

# The impact of macrozoobenthos on the benthic life stage of zooplankton

**Satu Viitasalo**

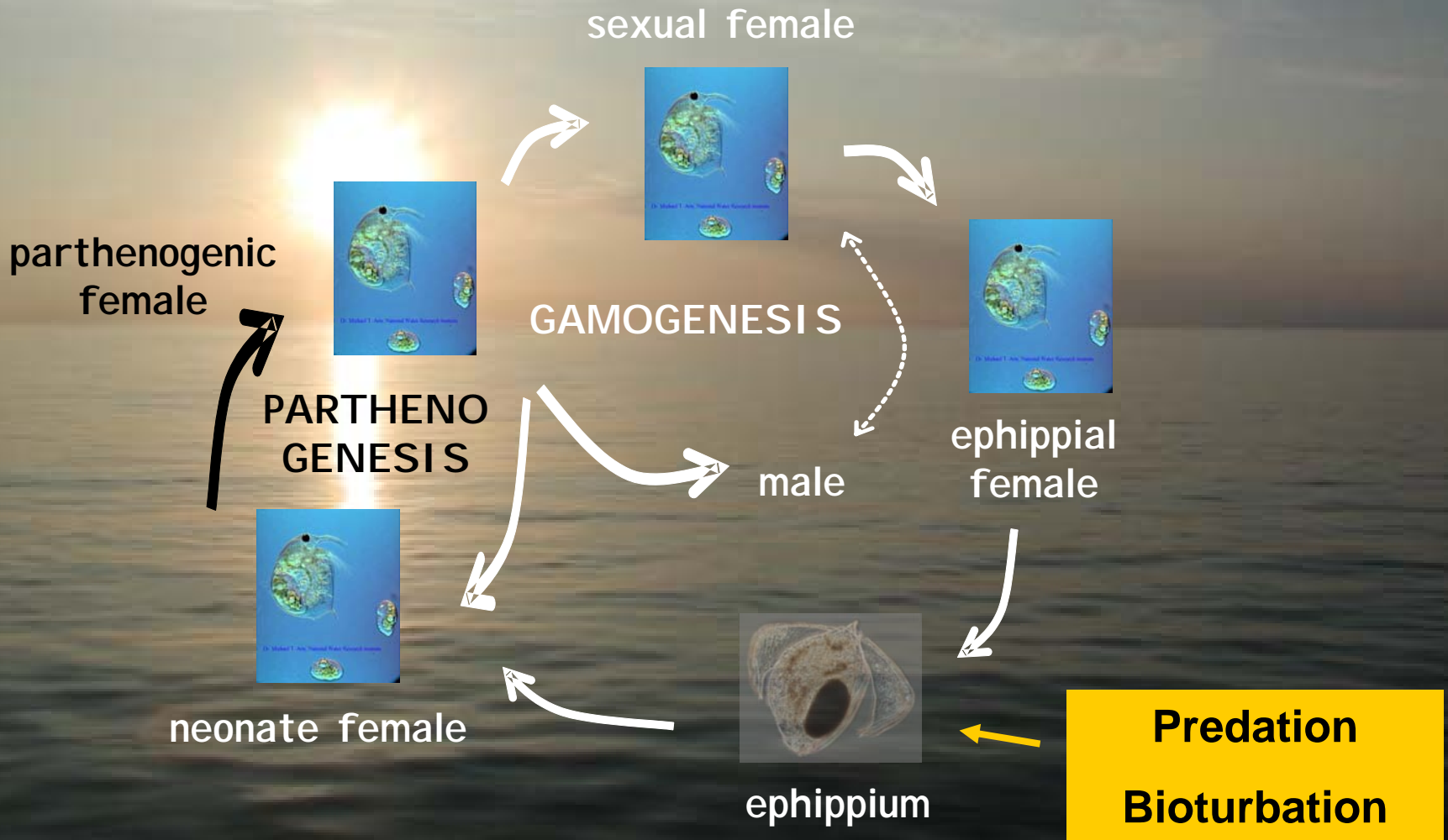
**Finnish Institute of Marine Research**



*Acknowledgements: Staff at the Tvärminne Zoological Station and at FIMR, colleagues in EZECO*

