Appendix S1

**Table S1.** Summary statistics of Bayesian standard ellipse area (SEAB, ‰2) of the earthworm species in each study site. The SEAB was estimated using the R SIBER package (Jackson et al. 2011); the lower and upper 95% high density interval (HDI) was calculated using the function “HPDinterval” in the R coda package (Plummer et al. 2006).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Site | Species | Mean | SD | Mode | Lower 95% HDI | Upper 95% HDI |
| BDTR1 | *Allolobophora chlorotica* | 14.91 | 6.11 | 13.57 | 6.20 | 26.72 |
|  | *Aporrectodea caliginosa* | 5.35 | 1.44 | 5.11 | 2.96 | 8.22 |
|  | *Aporrectodea trapezoides* | 6.53 | 1.90 | 6.19 | 3.44 | 10.32 |
|  | *Lumbricus friendi* | 8.90 | 1.78 | 8.69 | 5.85 | 12.55 |
|  | *Lumbricus rubellus* | 10.94 | 2.47 | 10.59 | 6.66 | 15.90 |
| BDTR2 | *Allolobophora chlorotica* | 5.85 | 2.41 | 5.33 | 2.63 | 10.74 |
|  | *Aporrectodea caliginosa* | 11.15 | 6.21 | 9.58 | 3.36 | 23.07 |
|  | *Aporrectodea trapezoides* | 3.25 | 1.15 | 3.02 | 1.49 | 5.56 |
|  | *Lumbricus friendi* | 7.30 | 2.92 | 6.66 | 3.10 | 13.04 |
|  | *Lumbricus rubellus* | 7.18 | 2.86 | 6.58 | 3.10 | 13.07 |
| BARC | *Aporrectodea caliginosa* | 3.04 | 1.14 | 2.80 | 1.30 | 5.32 |
|  | *Aporrectodea trapezoides* | 4.17 | 1.30 | 3.92 | 2.13 | 6.78 |
| SERC1 | *Aporrectodea caliginosa* | 0.42 | 0.13 | 0.39 | 0.21 | 0.67 |
|  | *Eisenoides lonnbergi* | 1.31 | 0.36 | 1.24 | 0.70 | 2.02 |
|  | *Lumbricus rubellus* | 0.27 | 0.08 | 0.26 | 0.14 | 0.42 |
|  | *Octolasion cyaneum* | 0.64 | 0.22 | 0.60 | 0.29 | 1.07 |
| SERC2 | *Eisenoides lonnbergi* | 2.21 | 0.59 | 2.11 | 1.21 | 3.38 |
|  | *Lumbricus rubellus* | 0.98 | 0.33 | 0.92 | 0.49 | 1.65 |
|  | *Metaphire hilgendorfi* | 4.25 | 1.02 | 4.11 | 2.53 | 6.32 |

**Table S2.** Results of PERMANOVA and PERMDISP analysis (Oksanen et al. 2013) comparing the pairwise differences in isotopic niches of the earthworm species in each study site.

