Oikos

**OIK-02687**

Frainer, A., Jabiol, J., Gessner, M. O., Bruder, A., Chauvet, E. andMcKie, B. G. 2015. Stoichiometric imbalances between detritus and detritivores are related to shifts in ecosystem functioning. – Oikos doi: 10.1111/oik.02687

# Appendix 1

## Allometric equations used to estimate invertebrate biomass

The conversion of body length or case opening width to biomass was based on the following allometric equations derived form a sub-set of individuals: *Gammarus fossarum:* $y = 2.2644x - 5.2791$, $r^2 = 0.74$, $F_{1,22} = 65$, $p < 0.001$; *Nemoura* sp.: $y = 2.3103x - 5.6058$, $r^2 = 0.77$, $F_{1,58} = 190.8$, $p < 0.001$; *Sericostoma personatum*: $y = 3.2588x - 1.0825$, $r^2 = 0.86$, $F_{1,22} = 140.9$, $p < 0.001$. Results of the back transformation performed with allometric equations give the median of the skewed distribution of *y*, instead of the mean (Wood 1986). To correct this bias, we multiplied *y* by $e^{(SEE^2/2)}$, where *e* is the base of the natural logarithm, and *SEE* is the standard error of the estimate of the regression (Sprugel 1983).

# References

Sprugel, D. 1983. Correcting for bias in log-transformed allometric equations. – Ecology 64: 209–210.

Wood, A. 1986. A potential bias in log-transformed allometric equations. – Wader Study Grp Bull. 47: 17–19.

# Appendix 2

Table A1. Akaike and Bayesian inference criteria (AIC and BIC, respectively) used for model selection on detritivore growth rates related to the elemental imbalance (EI, based on leaf litter initial [i] and final [f] elemental ratio), and litter pair. Final models (in bold) were chosen when AIC and BIC values were the lowest, and there was a significant difference between the competing models ($p < 0.05$, indicated by different superscripts).

| Elemental imbalance | Detritivore | Model | AIC | BIC |
|---|---|---|---|---|
| N:P[i] | *Gammarus* | Full model | -372.1 | -361.4[a] |
| | | - 2-way interaction (EI × Pair) | -373.5 | -364.6[a] |
| | | - Fixed factor 'Pair' | **-373.4** | **-366.2[a]** |
| | *Nemoura* | Full model | -371.7 | -360.9[a] |
| | | - 2-way interaction (EI × Pair) | **-372.2** | **-363.2[a]** |
| | *Sericostoma* | Full model | -389.2 | -378.1[a] |
| | | - 2-way interaction (EI × Pair) | -390.5 | -381.3[a] |
| | | - Fixed factor 'Pair' | **-392.5** | **-385.1[a]** |
| C:N[i] | *Gammarus* | Full model | -372.1 | -361.4[a] |
| | | - 2-way interaction (EI × Pair) | **-374.1** | **-365.2[a]** |
| | | - Fixed factor 'Pair' | -373.1 | -365.9[a] |
| | *Nemoura* | Full model | -371.7 | -360.9[a] |
| | | - 2-way interaction (EI × Pair) | -373.6 | -364.6[a] |
| | *Sericostoma* | Full model | **-389.2** | **-378.1[a]** |
| | | - 2-way interaction (EI × Pair) | -388.2 | -378.9[a] |
| | | - Fixed factor 'Pair' | -387.6 | -380.2[a] |
| C:P[i] | *Gammarus* | Full model | -372.1 | -361.4[a] |
| | | - 2-way interaction (EI × Pair) | -372.3 | -363.3[a] |
| | | - Fixed factor 'Pair | -372.7 | -365.5[a] |
| | *Nemoura* | Full model | -371.7 | -360.9 |
| | *Sericostoma* | Full model | -389.2 | -378.1 |
| N:P[f] | *Gammarus* | Full model | -373.9 | -363.3[a] |
| | | - 2-way interaction (EI × Pair) | -375.6 | -366.7[a] |
| | | - Fixed factor 'Pair' | **-377.1** | **-370.0**[a] |
| | *Nemoura* | Full model | -371.8 | -360.9[a] |
| | | - 2-way interaction (EI × Pair) | -373.6 | -364.6[a] |

