10.29 | 22.12±19.14 | 0.36 | ${}^{W}F_{2,10.7}$=1.712 | 0.23 | |
| LIN | 4.54±3.68 | 6.26±7.58 | 10.6±9.40 | 0.21 | ${}^{W}F_{2,10.3}$=1.307 | 0.31 | |
| ARA | 1.60±1.82 | 2.84±2.04 | 4.88±4.06 | 0.03 | ${}^{W}F_{2,11.3}$=2.821 | 0.1 | |
| 22:4n-6 | 0.88±1.49 | 0.80±0.62 | 0.99±0.72 | 0.08 | ${}^{W}F_{2,15.7}$=0.149 | 0.86 | |
| 22:5n-6 | 1.03±1.94 | 1.03±1.22 | 5.65±5.03 | 0.05 | ${}^{W}F_{2,11.7}$=2.358 | 0.14 | |
| n-3 PUFA | 14.57±20.92 | 13.67±11.46 | 53.54±43.65 | 0.78 | ${}^{W}F_{2,11.9}$=2.293 | 0.14 | |
| ALA | 2.06±2.61 | 1.98±2.13 | 10.87±10.15 | 0.24 | ${}^{W}F_{2,11.4}$=2.138 | 0.16 | |
| SDA | 1.65±3.01 | 1.65±1.48 | 4.24±7.64 | 0.10 | ${}^{W}F_{2,11.7}$=0.32 | 0.73 | |
| 20:4n-3 | 0.71±1.55 | 0.78±0.73 | 1.71±0.98 | 0.04 | ${}^{W}F_{2,14.6}$=2.253 | 0.14 | |
| EPA | 4.47±6.68 | 5.76±5.38 | 15.18±12.04 | 0.14 | ${}^{W}F_{2,12}$=2.085 | 0.17 | |
| 22:5n-3 | 3.44±8.43 | 1.46±1.81 | 2.04±1.24 | 0.06 | ${}^{W}F_{2,21.7}$=0.704 | 0.51 | |
| DHA | 2.24±4.43 | 2.03±1.81 | 19.49±14.88 | 0.19 | ${}^{W}F_{2,11.5}$=3.878 | 0.05 | |
| DMA | 0.27±0.41 | 0.33±0.23 | 0.31±0.16 | 0.01 | ${}^{W}F_{2,19.6}$=0.131 | 0.88 | |
| DMA16:0 | 0.27±0.41 | 0.33±0.23 | 0.31±0.16 | 0.01 | ${}^{W}F_{2,19.6}$=0.131 | 0.88 | |
| UFA/SFA | 2.40±1.13 | 2.25±0.65 | 1.74±0.95 | 2.07 | ${}^{W}F_{2,13.8}$=0.985 | 0.4 | |
| Tot-FA | 80.27±68.42 | 79.60±74.60 | 171.56±114.80 | 4.09 | ${}^{W}F_{2,11.8}$=1.689 | 0.23 | |

