Ship mediated non-indigenous mesozooplankton: are they in Canadian Arctic ports yet?

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1. CONTEXT

To understand future impacts on communities, we need to know the present community of mesozooplankton (MZP).

2. MAIN OBJECTIVES

Establish a comprehensive baseline of mesozooplankton biodiversity

1. To determine and to compare diversity patterns within and among three of the most active Canadian Arctic ports³, in relation to environmental parameters.
2. To evaluate if non-indigenous species are already present and to compare with NIS arriving in ballast water.

3. MATERIAL & METHODS

3 Canadian Arctic ports

- Igloolik 2015
- Deception Bay 2016
- Churchill 2018

10 stations per port

Taxonomy and statistical analyses (PRIMER)

AUGUST SAMPLING

CTD + Two nets: Oblique 250µm Vertical 80µm

LAB

4. RESULTS

Objective 1 : Biodiversity of the 3 ports

Fig. 1: Mean mesozooplankton density at each port (ind. m⁻³) at the 250µm net. All significantly different (P < 0.05). Note: A = 205µm & B = 80µm.

- Highest abundance in Churchill, lowest in Deception Bay (250µm) or Igloolik (80µm) (Fig.1).
- Community structure differed largely among these 3 ports (Fig.3).

Objective 2 : NIS in ballast water

Fig. 5: Deballasted mesozooplankton (MZP) from domestic and international ships in Churchill (CH) and Deception Bay (DB) between 2013 & 2014, with the number of indigenous species (IS) & NIS present in ballast water.

- 4 NIS of MZP found in ballast water discharged in Churchill and Deception Bay but none of these NIS were found (by taxonomy) in port samples at this time (Fig.5).

5. KEY POINTS & NEXT STEPS

- 47 species and 18 higher taxa; Community structure differed largely among these 3 ports and nets
- T & S gradients in Churchill create highest variability of community composition among stations, compared to more homogeneous community pattern in Deception Bay and Igloolik
- No NIS of MZP found by taxonomy, but potentially NIS occurrence is rare, thus metabarcoding and eDNA helpful for detection
- Including the data from the last port: Milne Inlet 2017
- Identify jellyfish samples and confirm non-indigenous Aurelia limbata (macrozooplankton) in Churchill (DNA barcoding)