The impact of macrozoobenthos on the benthic life stage of zooplankton

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Life cycle strategy of the Baltic cladoceran *Bosmina longispina maritima*

- **Sexual female**
- **Parthenogenic female**
- **Neonate female**
- **Male**
- **Ephippial female**
- **Ephippium**
- **Predation**
- **Bioturbation**

**GAMOGENESIS**
Benthic life stage: a risk or a chance?

- Predation: epibenthic and sediment-dwelling consumers → negative effects

- Bioturbation: particle mixing, change in the sediment stability and water content, biodeposition, resuspension, supply of dissolved oxygen → both positive and negative effects

**Differences in the egg type**

**Functional traits of benthic fauna:**
- type of particle mixing,
- type of burrowing,
- type and degree of mobility,
- type of feeding
Functional traits of the Baltic macrozoobenthos:

- *Monoporeia affinis*
- *Marenzelleria spp.*
- *Macoma balthica*
- *Mysis mixta*

Karlson et al. 2005
Methods:
laboratory scale experiments

...and a lot of sieving mud!

...careful catching of amphipods...

Epibenthic sledge to collect mysids...
Effects of bioturbation on zooplankton emergence: experimental cylinders

Ephippium of *Bosmina longispina maritima*, collected from sediment

Centrifugation: to separate eggs from heavier particles

Effects of macrofauna on the depth distribution of cladoceran eggs: cylinders with a movable bottom
Mysids: predators on *Bosmina* ephippia


The vertical distribution of ephippia determines the ability of the mysids to feed on them.
The effect of macrofauna on *Bosmina* ephippia:

Viitasalo (2007) MEPS 336: 131-140
The effect of macrofauna on *Bosmina* ephippia:

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The effect of macrofauna on *Bosmina* ephippia:

- amphipods
- polychaetes
- bivalves

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Emergence: cladocerans and rotifers (4 wk)

Macrofauna decrease the emergence of both rotifers and cladocerans

Viitasalo et al., submitted
Emergence: copepods (15d)

subitaneous eggs!

The response of Temora exceptional

Viitasalo et al., submitted
Is it **prior to** or **after** hatching that predation regulates the recruitment?

A hatchling of the Leatherback Seaturtle seeking its way from the nest to the sea.

The first moments of the life may be the most dangerous!
Macoma suspension feeding on:

- rotifers
- copepod nauplii
Summary:

- Both predation and bioturbation
- Both positive (*Temora*) and negative effect
- Species-specific differences in both zooplankton and the benthic fauna
Egg burial and predation by infauna and epifauna can regulate the benthic emergence in zooplankton.

Different benthic communities trigger different zooplankton assemblages.

Thank you!