


# Winners and losers of Atlantification

The degree of ocean warming affects the structure of Arctic microbial communities

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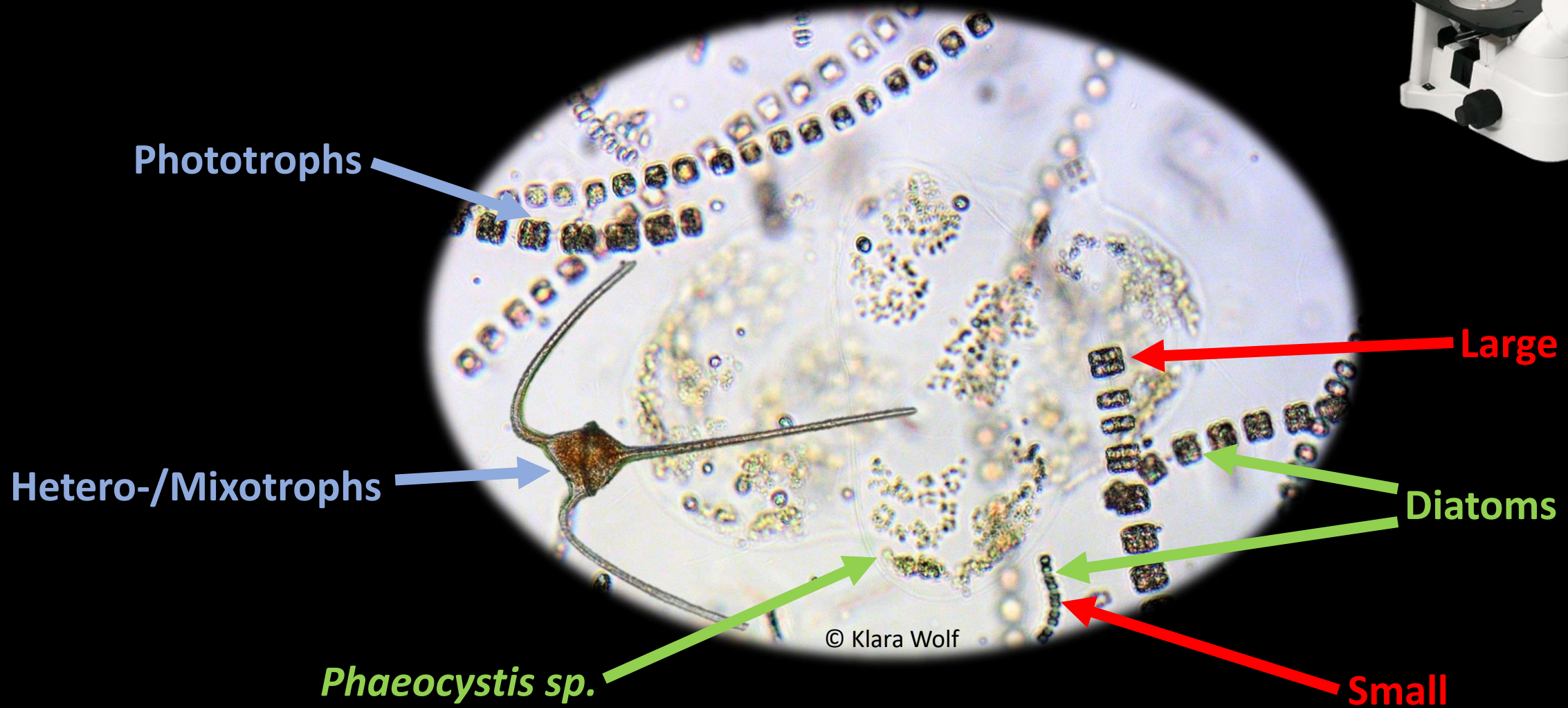
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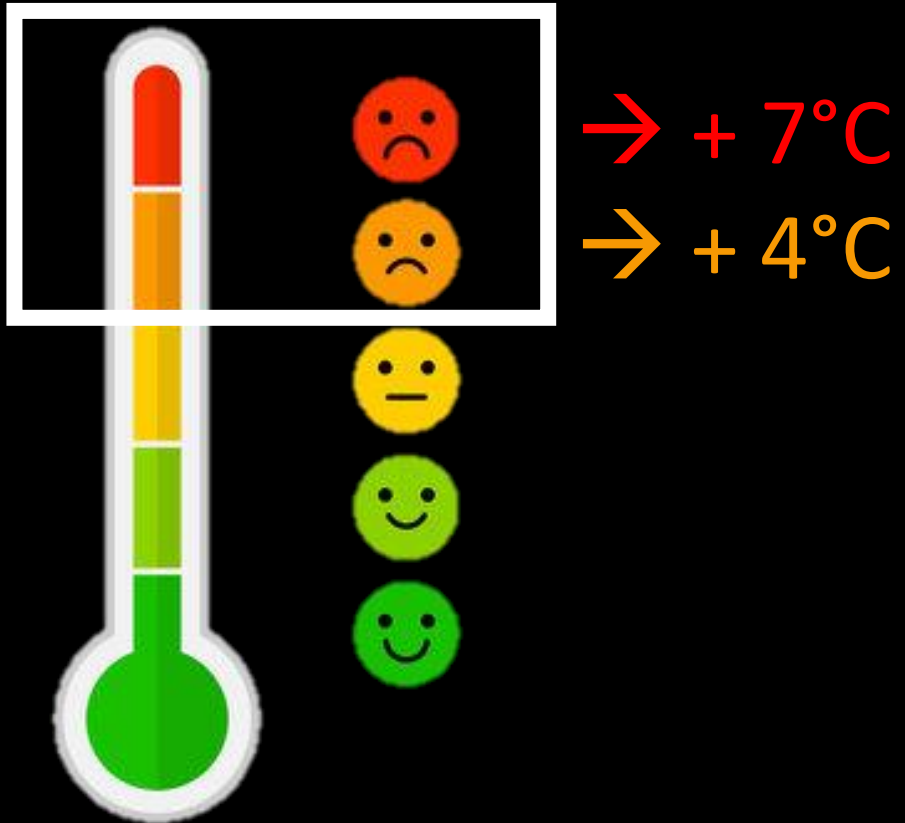
# Eukaryotic microbes



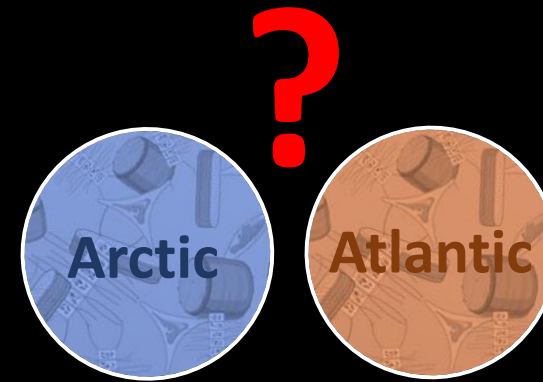
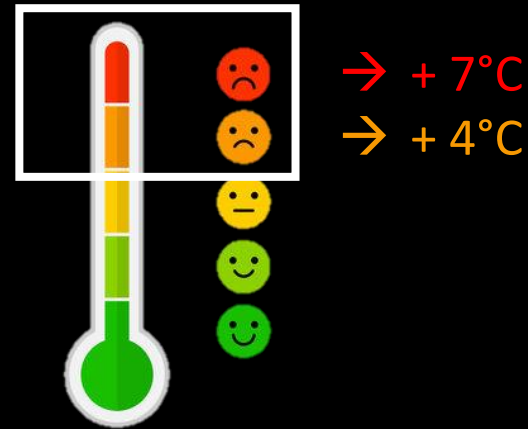
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*Phaeocystis sp.*