*Funding: Onni Talas and Walter and Andrée de Nottbeck foundations, FIMR*

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



# Benthic life stage: a risk or a chance?

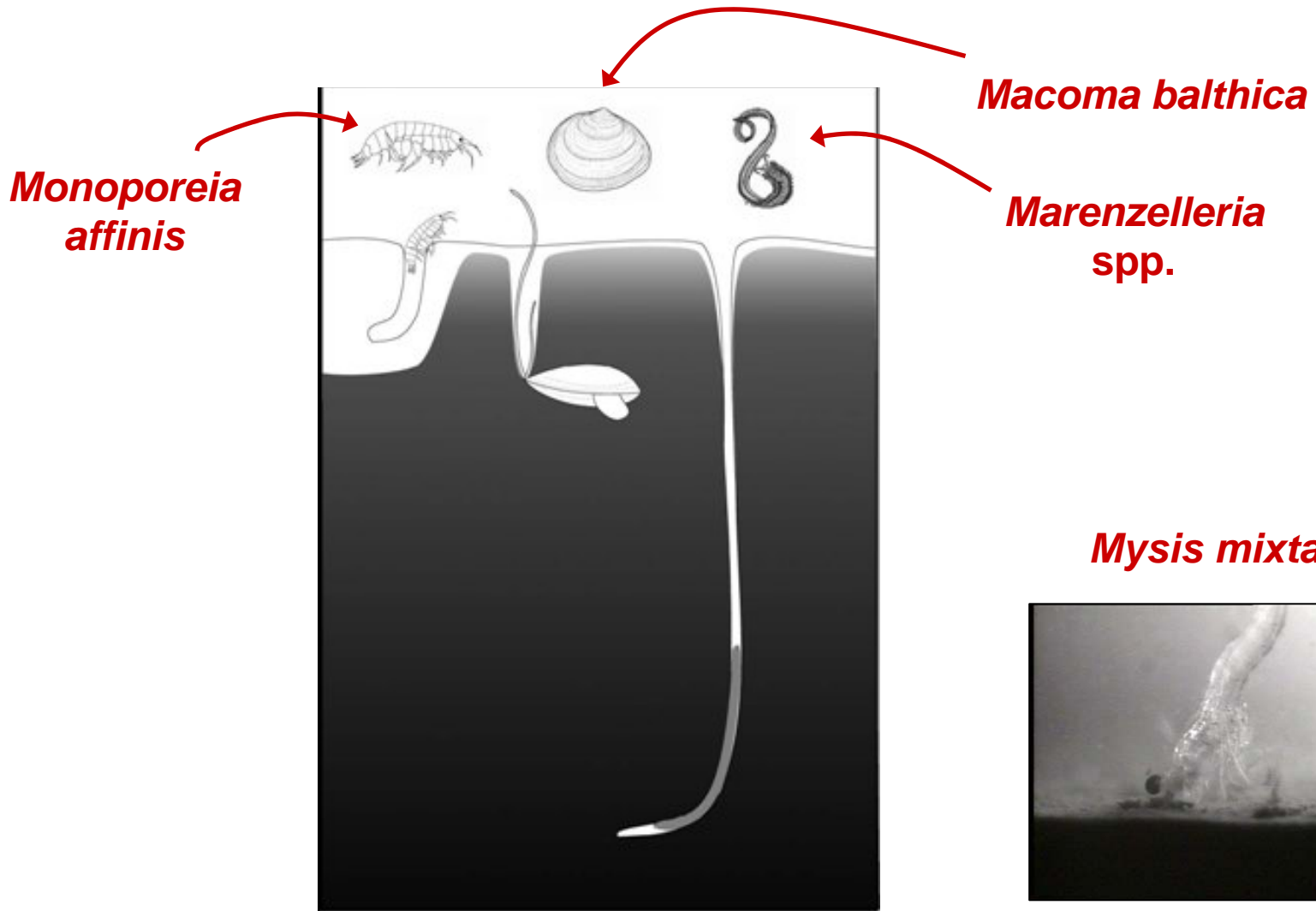
- Predation: epibenthic and sediment-dwelling consumers  
→ negative effects
- Bioturbation: particle mixing, change in the sediment stability and water content, biodeposition, resuspension, supply of dissolved oxygen  
→ both positive and negative effects

