

# Effects of seasonality and spatial heterogeneity on Polar cod (*Boreogadus saida*) diet in Svalbard waters.



Photo: Peter Leopold

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*Effects of seasonality and spatial heterogeneity **on gadoid diet in Svalbard waters.***



Photo: Thomas de Lange Wenneck

- What is seasonality?
- What is spatial heterogeneity?
- Which species are affected?
- Why does it matter?

# Boreogadus saida (polar cod)

Importance in arctic trophic web

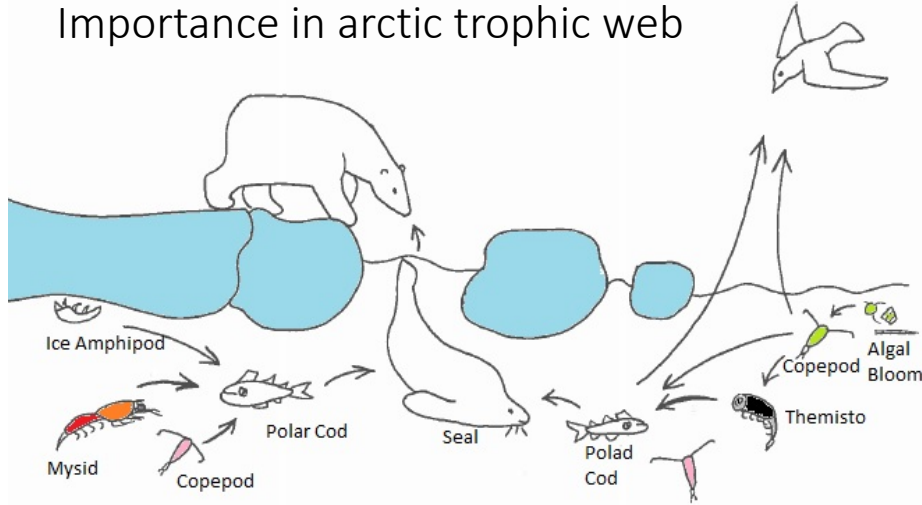


Fig. 2: Trophic interactions in the marginal ice zone.

- Circumpolar distribution
- Highly mobile and abundant
- True Arctic species
  
- Up to 25 cm in length (38 cm max)
- Eurythermal and euryhiline

Distribution and realized habitat

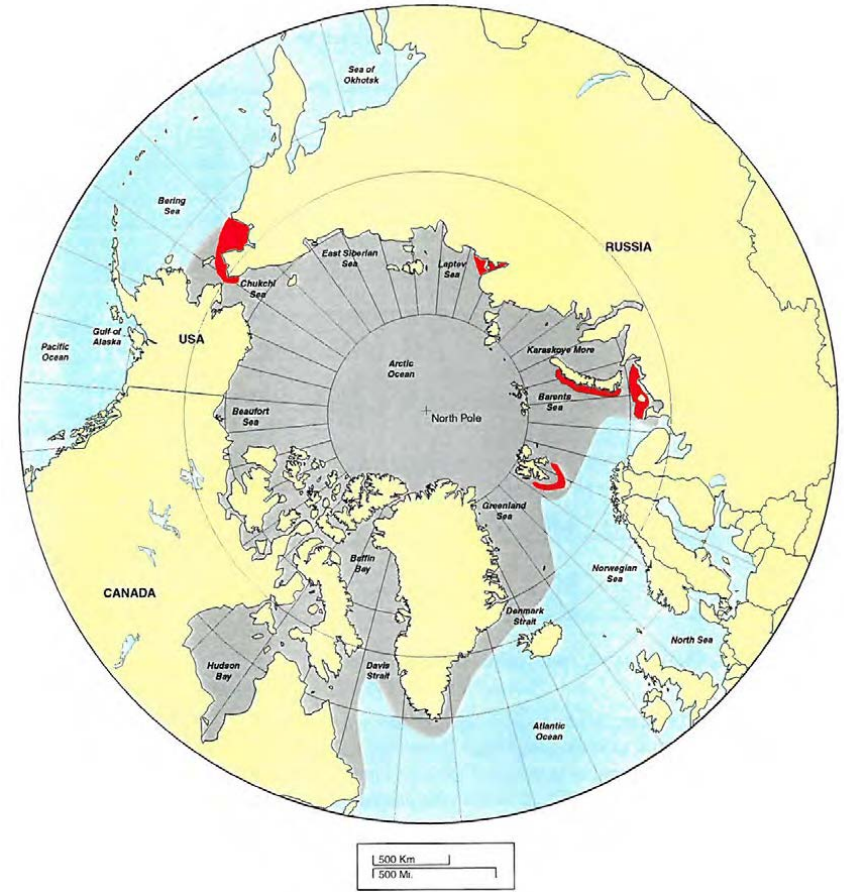


Fig. 1: Circumpolar distribution of Boreogadus saida across the Arctic ocean.

## Diet

- Larvae feed on copepods
- Adults feed on copepods, amphipods, euphausiids, and decapods

## Case study (Nahrgang et al. 2014):

- Diet vary based on geographical location
- More diverse in Atlantic region



Hopcroft/NOAA



*Thysanoessa inermis*  
Hopcroft/US/NOAA/CoML

Photos: NOAA, <http://www.arcodiv.org/>



Mature female copepods from Kongstjorden, Svalbard.