**Table S7**

| LSR (mg/g DW) | [12]Dec-11 (6) | [2]Feb-12 (6) | [5]May-12 (6) | [6]Jun-12 (6) | [7]Jul-12 (6) | [9]Sep-12 (6) | ANOVA | $p_{anova}$ | *post-hoc* tests |
|---|---|---|---|---|---|---|---|---|---|
| SFA | 6.86±1.87 | 6.03±1.25 | 6.42±1.00 | 6.67±1.37 | 6.34±2.56 | 6.74±2.70 | $^{A}F_{5,30}$=0.157 | 0.976 | |
| 14:0*iso* | 0.12±0.04 | 0.11±0.01 | 0.10±0.03 | 0.11±0.02 | 0.10±0.05 | 0.16±0.05 | $^{W}F_{5,13.2}$=1.502 | 0.25 | |
| 14:0 | 0.71±0.60 | 0.34±0.10 | 0.28±0.10 | 0.25±0.04 | 0.40±0.16 | 0.49±0.17 | $^{W}F_{5,12.8}$=3.524 | 0.03 | |
| 15:0 | 0.14±0.05 | 0.12±0.02 | 0.12±0.03 | 0.11±0.01 | 0.14±0.06 | 0.18±0.06 | $^{W}F_{5,13.2}$=1.838 | 0.17 | |
| 16:0 | 4.52±0.98 | 4.23±0.90 | 4.60±0.77 | 4.84±1.08 | 4.52±1.87 | 4.55±1.74 | $^{A}F_{5,30}$=0.135 | 0.983 | |
| 18:0 | 1.37±0.30 | 1.22±0.28 | 1.32±0.17 | 1.36±0.29 | 1.20±0.48 | 1.36±0.76 | $^{W}F_{5,13.6}$=0.246 | 0.93 | |
| MUFA | 3.20±1.45 | 2.17±0.54 | 2.37±0.54 | 3.34±1.33 | 2.77±1.40 | 3.29±1.66 | $^{W}F_{5,13.5}$=1.326 | 0.31 | |
| 16:1n-9 | 0.16±0.10 | 0.10±0.03 | 0.11±0.03 | 0.10±0.02 | 0.13±0.05 | 0.12±0.04 | $^{W}F_{5,13.8}$=0.973 | 0.47 | |
| 16:1n-7 | 0.48±0.27 | 0.27±0.14 | 0.34±0.16 | 0.64±0.38 | 0.53±0.37 | 0.75±0.40 | $^{W}F_{5,13.6}$=2.296 | 0.1 | |
| 16:1n-5 | 0.12±0.03 | 0.11±0.03 | 0.12±0.03 | 0.11±0.02 | 0.16±0.10 | 0.14±0.05 | $^{W}F_{5,13.4}$=0.717 | 0.62 | |
| 18:1n-9 | 1.41±0.74 | 0.85±0.21 | 0.90±0.21 | 1.59±0.75 | 1.11±0.63 | 1.25±0.74 | $^{W}F_{5,13.3}$=1.611 | 0.22 | |
| 18:1n-7 | 0.70±0.31 | 0.46±0.15 | 0.57±0.16 | 0.62±0.23 | 0.61±0.27 | 0.83±0.45 | $^{W}F_{5,13.8}$=1.035 | 0.44 | |
| 24:1n-9 | 0.32±0.08 | 0.36±0.07 | 0.33±0.05 | 0.29±0.04 | 0.23±0.09 | 0.19±0.05 | $^{A}F_{5,30}$=5.735 | **0.001** | 12-9, 2-7, 2-9, 5-9 |
| PUFA | 5.21±0.97 | 12.23±2.44 | 14.02±1.76 | 14.46±2.61 | 12.25±4.95 | 11.8±3.75 | $^{A}F_{5,30}$=7.229 | * | 12-2, 12-5, 12-6, 12-7, 12-9 |
| n-3/n-6 | 2.72±0.48 | 3.66±0.37 | 3.73±0.26 | 3.22±0.43 | 3.63±0.38 | 3.91±0.33 | $^{A}F_{5,30}$=7.902 | * | 12-2, 12-5, 12-7, 12-9 |