| | | | | |
|---|---|---|---|---|
| | | - Fixed factor 'Pair' | **-373.6** | **-366.4**[a] |
| | *Sericostoma* | Full model | -381.6 | -370.5[a] |
| | | - 2-way interaction (EI × Pair) | -383.2 | -373.9[a] |
| | | - Fixed factor 'Pair' | **-385.1** | **-377.7**[a] |
| C:N[f] | *Gammarus* | Full model | -373.3 | -362.6[a] |
| | | - 2-way interaction (EI × Pair) | -375.1 | -366.1[a] |
| | | - Fixed factor 'Pair' | **-374.2** | **-367.1**[a] |
| | *Nemoura* | Full model | -371.7 | -360.9[a] |
| | | - 2-way interaction (EI × Pair) | **-373.7** | **-364.7**[a] |
| | | - Fixed factor 'Pair' | -369.0 | -361.7[b] |
| | *Sericostoma* | Full model | -382.3 | -371.2[a] |
| | | - 2-way interaction (EI × Pair) | -384.0 | -374.7[a] |
| | | - Fixed factor 'Pair' | **-384.6** | **-377.2**[a] |
| C:P[f] | *Gammarus* | Full model | -370.4 | -359.7[a] |
| | | - 2-way interaction (EI × Pair) | -372.4 | -363.4[a] |
| | | - Fixed factor 'EI' | **-373.1** | **-366.0**[a] |
| | *Nemoura* | Full model | -365.4 | -354.6[a] |
| | | - 2-way interaction (EI × Pair) | -367.3 | -358.3[a] |
| | | - Fixed factor 'EI | **-367.1** | **-359.8**[a] |
| | *Sericostoma* | Full model | -371.0 | -359.9[a] |
| | | - 2-way interaction (EI × Pair) | **-372.7** | **-363.3**[a] |
| | | - Fixed factor 'EI | -370.5 | -363.1[b] |

Table A2**.** Akaike and Bayesian inference criteria (AIC and BIC, respectively) used for model selection on detritivore-mediated decomposition rates related to the elemental imbalance (EI, based on leaf litter initial [i] and final [f] elemental ratio), litter pair, and litter mixture. Final models (in bold) were chosen when AIC and BIC values were the lowest, and there was a significant difference between the competing models ($p < 0.05$, indicated by different superscripts).

| | | Consumption rates | | |
|---|---|---|---|---|
| EI | Detritivore | Model selection | AIC | BIC |
| N:P[i] | *Gammarus* | Full model | -894.9 | -869.9[a] |
| | | - 3-way interaction | -896.5 | -873.9[a] |
| | | - 2-way interaction (EI × Mixture) | **-898.4** | **-878.4[a]** |
| | | - 2-way interaction (EI × Pair) | -896.6 | -879.1[b] |
| | *Nemoura* | Full model | -871.6 | -846.5[a] |
| | | - 3-way interaction | **-873.3** | **-850.7[a]** |
| | | - 2-way interaction (EI × Mixture) | -870.8 | -850.7[b] |
| | *Sericostoma* | Full model | -843-5 | -818.8[a] |
| | | - 3-way interaction | -845-5 | -823.3[a] |
| | | - 2-way interaction (EI × Pair) | -846-1 | -826.4[a] |
| | | - 2-way interaction (Pair:Mixture) | **-846-7** | **-829.5[a]** |
| C:N[i] | *Gammarus* | Full model | -894.9 | -869.9[a] |
| | | - 3-way interaction | -896.5 | -873.9[a] |
| | | - 2-way interaction (EI × Mixture) | **-898.4** | **-878.4[a]** |
| | *Nemoura* | Full model | -871.6 | -846.5[a] |
| | | - 3-way interaction | -871.3 | -848.7[a] |
| | | - 2-way interaction (Pair × Mixture) | **-870.8** | **-850.7[a]** |
| | *Sericostoma* | Full model | **-843.5** | **-818.8[a]** |
| | | - 3-way interaction | -841.7 | -819.5[a] |
| C:P[i] | *Gammarus* | Full model | -894.9 | -869.9[a] |
| | | - 3-way interaction | -896.6 | -874.1[a] |
| | | - 2-way interaction (EI × Pair) | -898.4 | -878.4[a] |
| | | - 2-way interaction (EI × Mixture) | **-899.7** | **-882.2**[a] |
| | *Nemoura* | Full model | -871.6 | -846.5[a] |
| | | - 3-way interaction | -873.5 | -850.9[a] |
| | | - 2-way interaction (EI × Pair) | **-875.3** | **-855.2[a]** |
| | *Sericostoma* | Full model | -843.5 | -818.8[a] |
| | | - 3-way interaction | -842.2 | -819.9[a] |