## 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:



Karlson et al. 2005

# Methods: laboratory scale experiments

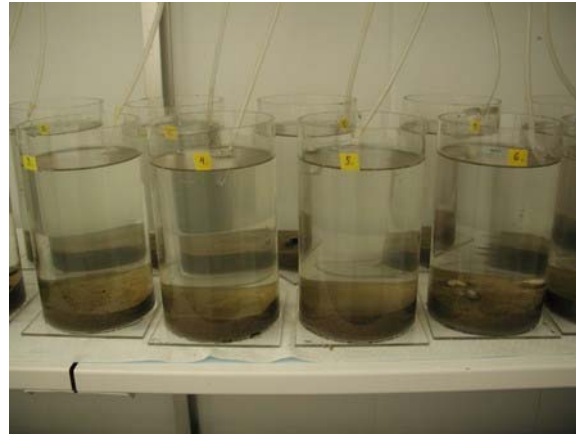


Epibenthic sledge to  
collect mysids...

...and a lot of  
sieving mud!

...careful catching  
of amphipods...



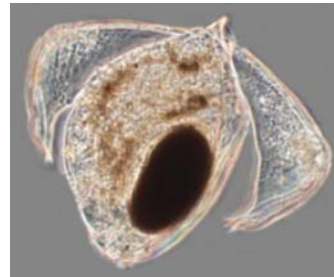


Effects of bioturbation on zooplankton emergence: experimental cylinders



Centrifugation: to separate eggs from heavier particles

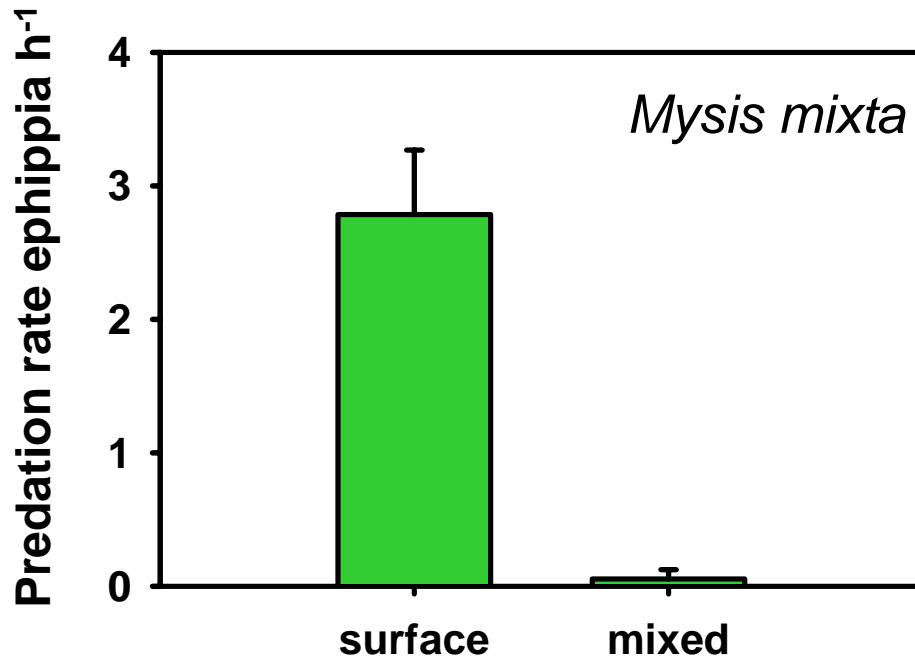
Ephippium of *Bosmina longispina* *maritima*, collected from sediment



Effects of macrofauna on the depth distribution of cladoceran eggs: cylinders with a movable bottom