| n-6 PUFA | 1.40±0.14 | 2.63±0.53 | 2.97±0.41 | 3.48±0.88 | 2.64±1.04 | 2.42±0.82 | $^{A}F_{5,30}$=5.708 | **0.001** | 12-5, 12-6 |
| LIN | 0.41±0.12 | 0.38±0.12 | 0.42±0.10 | 0.71±0.39 | 0.48±0.25 | 0.52±0.19 | $^{A}F_{5,13.8}$=0.97 | 0.47 | |
| ARA | 0.68±0.08 | 1.55±0.33 | 1.77±0.29 | 2.02±0.38 | 1.54±0.56 | 1.35±0.47 | $^{A}F_{5,30}$=8.431 | * | 12-2, 12-5, 12-6, 12-7 |
| 22:4n-6 | 0.09±0.01 | 0.15±0.03 | 0.19±0.04 | 0.24±0.11 | 0.14±0.04 | 0.18±0.15 | $^{W}F_{5,13.2}$=9.259 | * | 12-2, 12-5 |
| 22:5n-6 | 0.22±0.07 | 0.55±0.08 | 0.59±0.10 | 0.52±0.06 | 0.48±0.23 | 0.37±0.12 | $^{A}F_{5,30}$=7.644 | * | 12-2, 12-5, 12-6, 12-7 |
| n-3 PUFA | 3.82±0.88 | 9.61±1.95 | 11.04±1.39 | 10.97±1.84 | 9.61±3.94 | 9.38±2.96 | $^{W}F_{5,13.5}$=29.222 | * | 12-2, 12-5, 12-6, 12-7, 12-9 |
| ALA | 0.28±0.05 | 0.31±0.10 | 0.34±0.08 | 0.48±0.16 | 0.40±0.21 | 0.57±0.37 | $^{W}F_{5,13.3}$=2.31 | 0.1 | |
| SDA | 0.13±0.05 | 0.14±0.04 | 0.13±0.03 | 0.14±0.03 | 0.16±0.07 | 0.32±0.14 | $^{A}F_{5,30}$=6.842 | * | 12-9, 2-9, 5-9, 6-9, 7-9 |
| 20:4n-3 | 0.10±0.02 | 0.17±0.05 | 0.15±0.03 | 0.12±0.01 | 0.20±0.08 | 0.21±0.12 | $^{W}F_{5,12.7}$=4.338 | **0.02** | 12-5 |
| EPA | 0.83±0.15 | 1.97±0.48 | 2.23±0.72 | 2.48±0.55 | 2.33±0.85 | 2.29±0.80 | $^{A}F_{5,30}$=5.428 | **0.001** | 12-5, 12-6, 12-7, 12-9 |
| 22:5n-3 | 0.22±0.06 | 0.52±0.14 | 0.68±0.15 | 0.80±0.31 | 0.56±0.18 | 0.56±0.21 | $^{A}F_{5,30}$=6.206 | * | 12-5, 12-6 |
| DHA | 2.25±0.71 | 6.50±1.29 | 7.52±0.75 | 6.95±0.93 | 5.96±2.67 | 5.43±1.64 | $^{W}F_{5,13.7}$=31.282 | * | 12-2, 12-5, 12-6, 12-9 |
| DMA | 0.09±0.02 | 0.11±0.04 | 0.14±0.04 | 0.16±0.06 | 0.12±0.05 | 0.14±0.05 | $^{A}F_{5,30}$=2.239 | 0.076 | |
| DMA16:0 | 0.09±0.02 | 0.11±0.04 | 0.14±0.04 | 0.16±0.06 | 0.12±0.05 | 0.14±0.05 | $^{A}F_{5,30}$=2.239 | 0.076 | |
| UFA/SFA | 1.28±0.33 | 2.40±0.22 | 2.57±0.24 | 2.67±0.15 | 2.36±0.05 | 2.26±0.19 | $^{W}F_{5,12.7}$=15.418 | * | 12-2, 12-5, 12-6, 12-7, 12-9, 6-9 |
| Tot-FA | 15.36±3.02 | 20.54±4.13 | 22.94±2.98 | 24.63±5.14 | 21.48±8.77 | 21.97±7.88 | $^{A}F_{5,30}$=1.795 | 0.144 | |