| | | | | |
|---|---|---|---|---|
| | | - 2-way interaction (EI × Pair) | -842.2 | -822.5[a] |
| | | - 2-way interaction (Pair × Mixture) | **-841.0** | **-823.8[a]** |
| N:P[f] | *Gammarus* | Full model | -878.8 | -854.0[a] |
| | | - 3-way interaction | -880.2 | -857.8[a] |
| | | - 2-way interaction (EI × Misture) | -882.0 | -862.0[a] |
| | | - 2-way interaction (EI × Pair) | **-882.5** | **-865.1[a]** |
| | | - 2-way interaction (Pair × Mixture) | -878.1 | -863.2[b] |
| | *Nemoura* | Full model | **-846.0** | **-821.1[a]** |
| | | - 3-way interaction | -843.7 | -821.4[b] |
| | *Sericostoma* | Full model | -834.7 | -810.1[a] |
| | | - 3-way interaction | -836.5 | -814.3[a] |
| | | - 2-way interaction (Pair × Mixture) | **-835.4** | **-815.7[a]** |
| | | - 2-way interaction (EI × Pair) | -832.7 | -815.4[b] |
| C:N[f] | *Gammarus* | Full model | -881.0 | -856.1[a] |
| | | - 3-way interaction | -882.6 | -860.2[a] |
| | | - 2-way interaction (Pair × Mixture) | -884.5 | -864.6[a] |
| | | - 2-way interaction (EI × Pair) | **-884.0** | **-866.6[a]** |
| | | - 2-way interaction (EI × Mixture) | -879.1 | -864.2[b] |
| | *Nemoura* | Full model | -840.5 | -815.7[a] |
| | | - 3-way interaction | **-841.8** | **-816.5[a]** |
| | | - 2-way interaction (Pair × Mixture) | -839.7 | -819.9[b] |
| | *Sericostoma* | Full model | -835.0 | -810.4[a] |
| | | - 3-way interaction | -837.0 | -814.8[a] |
| | | - 2-way interaction (EI × Pair) | -837.1 | -817.3[a] |
| | | - 2-way interaction (Pair × Mixture) | **-836.4** | **-819.1[a]** |
| | | - 2-way interaction (EI × Mixture) | -825.6 | -810.8[b] |
| C:P[f] | *Gammarus* | Full model | -881.7 | -856.5[a] |
| | | - 3-way interaction | -881.9 | -859.5[a] |
| | | - 2-way interaction (EI × Pair) | -883.9 | -864.0[a] |
| | | - 2-way interaction (EI × Mixture) | **-885.9** | **-868.5[a]** |
| | | - 2-way interaction (Pair × Mixture) | -880.8 | -865.9[b] |
| | *Nemoura* | Full model | -822.3 | -797.5[a] |
| | | - 3-way interaction | -822.3 | -780.0[a] |
| | | - 2-way interaction (EI × Mixture) | **-824.3** | **-804.5[a]** |

| | | | | |
|---|---|---|---|---|
| | | - 2-way interaction (EI × Pair) | -822.2 | -804.9[b] |
| | *Sericostoma* | Full model | **-819.6** | **-795.0[a]** |
| | | - 3-way interaction | -811.6 | -789.4[b] |

# Appendix 3

Table A3**.** Elemental imbalance (EI) between detritivores and leaf litter, shown as the quotient between leaf litter X:Y and detritivore X:Y, where X and Y denote any one of the chemical elements: carbon (C), nitrogen (N), or phosphorus (P), determined at initial and final decomposition stage. Numbers within brackets are the standard deviation.

| | | Initial EI | | | Final EI | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Detritivore | Litter | | | | Single-species | | | Mixed-species | | |
| species | species | N:P | C:N | C:P | N:P | C:N | C:P | N:P | C:N | C:P |
| *Gammarus* | alder | 16.37 | 4.28 | 70.07 | 4.68 (0.41) | 2.89 (0.29) | 13.50 (1.31) | 6.46 (0.75) | 2.55 (0.22) | 16.45 (2.29) |
| | birch | 2.03 | 16.25 | 32.96 | 2.01 (0.33) | 8.91 (1.64) | 17.52 (1.41) | 2.36 (0.30) | 7.67 (0.71) | 17.96 (1.75) |
| | walnut | 7.08 | 7.72 | 54.68 | 2.43 (0.20) | 4.61 (0.35) | 11.21 (1.28) | 2.62 (0.23) | 5.36 (0.80) | 13.99 (1.94) |
| | oak | 1.78 | 8.65 | 15.38 | 1.88 (0.24) | 7.19 (1.46) | 13.24 (1.32) | 2.05 (0.16) | 6.71 (0.61) | 13.79 (1.68) |
| *Nemoura* | alder | 12.81 | 5.00 | 64.09 | 3.70 (0.84) | 3.47 (0.14) | 12.83 (2.94) | 5.40 (0.68) | 3.11 (0.22) | 16.78 (2.25) |
| | birch | 1.59 | 18.99 | 30.15 | 1.60 (0.30) | 12.32 (3.84) | 18.90 (3.00) | 1.76 (0.28) | 9.77 (0.79) | 17.03 (2.28) |
| | walnut | 5.54 | 9.02 | 50.01 | 1.93 (0.08) | 6.30 (0.97) | 12.19 (2.07) | 2.04 (0.10) | 6.32 (0.73) | 12.88 (1.50) |
| | oak | 1.39 | 10.10 | 14.07 | 1.55 (0.06) | 8.13 (0.78) | 12.63 (1.51) | 1.64 (0.08) | 8.96 (1.52) | 14.61 (2.27) |
| *Sericostoma* | alder | 13.63 | 3.81 | 51.88 | 3.67 (1.07) | 2.90 (1.08) | 9.99 (2.47) | 5.35 (0.45) | 2.31 (0.13) | 12.38 (1.40) |
| | birch | 1.69 | 14.45 | 24.40 | 1.63 (0.32) | 9.67 (4.02) | 14.67 (2.01) | 1.99 (0.17) | 7.20 (0.45) | 14.33 (1.08) |
| | walnut | 5.89 | 6.87 | 40.48 | 1.97 (0.09) | 4.71 (0.50) | 9.29 (0.97) | 2.23 (0.21) | 5.05 (0.99) | 11.17 (1.95) |
| | oak | 1.48 | 7.69 | 11.39 | 1.59 (0.07) | 6.32 (0.45) | 10.07 (0.79) | 1.70 (0.20) | 6.31 (0.79) | 10.62 (0.78) |