*Calanus hyperboreus*

*Calanus glacialis*

*Calanus finmarchicus*

Foto: IdaB & DagA

## Polar cods: visual predators?

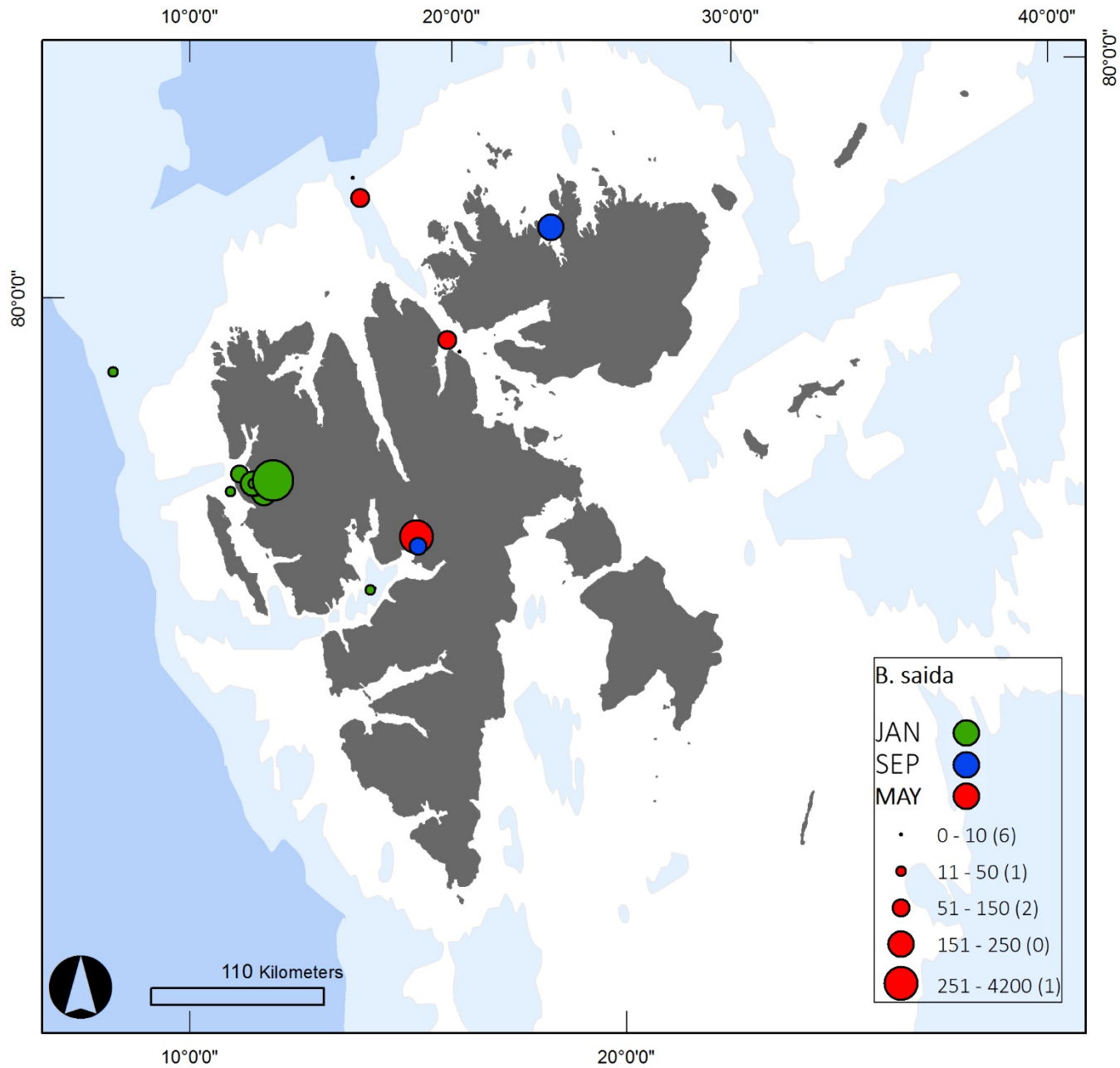
- Unable to feed below a certain light threshold (Girsa II 1961)
- Avoid areas above that light threshold (Benoit et al. 2010)
- Young eyes might be less adapted to lower light levels (Fernald 1990)



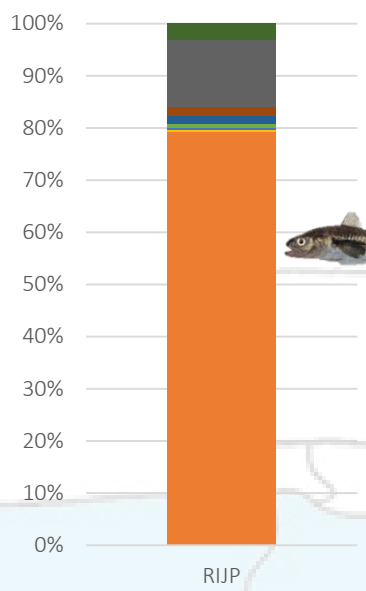
- Bottom trawl & Pelagic trawl from R/V Helmer Hanssen
- AB320 cruise, AB202 cruise, Marine night cruise, AB321, ABC cruise
- Use and reformat existing data

- \* Biological measurements
- \* Collect stomachs
- \* Id preys in stomach

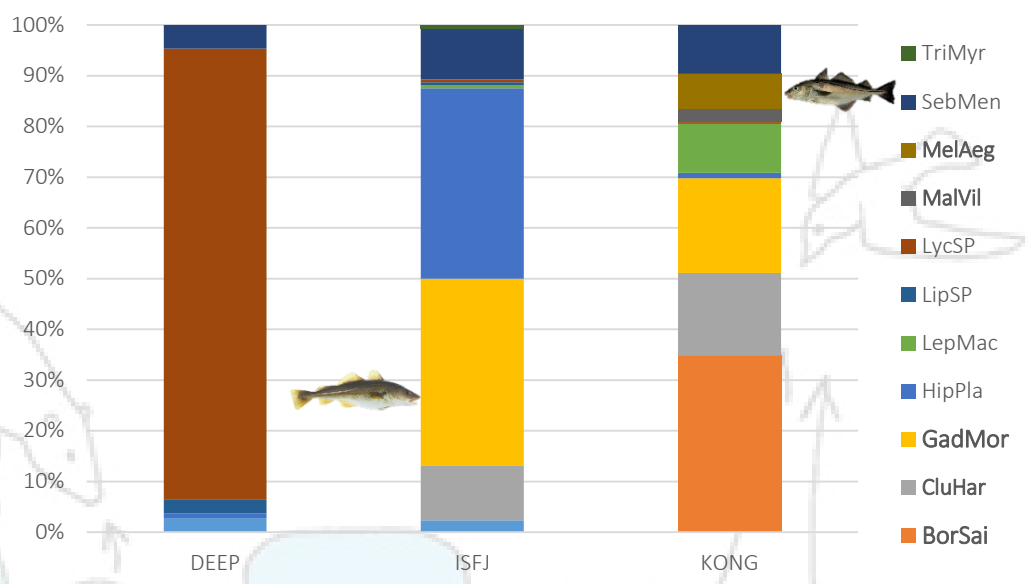




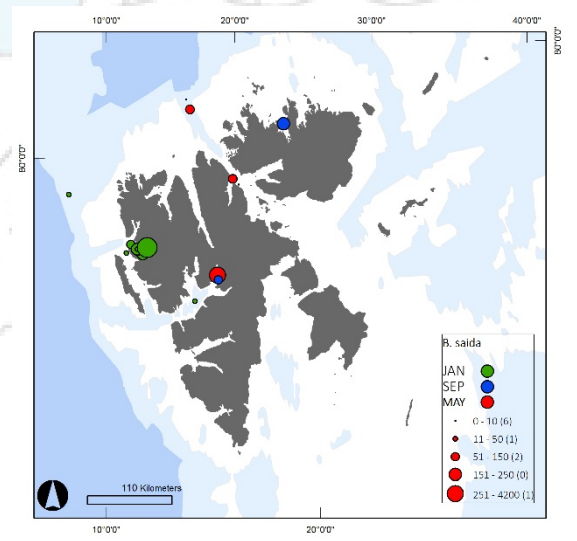
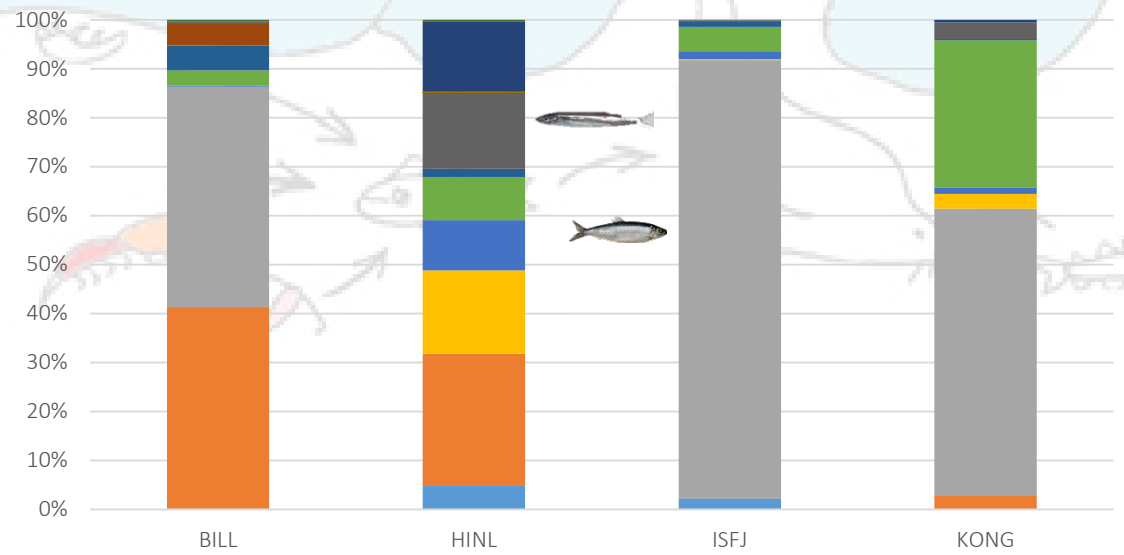
Fish community composition in Sep 2014