# Climate change & Atlantification

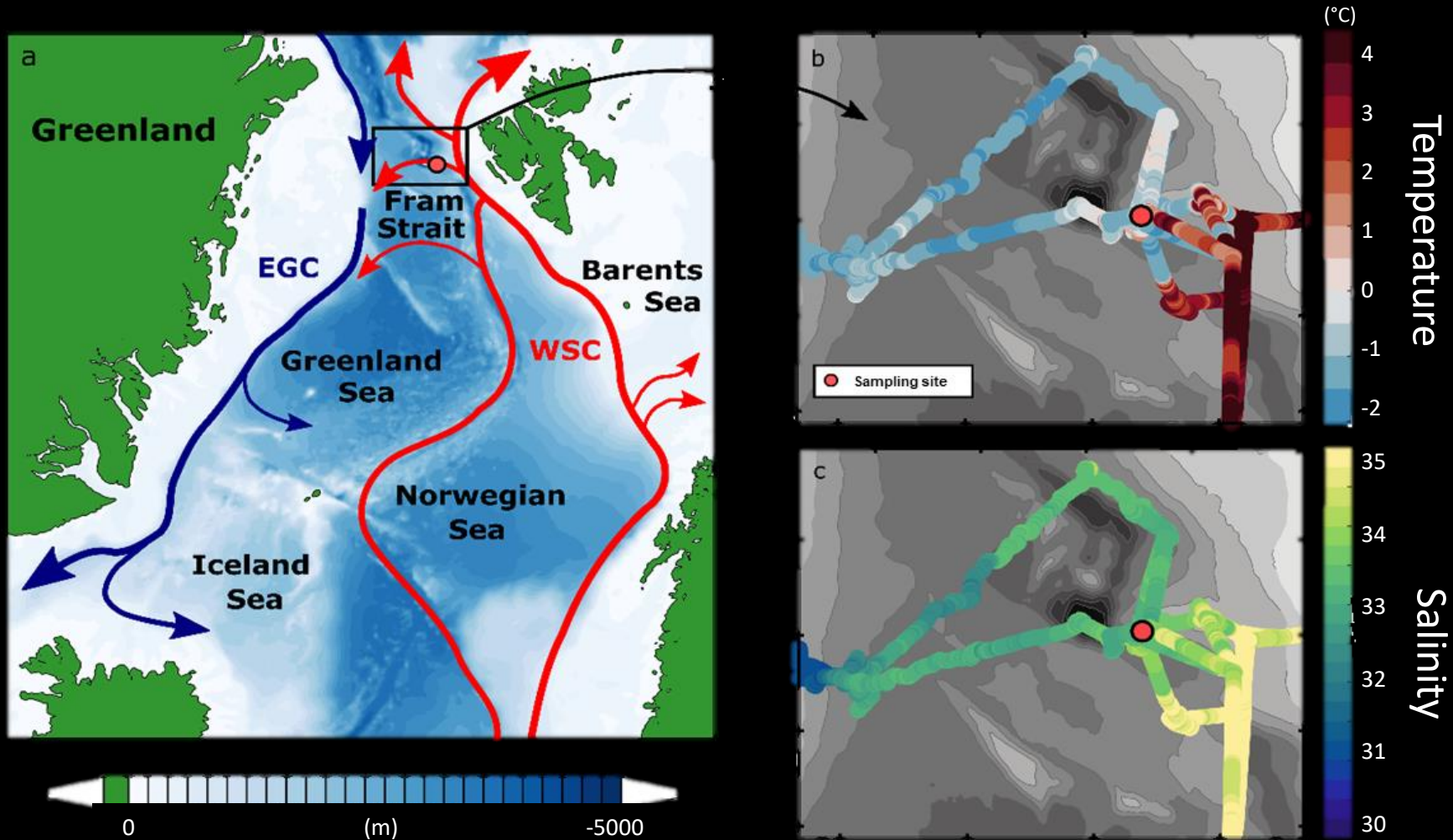


# Objective



To experimentally simulate the effect of **different temperature scenarios** on the composition and characteristics of microbial communities from **Atlantic water inflow** to the Arctic Ocean.