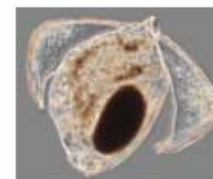
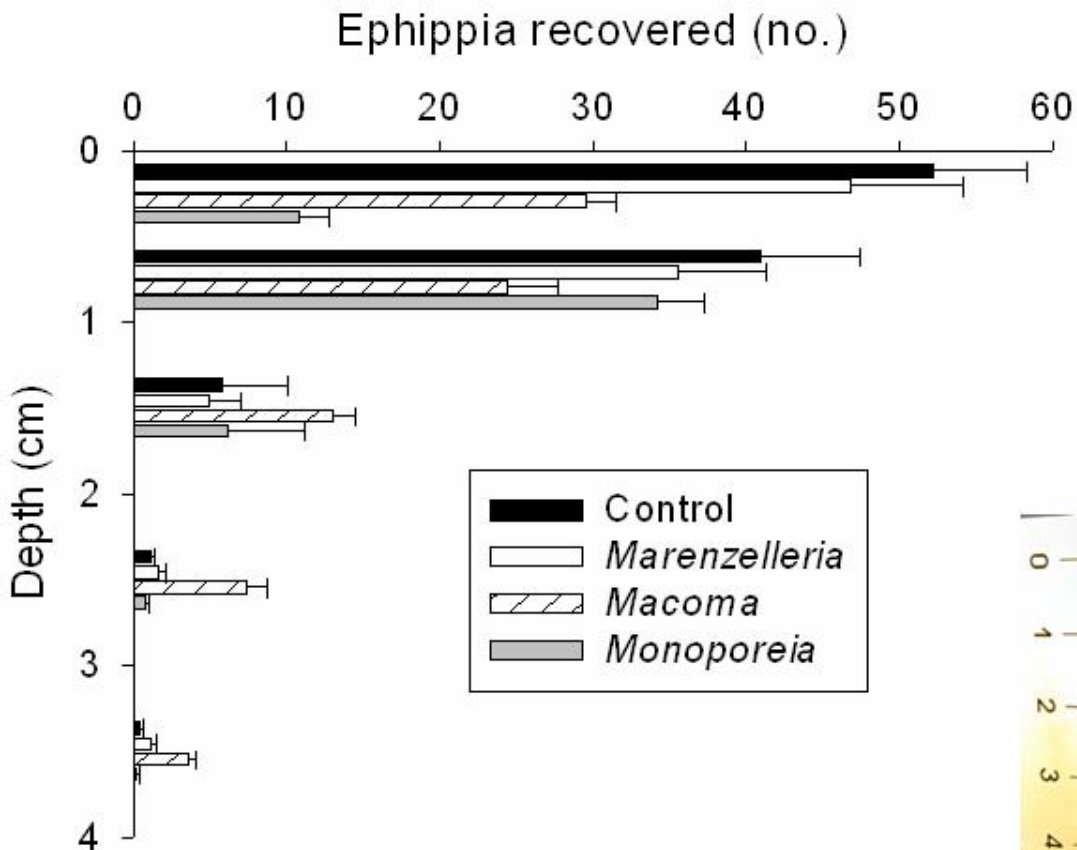
# Mysids: predators on *Bosmina ephippia*

Viitasalo & Viitasalo (2004) MEPS 281: 155-163



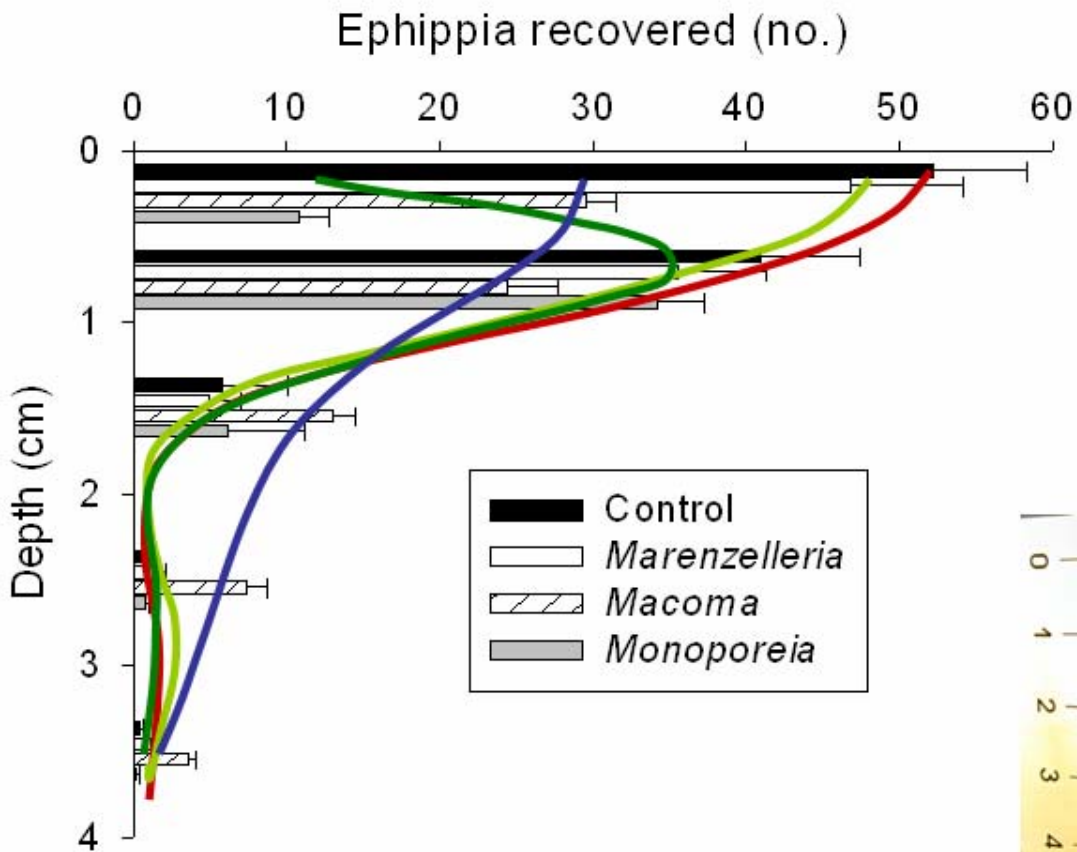
The vertical distribution of ephippia determines the ability of the mysids to feed on them

