Feeding and fecundity of *Calanus finmarchicus* and *Temora longicornis* in Breiðafjörður, West Iceland, in 2008 and 2009

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Introduction Feeding and fecundity of zooplankton are important for understanding energy transfer through trophic levels in marine systems. Previous research on the zooplankton community in Breiðafjörður has revealed that *Calanus finmarchicus* and *Temora longicornis* are two of the key species of copepods in the bay (Sigurðardóttir in prep.). The objective of the study was to investigate feeding activity and fecundity of *C. finmarchicus* and *T. longicornis* in Breiðafjörður, West Iceland.

Methods Samples were collected at approximately 10 days interval through spring and summer of 2008 and 2009 at two locations (Fig. 1). Samples were collected with 200 µm nets with closed cod-ends, towed vertically from ~50 meters depth to surface. Samples for gut content analysis were frozen on board. In the laboratory ashore, 3–6 (*C. finmarchicus*) or 6–11 (*T. longicornis*) individuals were picked out from the frozen samples and analyzed for gut fluorescence. Egg production experiments, were conducted in incubations chambers with false net bottoms to prevent cannibalism by individual females (Fig. 2). Experiments were carried out for 24 hours in temperature controlled and darkened container. At the end of the experiment, seawater from the containers was sieved through 15 µm net and eggs counted. Weight-specific egg production rates were calculated from carbon content of eggs divided by carbon content of females per day. For this presentation, data have been combined by weeks for the two stations.

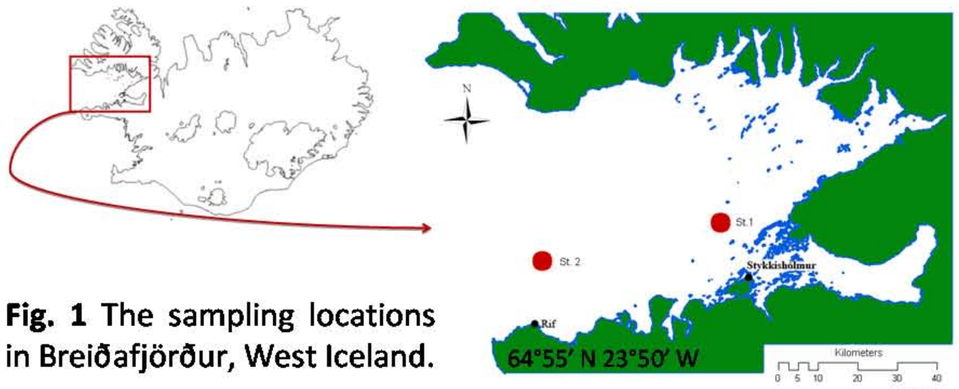

Fig. 1 The sampling locations in Breiðafjörður, West Iceland.

Fig. 2 Setup for copepod egg production experiment. Incubation chambers in a cooling water bath.

Results

Temora longicornis:

- Annual mean abundance of females was four times higher in 2008 (21 000 females m^{-2}) than in 2009 (5 000 females m^{-2}) (Fig. 3A).
- Feeding activity on average was close to two times higher in 2009 (annual mean gut content ~3.1 ng chl *a* $indv.^{-1}$) than in 2008 (~1.7 ng chl *a* $indv.^{-1}$). Gut content maxima was in September in 2008 and in June in 2009 (Fig. 3C).
- Fecundity was on average greater in 2009 (0.44 µg C µg C^{-1} d^{-1}) than in 2008 (0.06 µg C µg C^{-1} d^{-1}), with highest egg production observed in June both years (Fig. 3E).

Calanus finmarchicus:

- Female annual mean abundance was three times higher in 2008 (~6 000 females m^{-2}) than in 2009 (~2 000 females m^{-2}) (Fig. 3B).
- Feeding activity as estimated from gut content was on average two times lower in 2008 (annual mean ~2.6 ng chl *a* $indv.^{-1}$), than in 2009 (~5.0 ng chl *a* $indv.^{-1}$). Feeding maximum was one in May in 2008 whereas multiple peaks were observed in 2009 (Fig. 3D).
- Fecundity was similar on average in 2008 (0.078 µg C µg C^{-1} d^{-1}) and 2009 (0.098 µg C µg C^{-1} d^{-1}). Egg production peaked in June and July (Fig. 3F).

Conclusions This study revealed that female abundance, feeding and fecundity of *Temora longicornis* and *Calanus finmarchicus* was annually variable and possibly controlled by food availability.

Feeding activity and fecundity of *T. longicornis* was higher the second year than in the previous year. Observed egg production rate in 2008 was similar to observations of *T. longicornis* fecundity in the Baltic Sea (Dutz pers. conv.).

