

Environmental drivers of zooplankton functional diversity in European pond ecosystems

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Introduction

Functional diversity is increasingly recognised as a key driver of ecosystem processes. However, small freshwater habitats, such as ponds, remain relatively understudied.

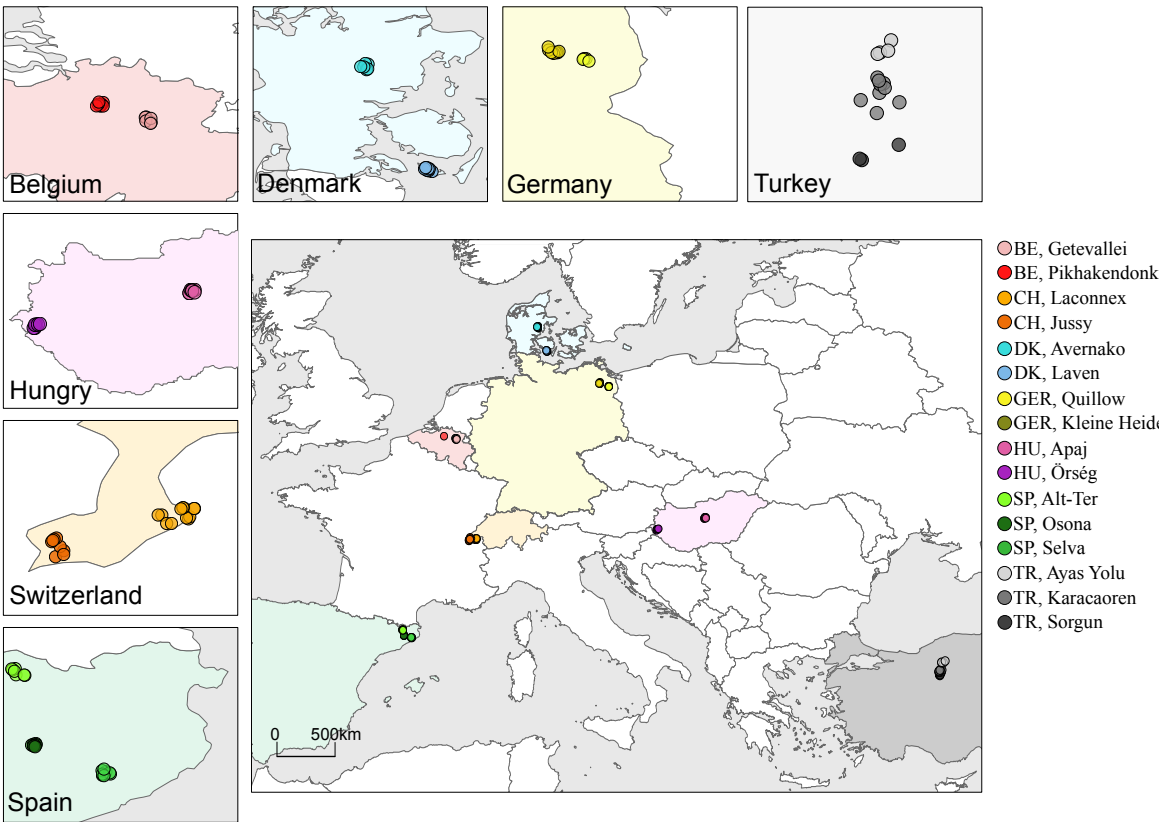
Within this context, the **Biodiversa+ TRANSPONDER** project focuses on ponds as key ecosystems supporting a large proportion of the freshwater species pool and providing important ecosystem functions and services.

Objectives

- Quantify zooplankton functional diversity in ponds along a latitudinal gradient.
- Assess the main environmental drivers influencing zooplankton functional diversity across a land-use gradient.

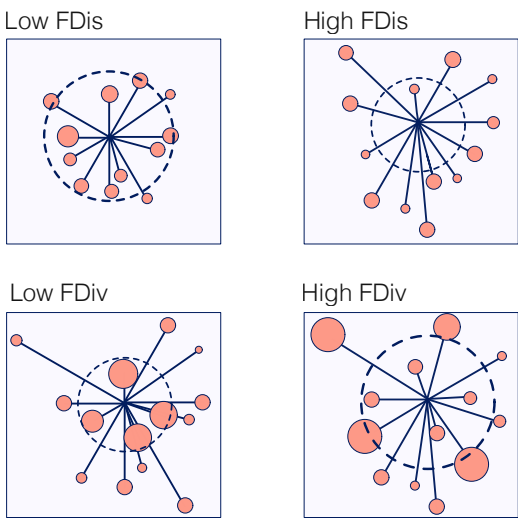
Methods

A total of 151 ponds across seven European countries were selected. A range of environmental factors was collected, including Chl-a and nutrient concentrations, cropland intensity, area and depth, and macrophyte coverage.