# The effect of macrofauna on *Bosmina ehippia*:

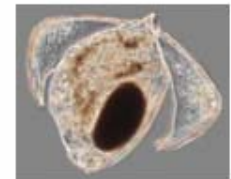
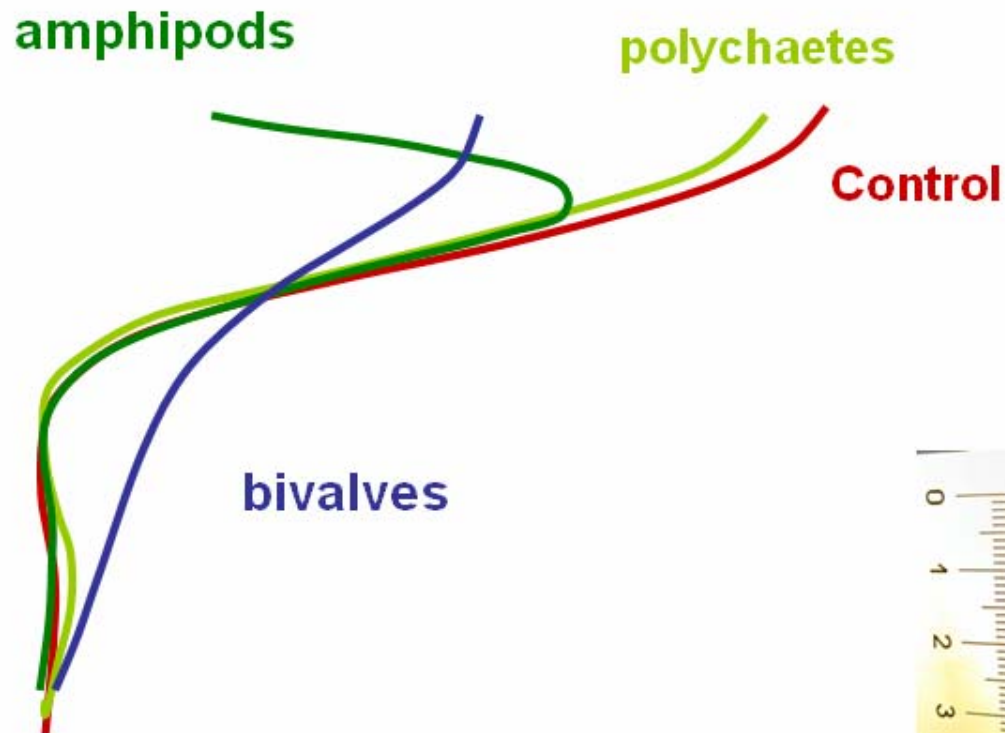