Appendix 4

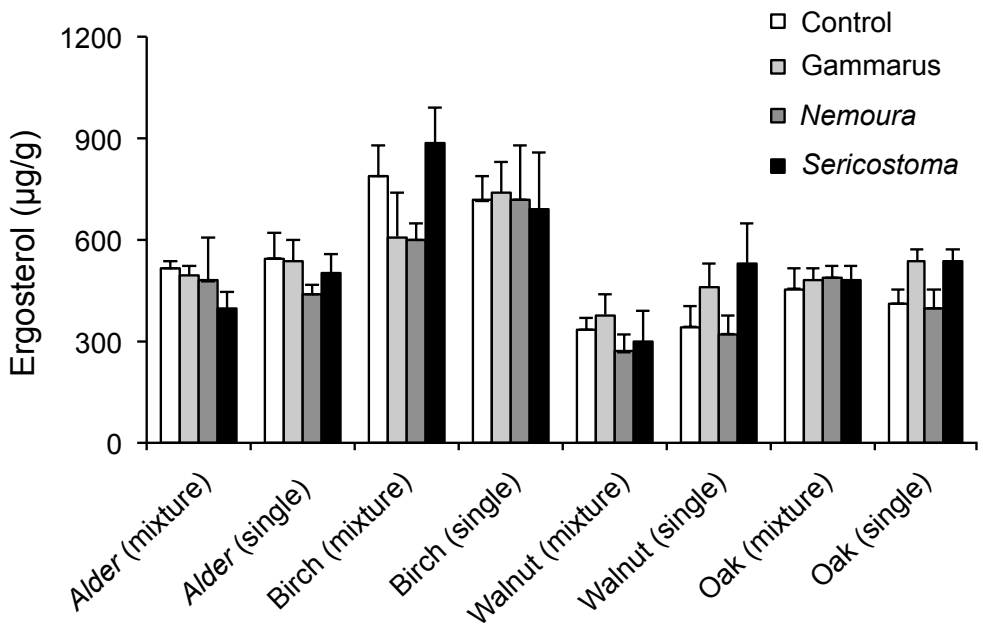


Figure A1. Fungal biomass measured as ergosterol content across the four detritivore treatments (three invertebrate detritivore and one control) separated by leaf species and litter mixture.

# Appendix 5

Table A4. Relationships between detritivore growth rates, litter pair, and the elemental imbalance (EI, based on initial [i] and final [f] litter elemental ratio). Results are shown after AIC and BIC model selection (Supplementary material Appendix 2 Table A1).