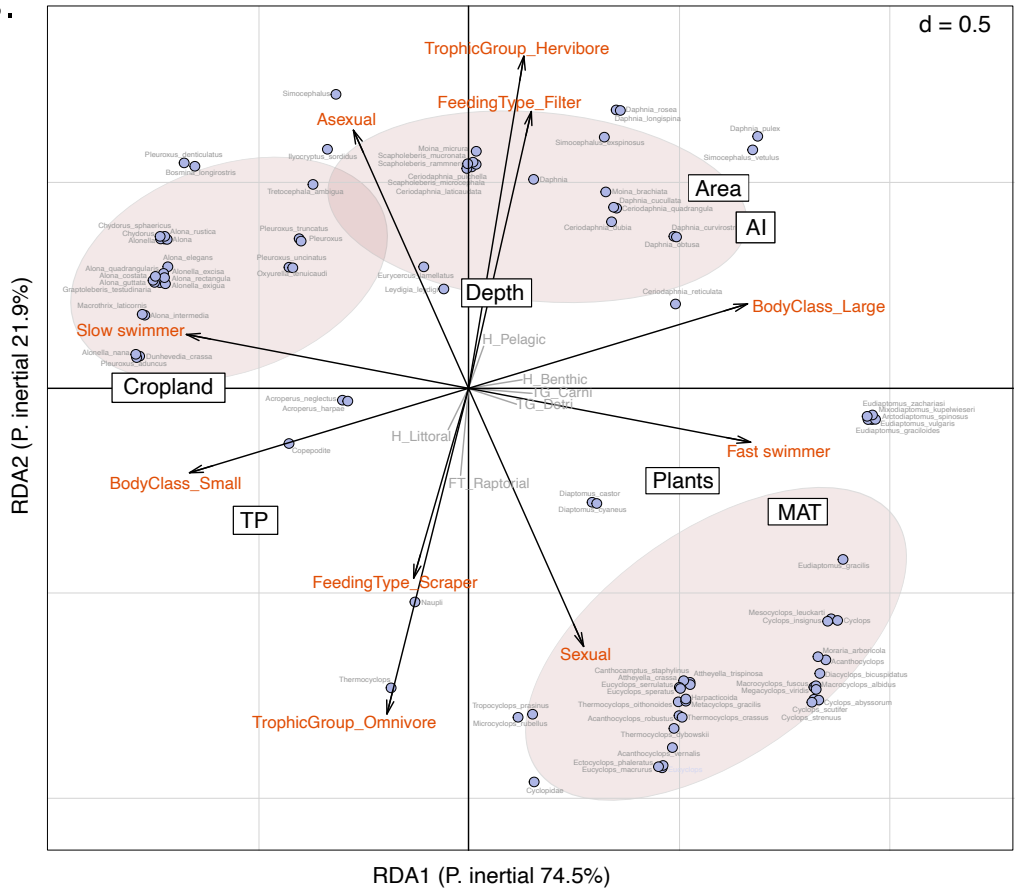
Functional dispersion (FDis): it measures functional diversity as the distance of individual species from the assemblage centroid in a multi-dimensional trait space.

Functional divergence (FDiv): It measures how species abundance is distributed towards the edges of the multi-dimensional trait space.

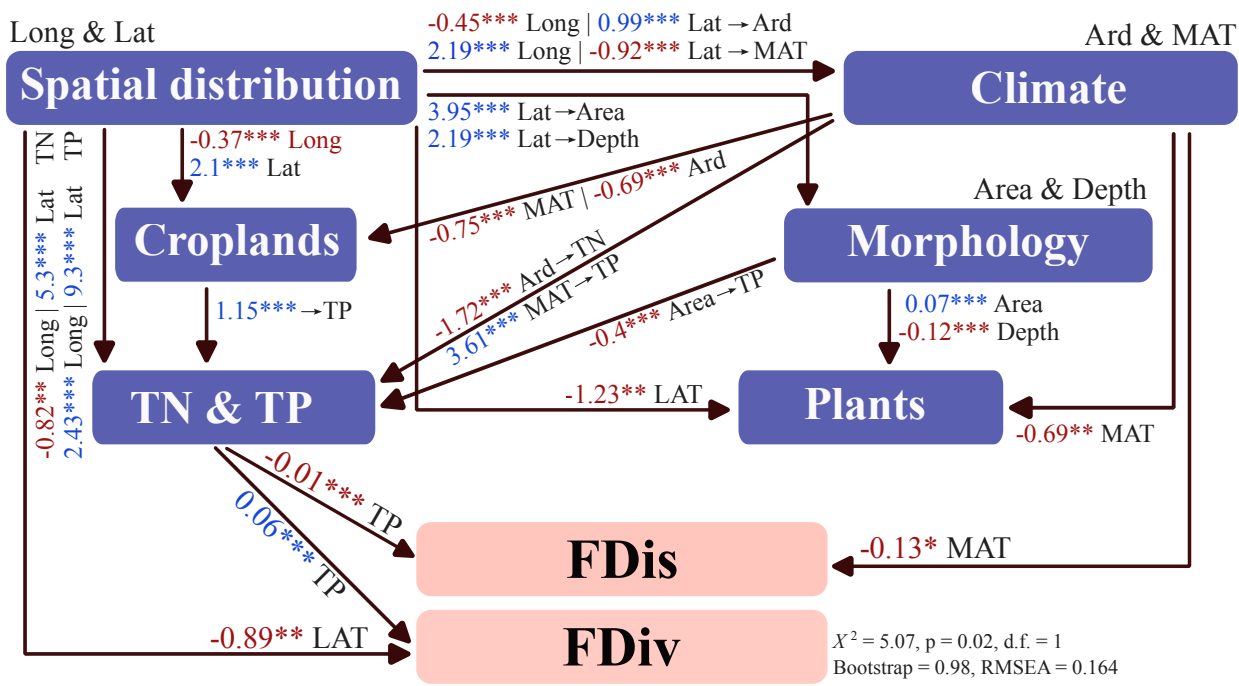


Results and Discussion

An increase in temperature favours carnivorous copepods, whereas high cropland cover and total phosphorus (TP) were associated with the dominance of small, slow-swimming taxa, including many branchiopods.



TP and mean annual temperature (MAT) were negatively associated with zooplankton FDis, while TP was positively associated with FDiv, indicating that eutrophication and warming may promote functional homogenisation in pond ecosystems and favour the abundance of species with extreme traits.



Conclusion

Climate warming and nutrient enrichment may erode zooplankton functional diversity by promoting trait convergence and favouring species with extreme traits, with potential consequences for ecosystem stability and the trophic food web in freshwater ponds.

References & Project link