Feeding activity of *C. finmarchicus* was significantly different between the two years while fecundity and abundance was not significantly different. Fecundity of *C. finmarchicus* was higher in this study than was observed in the Faroe Islands in 2004 (Debes et al. 2007).

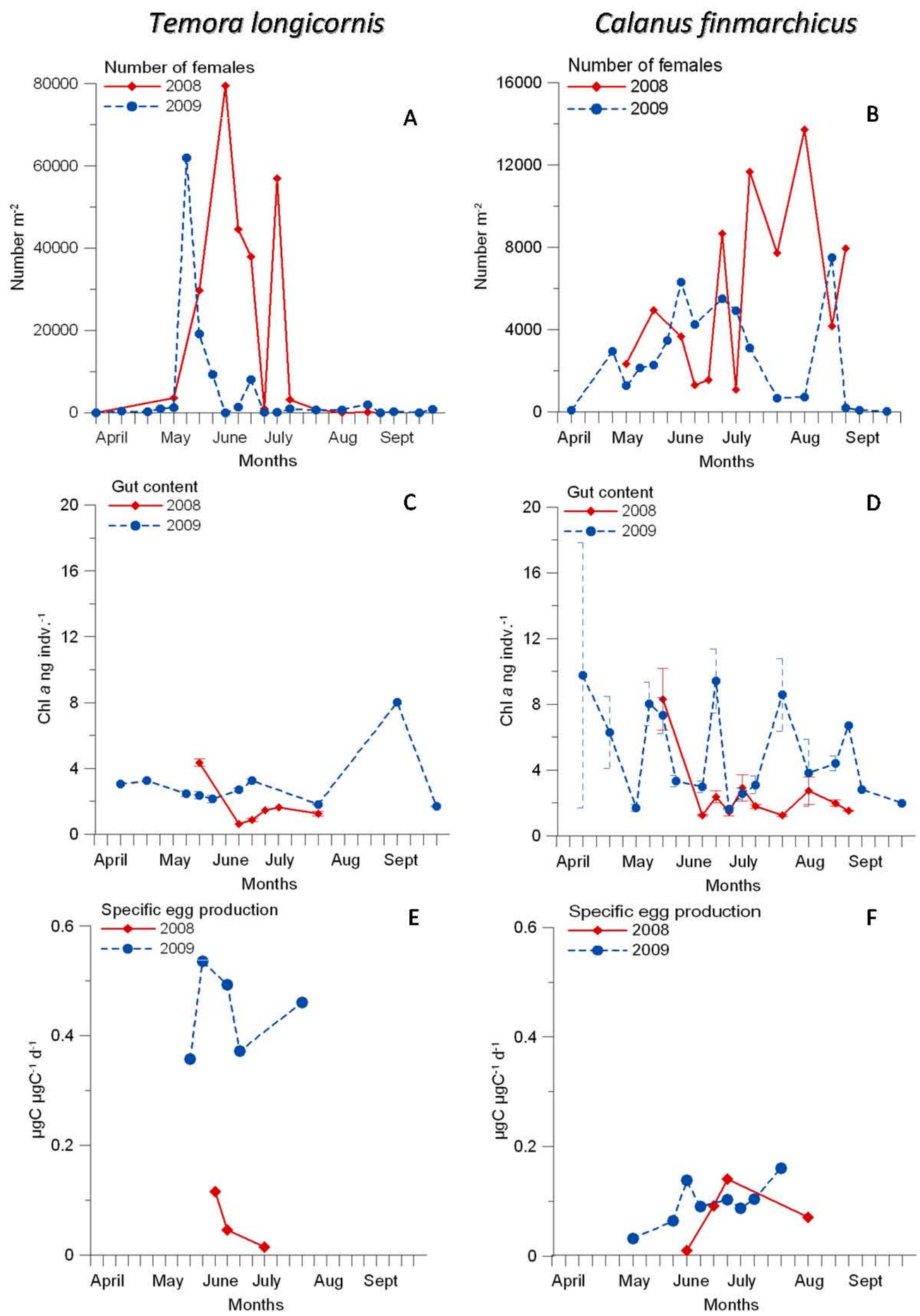

Fig. 3 Female abundance (A and B), gut content (C and D) and egg production (E and F) of *Temora longicornis* (left panel) and *Calanus finmarchicus* (right panel) in 2008 and 2009. Vertical bars in C, D, E and F represent standard error (SE). Note different vertical scales for abundance in A and B.

References: Debes, H., Eliasen, K. and Gaard, E. 2007. Seasonal variability in copepod ingestion and egg production on the Faroe shelf. Hydrobiologia **600**: 247–265.

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