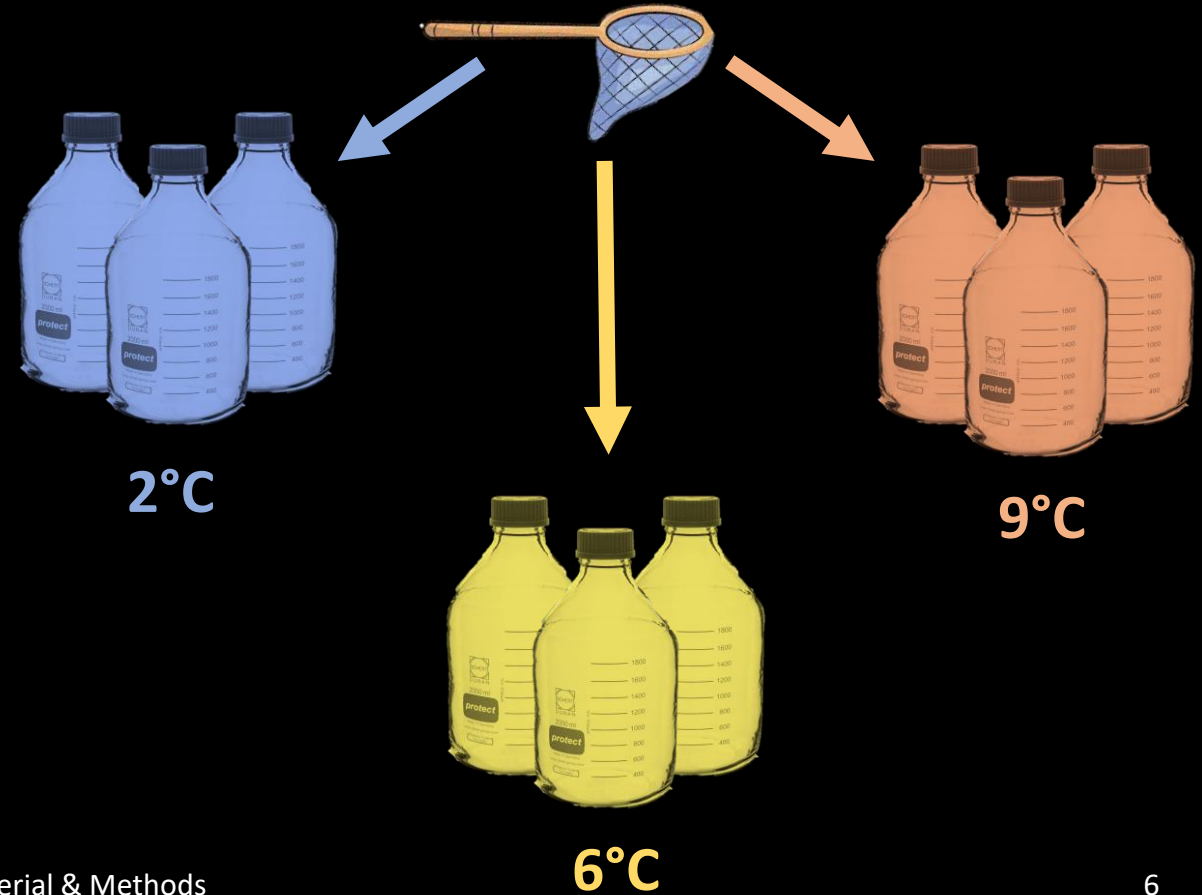
# The perfect sampling location



# Experiment & parameters



10-day bottle incubation



# Experiment & parameters



**10-day bottle incubation**

DNA → Composition, taxonomic diversity, trait groups

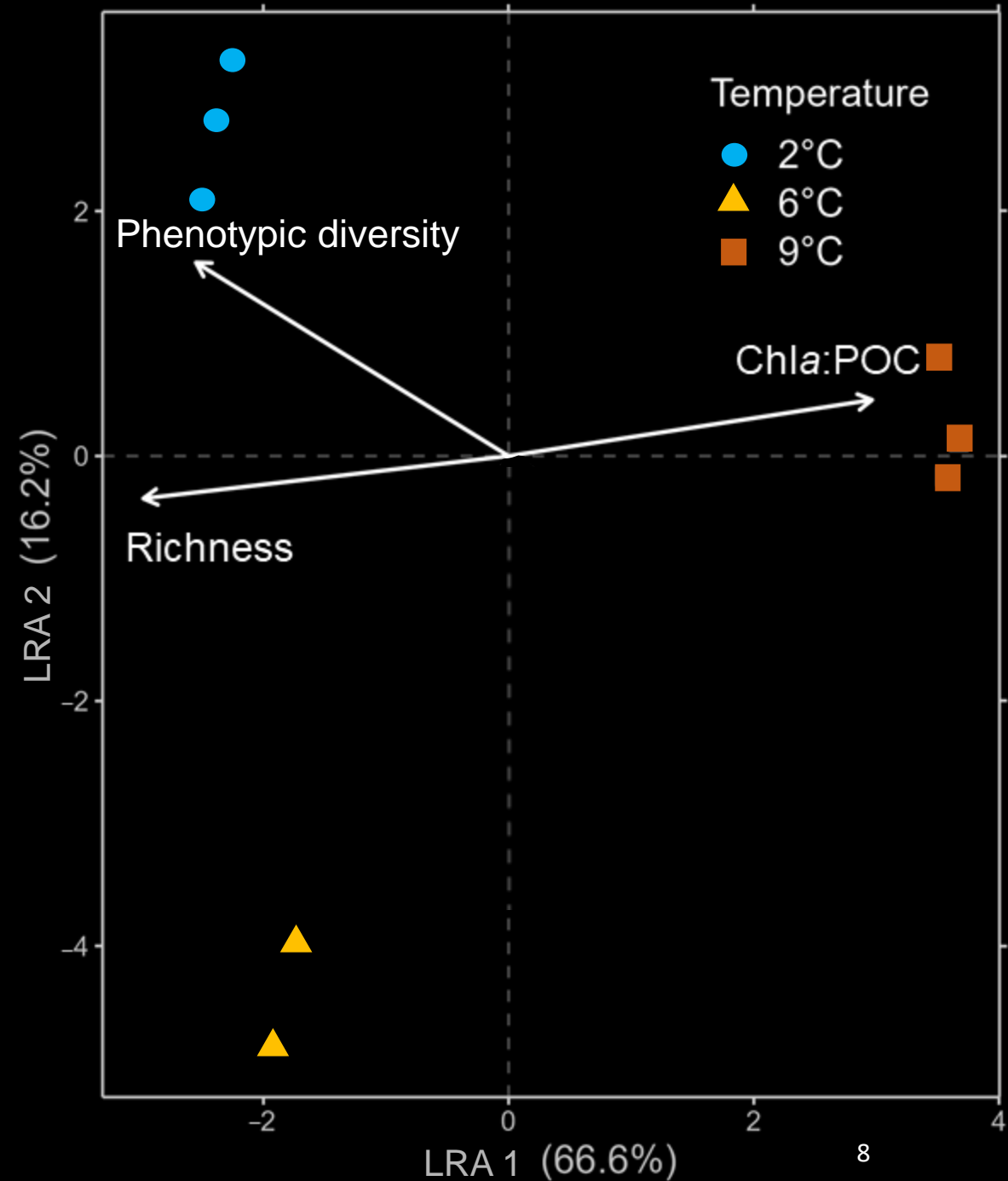
Flow Cytometry → Phenotypic diversity

POC & PON → Biomass & C:N ratio

Chlorophyll  $a$  → Phototrophic biomass

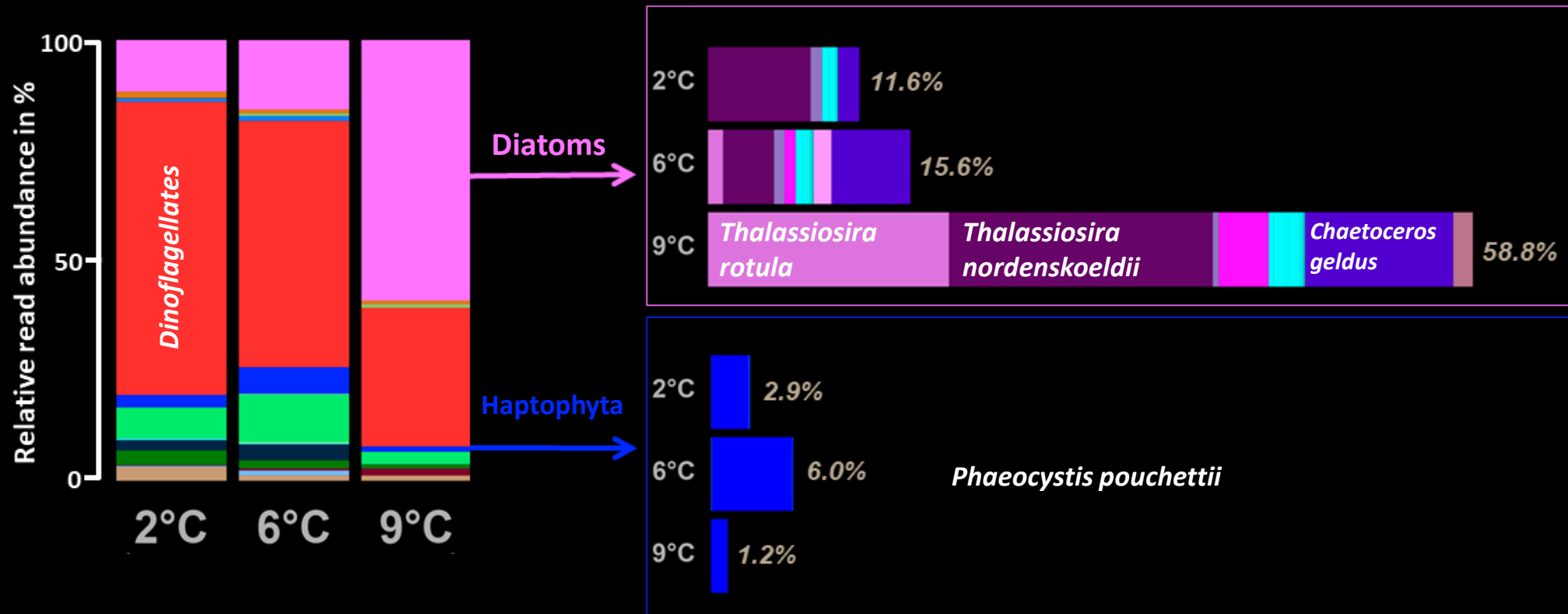
# Biomass & diversity

- 2°C and 6°C communities were more similar to each other than to the 9°C community
- 9°C communities had a lower **phenotypic diversity**, lower **species richness**, and a higher **chl $\alpha$ :POC ratio**
- The **C:N ratio** and **species evenness** did not differ among temperatures

