Accounting for nonlinear responses to traits improves range shift predictions

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Ecosphere

Data Descriptions

plants_Angertetal2011.csv

Traits of alpine plants from Angert et al. (2011). The response variable (migration_m) is the altitudinal range shift with negative values indicate shifts downward in elevation (m).

Name	Type	Description
T mean (°C)	climatic	Mean temperature (BioClim Bio1) across distribution
T breadth (°C)	climatic	Standard deviation of temperature (BioClim Bio1) across distribution
Northern latitude (degree)	climatic	Latitude of the northernmost pre-1975 locality record, using locality records downloaded from the Global Biodiversity Information Facility
Earliest seed shed (mo)	dispersal	Month of first reported seed shed
Seed shed duration (mo)	dispersal	Number of months between first and last reported seed shed

MothsBirds_Hallfors2023.csv

Traits of lepidoptera and birds (Hällfors et al. 2023). The response variable (D_border_0.9) is the range shift of the northern range limit northward in latitude (km).

Name	Type	Description
T mean (°C)	climatic	Mean annual temperature across distribution
T breadth (°C)	climatic	Standard deviation of mean annual temperature across distribution
P mean (mm)	climatic	Mean annual precipitation across distribution
P breadth (mm)	climatic	Standard deviation of mean annual precipitation across distribution
Body size	life history	Total female wingspan (mm) for moths and body mass (g) for birds
Number generations	life history	Number of generations or broods per season: 0, one or less; 1: two or more
Overwintering mode	life history	Greater values indicate greater migration propensity for birds from resident to short-distance migrant to long-distance migrant. Greater values indicate more advanced overwintering stages for moths: 1, egg; 2, larva; 3, pupa; 4, adult.

Range size (grid cells)	ecological generalization	Range Size across Europe (grid cells)

fish_Pinskyetal2013.csv
Traits of marine organisms from FishBase (Froese and Pauly 2010). The response variable (Latitudinal Difference) is the range shift equatorward in latitude (degrees).

Name	Type	Description
Length (cm)	life history	Length
Depth range (m)	ecological generalization	Range of depths occupied from FishBase
Vulnerability	ecological generalization	Vulnerability index from FishBase
Habitat	ecological generalization	Habitat index ranging from bottom associated to pelagic to reef associated: 1, bathydemersal; 2, demersal; 3, benthopelagic; 4, pelagic-oceanic; 5, pelagic-neritic; 6, reef-associated
Water type	ecological generalization	Water type index indicating associations with salt water (0) to brackish water (1) to fresh water (2)

mammals_Angertetal2011.csv
Traits of mammals (Angert et al. 2011). The response variable (High_change) is the altitudinal range shift with negative values indicate shifts downward in elevation (m).

Name	Type	Description
T mean (°C)	climatic	Mean temperature (BioClim Bio1) across distribution
T breadth (°C)	climatic	Standard deviation of temperature (BioClim Bio1) across distribution
Altitudinal limit (m)	climatic	Altitude of historic upper range limit (m)
Litter size	life history	Average number of individuals per litter size
Litters per yr	life history	Number of litters per year
Mass (g)	life history	Body mass (g)
Longevity (yrs)	life history	Longevity (years)
Range size (km^2)	ecological generalization	Range Size estimated from NatureServe range maps (km^2)

Diet breadth	ecological generalization	Binary index where 1 indicates use of more than one food source (0: insectivore/herbivore/carnivore, 1: omnivore)

References

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