Fish community composition in Jan 2014 and Jan 2015



Fish community composition in May 2015



### *B. saida*

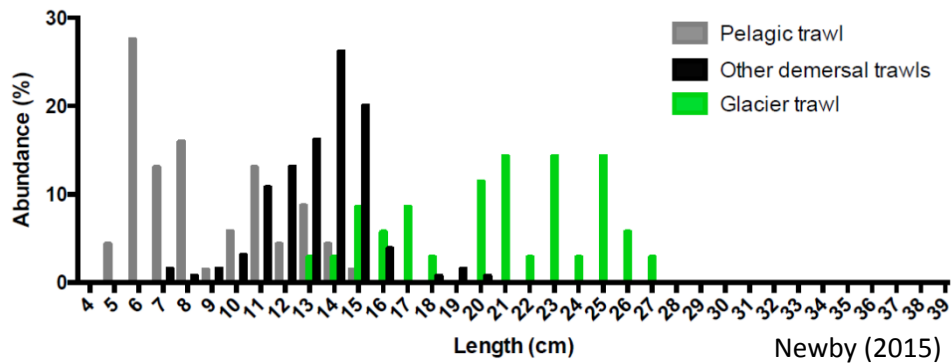
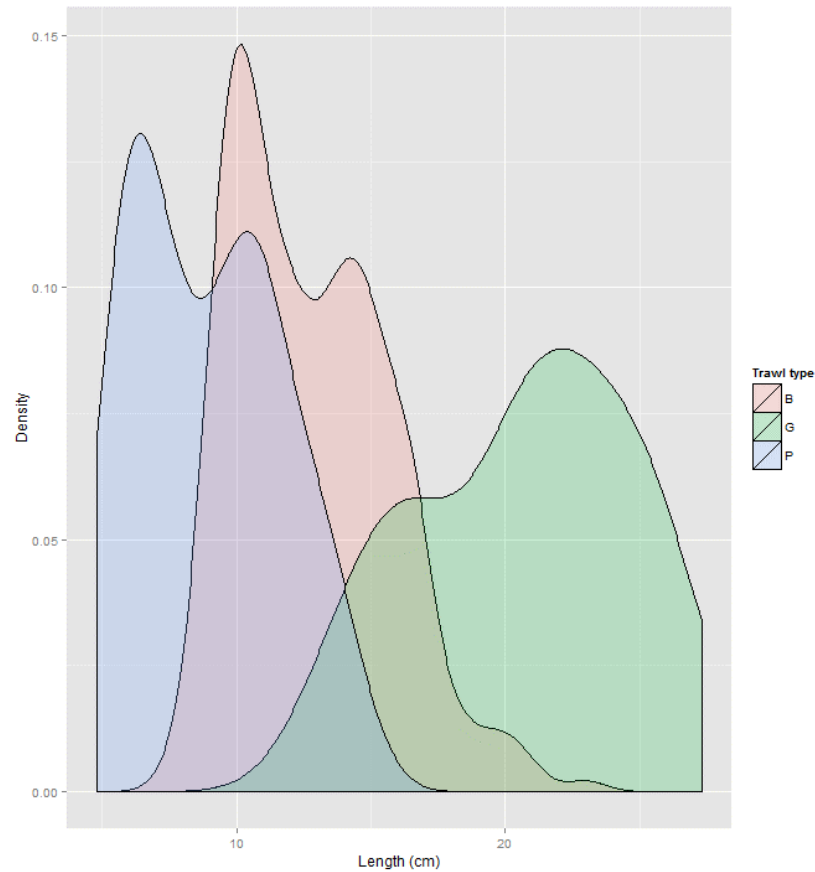
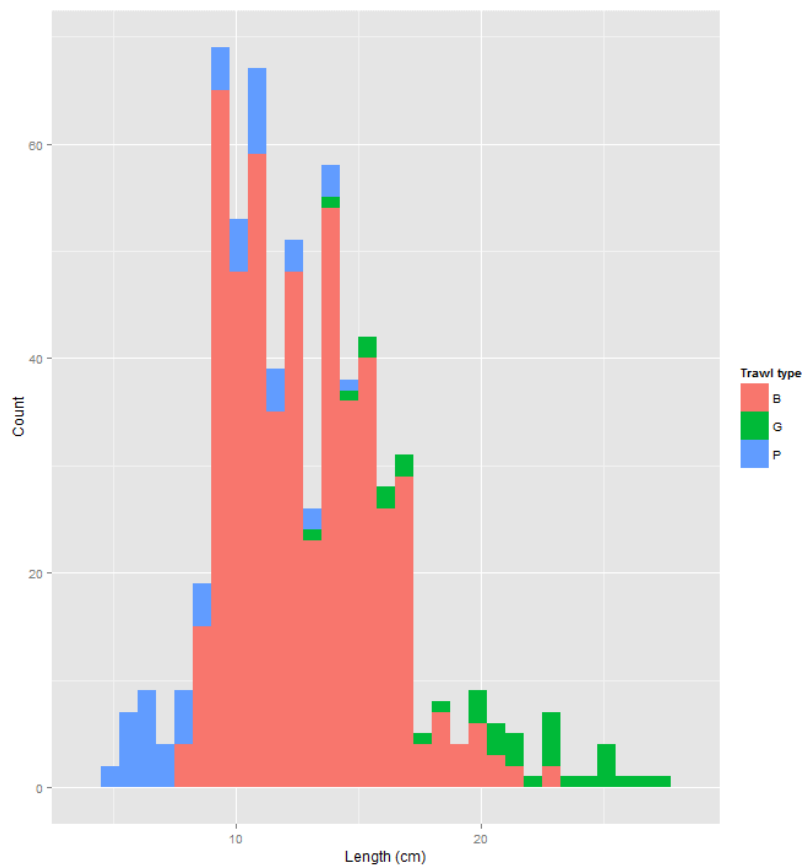
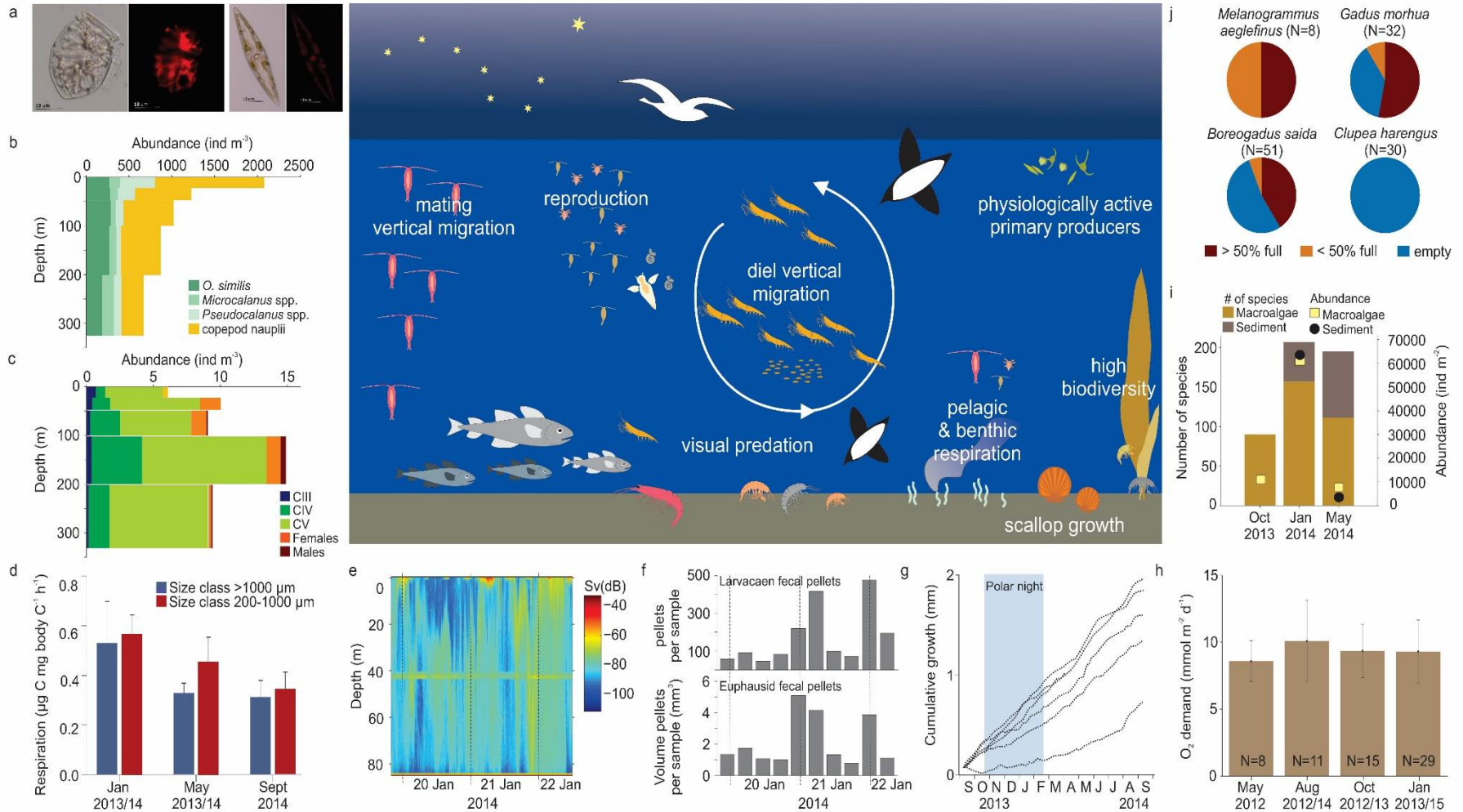


