

Zooplankton of the Scheldt river continuum

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Context of study & objectives

The Scheldt river has its source in the north of France, flows through Belgium and into the North Sea at Vlissingen in The Netherlands. Three salinity zones can be distinguished in the estuarine stretch under tidal influence: the saltwater Westerscheldt, the brackish and freshwater zone of the Zeescheldt. Its upstream basin is mainly drained by the rivers Scheldt and Lys. In the frame of MONEOS, OMES and BIOFOZI projects, the ecological status and functioning of the Scheldt river continuum is studied.

Aim of this study: to examine how the zooplankton community structure changes along the continuum and which environmental variables are most significant in explaining the variance in the zooplankton community

Materiels & methods

- 21 stations were sampled (Fig1) in April 2013.
- At each Westerscheldt station, 150-250 L of water are taken at sub-surface with a pump and filtered through a 50 µm net for zooplankton. Only 50 L of water was taken at the other stations.
- A set of environmental variables were measured.
- Mesozooplankton was collected in plastic container and fixed with formaldehyde 4% final concentration.
- Determination and abundance quantification of mesozooplankton groups was done under binocular microscope.
- Multivariate analysis were realized using CANOCO software.

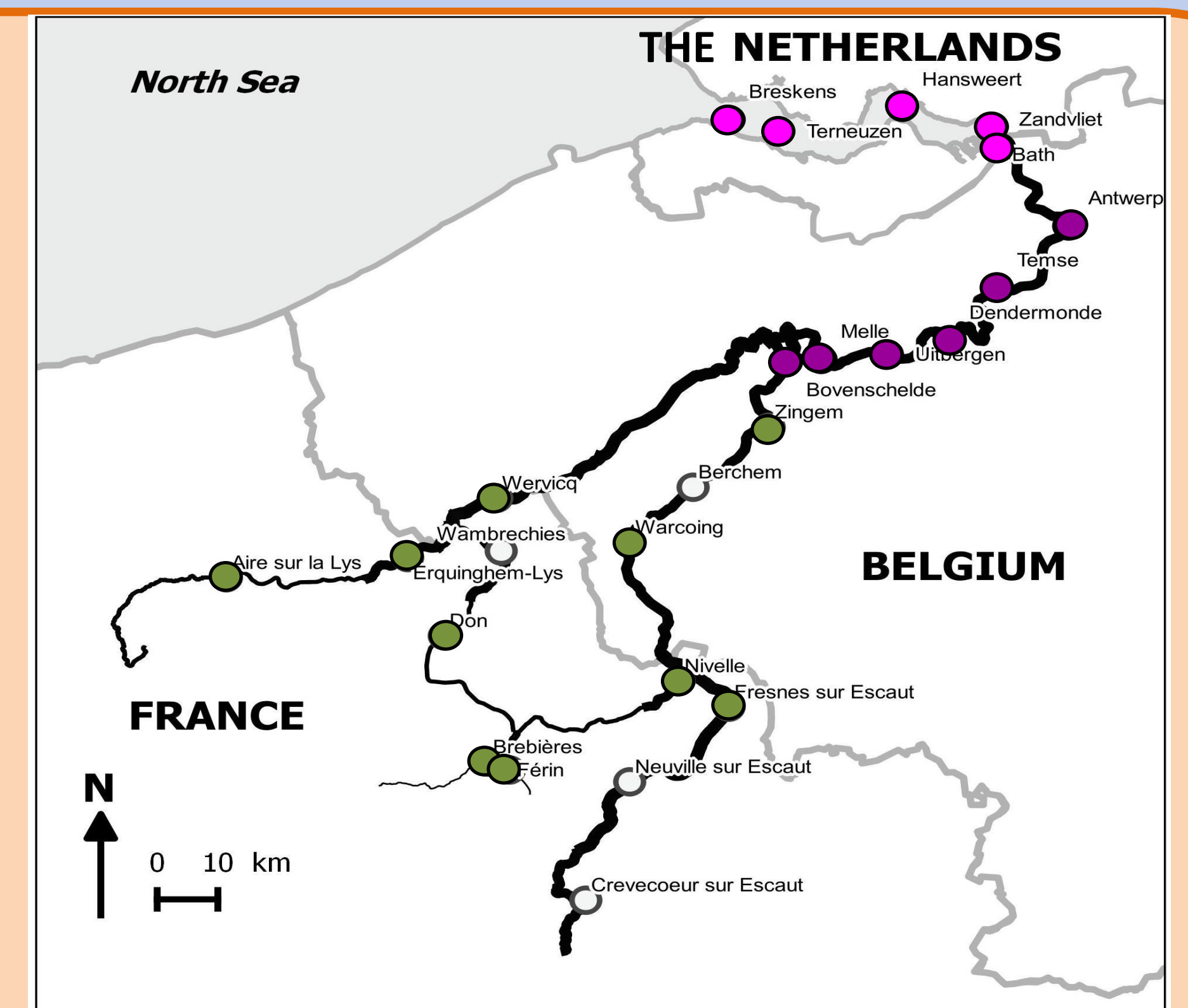


Fig 1: Scheldt continuum. Light violet: Salt water Westerschelde, violet: freshwater estuarine, green: upstream riverine stations.

Results

1) Abundance and spatio-temporal distribution

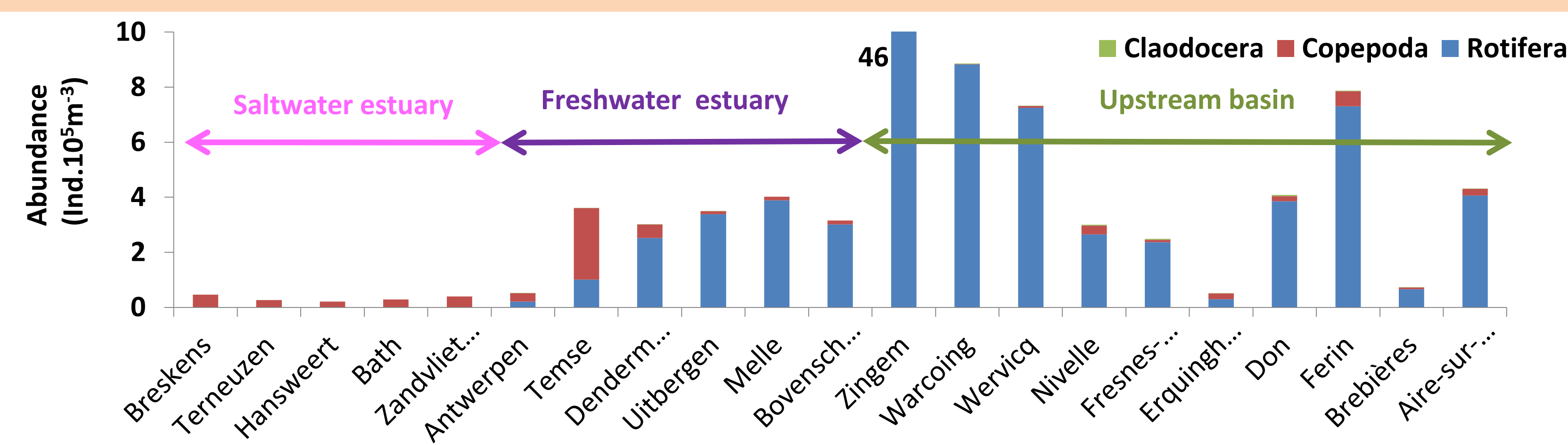


Fig 2a: Brackish-marine water is essentially dominated by copepods whereas freshwater shows mainly rotifer abundance. Cladocera appear in both fresh- and brackish water.