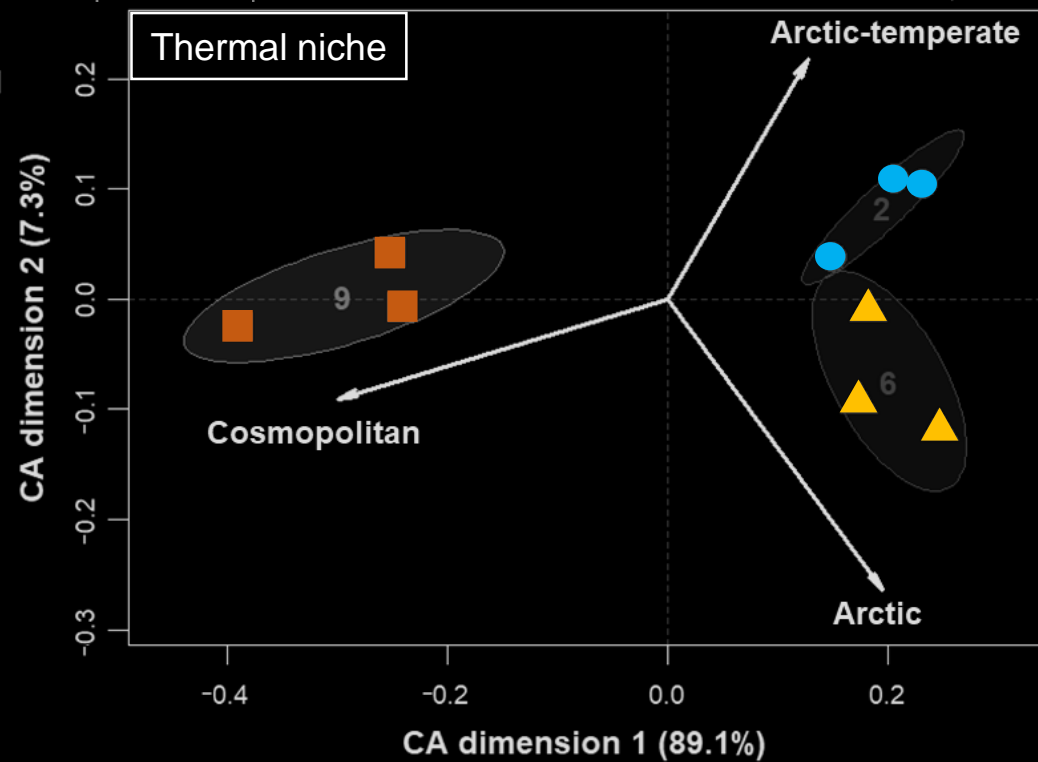
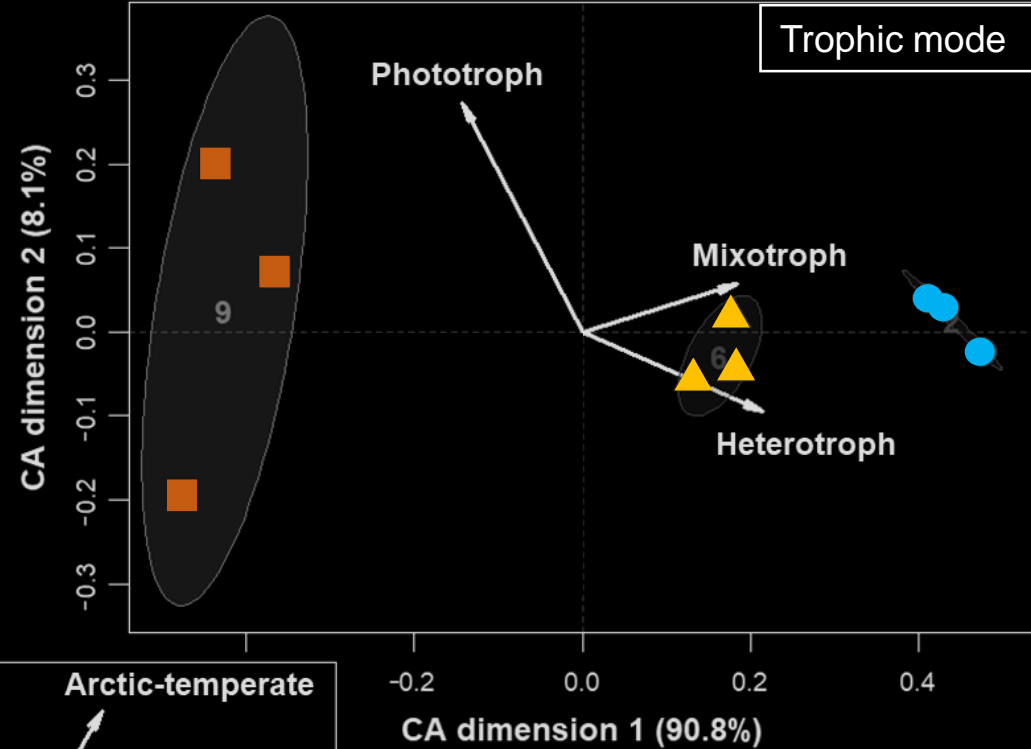
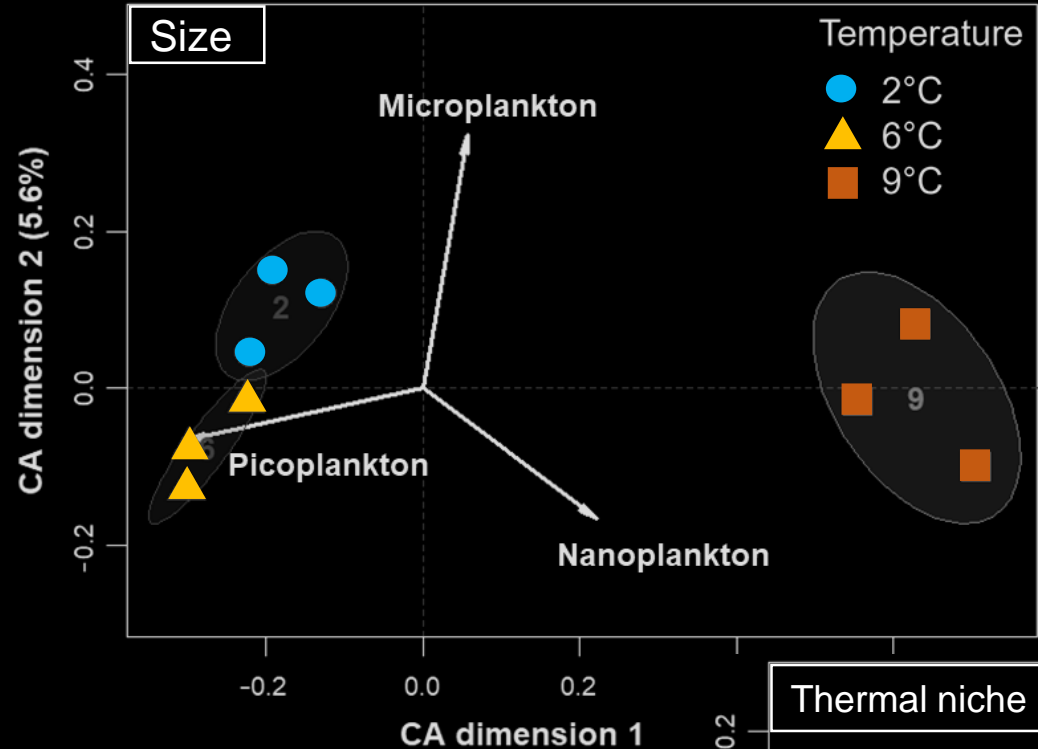




# Relative community composition



→ *Phaeocystis pouchettii* mainly prevalent at 6°C and **temperate diatoms** at 9°C