Photo: Thomas de Lange Wenneck





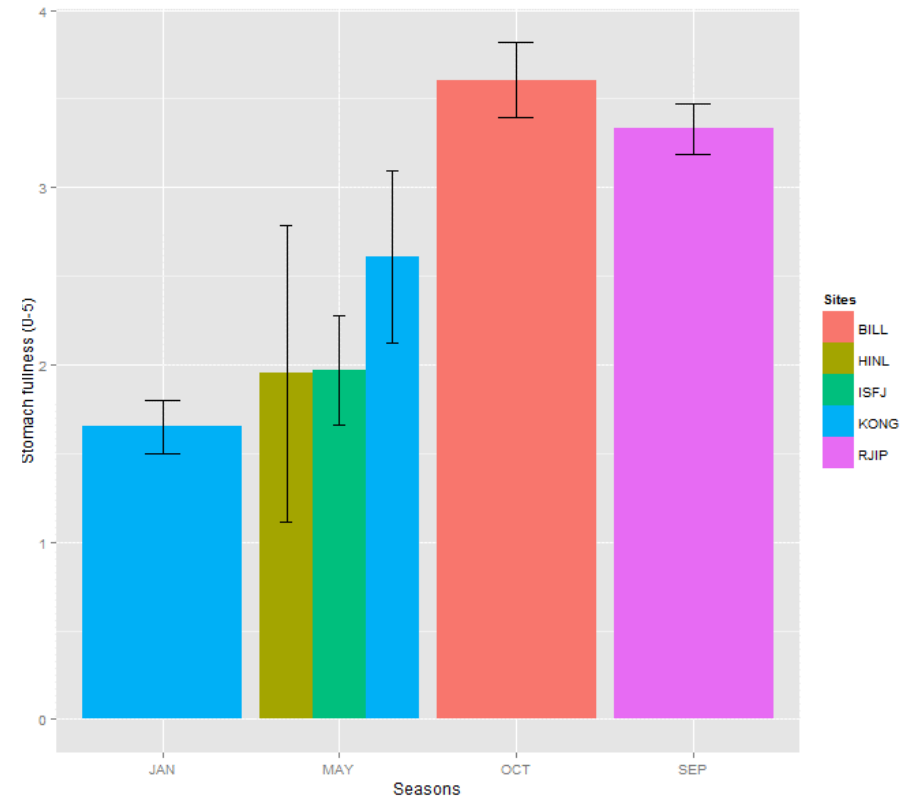
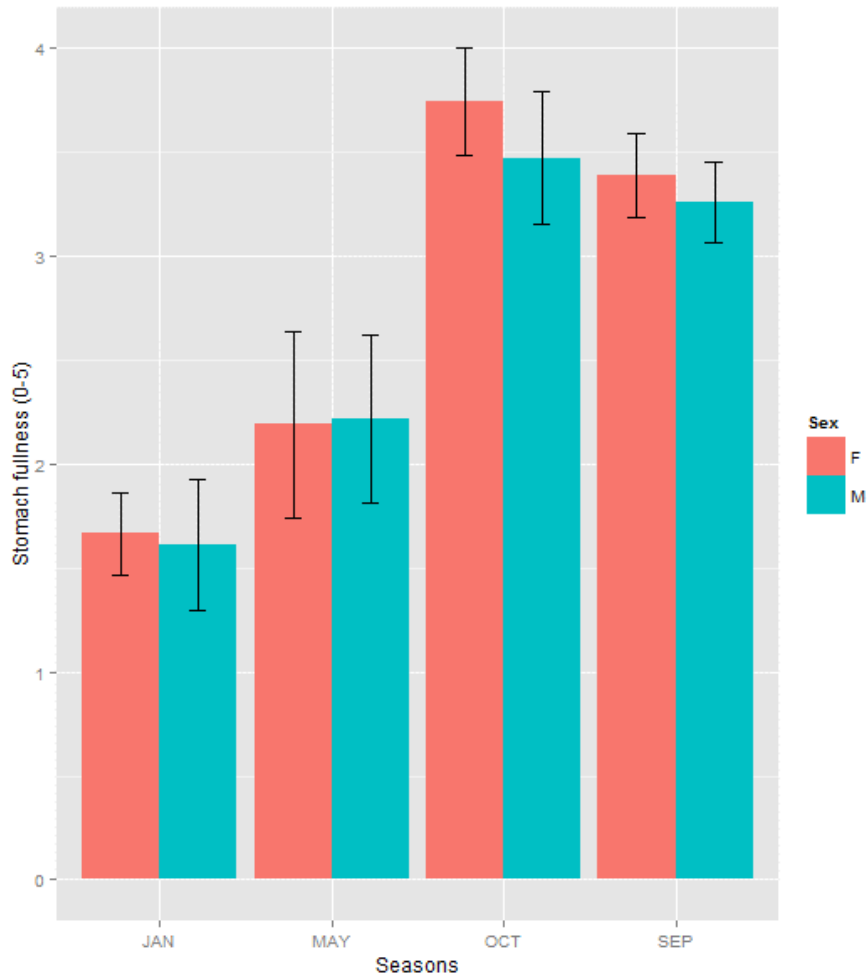
# The Kongsfjorden marine ecosystem during the polar night