2) Relation between taxa, stations and environmental data

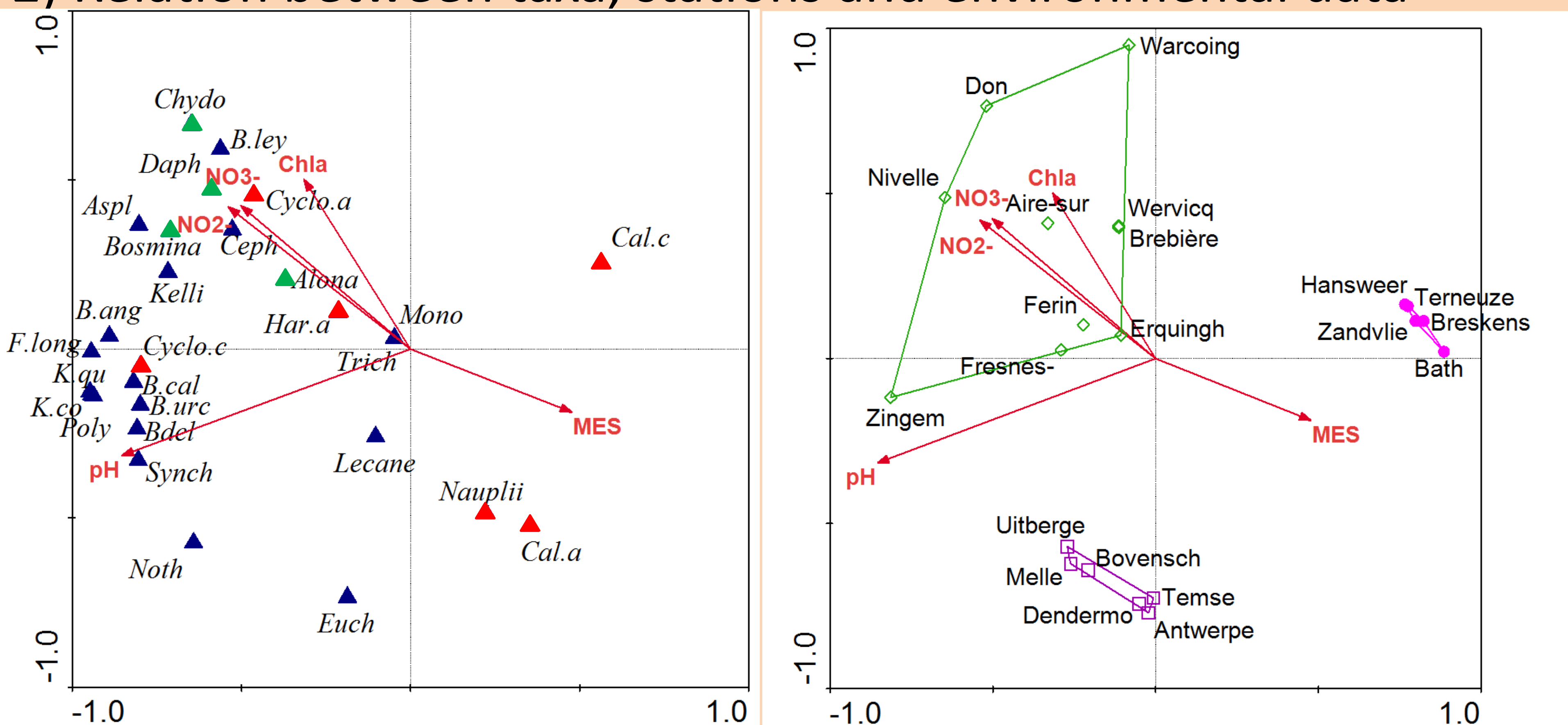


Fig 3: Multivariate analysis shows three distinct communities: the riverine freshwater upstream, the tidal freshwater and the brackish marine community. (cladocera: green, copepoda: red and rotifers: blue).

- The upstream community, composed of rotifers and cladocerans, was linked to high Chla and nutrient concentrations.
- Calanoids in the brackish-marine community was associated with high SPM concentrations.
- The tidal-freshwater community, composed of calanoids copepods and rotifers occurs in less nutrient rich waters than the upstream riverine community.

