Table S1. GBIF links to each country's database and their references.

Country	Database DOI GBIF.org (15 June 2021) GBIF Occurrence Download https://doi.org/
Sweden	10.15468/dl.kjcc3n 10.15468/dl.4hfdru 10.15468/dl.9cgua5 10.15468/dl.938ksp 10.15468/dl.sybve6 10.15468/dl.mkwjmd 10.15468/dl.2g657t
Germany	10.15468/dl.6w565m 10.15468/dl.yycxvc
Denmark	10.15468/dl.ru6t4w Rask Møller P (2016). Atlas of Danish Fishes. Version 2.1. Zoological Museum, Natural History Museum of Denmark. Occurrence dataset https://doi.org/10.15468/gekzst accessed via GBIF.org on 2021-06-22.
Poland	Kotusz J, De Wever A (2017). Freshwater fishes of Poland. Version 2.2. BioFresh. Occurrence dataset https://doi.org/10.13148/bfcf8 accessed via GBIF.org on 2021-06-15.
France	10.15468/dl.cxkprq 10.15468/dl.pdy8je
Spain	10.15468/dl.fnmmn6
Portugal	10.15468/dl.fnmmn6
Belgium	Van Thuyne G, Breine J, Verreycken H, De Boeck T, Brosens D, Desmet P (2021). VIS - Fishes in inland waters in Flanders, Belgium. Version 9.7. Research Institute for Nature and Forest (INBO). Occurrence dataset https://doi.org/10.15468/gzyxyd accessed via GBIF.org on 2021-10-28.
Greece	Stoumboudi M T, De Wever A (2017). Freshwater fishes of Greece. Version 2.2. BioFresh. Occurrence dataset https://doi.org/10.13148/bfcf3 accessed via GBIF.org on 2021-10-29.
Romania	10.15468/dl.uju5b6
Netherlands	Verdijk M, Creuwels J, Kranenbarg J (2021). Freshwater fish of the Netherlands, 1800-2019. Version 1.4. Reptile, Amphibian and Fish Conservation Netherlands (RAVON). Occurrence dataset https://doi.org/10.15468/tphmcf accessed via GBIF.org on 2021-05-11.
Norway	10.15468/dl.8wgbnh
Bulgaria	De Wever A (2017). Freshwater Fishes of Bulgaria. Version 1.2. BioFresh. Occurrence dataset https://doi.org/10.13148/bfe107 accessed via GBIF.org on 2021-06-15.

Table S2. Number of freshwater fish records and species and average completeness by country.

Country	Records	Species	Average completeness
Belgium	25610	59	31.81
Bulgaria	699	72	0.67
Denmark	49518	64	65.14
France	560728	74	54.93
Germany	39453	81	17.07
Greece	1841	111	3.16
Italy	37973	113	16.07
Netherlands	249009	77	86.00
Norway	80295	37	39.60
Poland	34398	76	15.93
Portugal	21901	72	26.01
Romania	718	99	0.49

Slovenia	47122	93	59.60
Spain	61396	110	21.37
Sweden	239928	59	49.61
United Kingdom	261094	50	62.49

Table S3. Eigenvalues showing the percentage of variances explained by each principal component for the PCA performed to group the 19 bioclimatic predictors.

Factors	*Cumulative variance percentage*
PC1	38.11097
PC2	68.93620
PC3	79.78451
PC4	89.17803
PC5	95.33225
PC6	98.08142

Table S4. Loading of each of the two factors resulting from the PCA explaining 69% of the climate information.

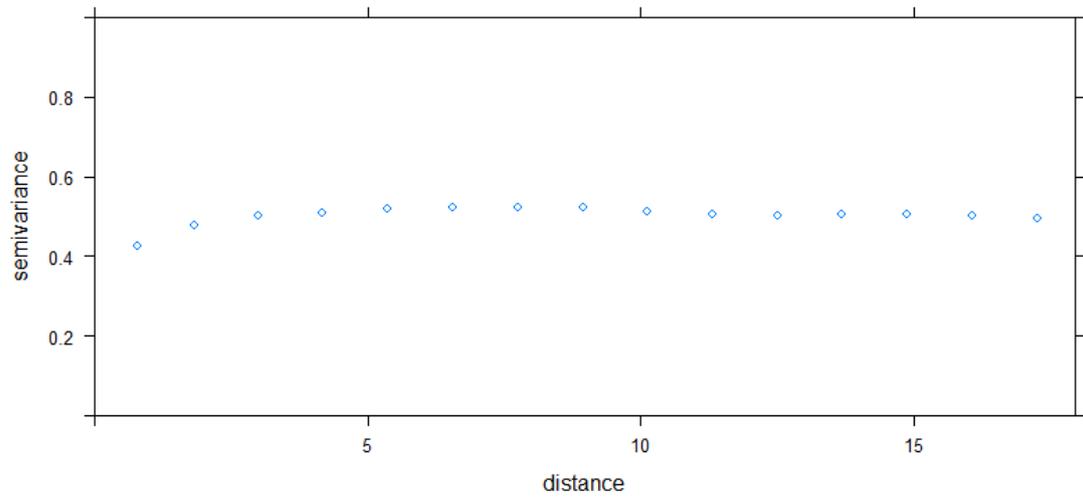| *Predictor*	*PC1*	*PC2*
BIO1 = Annual Mean Temperature	-0.2900	-0.2288
BIO2 = Mean Diurnal Range (Mean of monthly (max temp–min temp))	-0.2229	0.0265
BIO3 = Isothermality (BIO2/BIO7) (×100)	-0.1856	-0.2132
BIO4 = Temperature Seasonality (standard deviation ×100)	-0.0131	0.3399
BIO5 = Max Temperature of Warmest Month	-0.3312	-0.0806
BIO6 = Min Temperature of Coldest Month	-0.2081	-0.3110
BIO7 = Temperature Annual Range (BIO5-BIO6)	-0.1049	0.2787
BIO8 = Mean Temperature of Wettest Quarter	-0.1275	0.1841
BIO9 = Mean Temperature of Driest Quarter	-0.2289	-0.2741
BIO10 = Mean Temperature of Warmest Quarter	-0.3245	-0.1150
BIO11 = Mean Temperature of Coldest Quarter	-0.2360	-0.3018
BIO12 = Annual Precipitation	0.2432	-0.2793
BIO13 = Precipitation of Wettest Month	0.2010	-0.2602
BIO14 = Precipitation of Driest Month	0.2822	-0.1646
BIO15 = Precipitation Seasonality (Coefficient of Variation)	-0.1452	0.0002
BIO16 = Precipitation of Wettest Quarter	0.2010	-0.2656
BIO17 = Precipitation of Driest Quarter	0.2803	-0.1729
BIO18 = Precipitation of Warmest Quarter	0.3219	0.0165
BIO19 = Precipitation of Coldest Quarter	0.1231	-0.3439

Figure S1. Variograms showing low spatial autocorrelation for the GLMM residuals.