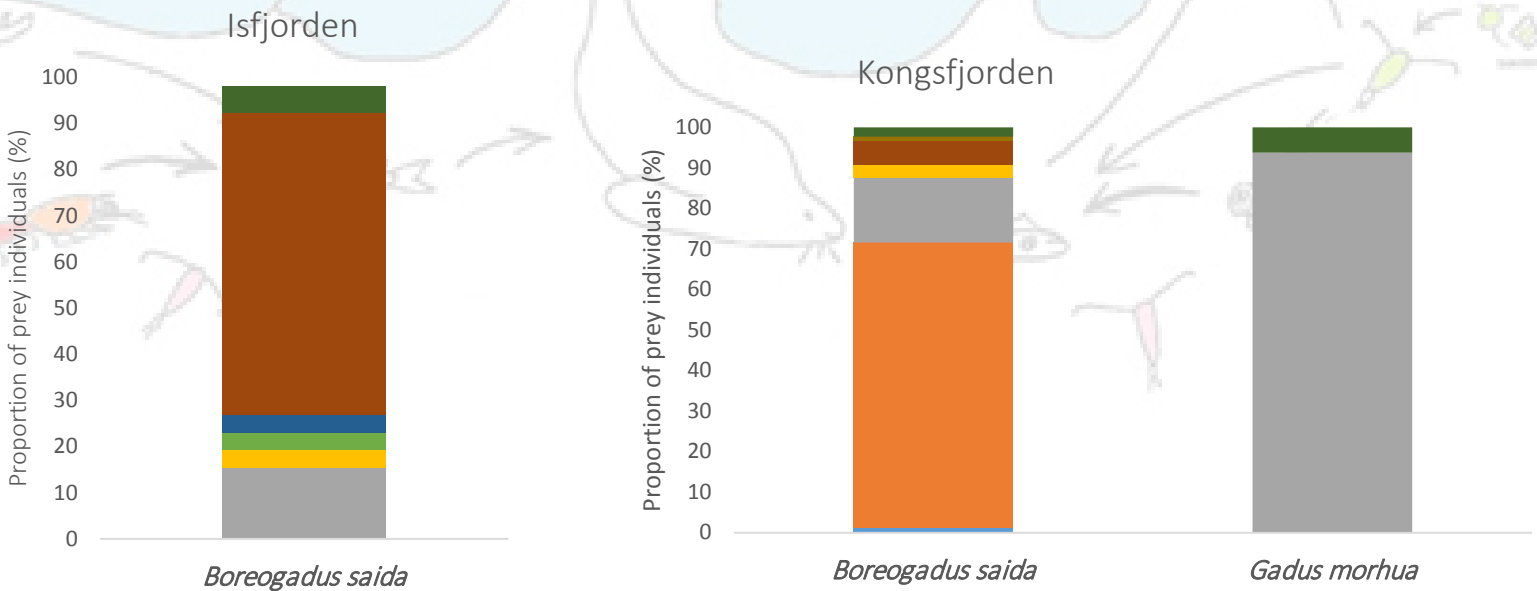
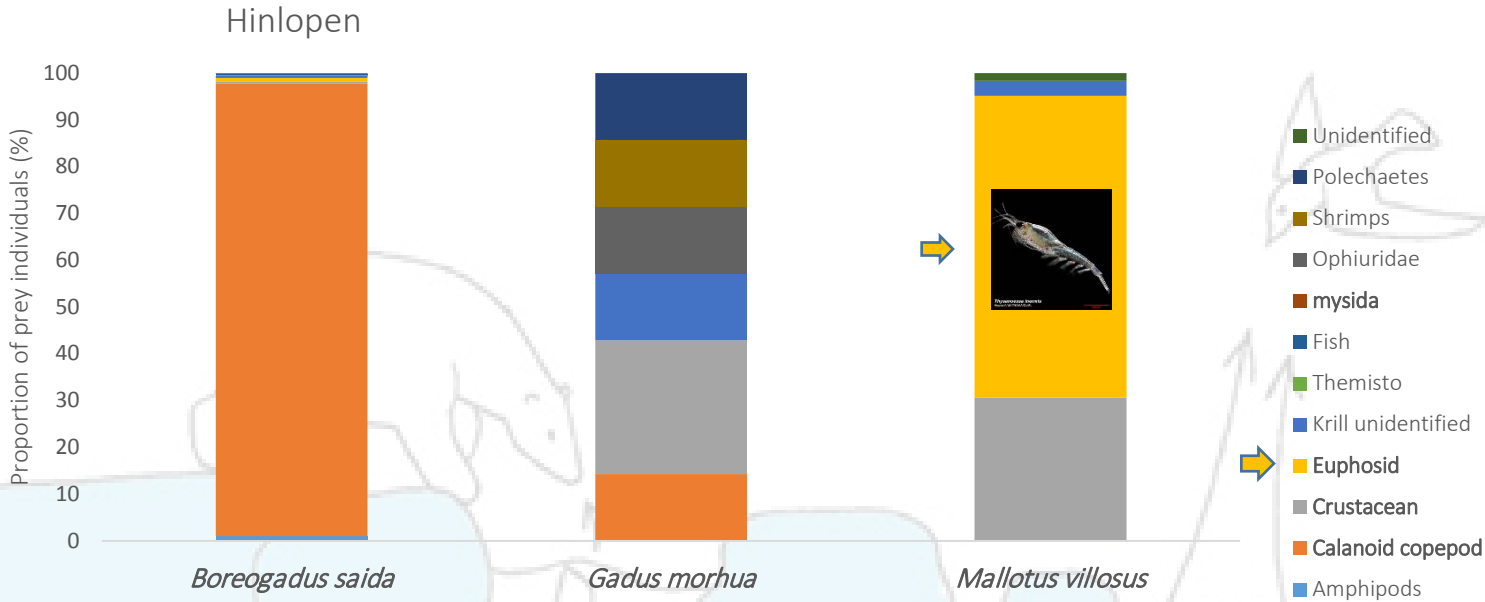
## *B. Saida* stomach fullness across sites and seasons