|  |  |  |  |
| --- | --- | --- | --- |
| Site | Species pair | PERMANOVA | PERMDISP |
| BDTR1 | *Allolobophora chlorotica-Aporrectodea caliginosa* | *F* = 2.86, *P* = 0.09 | *F* = 3.07, *P* = 0.09 |
|  | *Allolobophora chlorotica-Aporrectodea trapezoides* | *F* = 0.36, *P* = 0.58 | *F* = 2.22, *P* = 0.15 |
|  | *Allolobophora chlorotica-Lumbricus friendi* | *F* = 0.001, *P* = 0.97 | *F* = 2.96, *P* = 0.09 |
|  | *Allolobophora chlorotica-Lumbricus rubellus* | *F* = 1.25, *P* = 0.27 | *F* = 0.02, *P* = 0.88 |
|  | *Aporrectodea caliginosa-Aporrectodea trapezoides* | *F* = 2.24, *P* = 0.14 | *F* = 0.01, *P* = 0.91 |
|  | *Aporrectodea caliginosa-Lumbricus friendi* | *F* = 7.18, *P* = 0.01 | *F* = 0.07, *P* = 0.81 |
|  | *Aporrectodea caliginosa-Lumbricus rubellus* | *F* = 11.54, *P* = 0.002 | *F* = 2.21, *P* = 0.16 |
|  | *Aporrectodea trapezoides-Lumbricus friendi* | *F* = 0.88, *P* = 0.35 | *F* = 0.12, *P* = 0.74 |
|  | *Aporrectodea trapezoides-Lumbricus rubellus* | *F* = 4.71, *P* = 0.03 | *F* = 1.94, *P* = 0.17 |
|  | *Lumbricus friendi-Lumbricus rubellus* | *F* = 3.93, *P* = 0.06 | *F* = 2.53, *P* = 0.12 |
| BDTR2 | *Allolobophora chlorotica-Aporrectodea caliginosa* | *F* = 0.02, *P* = 0.90 | *F* = 0.01, *P* = 0.90 |
|  | *Allolobophora chlorotica-Aporrectodea trapezoides* | *F* = 0.25, *P* = 0.62 | *F* = 1.60, *P* = 0.23 |
|  | *Allolobophora chlorotica-Lumbricus friendi* | *F* = 0.45, *P* = 0.50 | *F* = 0.06, *P* = 0.78 |
|  | *Allolobophora chlorotica-Lumbricus rubellus* | *F* = 0.005, *P* = 0.94 | *F* = 0.06, *P* = 0.78 |
|  | *Aporrectodea caliginosa-Aporrectodea trapezoides* | *F* = 0.40, *P* = 0.56 | *F* = 3.34, *P* = 0.09 |
|  | *Aporrectodea caliginosa-Lumbricus friendi* | *F* = 0.50, *P* = 0.52 | *F* = 0.13, *P* = 0.72 |
|  | *Aporrectodea caliginosa-Lumbricus rubellus* | *F* = 0.004, *P* = 0.95 | *F* = 0.13, *P* = 0.71 |
|  | *Aporrectodea trapezoides-Lumbricus friendi* | *F* = 0.14, *P* = 0.71 | *F* = 0.88, *P* = 0.38 |
|  | *Aporrectodea trapezoides-Lumbricus rubellus* | *F* = 0.31, *P* = 0.59 | *F* = 0.83, *P* = 0.37 |
|  | *Lumbricus friendi-Lumbricus rubellus* | *F* = 0.50, *P* = 0.48 | *F* < 0.001, *P* = 1.00 |
| BARC | *Aporrectodea caliginosa-Aporrectodea trapezoides* | *F* = 12.41, *P* = 0.004 | *F* = 0.8, *P* = 0.38 |
| SERC1 | *Aporrectodea caliginosa-Eisenoides lonnbergi* | *F* = 42.8, *P* = 0.001 | *F* = 1.21, *P* = 0.29 |
|  | *Aporrectodea caliginosa-Lumbricus rubellus* | *F* = 153.31, *P* = 0.001 | *F* = 1.60, *P* = 0.23 |
|  | *Aporrectodea caliginosa-Octolasion cyaneum* | *F* = 36.6, *P* = 0.001 | *F* = 0.88, *P* = 0.34 |
|  | *Eisenoides lonnbergi-Lumbricus rubellus* | *F* = 292.85, *P* = 0.001 | *F* = 4.96, *P* = 0.04 |
|  | *Eisenoides lonnbergi-Octolasion cyaneum* | *F* < 0.001, *P* = 0.99 | *F* < 0.001, *P* = 0.99 |
|  | *Lumbricus rubellus-Octolasion cyaneum* | *F* = 265.27, *P* = 0.001 | *F* = 3.81, *P* = 0.08 |
| SERC2 | *Eisenoides lonnbergi-Lumbricus rubellus* | *F* = 113.83, *P* = 0.001 | *F* = 5.29, *P* = 0.04 |
|  | *Eisenoides lonnbergi-Metaphire hilgendorfi* | *F* = 36.23, *P* = 0.001 | *F* = 0.99, *P* = 0.36 |
|  | *Lumbricus rubellus-Metaphire hilgendorfi* | *F* = 6.93, *P* = 0.01 | *F* = 4.12, *P* = 0.04 |

**Table S3.** The percentage of the SEAB of species A that overlaps with the SEAB of species B in the study sites BDTR1, BDTR2, and BARC.

(a) BDTR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Species B | | | | |
|  |  | *Allolobophora chlorotica* | *Aporrectodea caliginosa* | *Aporrectodea trapezoides* | *Lumbricus friendi* | *Lumbricus rubellus* |
| Species A | *Allolobophora chlorotica* | - | 12.4 | 36.6 | 43.1 | 23.1 |
| *Aporrectodea caliginosa* | 34.3 | - | 26.4 | 14.5 | 0.7 |
| *Aporrectodea trapezoides* | 80.4 | 20.9 | - | 63.6 | 19.5 |
| *Lumbricus*  *friendi* | 72.9 | 8.8 | 49 | - | 50.4 |
| *Lumbricus rubellus* | 31.5 | 0.4 | 12.1 | 40.5 | - |

(b) BDTR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Species B | | | | |
|  |  | *Allolobophora chlorotica* | *Aporrectodea caliginosa* | *Aporrectodea trapezoides* | *Lumbricus friendi* | *Lumbricus rubellus* |
| Species A | *Allolobophora chlorotica* | - | 49.5 | 18.7 | 5.8 | 9.4 |
| *Aporrectodea caliginosa* | 28.4 | - | 22.7 | 16.4 | 16.4 |
| *Aporrectodea trapezoides* | 31.3 | 66.3 | - | 33.7 | 37.6 |
| *Lumbricus*  *friendi* | 4.4 | 21.7 | 15.2 | - | 44.3 |
| *Lumbricus rubellus* | 7.8 | 23.7 | 18.5 | 48.4 | - |

(c) BARC

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Species B | |
|  |  | *Aporrectodea caliginosa* | *Aporrectodea trapezoides* |
| Species A | *Aporrectodea caliginosa* | - | 11.2 |
| *Aporrectodea trapezoides* | 8.5 | - |

SEAb_dotchart1.tiff

SEAb_dotchart2.tiff

**Figure S1.** Bayesian standard ellipse area (SEAB) (mean ± 95% HDI) of the earthworm species in the study site BDTR1, BDTR2, and BARC (see also Appendix S1: Table S1 for detailed numerical results).

**Figure S2.** Bayesian standard ellipse area (SEAB) (mean ± 95% HDI) of the earthworm species in the study site SERC1 and SERC2 (see also Appendix S1: Table S1 for detailed numerical results).

Reference

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