| EI | Detritivore | Response | F-value | DF | p | Intercept ± SE | Slope ± SE |
|---|---|---|---|---|---|---|---|
| N:P[i] | *Gammarus* | EI | 3.49 | 1,31 | 0.071 | | |
| | *Nemoura* | EI | 10.89 | 1,31 | 0.002 | 0.0089 ± 0.0012 | 0.0016 ± 0.0006 |
| | | Pair | 4.25 | 1,31 | 0.048 | | |
| | *Sericostoma* | EI | 29.43 | 1,34 | < 0.001 | –0.0032 ± 0.0009 | 0.0030 ± 0.0005 |
| C:N[i] | *Gammarus* | EI | 2.55 | 1,30 | 0.12 | | |
| | | Pair | 3.76 | 1,30 | 0.06 | | |
| | *Nemoura* | EI | 7.89 | 1,31 | 0.008 | 0.019 ± 0.003 | –0.003 ± 0.001 |
| | | Pair | 9.01 | 1,31 | 0.005 | | |
| | *Sericostoma* | EI | 24.05 | 1,32 | < 0.001 | 0.012 ± 0.002 | -0.0052 ± 0.0011 |
| | | Pair | 2.63 | 1,32 | 0.11 | | |
| | | EI × Pair | 2.91 | 1,32 | 0.10 | | |
| C:P[i] | *Gammarus* | EI | 2.75 | 1,31 | 0.11 | | |
| | *Nemoura* | EI | 8.63 | 1,30 | 0.006 | | |
| | | Pair | 3.07 | 1,30 | 0.09 | | |
| | | EI × Pair | 4.96 | 1,30 | 0.033 | | |
| | *Sericostoma* | EI | 20.52 | 1,32 | < 0.001 | | |
| | | Pair | 0.17 | 1,32 | 0.68 | | |
| | | EI × Pair | 8.90 | 1,32 | 0.005 | | |
| N:P[f] | *Gammarus* | EI | 7.52 | 1,30 | 0.010 | –0.0025 ± 0.0012 | 0.0033 ± 0.0012 |
| | *Nemoura* | EI | 14.71 | 1,31 | < 0.001 | 0.0059 ± 0.0011 | 0.0054 ± 0.0014 |
| | *Sericostoma* | EI | 19.69 | 1,33 | < 0.001 | –0.0036 ± 0.0011 | 0.0061 ± 0.0014 |
| C:N[f] | *Gammarus* | EI | 4.35 | 1,30 | 0.045 | 0.0043 ± 0.0019 | -0.0023 ± 0.0011 |
| | *Nemoura* | EI | 10.25 | 1,31 | 0.003 | 0.0178 ± 0.0023 | -0.0034 ± 0.0011 |
| | | Pair | 6.77 | 1,31 | 0.014 | | |
| | *Sericostoma* | EI | 18.45 | 1,34 | < 0.001 | 0.0088 ± 0.0019 | –0.0048 ± 0.0011 |
| C:P[f] | *Gammarus* | Pair | 4.15 | 1,30 | 0.050 | | |
| | *Nemoura* | Pair | 9.21 | 1,31 | 0.005 | | |
| | *Sericostoma* | Pair | 1,59 | 1,33 | 0.21 | | |
| | | EI | 4,38 | 1,33 | 0.044 | 0.016 ± 0.007 | –0.0058 ± 0.0027 |

Table A5. Relationships between detritivore-mediated decomposition rates, litter pair, litter mixture, and the elemental imbalance (EI, based on initial [i] and final [f] litter elemental ratio). Results are shown after AIC and BIC model selection (Supplementary material Appendix 2 Table A2).

| EI | Detritivore | Response | F (DF) | DF | p |
|---|---|---|---|---|---|
| N:P[i] | *Gammarus* | EI | 4.14 | 1,73 | 0.045 |
| | | Pair | 0.58 | 1,73 | 0.45 |
| | | Mixture | 0.02 | 1,73 | 0.89 |
| | | Pair × Mixture | 6.27 | 1,73 | 0.014 |
| | | EI × Pair | 3.89 | 1,73 | 0.052 |
| | *Nemoura* | EI | 13.46 | 1,73 | < 0.001 |
| | | Pair | 7.55 | 1,73 | 0.007 |
| | | Mixture | 0.19 | 1,73 | 0.66 |
| | | Pair × Mixture | 5.52 | 1,73 | 0.021 |
| | | EI × Pair | 5.82 | 1,73 | 0.018 |
| | | EI × Mixture | 4.63 | 1,73 | 0.03 |
| | *Sericostoma* | EI | 36.05 | 1,71 | < 0.0001 |
| | | Pair | 0.01 | 1,71 | 0.92 |
| | | Mixture | 2.45 | 1,71 | 0.12 |
| | | EI × Mixture | 16.06 | 1,71 | < 0.001 |
| C:N[i] | *Gammarus* | EI | 0.92 | 1,73 | 0.34 |
| | | Pair | 0.04 | 1,73 | 0.85 |
| | | Mixture | 0.01 | 1,73 | 0.91 |
| | | EI × Pair | 7.67 | 1,73 | 0.007 |
| | | Pair × Mixture | 6.17 | 1,73 | 0.014 |
| | *Nemoura* | EI | 6.56 | 1,74 | 0.012 |
| | | Pair | 2.57 | 1,74 | 0.11 |
| | | Mixture | 0.21 | 1,74 | 0.65 |
| | | EI × Pair | 16.48 | 1,74 | < 0.001 |
| | | Pair × Mixture | 3.28 | 1,74 | 0.074 |
| | *Sericostoma* | EI | 23.67 | 1,68 | < 0.0001 |
| | | Pair | 2.28 | 1,68 | 0.13 |
| | | Mixture | 2.16 | 1,68 | 0.15 |
| | | EI × Pair | 11.32 | 1,68 | 0.001 |
| | | EI × Mixture | 14.31 | 1,68 | < 0.001 |
| | | Pair × Mixture | 0.01 | 1,68 | 0.97 |
| | | EI × Pair × Mixture | 3.48 | 1,68 | 0.066 |
| C:P[i] | *Gammarus* | EI | 5.98 | 1,74 | 0.017 |
| | | Pair | 1.89 | 1,74 | 0.17 |
| | | Mixture | 0.02 | 1,74 | 0.89 |
| | | Pair × Mixture | 6.43 | 1,74 | 0.013 |
| | *Nemoura* | EI | 13.90 | 1,74 | < 0.001 |
| | | Pair | 13.08 | 1,74 | < 0.001 |

