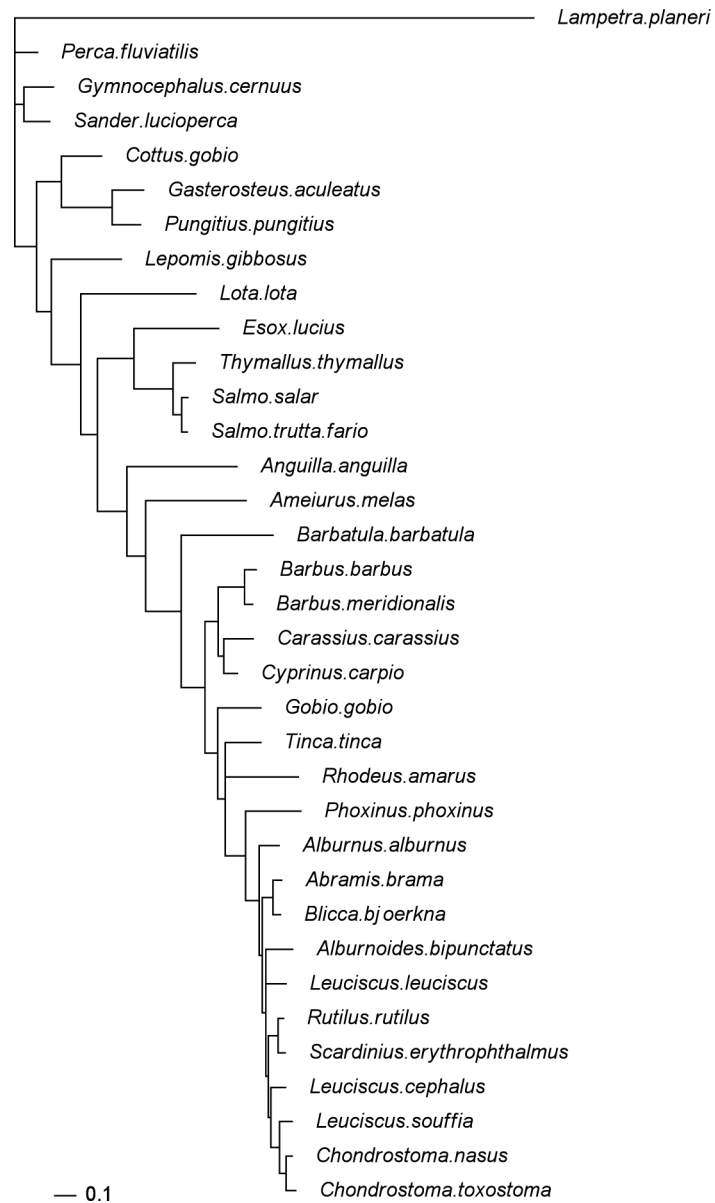


Supplementary material

Appendix 1. The phylogenetic tree used in the comparative analyses to calculate the species-to-species correlation matrix.



Appendix 2. Attributes of the fish species distribution patterns. PV = prevalence; LR = latitudinal range (km); TR = thermal range; GR = stream gradient range; ER = elevation range (m). See Methods for details.