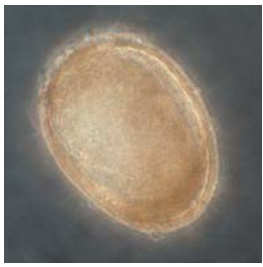


# The effect of macrofauna on *Bosmina ehippia*:

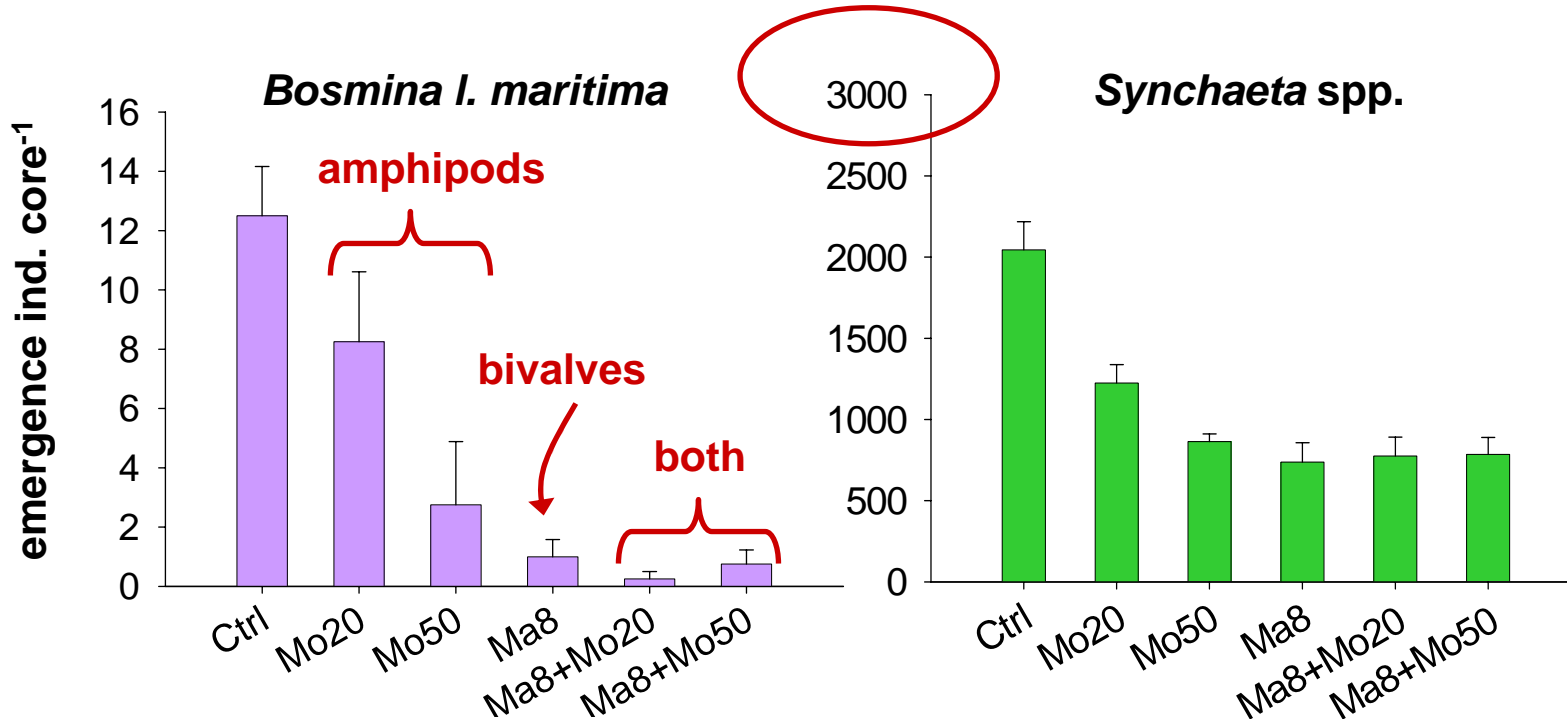
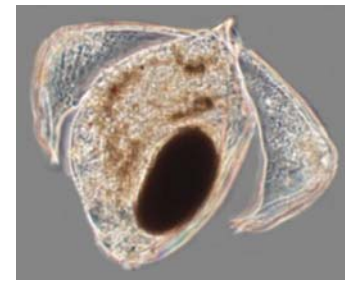