# Take home messages

- *Phaeocystis pouchettii* thrives at 6°C and temperate diatoms at 9°C
- Warming → decrease of species richness & phenotypic diversity
  - increase in photoautotrophic, intermediate-sized organisms
  - shift towards more cosmopolitan species
- Thermal limit for Arctic key eukaryotes between 6°C and 9°C


→ The **degree of warming** matters for the composition and most likely also for ensuing ecosystem functions

**Read the paper to get more funky details on the bacterial response 😊**



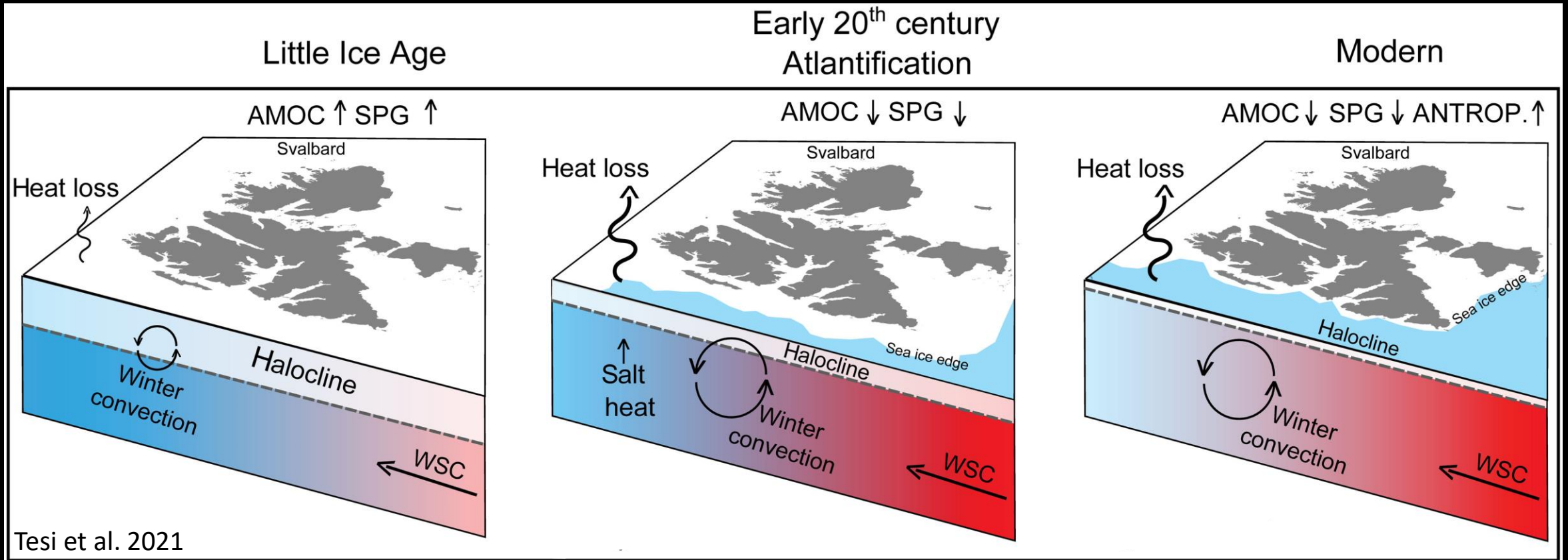
Thank you!  
Questions?



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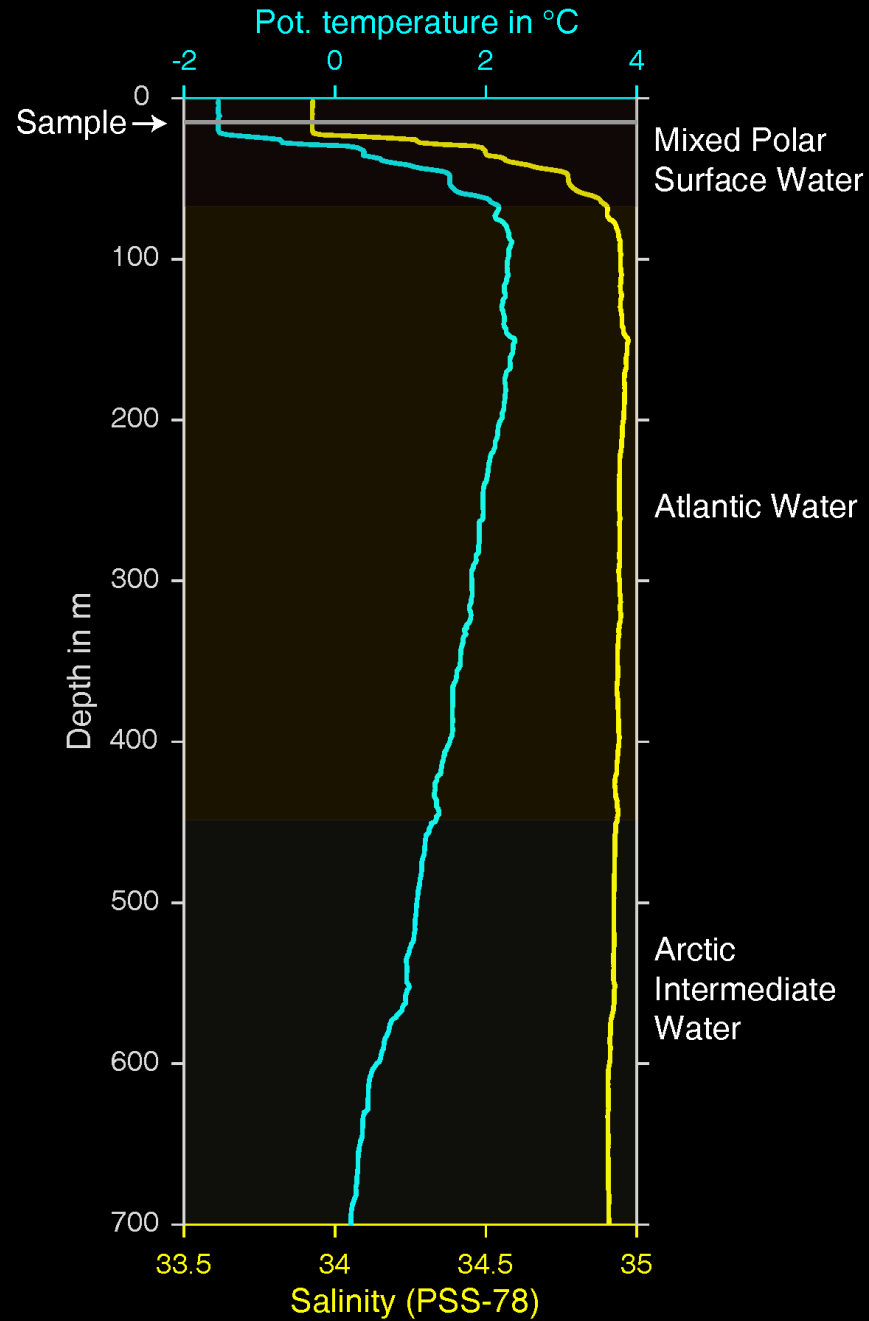