| Family | Species | PV | LR | TR | GR | ER |
|--------------------|------------------------------------|--------|--------|------|--------|---------|
| Anguillidae | <i>Anguilla anguilla</i> | 0.35 | 759.65 | 3.78 | 5.24 | 323.41 |
| Balitoridae | <i>Barbatula barbatula</i> | 0.56 | 708.14 | 4.39 | 4.06 | 703.47 |
| Centrarchidae | <i>Lepomis gibbosus</i> | 0.14 | 623.87 | 4.14 | 4.91 | 464.87 |
| Cottidae | <i>Cottus gobio</i> | 0.50 | 669.53 | 3.95 | 4.11 | 736.91 |
| Cyprinidae | <i>Abramis brama</i> | 0.09 | 713.21 | 3.41 | 4.61 | 282.80 |
| | <i>Alburnoides bipunctatus</i> | 0.11 | 654.26 | 4.06 | 3.80 | 422.33 |
| | <i>Alburnus alburnus</i> | 0.18 | 710.40 | 3.64 | 4.03 | 332.80 |
| | <i>Barbus barbus</i> | 0.19 | 694.81 | 4.00 | 4.32 | 562.81 |
| | <i>Barbus meridionalis</i> | 0.06 | 200.80 | 4.09 | 3.53 | 497.14 |
| | <i>Blicca bjoerkna</i> | 0.06 | 673.86 | 3.93 | 4.85 | 253.43 |
| | <i>Carassius carassius</i> | 0.03 | 713.34 | 4.57 | 5.29 | 318.33 |
| | <i>Chondrostoma nasus</i> | 0.08 | 614.54 | 3.34 | 4.35 | 427.22 |
| | <i>Chondrostoma toxostoma</i> | 0.04 | 275.26 | 3.58 | 3.74 | 603.75 |
| | <i>Cyprinus carpio</i> | 0.06 | 711.48 | 3.91 | 5.06 | 294.29 |
| | <i>Gobio gobio</i> | 0.49 | 744.32 | 4.43 | 4.46 | 666.20 |
| | <i>Leuciscus cephalus</i> | 0.45 | 728.66 | 4.16 | 4.70 | 505.52 |
| | <i>Leuciscus leuciscus</i> | 0.23 | 706.47 | 3.71 | 4.22 | 357.50 |
| | <i>Leuciscus souffia</i> | 0.06 | 423.08 | 4.84 | 3.72 | 647.14 |
| | <i>Phoxinus phoxinus</i> | 0.56 | 729.73 | 4.84 | 3.98 | 826.52 |
| | <i>Rhodeus amarus</i> | 0.07 | 622.95 | 3.08 | 3.66 | 265.00 |
| | <i>Rutilus rutilus</i> | 0.36 | 716.95 | 3.88 | 4.76 | 358.60 |
| | <i>Scardinius erythrophthalmus</i> | 0.09 | 654.77 | 3.52 | 5.26 | 389.70 |
| <i>Tinca tinca</i> | 0.12 | 686.33 | 3.94 | 4.92 | 378.07 | |
| Esocidae | <i>Esox lucius</i> | 0.17 | 667.12 | 3.61 | 4.54 | 313.11 |
| Gasterosteidae | <i>Gasterosteus aculeatus</i> | 0.09 | 737.75 | 3.72 | 4.44 | 284.10 |
| | <i>Pungitius pungitius</i> | 0.07 | 426.69 | 2.41 | 3.86 | 194.88 |
| Ictaluridae | <i>Ameiurus melas</i> | 0.05 | 489.05 | 2.89 | 4.84 | 390.60 |
| Lotidae | <i>Lota lota</i> | 0.03 | 330.81 | 1.67 | 4.58 | 278.00 |
| Percidae | <i>Gymnocephalus cernuus</i> | 0.05 | 588.61 | 2.64 | 4.10 | 264.00 |
| | <i>Perca fluviatilis</i> | 0.24 | 660.88 | 3.47 | 4.89 | 411.48 |
| | <i>Sander lucioperca</i> | 0.03 | 664.64 | 3.49 | 4.49 | 253.33 |
| Petromyzontidae | <i>Lampetra planeri</i> | 0.26 | 658.75 | 3.78 | 3.78 | 482.14 |
| Salmonidae | <i>Salmo salar</i> | 0.05 | 661.96 | 3.09 | 3.88 | 421.20 |
| | <i>Salmo trutta</i> | 0.76 | 765.03 | 6.05 | 3.94 | 1162.69 |
| | <i>Thymallus thymallus</i> | 0.03 | 600.12 | 3.92 | 4.27 | 703.50 |