| | | | | | |
|---|---|---|---|---|---|
| | | Mixture | 0.22 | 1,74 | 0.64 |
| | | EI × Mixture | 4.47 | 1,74 | 0.038 |
| | | Pair × Mixture | 6.77 | 1,74 | 0.011 |
| | *Sericostoma* | EI | 29.98 | 1,71 | < 0.0001 |
| | | Pair | 1.11 | 1,71 | 0.30 |
| | | Mixture | 2.55 | 1,71 | 0.11 |
| | | EI × Mixture | 11.13 | 1,71 | 0.001 |
| N:P[f] | *Gammarus* | EI | 0.43 | 1,73 | 0.51 |
| | | Pair | 0.52 | 1,73 | 0.47 |
| | | Mixture | 0.12 | 1,73 | 0.73 |
| | | Pair × Mixture | 6.22 | 1,73 | 0.015 |
| | *Nemoura* | EI | 4.34 | 1,69 | 0.041 |
| | | Pair | 11.46 | 1,69 | 0.001 |
| | | Mixture | 0.02 | 1,69 | 0.87 |
| | | Pair × Mixture | 5.77 | 1,69 | 0.019 |
| | | EI × Pair | 16.77 | 1,69 | < 0.001 |
| | | EI × Mixture | 0.81 | 1,69 | 0.37 |
| | | EI × Pair × Mixture | 4.06 | 1,69 | 0.048 |
| | *Sericostoma* | EI | 25.20 | 1,70 | < 0.0001 |
| | | Pair | 1.29 | 1,70 | 0.26 |
| | | Mixture | 0.01 | 1,70 | 0.94 |
| | | EI × Pair | 4.03 | 1,70 | 0.049 |
| | | EI × Mixture | 6.51 | 1,70 | 0.013 |
| C:N[f] | *Gammarus* | EI | 1.68 | 1,73 | 0.20 |
| | | Pair | 0.37 | 1,73 | 0.54 |
| | | Mixture | 0.05 | 1,73 | 0.83 |
| | | Pair × Mixture | 6.78 | 1,73 | 0.011 |
| | *Nemoura* | EI | 7.86 | 1,70 | 0.007 |
| | | Pair | 6.71 | 1,70 | 0.012 |
| | | Mixture | 0.09 | 1,70 | 0.77 |
| | | EI × Pair | 10.27 | 1,70 | 0.002 |
| | | EI × Mixture | 1.82 | 1,70 | 0.182 |
| | | Pair × mixture | 8.0 | 1,70 | 0.006 |
| | *Sericostoma* | EI | 25.95 | 1,71 | < 0.0001 |
| | | Pair | 0.18 | 1,71 | 0.67 |
| | | Mixture | 0.62 | 1,71 | 0.44 |
| | | EI × Mixture | 13.04 | 1,71 | 0.001 |
| C:P[f] | *Gammarus* | EI | 2.49 | 1,73 | 0.12 |
| | | Pair | 0.90 | 1,73 | 0.34 |
| | | Mixture | 0.48 | 1,73 | 0.49 |
| | | Pair × Mixture | 7.02 | 1,73 | 0.010 |
| | *Nemoura* | EI | 2.40 | 1,72 | 0.13 |
| | | Pair | 0.87 | 1,72 | 0.35 |
| | | Mixture | 0.58 | 1,72 | 0.45 |

| | | | | |
|---|---|---|---|---|
| | EI ×Pair | 2.15 | 1,72 | 0.146 |
| | Pair × Mixture | 4.23 | 1,72 | 0.043 |
| *Sericostoma* | EI | 0.01 | 1,68 | 0.95 |
| | Pair | 2.43 | 1,68 | 0.12 |
| | Mixture | 2.64 | 1,68 | 0.11 |
| | EI × Pair | 0.00 | 1,68 | 0.99 |
| | EI × Mixture | 4.23 | 1,68 | 0.043 |
| | Pair × Mixture | 4.14 | 1,68 | 0.046 |
| | EI × Pair × Mixture | 9.68 | 1,68 | 0.003 |