# Atlantification of the Arctic

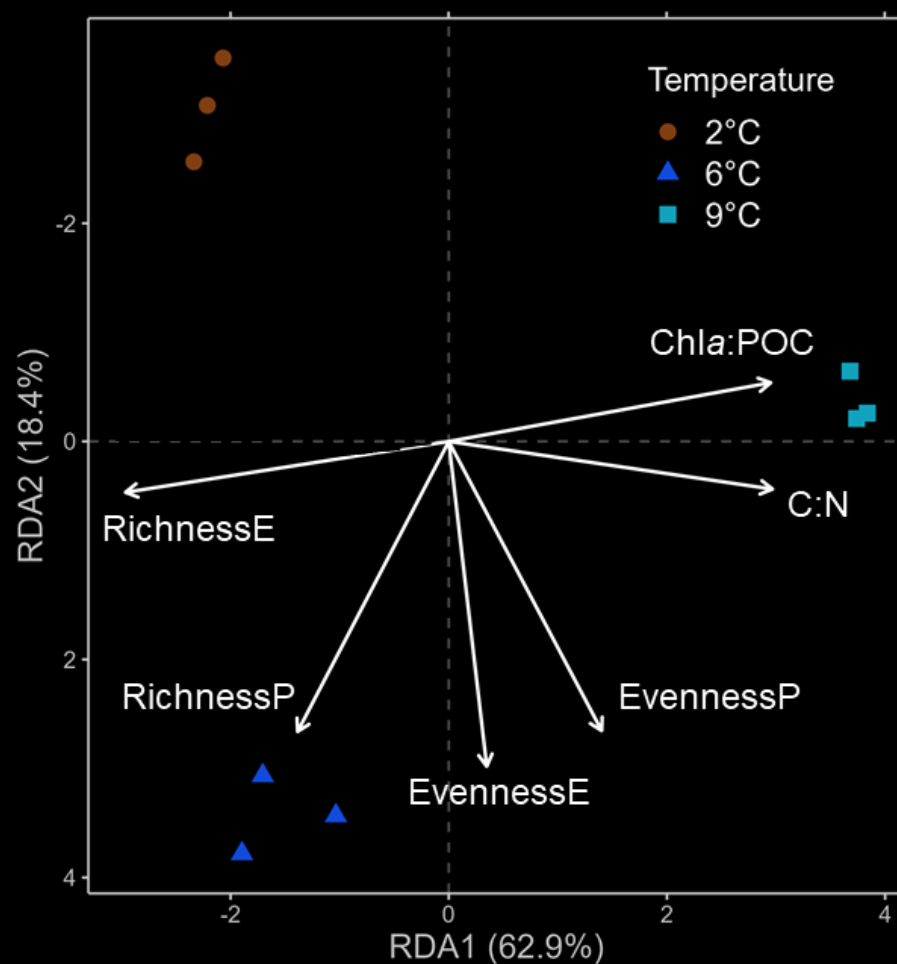


→ Higher temperature, lower salinity, **intrusion of temperate species**

# CTD profile



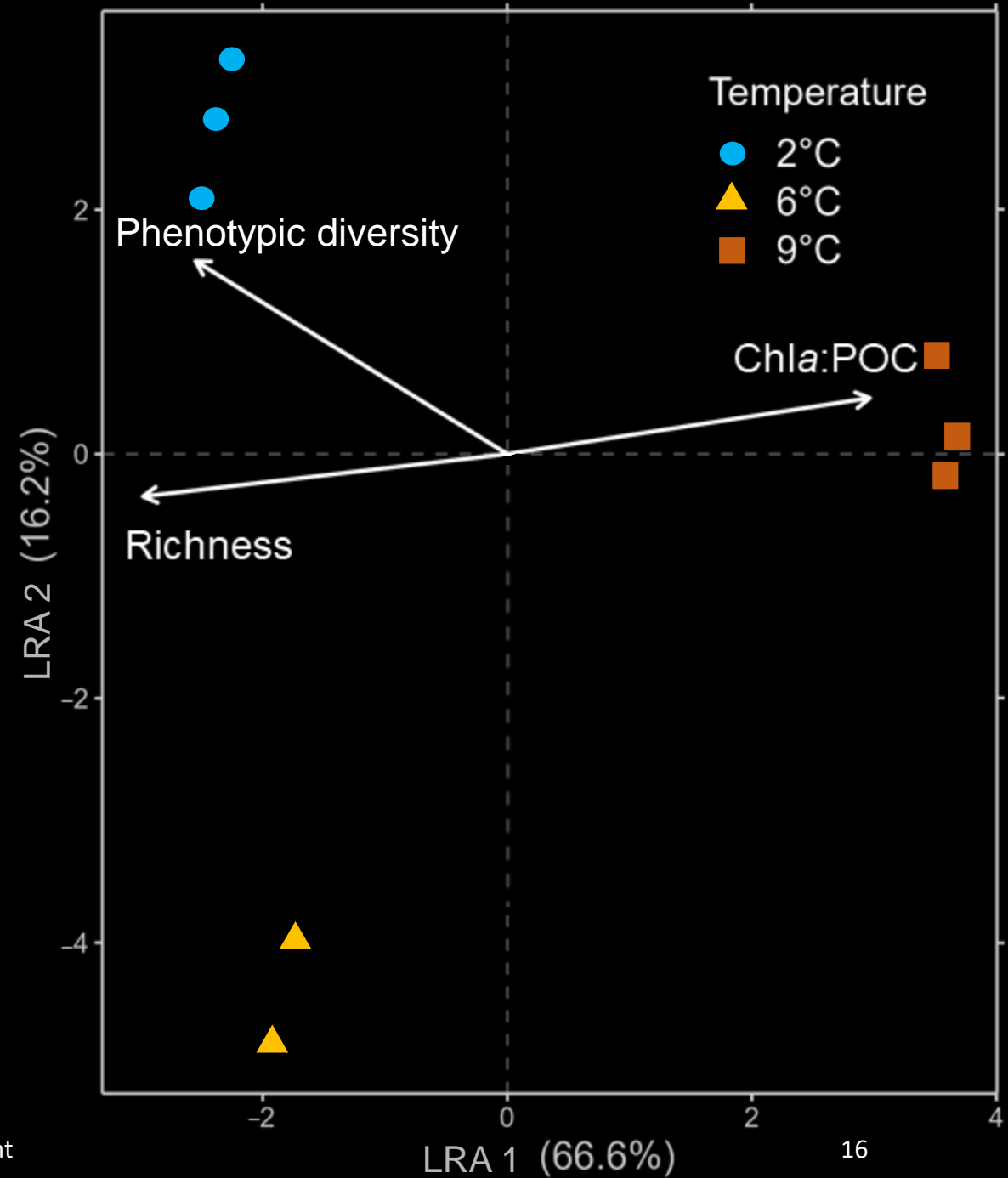
# LRA with all 6 °C replicates without PD



# Biomass & diversity

P-values of pairwise, Bonferroni corrected t-tests:

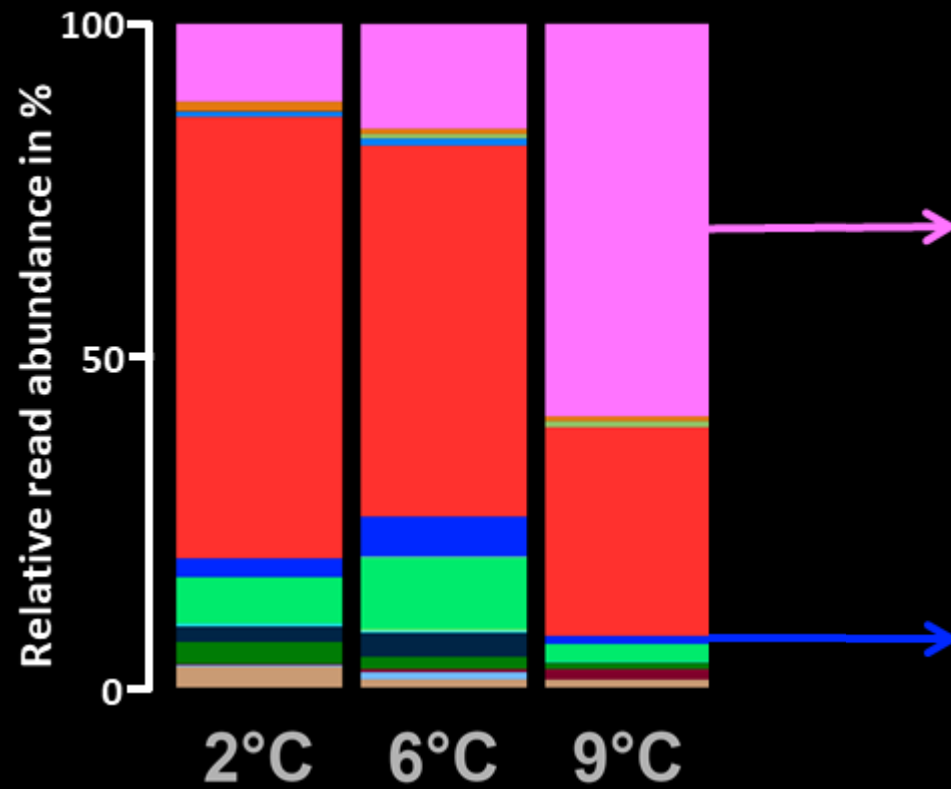
Pairs	Chla:POC	C:N	Phenotypic diversity	Richness	Evenness
2°C - 6°C	0.751	1	0.072	1	0.218
2°C - 9°C	0.048 *	0.433	0.008 **	0.001 **	0.88
6°C - 9°C	0.011 *	0.749	0.437	0.001 **	1



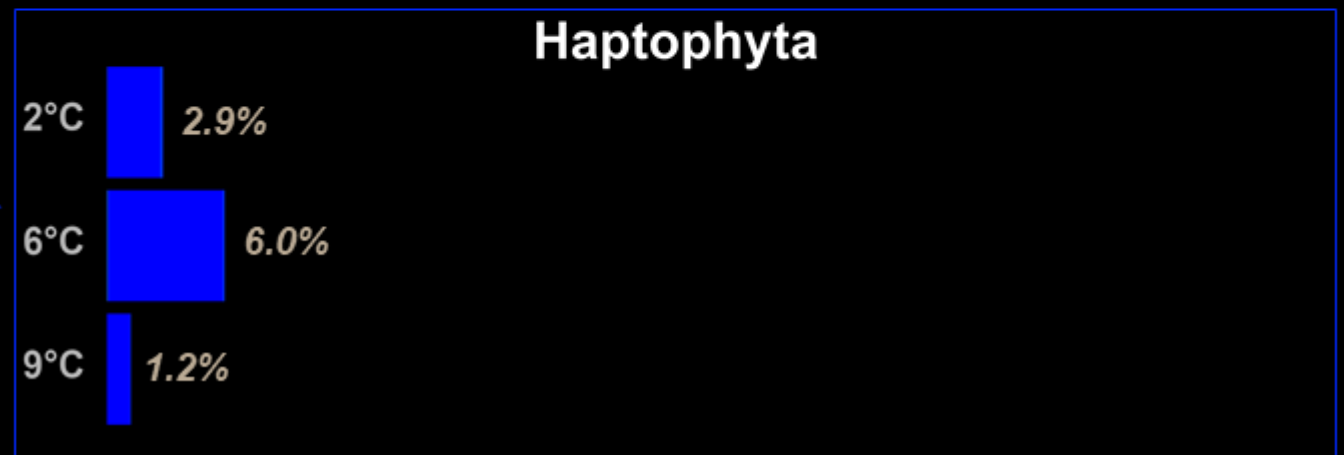
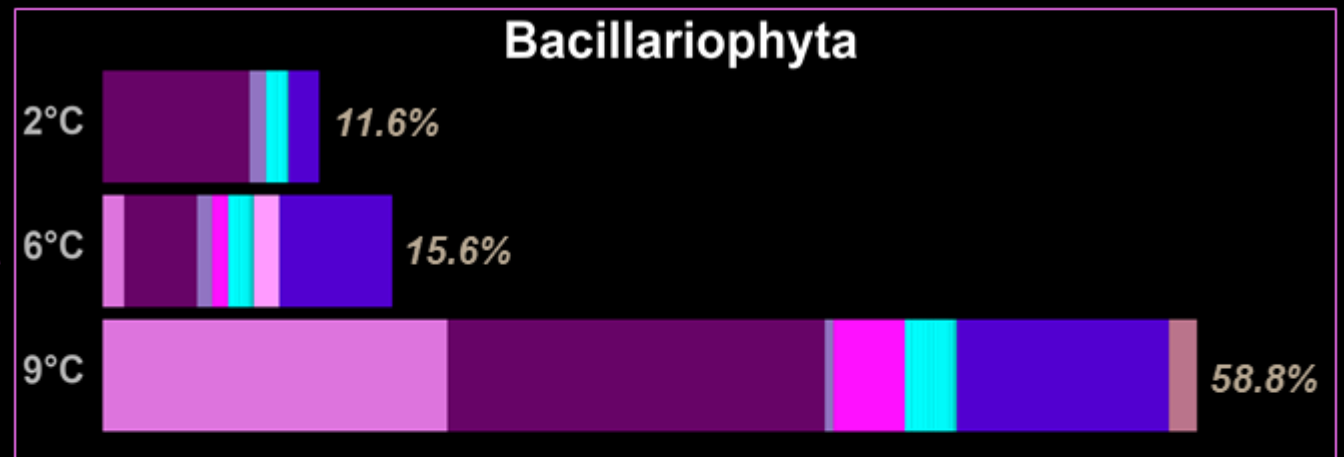
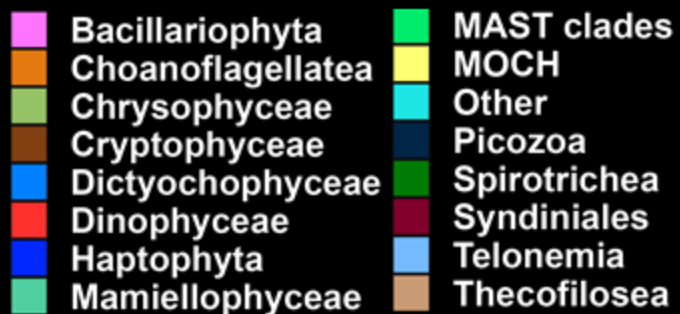


# Parameter values

Temp. [°C]	Chla [μg/L]	POC [μg/L]	PON [μg/L]	Chla:POC [g:g]	C:N [mol:mol]	D2	Eukaryote Richness	Eukaryote Evenness	Prokaryote Richness	Prokaryote Evenness
2	1.9 ± 0.6	74 ± 7.8	15.3 ± 2	0.03 ± 0.01	5.6 ± 0.7	8815 ± 222	211 ± 3	0.59 ± 0.01	180 ± 8	0.45 ± 0.04
6	2.5 ± 0.6	153.6 ± 84	30.8 ± 15.4	0.02 ± 0.01	5.8 ± 0.5	6641 ± 788	218 ± 2	0.63 ± 0.02	201 ± 2	0.55 ± 0.01
9	24.4 ± 24.7	312.4 ± 274.8	56.9 ± 52.5	0.09 ± 0.05	6.4 ± 0.2	6018 ± 529	124 ± 21	0.61 ± 0.04	179 ± 19	0.54 ± 0.04