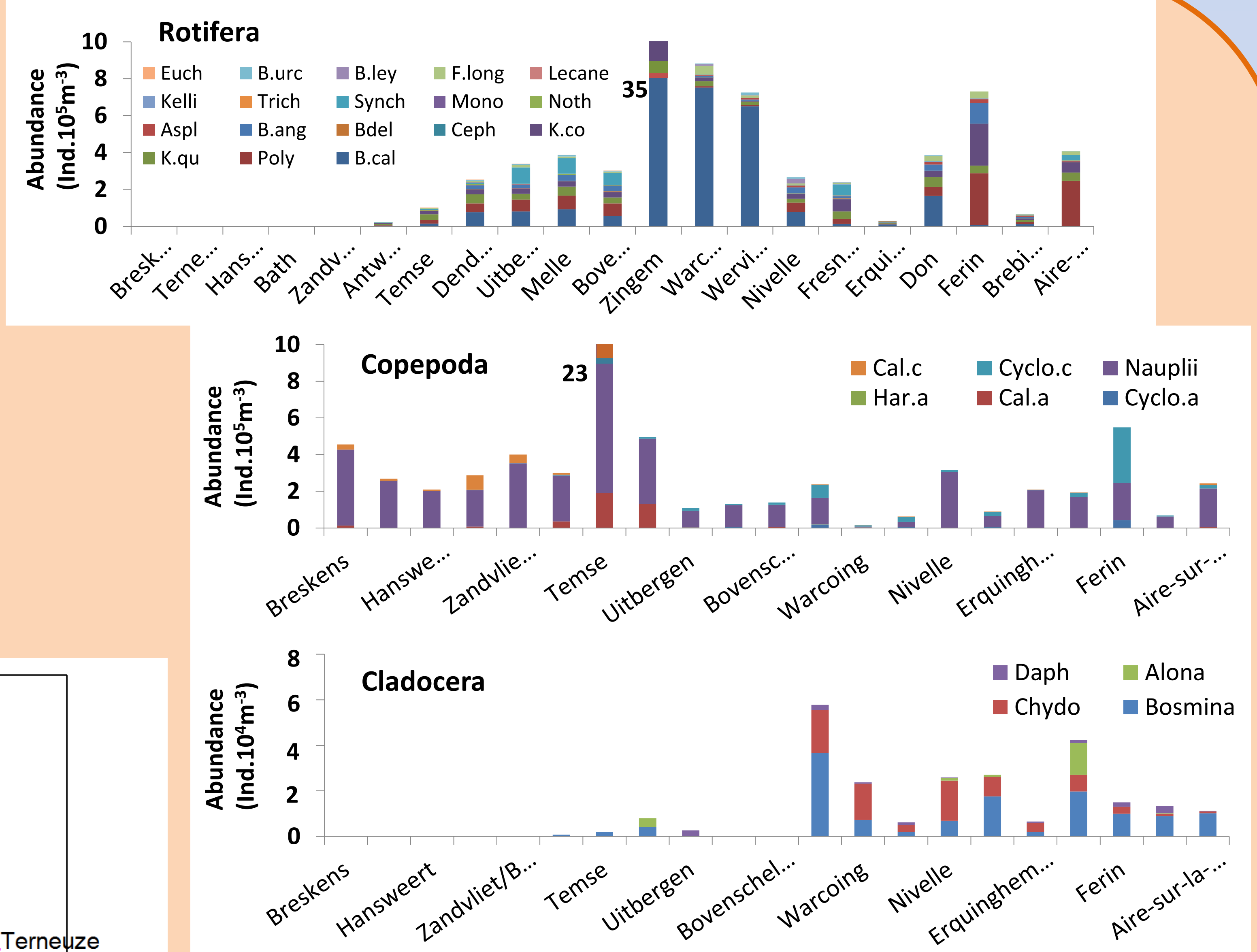


Fig 2b: Spatio-temporal distribution of zooplankton along the Scheldt continuum (a: adults; c: copepodids)

Brachionus calyciflorus was by the far the most representative rotifer in the brackish and freshwater reaches. Copepods were differently repartitioned along the continuum with nauplii dominating in marine waters. Cladocerans dominated in freshwater.

Discussion & Conclusion

Species repartition is different along the Scheldt continuum. Of the 23 rotifer taxa encountered in the freshwater Scheldt, ¼ is common to both the riverine and the tidal system. This international inventory and ecological analysis of the zooplankton along a 300 km river-estuarine continuum forms a useful basis for understanding specific tolerance of different zooplankton taxa to environmental conditions.

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