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Preliminary report on the research cruise B4-2013

Atlantic mackerel and horse mackerel egg survey: Icelandic participation 10-26 June 2013.

Vessel: R/V Bjarni Sæmundsson, TFEA (Iceland – Marine Research Institute (MRI))
Captain: Ásmundur Sveinsson
Personel: Agnes Eydal, Björn Gunnarsson (cruise leader), Björn Sigurðarson, Konráð Þórisson, Kristín Valsdóttir.

Introduction:

The cruise was a part of an international Atlantic survey, carried out by 9 different European institutes to monitor the spatial and seasonal distribution of Atlantic mackerel and horse mackerel. During this survey mackerel and horse mackerel eggs are sampled using a plankton torpedo or bongo nets. The survey covers the whole spawning area and season. It starts along the Portuguese coast in February and continues until July when the waters west of Scotland are sampled. The planning and coordination of the survey is made within the ICES Working Group for Mackerel and Horse Mackerel Egg Surveys (WGMEGS).

The ICES triennial mackerel and horse mackerel egg surveys have been carried out since 1977. Since then the participating countries and sampling area have expanded. In 2013 the following countries participated in this survey: The Faeroes, Germany, Ireland, Norway, Portugal, Scotland, Spain, The Netherlands and now for the second time, Iceland.

Objectives:

The MRI sampling undertaken on board the “RV Bjarni Sæmundsson” will provide egg data in the area between 59°45′ N to 63°45′ N and 0°15′ W to 22°15′ W during period 5. Also, pelagic hauls were carried out to collect adult mackerel samples to estimate fecundity. These data will be combined to provide a fisheries-independent estimate of the spawning stock biomass of western mackerel and horse mackerel.

Methods:

The sampling of the fish eggs was carried out with “Bongo 60” plankton sampler with a 280 micron mesh sized net and an opening diameter of 60 cm. The amount of water filtered during each haul was measured using a calibrated mechanical flow meter mounted in the opening of the net. The Bongo sampler was deployed on double oblique hauls to maximum depth of 200 m or to within 5 m of the bottom in shallower water. On every station temperature and salinity data were collected with a CTD applied from 0-50 m. Additionally a DST-tag was attached to the Bongo registering temperature and salinity profiles. On the way to the area to be surveyed, additional plankton stations were taken along the transect 62°45′ N. Due to the findings there, the investigation area was expanded further northwest (Fig. 1). 2/3 of the plankton samples were sorted for fish eggs during the survey, using the spray method and mackerel eggs were staged according the sampling protocol while 1/3 of the samples were processed in the laboratory after the cruise. For quality assurance sorting of the samples was checked after the survey.

In this survey, a total of 4 pelagic trawl hauls were carried out in the sea surface (Figure 1) using the pelagic WB trawl.

Results:

A total of 145 plankton stations were taken during the cruise (Figures 1 and 2). Around 17500 eggs were sorted out and identified to the species level. Of them, approximately 3300 were mackerel eggs (Fig. 3) and of them, approx. 40% were of stage 1 (Figure 4). By far the most abundant species was pearlside (*Maurolicus mülleri*). Relatively few eggs from other species were found. No horse-mackerel eggs were found during this cruise. The western limit of the spawning area for mackerel along the 59°45 and 60°45 legs was not reached. At 4 stations, fish eggs were identified, counted and stored in ethanol for modified plankton sample collection, fixation & sorting protocol for the Fluorescent in situ hybridization-Method (ISH).

A total of 20 mackerel ovaries for fecundity and atresia investigation were collected from 200 sampled individuals from two hauls at 60°44 N – 08°36 and 61°45' – 15°43'. Information on age, length, sex, maturity, total weight, gutted weight, and liver weight was also collected from the sample. In addition DNA samples were collected from 100 mackerels.

The distribution of mackerel eggs was observed to be wider in the northern and western area than in previous survey in 2010. More spawning activity was observed than 3 years ago and the distribution of spawning throughout the northern and western area appears to have a similar pattern and with no real large concentrations. Rather dispersed low level spawning activity was thus observed over a very large area with what appear to be pockets of slightly enhanced spawning density. Approximately 50% overall increase in mackerel eggs was observed in the area compared to previous survey. The spawning had extended even further to the northwest than we were able to investigate.

The overall mean temperature in the survey area was approximately 0.8 °C lower compared to previous survey in 2010 (Figures 5 and 6).