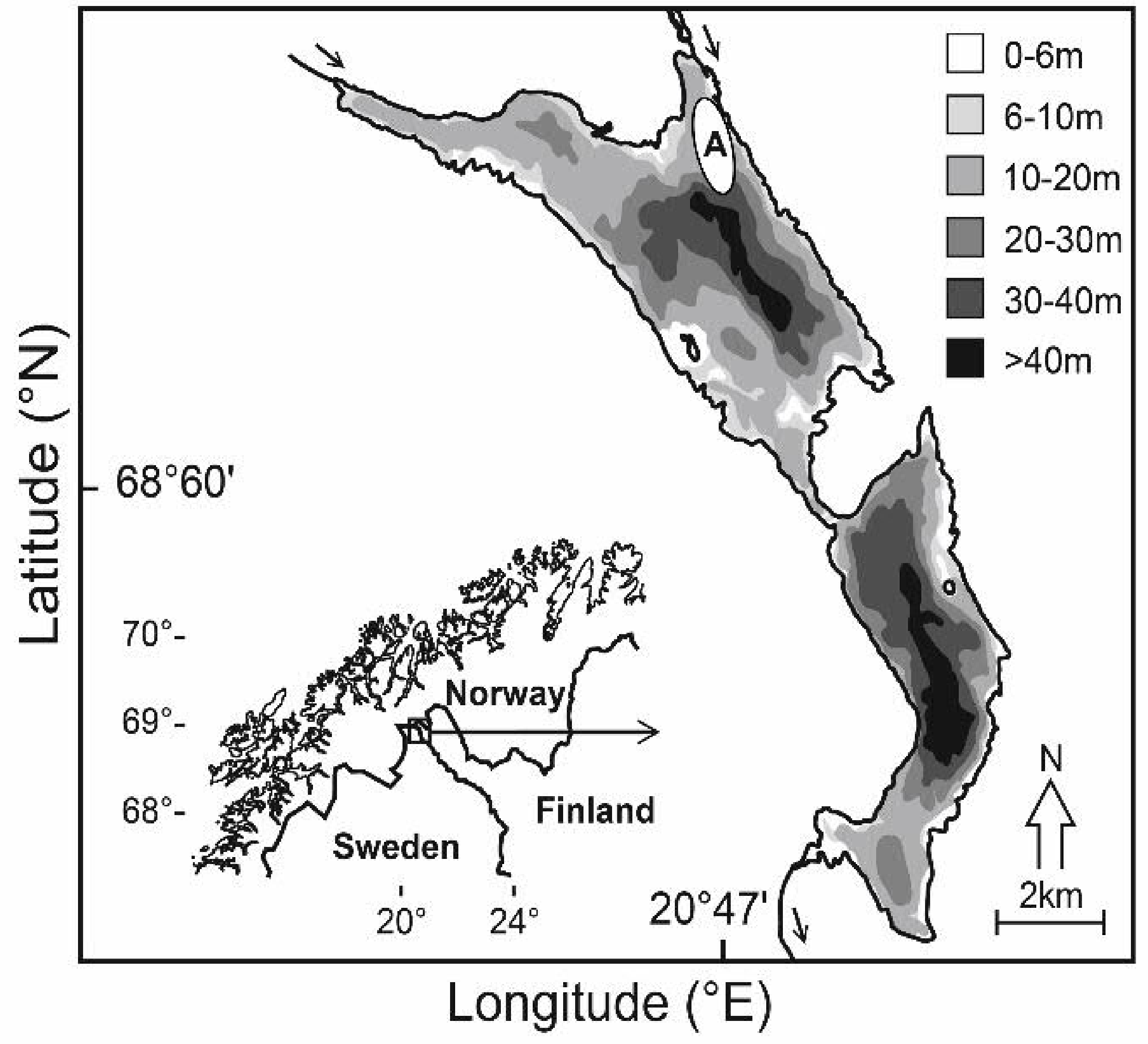
