Master-thesis: MARINE CILIATES – seasonal dynamics and food preferences.

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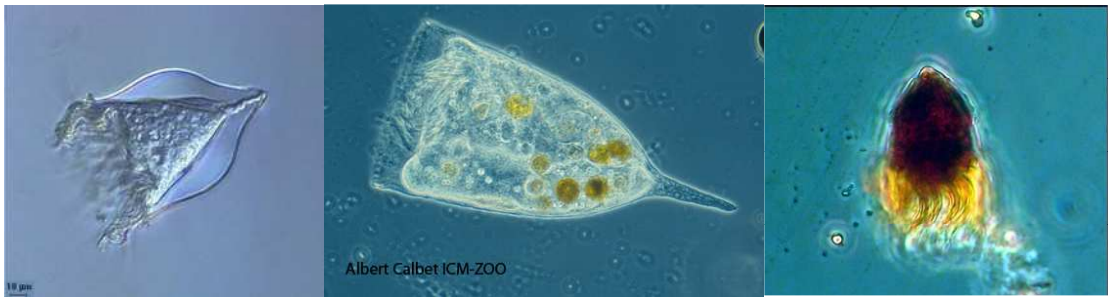
Background:

Ciliates (see photos below) are single celled microzooplankton with a central role in the marine microbial food web. They include heterotrophic and mixotrophic forms, select prey from different trophic levels, and their roles as both grazers and prey are well established (Stoecker & Capuzzo 1990, Calbet & Saiz 2005). Our most recent results and model considerations award ciliates an even more prominent role in the ecosystem as they appear to have a key function in controlling both food web dynamics and composition, activity and diversity of phytoplankton, bacteria and viruses (Thingstad et al. 2014, Larsen et al. 2015, Våge et al. 2016, Sandaa et al. under revision for publ in L&O letters). In order to evaluate whether our understanding is correct it is essential to find out more about their dynamics in nature, to culture them and learn more about what they prefer to eat and determine their content of essential elements.

Practical work:

a) Dynamics of ciliate and their potential prey in Raunefjorden/ Puddefjorden:
   Methodology: Detect and enumerate populations of ciliates by using FlowCam and potential prey populations (single celled protists) by using flow cytometer. Characterize physical (temperature, salinity) and chemical (nutrients, elemental composition) properties of the water they are collected from.

b) Produce viable ciliate-cultures to expand our knowledge on their preferred diet and to obtain realistic P and C content values for relevant ciliate species.
   Methodology: Collect water from Raunefjorden/Puddefjorden, remove larger zooplankton by screening through mesh and amend the water with low concentrations of seawater medium and with wheat grains (to provide bacteria and heterotrophic flagellates) or with low concentrations of cultured phytoplankton to stimulate the growth of ciliate populations and find out what they prefer to eat.



Possible expansions: Pick single ciliates to establish clonal cultures, characterize cultured species by molecular tools.

Litterature:

Calbet & Saiz 2005 Aq Micr Ecol 38: 157-167;
Larsen et al 2015 L&O 60: 360-374;
Stoecker & Capuzzo 1990 J Pl Res 12: 891-908;
Thingstad et al 2014 PNAS, doi:10.1073/pnas.1400909111
Våge, S., Pree, B. and Thingstad, T. F. 2016. EMI doi:10.1111/1462-2920.13391