# The effect of macrofauna on *Bosmina ehippia*:



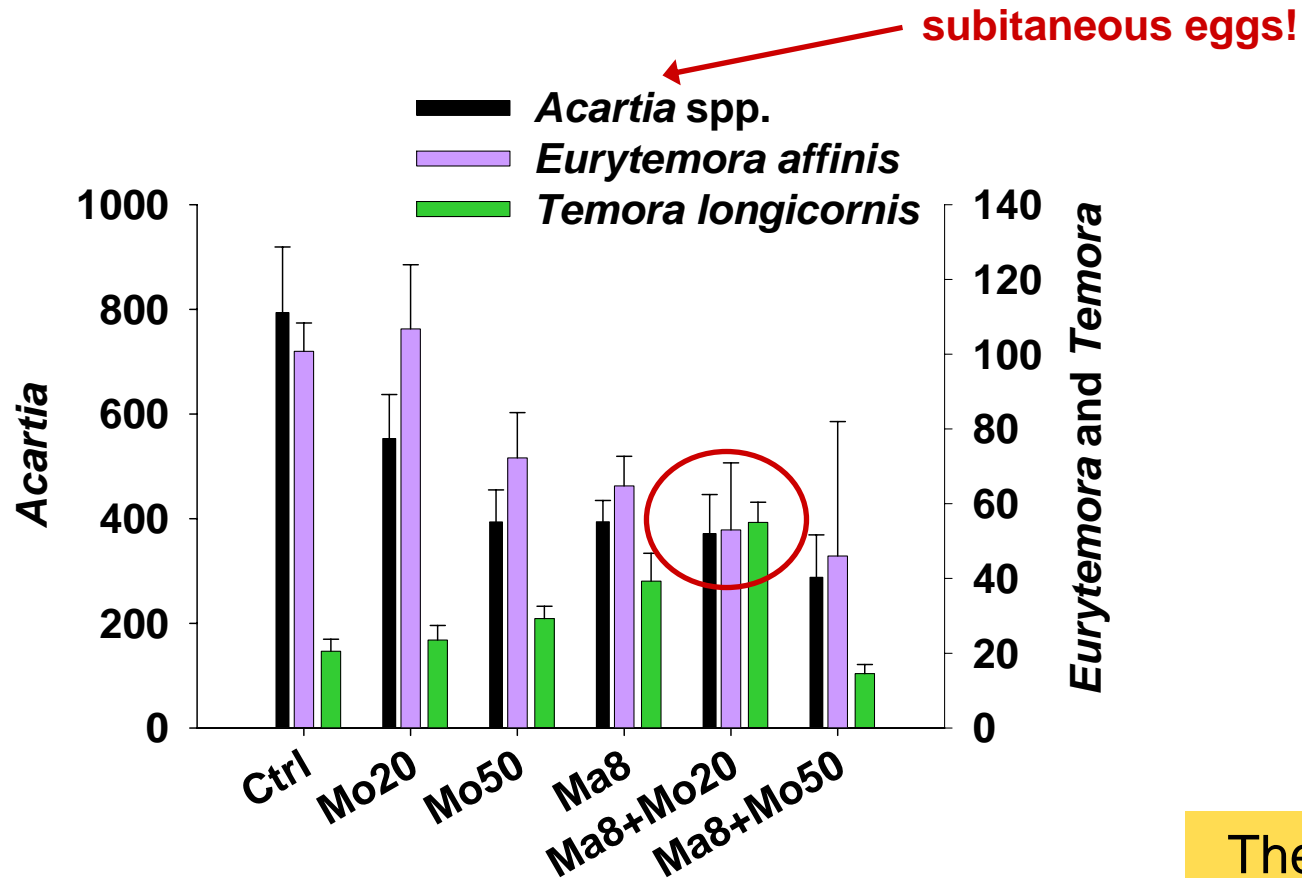
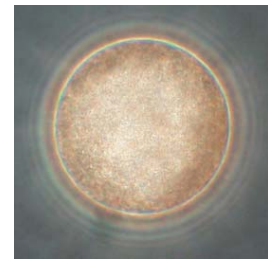


# Emergence: cladocerans and rotifers (4 wk)



Macrofauna decrease the emergence of both rotifers and cladocerans

# Emergence: copepods (15d)



The response of  
*Temora*  
exceptional

Is it **prior to** or **after** hatching that predation regulates the recruitment?