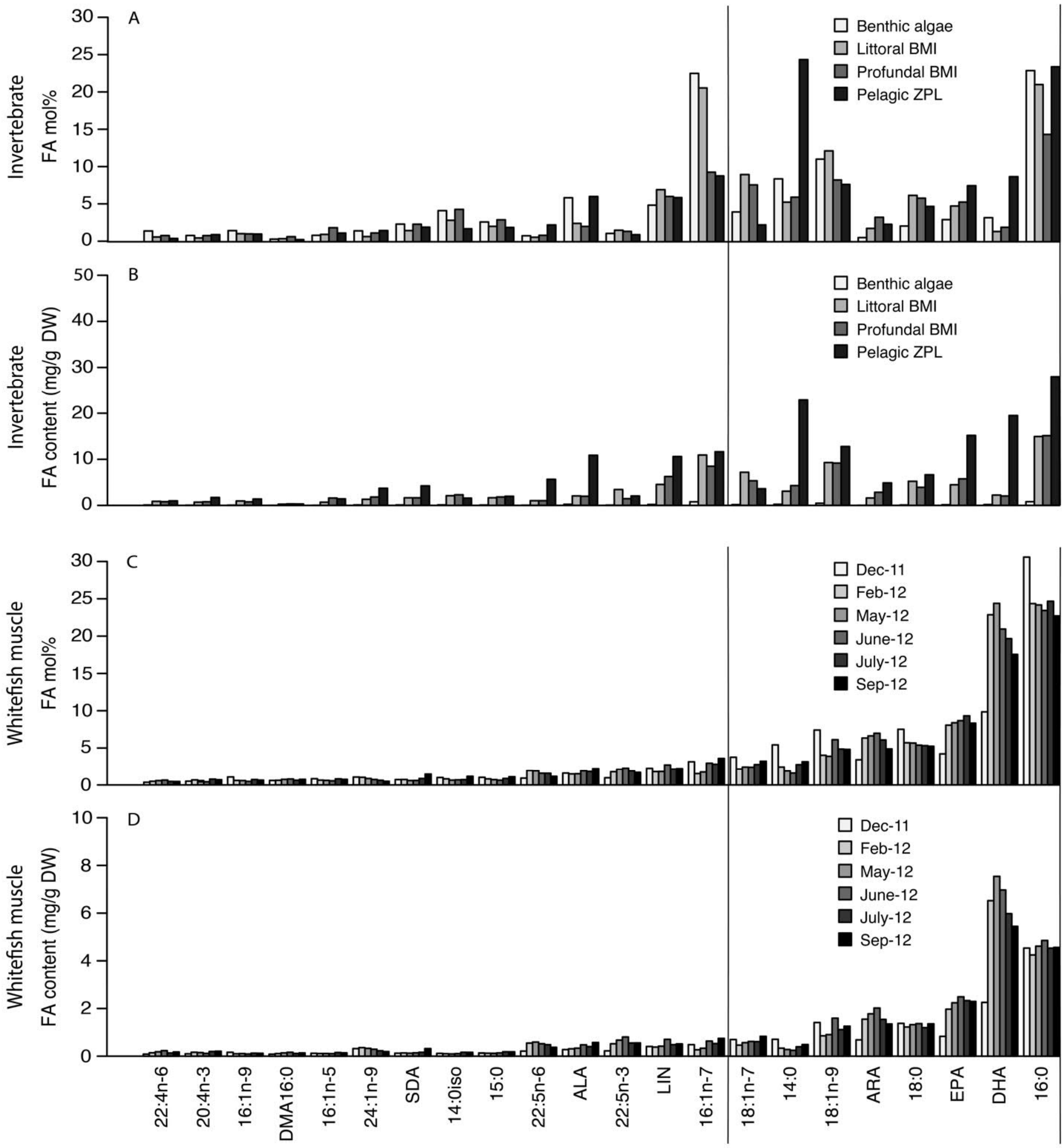