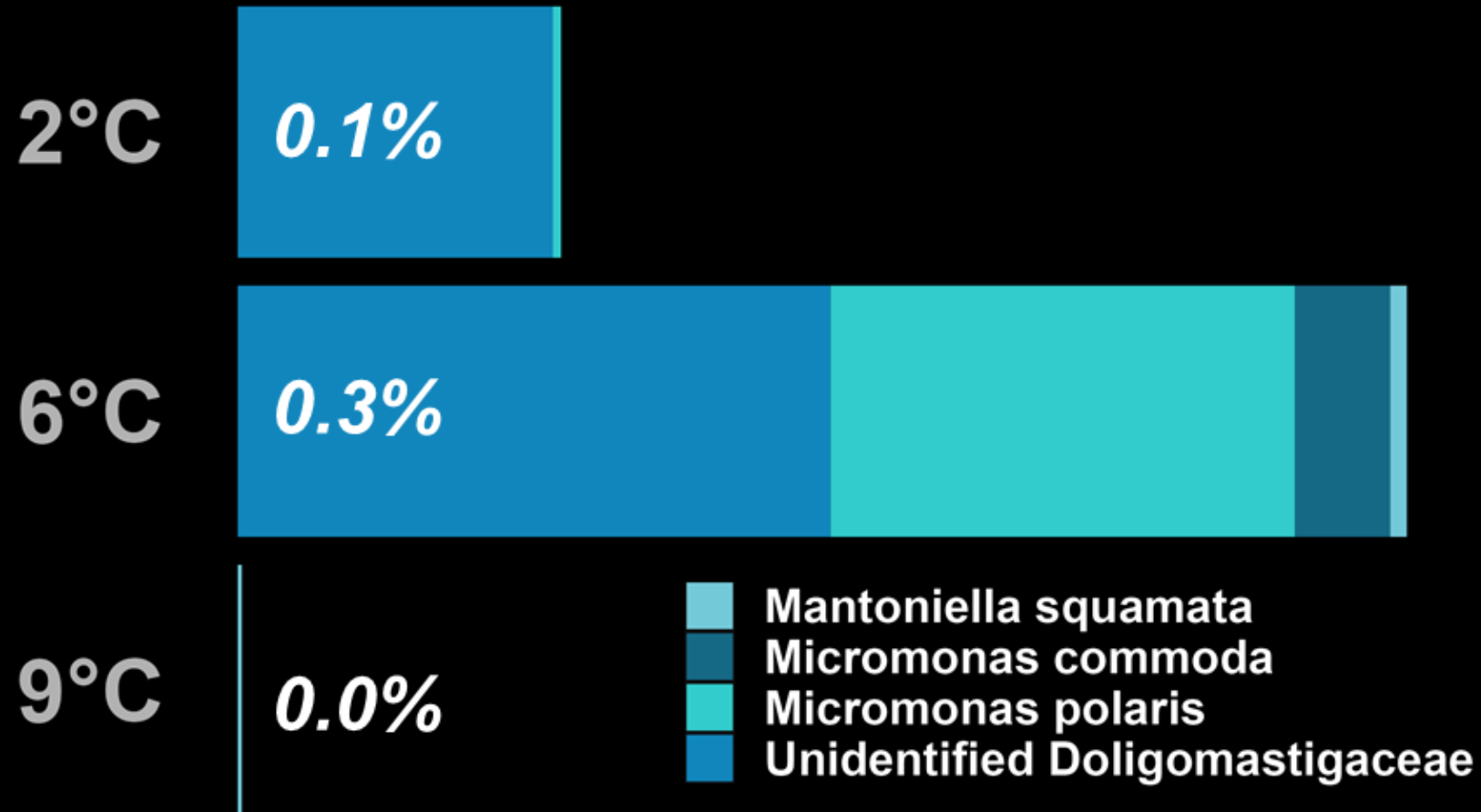
### Group



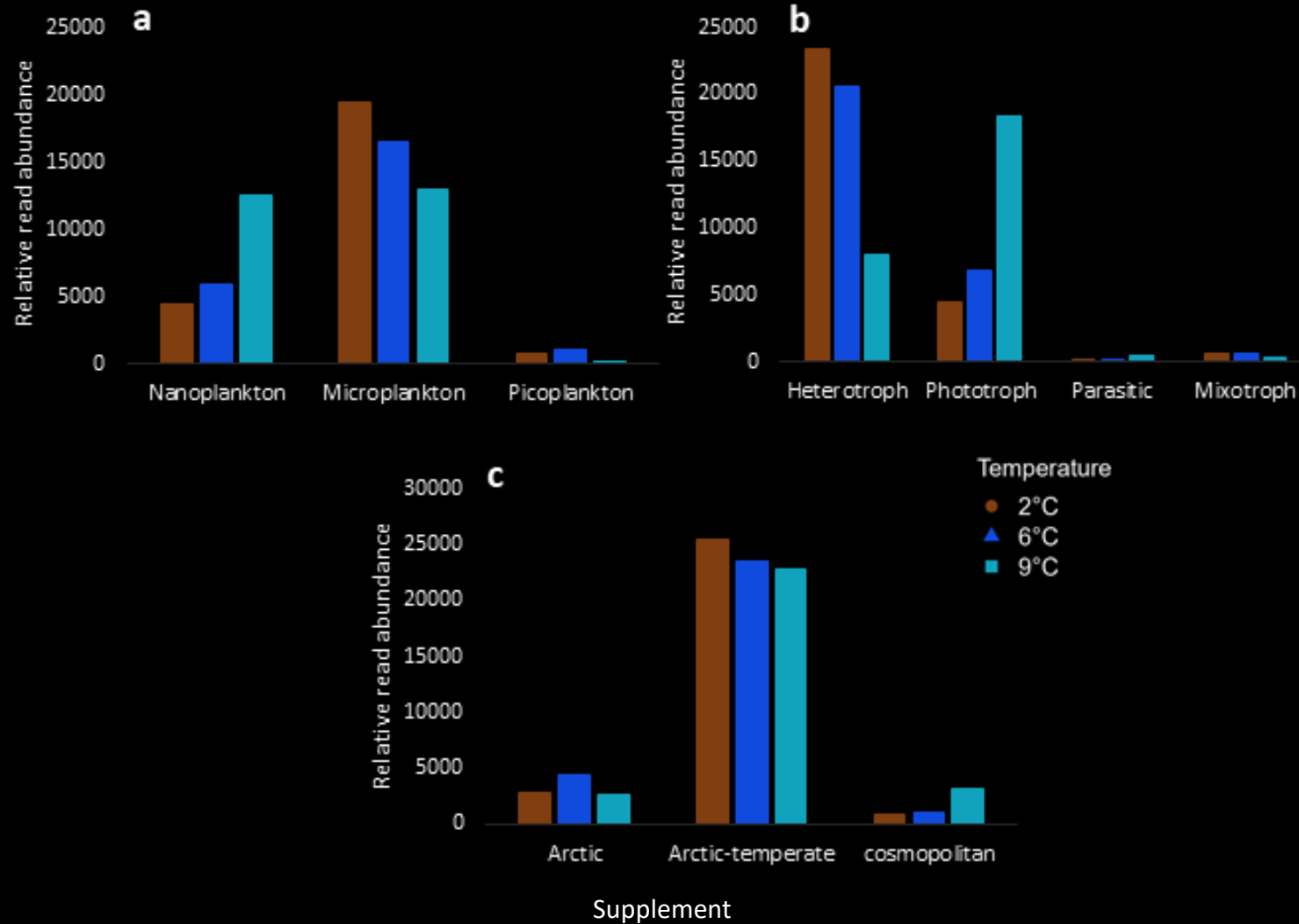
### Species



# Response of Mammiellophyceae



# Trait groups



# Bacterial response