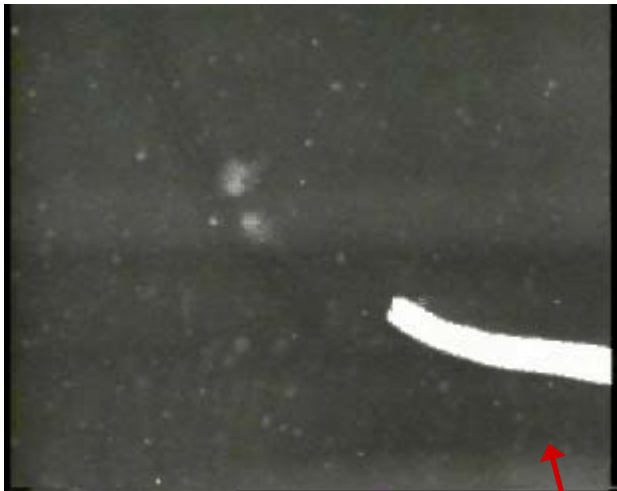


**A hatchling of the  
Leatherback  
Seaturtle seeking its  
way from the nest to  
the sea**

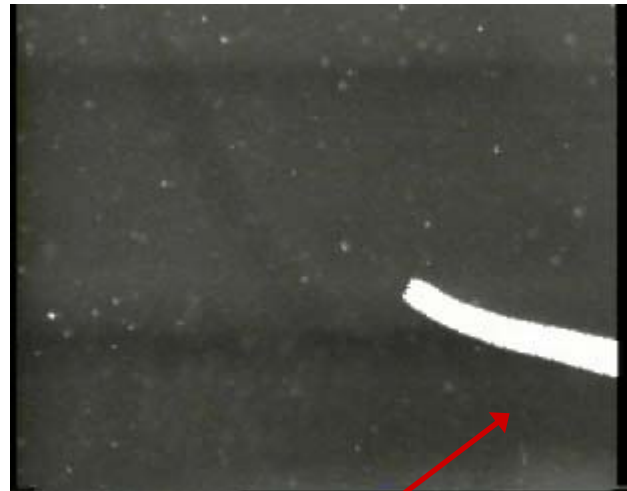
**The first moments of the life may be  
the most dangerous!**

## *Macoma* suspension feeding on:

rotifers



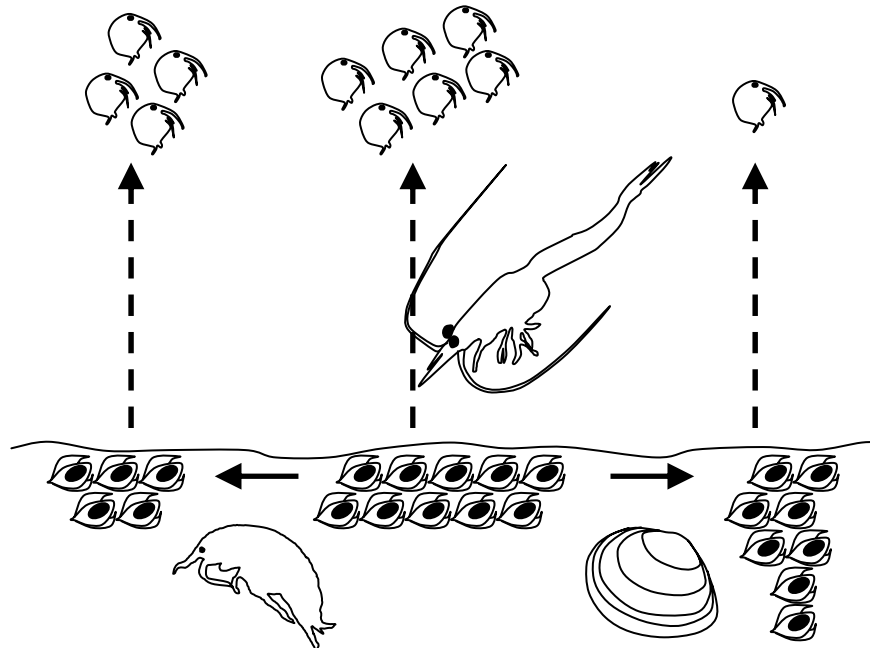
copepod nauplii



**inhalent siphon**

# 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!***