0-6m
6-10m
10-20m
20-30m
30-40m
>40m
A
Latitude (°N)
68°60'
70°-
69°-
68°-
Norway
Finland
Sweden
20°
24°
20°47'
N
2km
Longitude (°E)

**Fig. S1**



A
Invertebrate FA mol%
Benthic algae
Littoral BMI
Profundal BMI
Pelagic ZPL
B
Invertebrate FA content (mg/g DW)
C
Whitefish muscle FA mol%
Dec-11
Feb-12
May-12
June-12
July-12
Sep-12
D
Whitefish muscle FA content (mg/g DW)
22:4n-6
20:4n-3
16:1n-9
DMA16:0
16:1n-5
24:1n-9
SDA
14:0iso
15:0
22:5n-6
ALA
22:5n-3
LIN
16:1n-7
18:1n-7
14:0
18:1n-9
ARA
18:0
EPA
DHA
16:0


**Fig. S2**

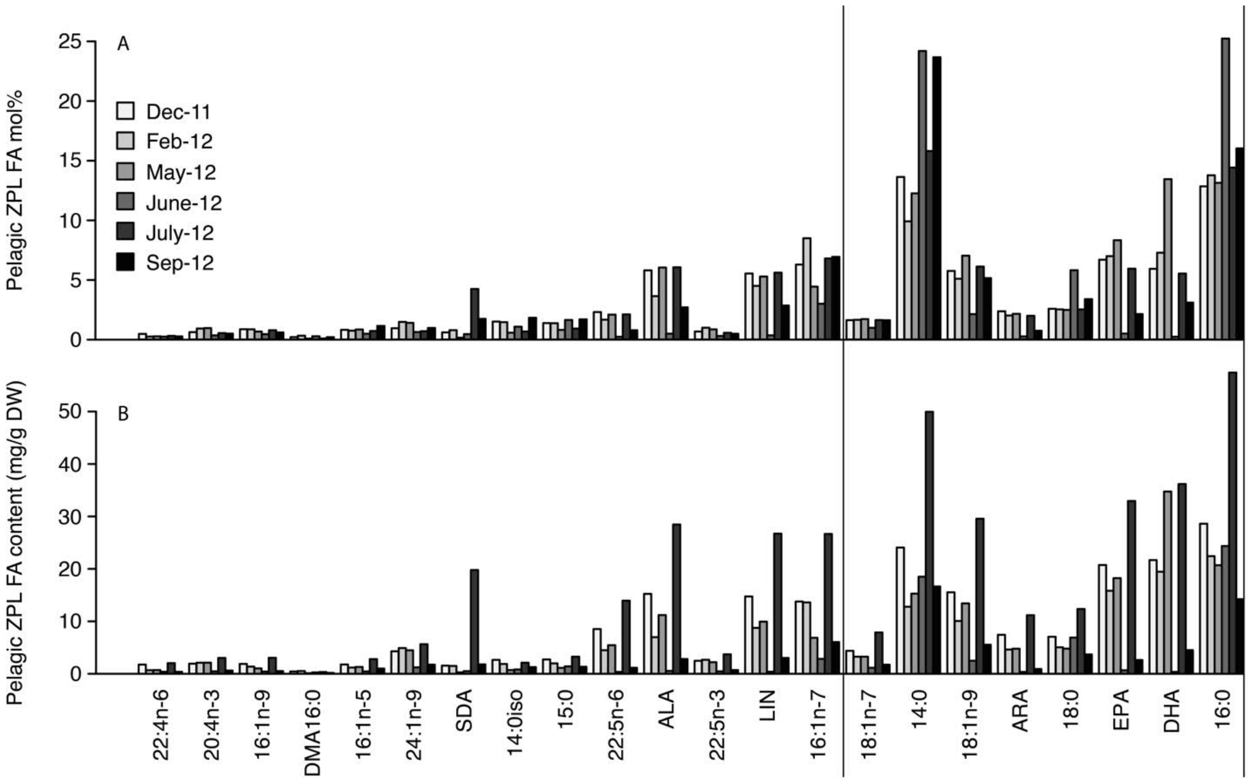

A
B
Pelagic ZPL FA mol%
Pelagic ZPL FA content (mg/g DW)
Dec-11
Feb-12
May-12
June-12
July-12
Sep-12
22:4n-6
20:4n-3
16:1n-9
DMA16:0
16:1n-5
24:1n-9
SDA
14:0iso
15:0
22:5n-6
ALA
22:5n-3
LIN
16:1n-7
18:1n-7
14:0
18:1n-9
ARA
18:0
EPA
DHA
16:0