# Appendix 6

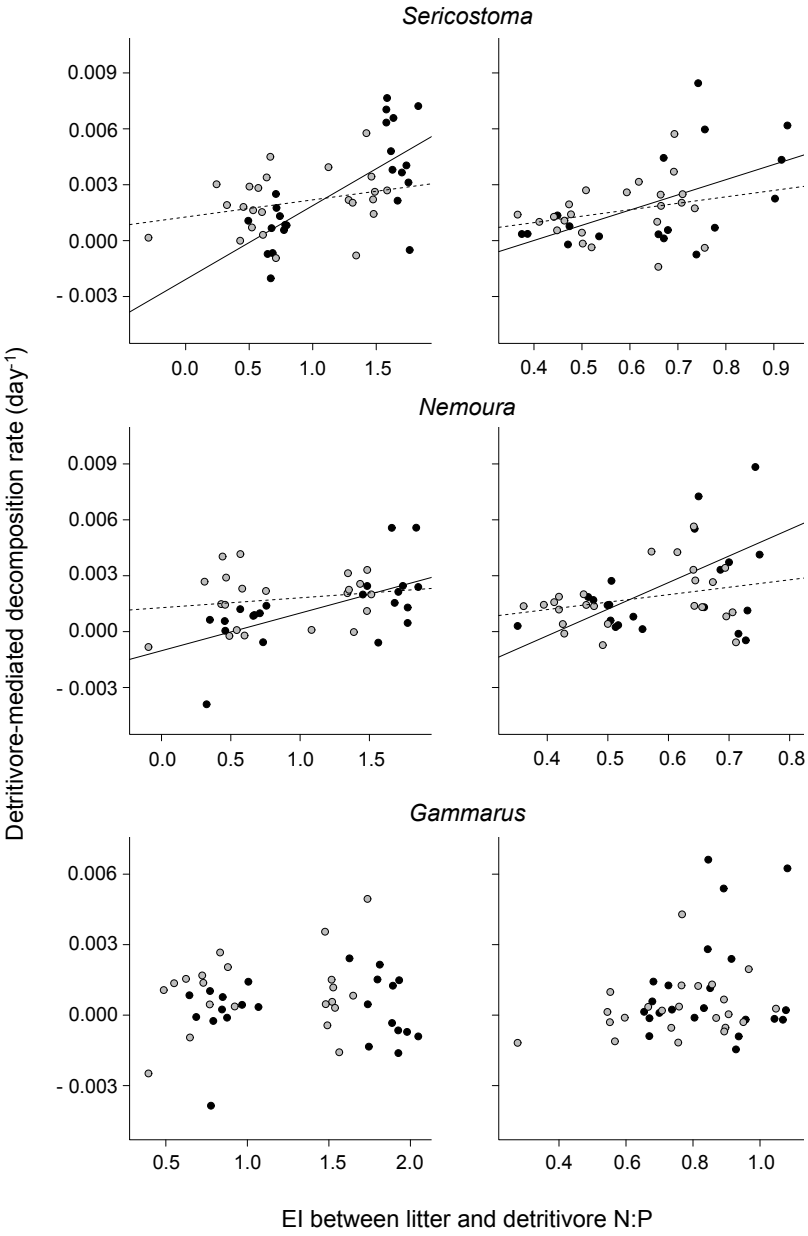


Figure A2. Relationship between detritivore-mediated decomposition rates (*k*) and the elemental imbalance for N:P ($EI_{N:P}$) based on final litter elemental ratio. Leaf litter from single-species (grey circles) and mixed (black circles) treatments on the labile (left column) and refractory (right column) litter pair. Trend lines (stippled lines = leaf litter of single species; solid lines = leaf litter in species mixtures) highlight the interaction ($p < 0.01$) between the fixed effects $EI_{C:N}$ and leaf mixture for *Sericosoma* and *Nemoura*.

