

# **Title: Factors affecting the distribution of fish larvae in the northern North Sea in early summer.**

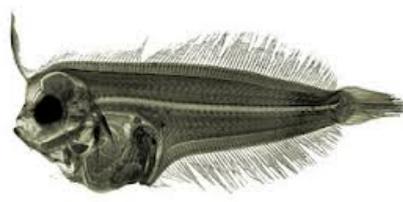
**Study Programme:** Fishery Ecology

**Type of study:** Laboratory, desk and field.

**Contact person:** Richard D.M. Nash (IMR, Bergen)

**Collaborators:** Tone Falkenhaus (IMR, Flødevigen), Hannes Höffle (IMR, Bergen)

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*Fish larvae*

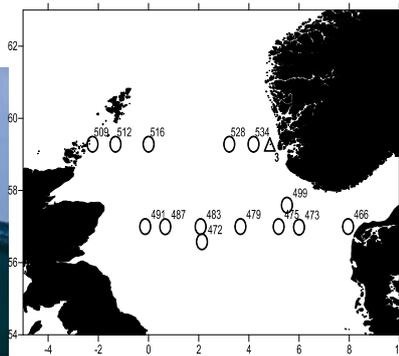
*IMR, RV Johan Hjort*



**MIK net**



**CTD with Rosette**



**MIK sampling stations (2011)**

## **Project description:**

Many of the commercially exploited fish species in the northern North Sea spawn during the spring and their larvae are found in the water column prior to metamorphosis or settlement. Much is known about many of the gadoid species, however, there is a paucity of information on the relatively abundant flatfishes and non-commercial species. The distribution of larvae is often 'patchy' with elevated concentrations being associated with physical features in the water column e.g. fronts, thermoclines etc. Often these features also have associated elevations of production. However, the spawning grounds of North Sea fishes are varied and the nursery areas are quite diverse. Therefore, the location of larvae in early summer will be a result of spawning locations, drift patterns and locations of nursery areas, to name but a few.

The novel aspect here will be the possibility to combine information on the size and distribution of fish larvae species along with the physical oceanography of the area that they occur and their potential prey. Larvae have been sampled with a 2m ring trawl (MIK) with a 2mm mesh size. By utilising the standard transects undertaken by IMR it will be possible to discern whether the larvae are aggregated in areas with physical structures such as fronts and whether this is associated with elevated or lowered levels of potential prey. Fine scale investigations could be enhanced using the acoustic data which are gathered simultaneously, thus providing a much more in-depth investigation of factors that can affect the distribution of fish larvae and possibly settlement locations.

The research will involve laboratory work to identify the fish larvae (it would be possible to concentrate on one group e.g. gadoids or flatfishes if so desired). Currently samples from 2011, 2012 and 2013 are archived and a further set of samples will be collected in 2014. It will be possible to join a cruise in June/July 2015 and collect a further set of samples to allow a comparison of distributions in relation to biological and physical factors over a five year period (2011-15). The oceanographic data and zooplankton (size fractionated dry weights and some species distributions) will be available from the IMR databases.

**Background knowledge:** Fish ecology, early life history, analytical techniques

**Skills to be acquired during Masters work:** Laboratory identification of fish larvae, field experience, statistics.

**Further information:** The project could involve shipboard work, a seagoing medical certificate is required, ability to work at sea is an advantage, laboratory work.

#### **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(7): 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.
- 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.