**Fig. S3**

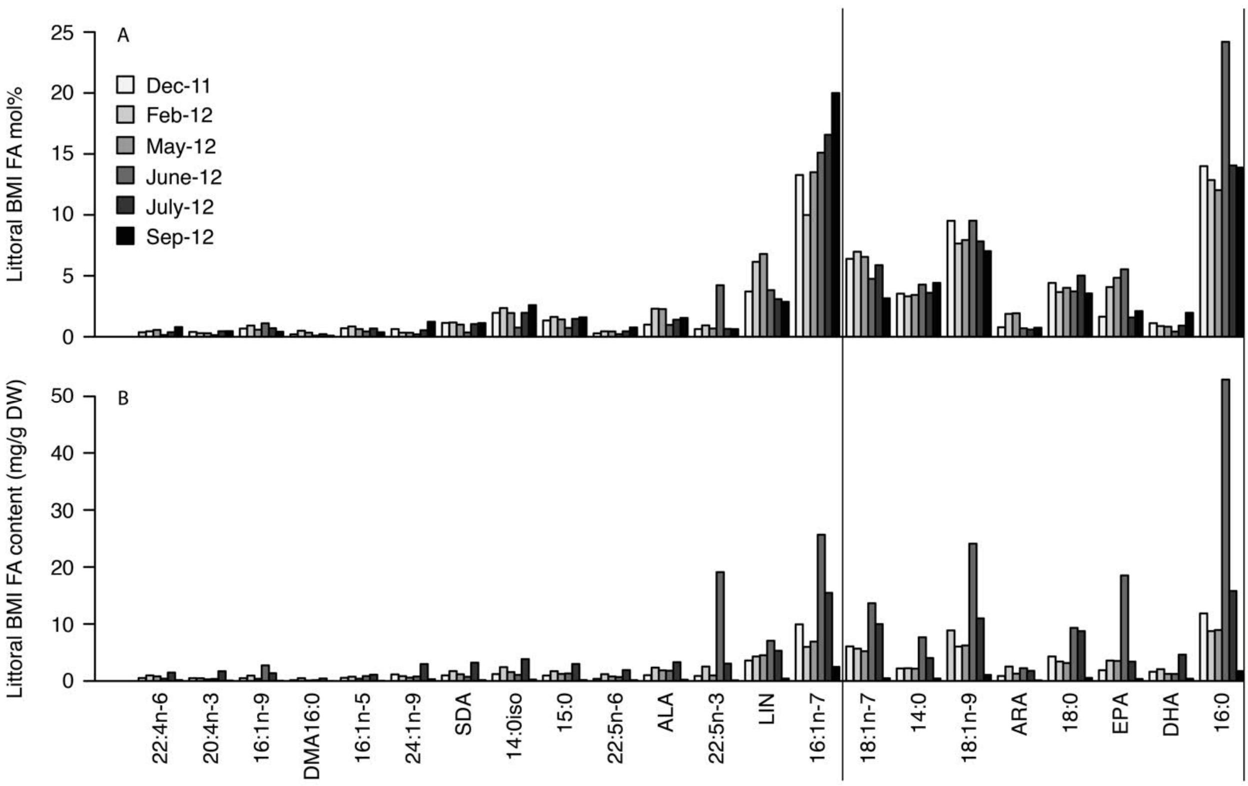

A
B
Littoral BMI FA mol%
Littoral BMI FA content (mg/g DW)
Dec-11
Feb-12
May-12
June-12
July-12
Sep-12
22:4n-6
20:4n-3
16:1n-9
DMA16:0
16:1n-5
24:1n-9
SDA
14:0iso
15:0
22:5n-6
ALA
22:5n-3
LIN
16:1n-7
18:1n-7
14:0
18:1n-9
ARA
18:0
EPA
DHA
16:0