Photo: Thomas de Lange Wenneck



# Prey composition (numerical) from fish stomachs in May 2015



# Prey composition (numerical) from *B. saida* stomachs in May 2015

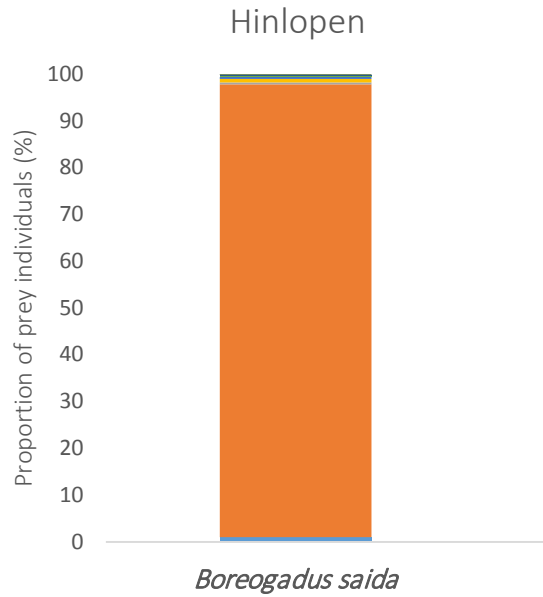
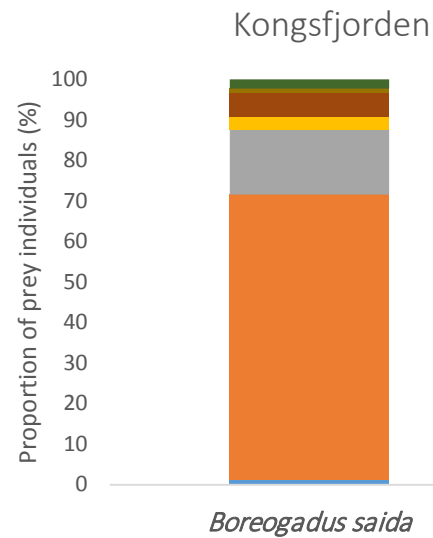
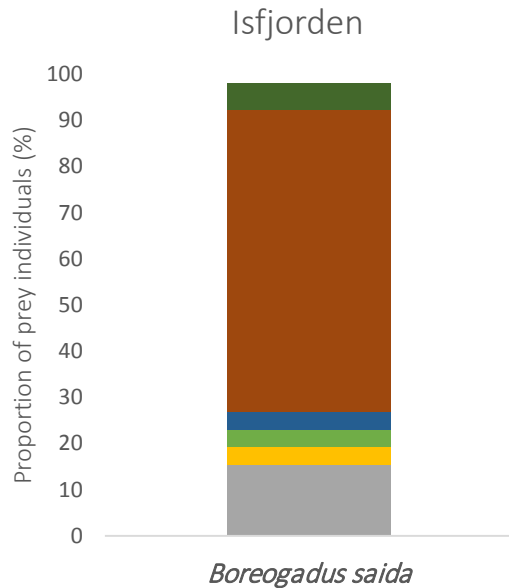
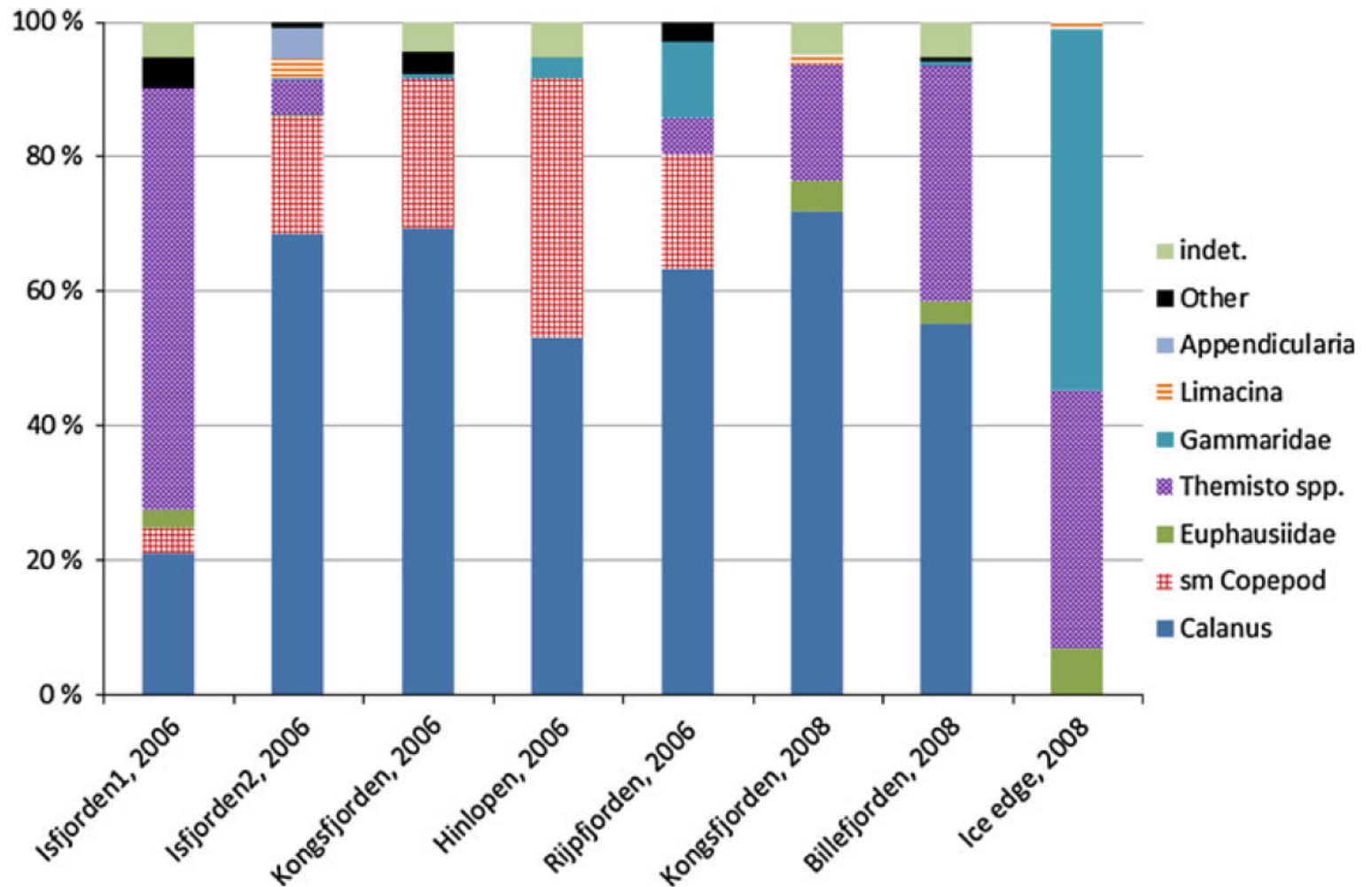


