

Title: Distribution of over-wintering pelagic juvenile fish in the north-eastern northern North Sea.

Study Programme: Fishery Biology, Marine Biology

Type of study: Field and Data desk study.

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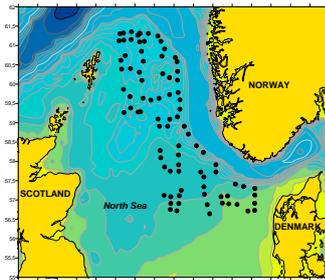
IMR, RV GO Sars



Plankton Lab, RV GO Sars



MIK net with MIKey M nets



MIK sampling stations



Pearlside (*Maurolicus muelleri*)



Crystal goby (*Crystallogobius linearis*)

Project description:

Since 1976 ICES has co-ordinated a survey for over-wintering herring larvae in the North Sea. This survey utilises a 2m ring trawl (MIK) and is undertaken by a number of nations in February to March (timing is dependent on vessel availability). The principal objective is to provide an index of recruitment for North Sea autumn spawned herring. During this sampling other species are also caught, however, these data are generally not collated or even examined. In addition, to the pelagic species e.g. Crystal goby (*Crystallogobius linearis*) and Pearlside (*Maurolicus muelleri*) demersal species e.g. Norway goby (*Pomatoschistus norvegicus*) and lemon sole (*Microstomus kitt*) are also caught. An interesting point is that many individuals are small indicating that they are over-wintering as late larvae or extremely small juveniles. Recently, the time series for the Skagerrak was analysed and indicated some interesting trends in species abundance along with spatial variability that was related to the

physical environment (see Munk *et al.* 2014). The overwintering fish community has also changed over time reflecting environmental variability along with species population dynamics and ecological interactions.

In general, it is assumed that over-wintering at a small size is not conducive to high survival. It is apparent that some parts of spring or summer spawned cohorts of fish do over-winter at a very small size. Very small individuals of plaice (*Pleuronectes platessa*) have been seen over-wintering (at least found in the early spring) on shallow nursery grounds. Due to inappropriate sampling techniques these small fish are often not observed. Very small or slow growing fish can also have consequences for age estimation, whereby the first winter ring on the otolith is missed because it is very close to the centre of the otolith. The extent of overwintering at a small size and which species do this is of interest to those people who undertake age readings and for fish ecologists in general.

The historic MIK data from sampling undertaken by Norway currently reside as data sheets and thus will need to be collated for analyses. In addition to the species specific information physical data (CTD data) on the water column structure are also available for each sampling period. There is also the opportunity to undertake sampling during the Norwegian section of the IBTS cruise which occurs in January to February. In general samples are processed (identifications, measurements etc) onboard the vessel so there is no need for any ‘on-shore’ laboratory work.

Background knowledge: Fish ecology, early life history

Skills to be acquired during Masters work: Field experience, identification of young stages of fish, statistics.

Further information: The project will involve shipboard work, a seagoing medical certificate is required, ability to work at sea is an advantage, laboratory work in a genetics lab.

References:

- Höffle, H., Nash, R.D.M., Falkenhaus, T. & Munk, P. 2013. Differences in vertical and horizontal distribution of fish larvae and zooplankton, related to hydrography. *Marine Biology Research* **9**: 629-644.
- Munk, P., Wright, P.J. & Pihl, N.J. 2002. Distribution of the early larval stages of cod, plaice and lesser sandeel across haline fronts in the North Sea. *Estuarine Coastal and Shelf Science* **55**: 139-149.
- Munk, P., Cardinale, M., Casini, M. & Rudolph, A-C. 2014. The community structure of over-wintering larval and small juvenile fish in a large estuary. *Estuarine, Coastal and Shelf Science* **139**: 27-39.
- Nash, R.D.M., Wright, P.J., Matejusova, I., Dimitrov, S. P., O’Sullivan, M., Augley, J. & Höffle, H. 2012. Spawning location of Norway pout (*Trisopterus esmarkii*) in the North Sea. *ICES Journal of Marine Science* **69**: 1338–1346.