**Fig. S4**

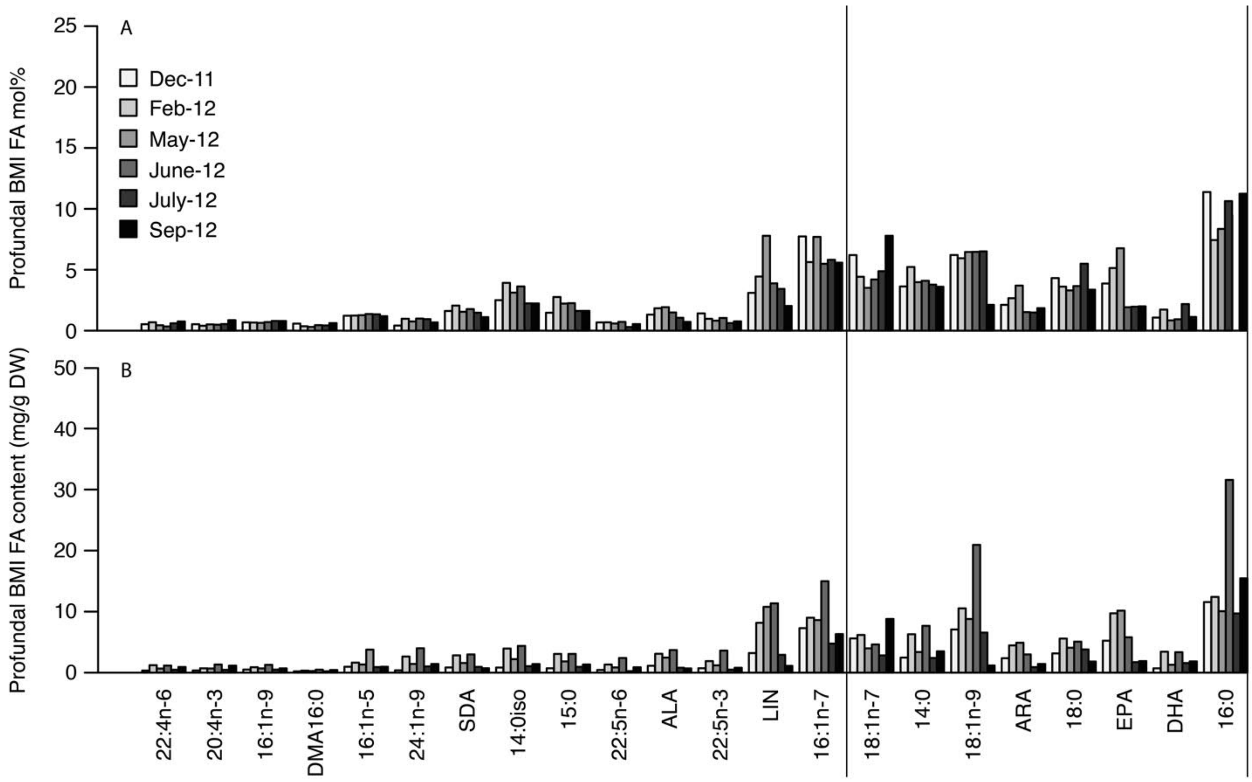

A
B
Dec-11
Feb-12
May-12
June-12
July-12
Sep-12
Profundal BMI FA mol%
Profundal BMI FA content (mg/g DW)
25
20
15
10
5
0
50
40
30
20
10
0
22:4n-6
20:4n-3
16:1n-9
DMA16:0
16:1n-5
24:1n-9
SDA
14:0iso
15:0
22:5n-6
ALA
22:5n-3
LIN
16:1n-7
18:1n-7
14:0
18:1n-9
ARA
18:0
EPA
DHA
16:0

**Fig. S5**

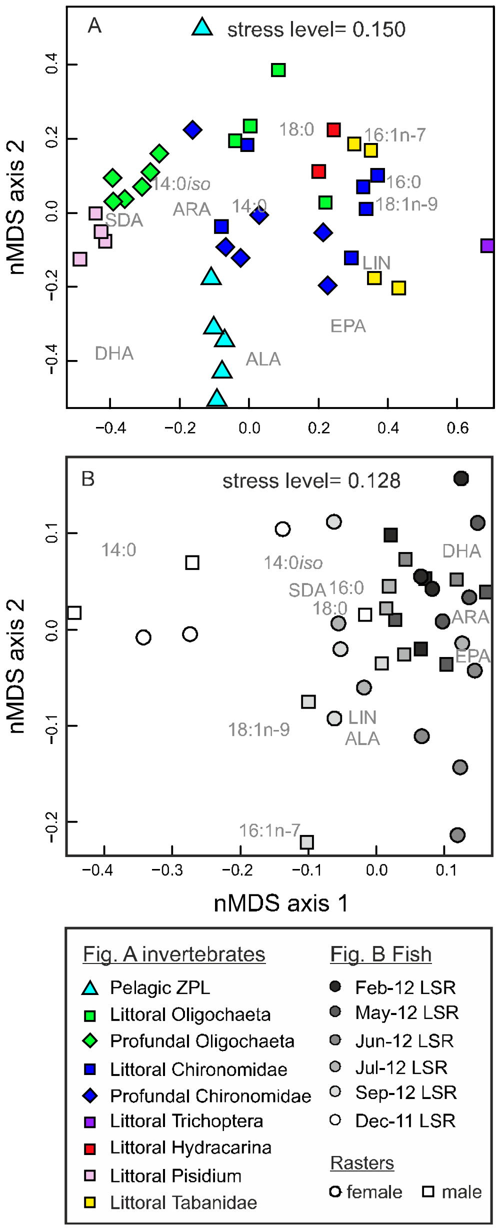

A
stress level= 0.150
nMDS axis 2
18:0
16:1n-7
16:0
18:1n-9
14:0iso
ARA
14:0
SDA
LIN
EPA
DHA
ALA
B
stress level= 0.128
14:0
14:0iso
DHA
SDA 16:0
18:0
ARA
EPA
LIN
ALA
18:1n-9
16:1n-7
nMDS axis 1
Fig. A invertebrates
Pelagic ZPL
Littoral Oligochaeta
Profundal Oligochaeta
Littoral Chironomidae
Profundal Chironomidae
Littoral Trichoptera
Littoral Hydracarina
Littoral Pisidium
Littoral Tabanidae
Fig. B Fish
Feb-12 LSR
May-12 LSR
Jun-12 LSR
Jul-12 LSR
Sep-12 LSR
Dec-11 LSR
Rasters
female
male

**Fig. S6**