Photo: Thomas de Lange Wenneck

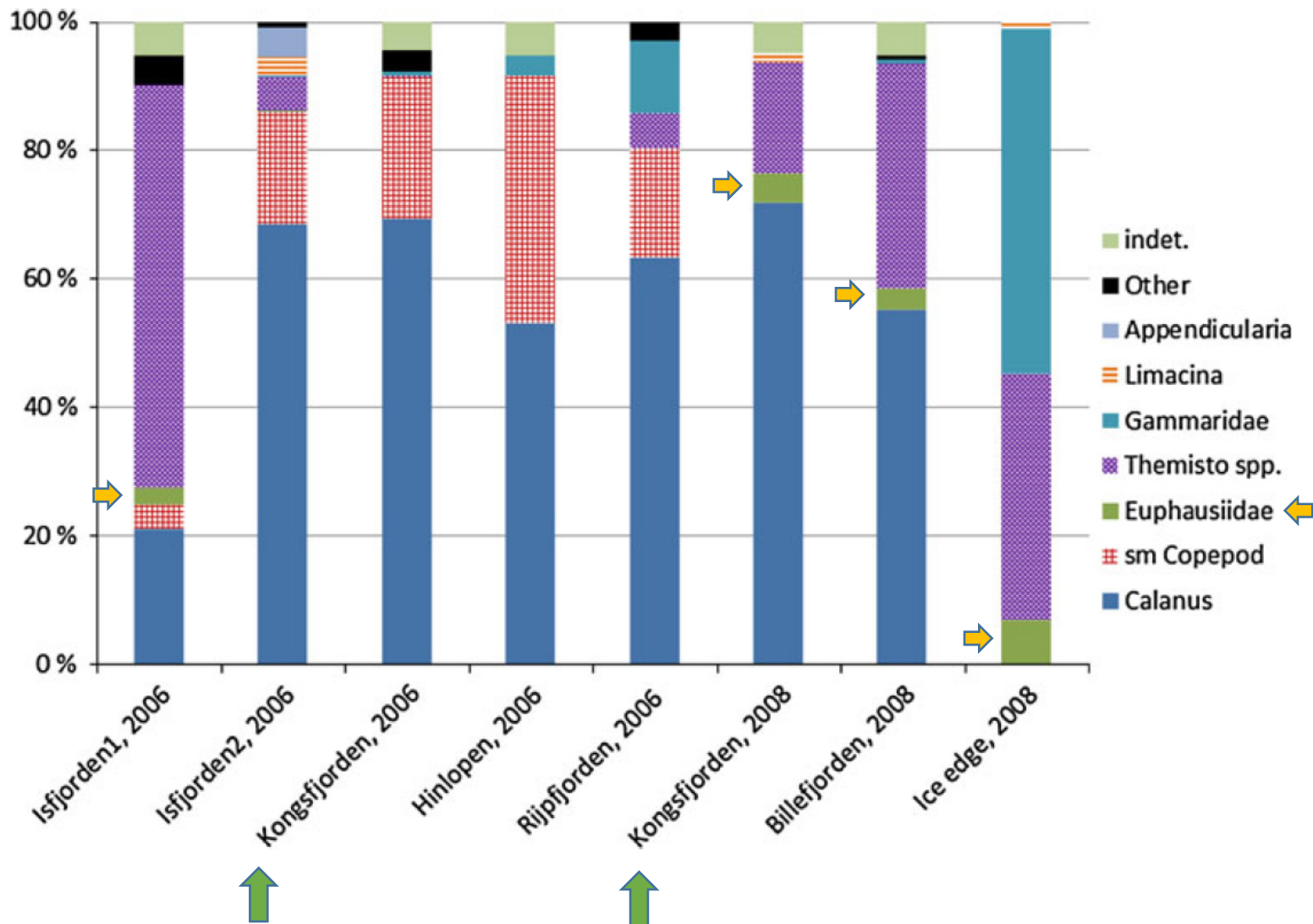
- Unidentified
- Polechaetes
- Shrimps
- Ophiuridae
- mysida
- Fish
- Themisto
- Krill unidentified
- ➔ ■ Euphosid
- Crustacean
- Calanoid copepod
- Amphipods



Percent composition of stomach content of *B. saida* collected in pelagic trawls in **August** and **September** 2006/2008 (numerical)

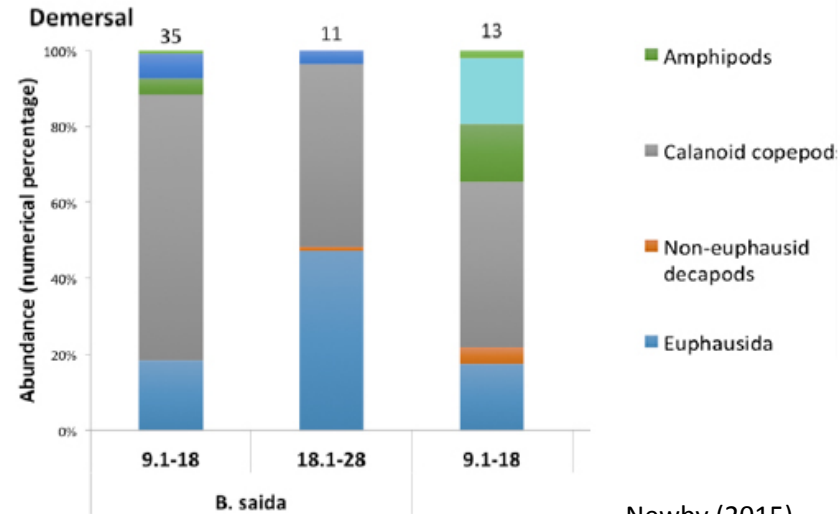
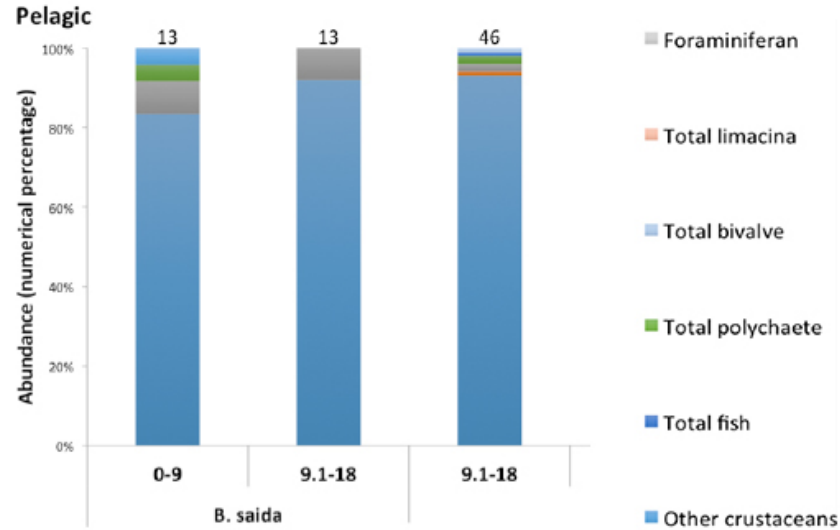


