

Cruise report

Sampling for juvenile cod in the shallow water of Kongsfjorden

Ny-Ålesund, Svalbard

RIS ID 5742
26.08.-26.09.2019



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Summary

The sampling campaign was part of the RIS ID 5742 AWIPEV Kongsfjorden Underwater Monitoring Station. The overall aim of this project is the year-round operation of a coastal monitoring station providing hydrographic and biological data in near-real time. The observatory is located in 11 m water depth close to Ny-Ålesund and is equipped with numerous sensors (temperature, salinity, oxygen, chlorophyll A, turbidity, light and current) as well as a high-resolution stereoscopic photography system for fish and macro crustaceans. With the observatory, we observed juvenile Gadidae in higher abundances in the shallow water of Kongsfjorden since 2012. The goal of the here reported cruise was to verify these optical observations by local beach seine samplings. The main objective of the sampling campaign was to investigate if Gadoid specimen on the stereoscopic images belong to Atlantic cod or Polar cod and to assess whether these individuals belong to a possible local stock of North East Arctic cod and / or Norwegian Coastal cod spawning in Svalbard waters. This question is addressed in the context of climate change and the increasing volume of warm Atlantic water masses affecting Svalbard coastal waters. These increasing warm water inflow situations (i.e. in the Kongsfjorden ecosystem) are assumed to lead to a borealization and Atlantification of the Arctic systems having severe effects on the local fish community.

After arrival we first checked all three possible sampling positions and decided to perform all samplings close to the harbour of Ny-Ålesund in front of the Kings Bay Marine Lab as the environmental conditions were most promising at this location. Both other sites were less suitable for beach seining. In total we could perform 12 beach seine samplings.

Study area

The sampling was planned to be performed at three different sites close to Ny-Ålesund and one was chosen for the actual sampling (Fig.1). We chose a site with slowly declining ground and a combination of gravel and algae coverage. The maximum water depth for the deployment was 2 m.



Figure 1 Chart with indented sampling positions in Kongsfjorden, Svalbard: A (Ny-Ålesund), B (Brandal) and C (Gåsebu), chosen sampling site marked in red in front of the Marine Lab in Ny-Ålesund

Methods

Sampling of juvenile cod was performed with a beach seine. The beach seine had a length of approx. 20 m, a height of approx. 1.20 m and a mesh size of 24 mm, respectively 6 mm in the cod end. The net was deployed with the help of a small boat and towed towards the beach after a rest period of 15 - 30 min. All specimens caught were transferred into water filled buckets and cod were killed immediately in the lab. All other species were measured (length and weight) and released as soon as possible. Cod was measured in the lab for length and weight and tissue samples as well as otoliths were taken for further analysis.



Figure 2 Beach seine

Preliminary results

The conducted sampling campaign allowed us to sample 48 juvenile cod in the shallow water of Kongsfjorden. We took tissue samples for genetic analysis and otoliths for age determination. The extraction of DNA was performed in November 2019 and further genetic analysis is at the moment ongoing. Age determination was also performed in December 2019 and could show that all caught specimens belong to the 0-class, except for 2 individuals which were classified as 1-class specimen. Investigation on possible daily increments in otolith microstructure is currently in process. The total length of all caught fish varied between 3.5 cm and 16 cm (Table 1) with an average weight of 2.7 g. Eight individuals which were also caught with the beach seine belonged to *Myoxocephalus scorpius* (Shorthorn sculpin).

Table 1 Length frequency of caught specimens with beach seine

