Development of a Triad Method for the Quality Assessment of Brackish Sediments in Flanders

Kristine De Schamphelaere[1,2] (kristine.deschamphelaere@uantwerpen.be), **Ronny Blust**[2] **and Patrick Meire**[1]

[1] Ecosystem Management Research Group, Department of Biology, University of Antwerp, Universiteitsplein 1, B-2610 Wilrijk, Belgium

[2] Systemic Physiological and Ecotoxicological Research Group, Department of Biology, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium

Sediment quality assessment in aquatic systems -

The Triad Method (Chapman, 1986) **- Integration of 3 components:**

Chemical analysis
Degree and nature of pollutant contamination

Ecotoxicological analysis
Ecotoxicological effects (lab tests)

Biological analysis
Effects on the biological community

No evidence of ecotoxicological/ biological effects

No evidence of biological effects in the field

Flemish Triad method applied by the Flemish Environment Agency (VMM) for freshwater sediments: **Need for adapted Triad method for brackish and saline sediments**

Chemistry
Development of adapted set of **quality standards** and **reference values** for micropollutants

→ **Influence of salinity on effect/availability of micropollutants, …**

Ecotox
Development of adapted **set of bioassays** suitable for the assessment of brackish and saline sediments

→ **Salinity range of testorganisms, ecological relevance of test species, …**

Biology
Development of a biological assessment method based on analysis of the macro-invertebrate community

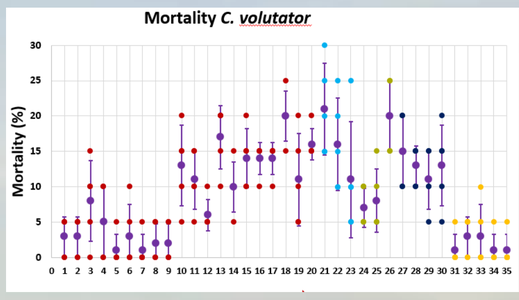
→ **Species composition of brackish and estuarine systems, …**

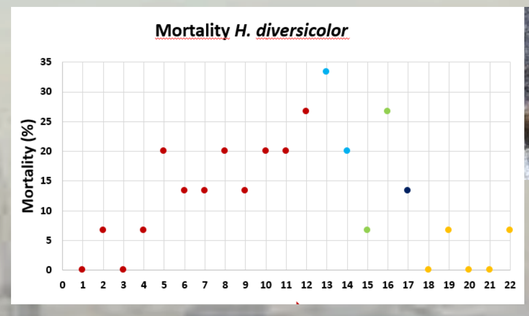
Methods

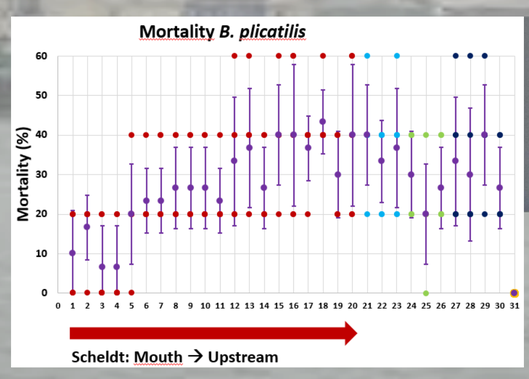
- **Inventory of** existing **sediment quality guidelines** for freshwater, brackish and saline systems → Indicating **set of quality ranges** for micropollutant concentrations
- **Inventory of** existing **biological assessment systems and indices based on benthic invertebrates** → designation of an appropriate method for the evaluation of brackish and estuarine sediments

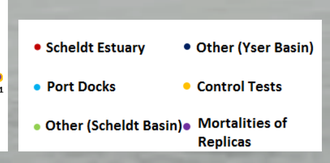
- **3 ecotoxicological tests - 30 sediment samples** (Scheldt estuary and basin, docks of the Port of Antwerp, Yser basin)
- ***Corophium volutator*** 10d sediment test (mortality)
- ***Hediste diversicolor*** 28d sediment test (growth and mortality)
- ***Brachionus plicatilis*** 48h porewater test (mortality)

Results









Integration: **Triad method** for the assessment of brackish sediments

iWT
Sphere
Systemic Physiological & Ecotoxicological Research
University of Antwerp
ECOSYSTEM MANAGEMENT RESEARCH GROUP
IMARES WAGENINGEN UR
Universiteit Antwerpen