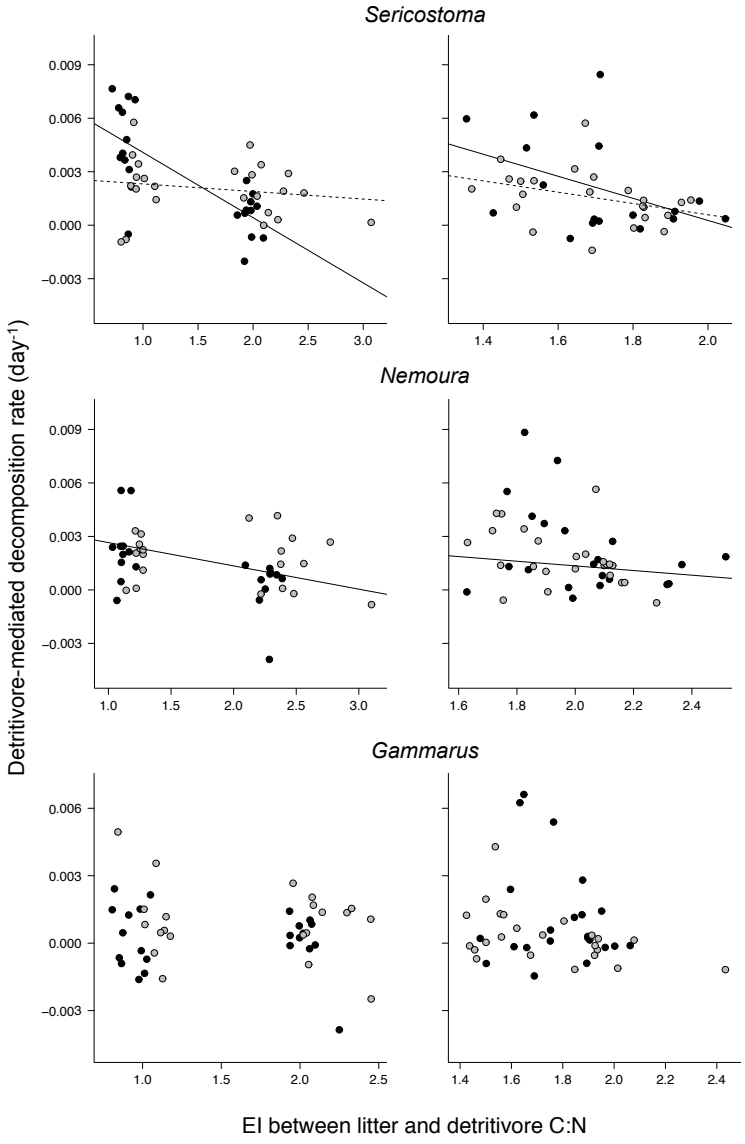


Figure A3. Relationship between detritivore-mediated decomposition rates (*k*) and the elemental imbalance for C:N ($EI_{C:N}$) based on final litter elemental ratio. Leaf litter from single-species (grey circles) and mixed (black circles) treatments on the labile (left column) and refractory (right column) litter pair. *Sericostoma*: trend lines (stippled lines = leaf litter of single species; solid lines = leaf litter in species mixtures) highlight the interaction ($p < 0.01$) between the fixed effects $EI_{C:N}$ and leaf mixture. *Nemoura*: trend lines (solid lines = leaf litter polled across the two mixture treatments) highlight the interaction ($p < 0.001$) between $EI_{C:N}$ and litter pair.

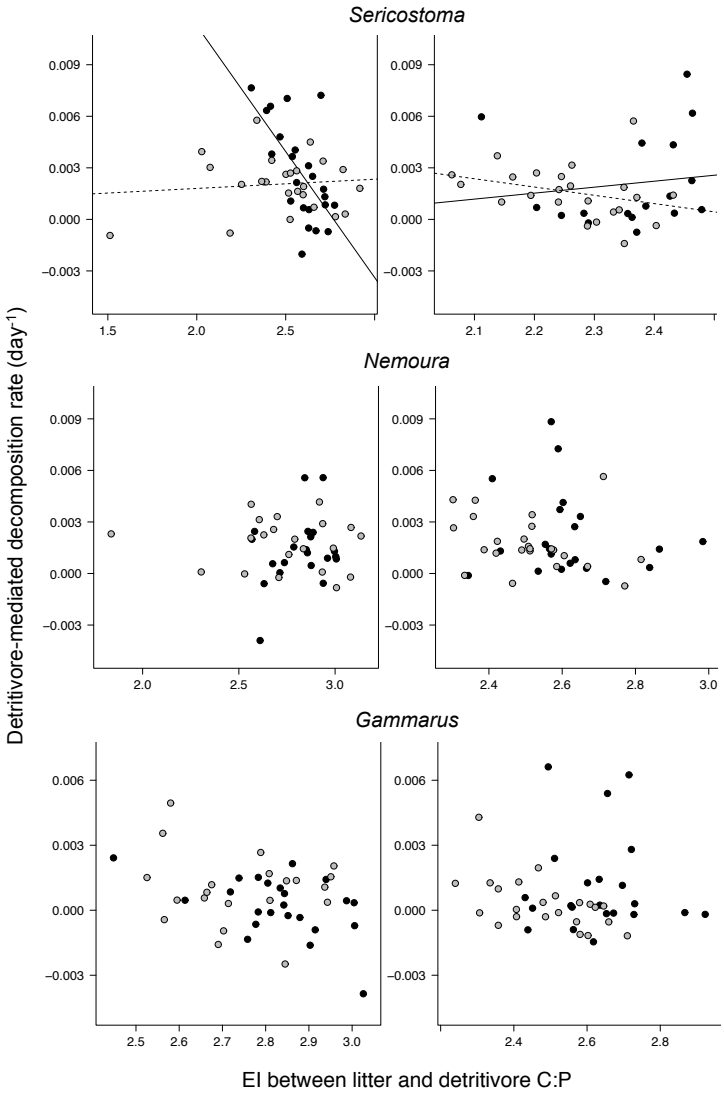


Figure A4. Relationship between detritivore-mediated decomposition rates (*k*) and the Elemental Imbalance for C:P ($EI_{C:P}$) based on final litter elemental ratio. Leaf litter from single-species (grey circles) and mixed (black circles) treatments on the labile (left column) and refractory (right column) litter pair. Trend lines (stippled lines = leaf litter of single species; solid lines = leaf litter in species mixtures) highlight the interaction between the fixed effects $EI_{C:P}$ and leaf mixture, and the relationship between $EI_{C:P}$ and litter pair ($p < 0.01$) for *Sericostoma*. *Gammarus* showed a negative relationship between $EI_{C:P}$ and detritivore-mediated decomposition rates ($p < 0.05$), but the trend line is not shown in this graph.