Percent composition of stomach content of *B. saida* collected in pelagic trawls in **August** and **September** 2006/2008 (numerical)

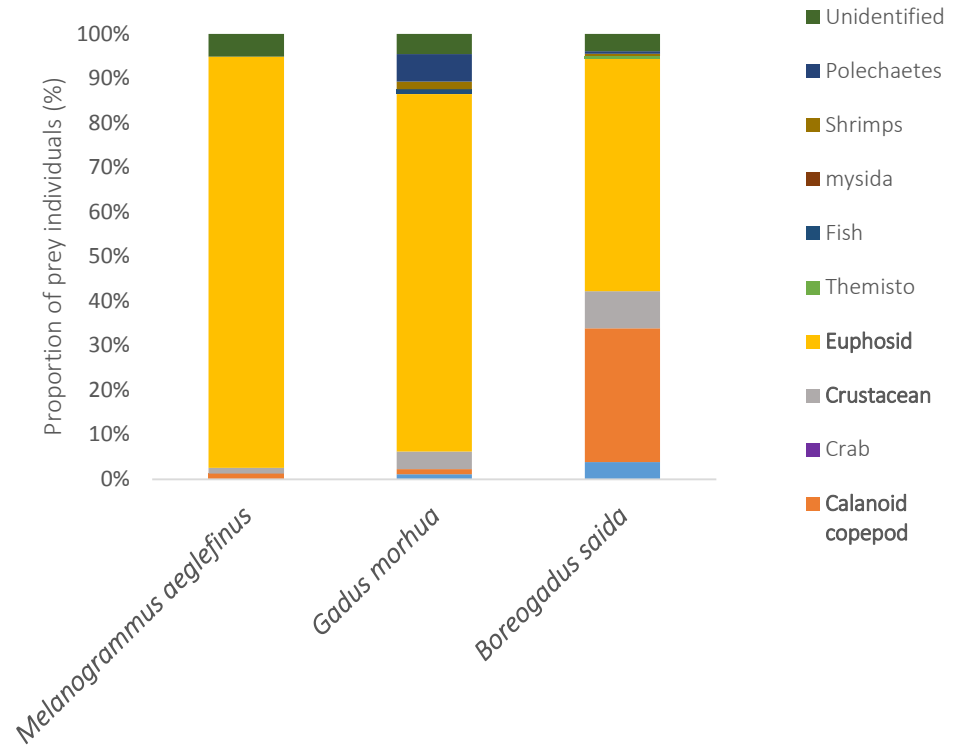


# Percent composition of stomach content in Kongsfjorden fish species in January

## Jan 2014



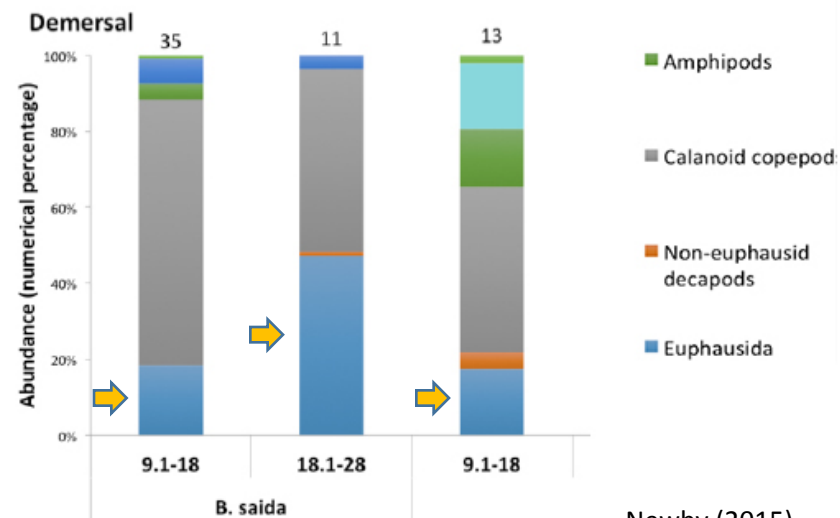
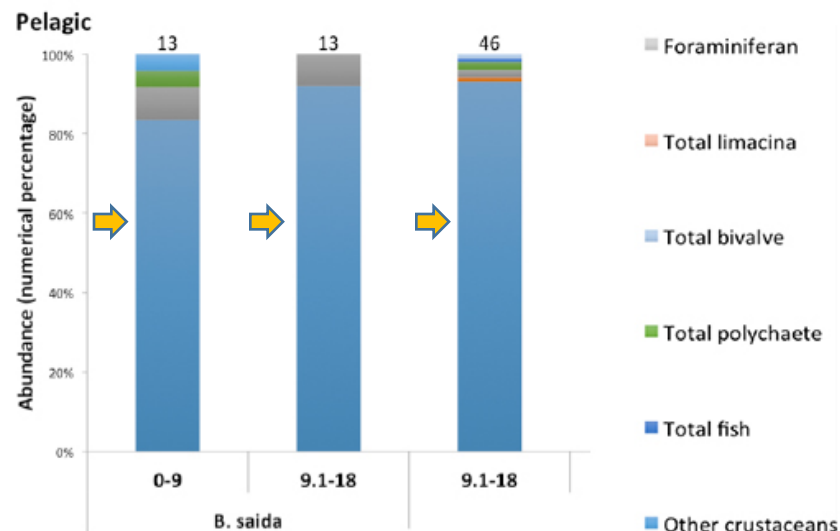
## Jan 2015



Newby (2015)

# Percent composition of stomach content in Kongsfjorden fish species in January

## Jan 2014



## Jan 2015

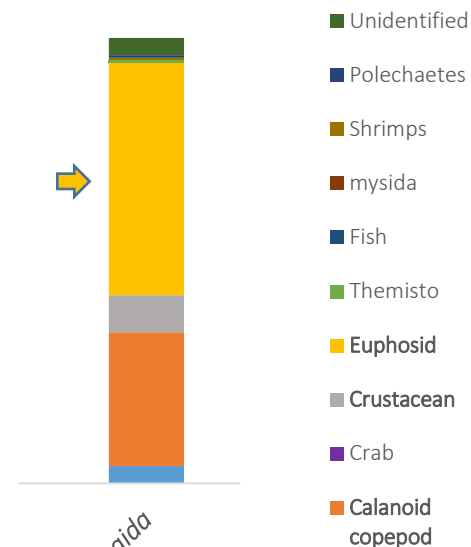


Photo: Thomas de Lange Wenneck





*Thank you*



Photo: Thomas de Lange Wenneck

Credits: Ivan Aivazovsky