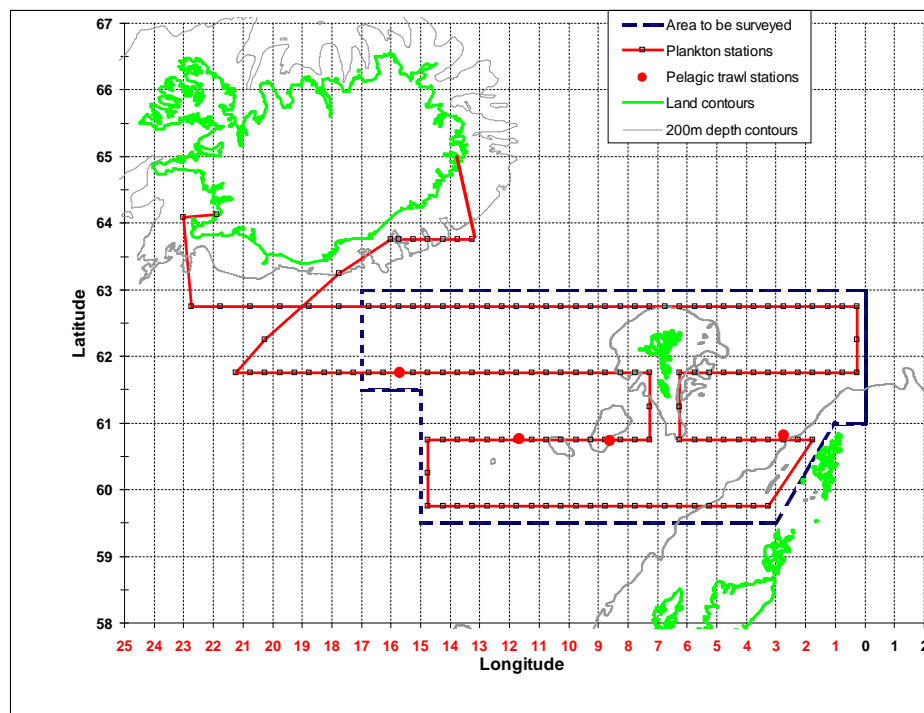


Fig. 1. The route of RV. Bjarni Sæmudsson during the research cruise B4-2013 10-26 June 2013 (period 5).

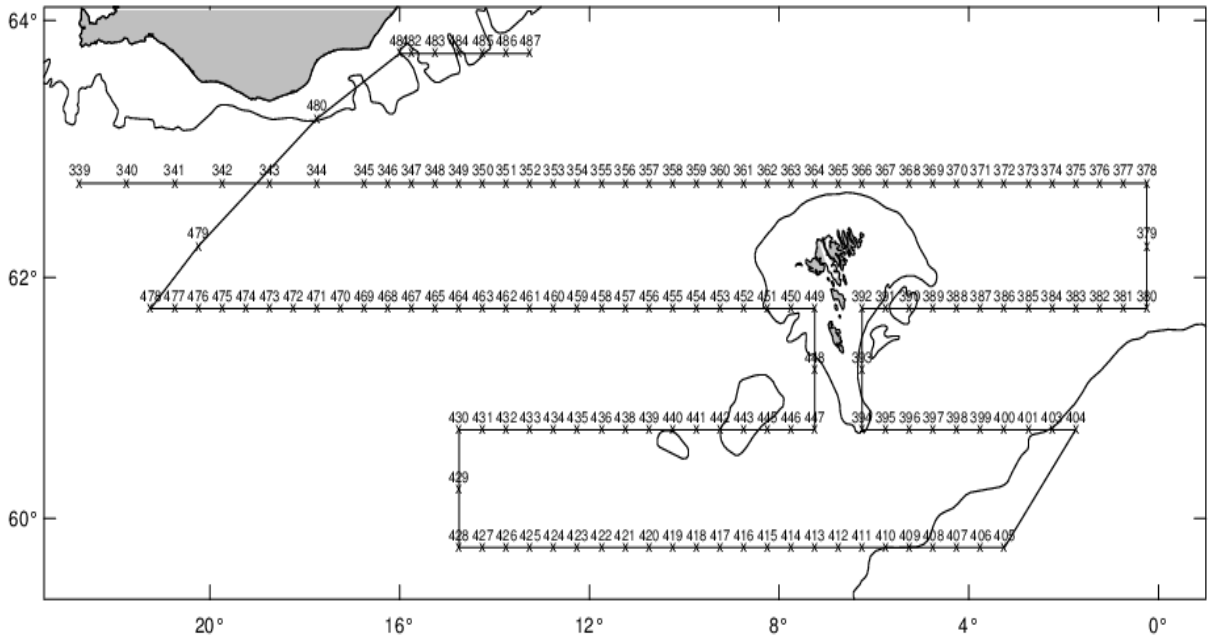


Fig. 2. Plankton- and CTD stations worked during the research cruise B4-2013 10-26 June 2013 (period 5).

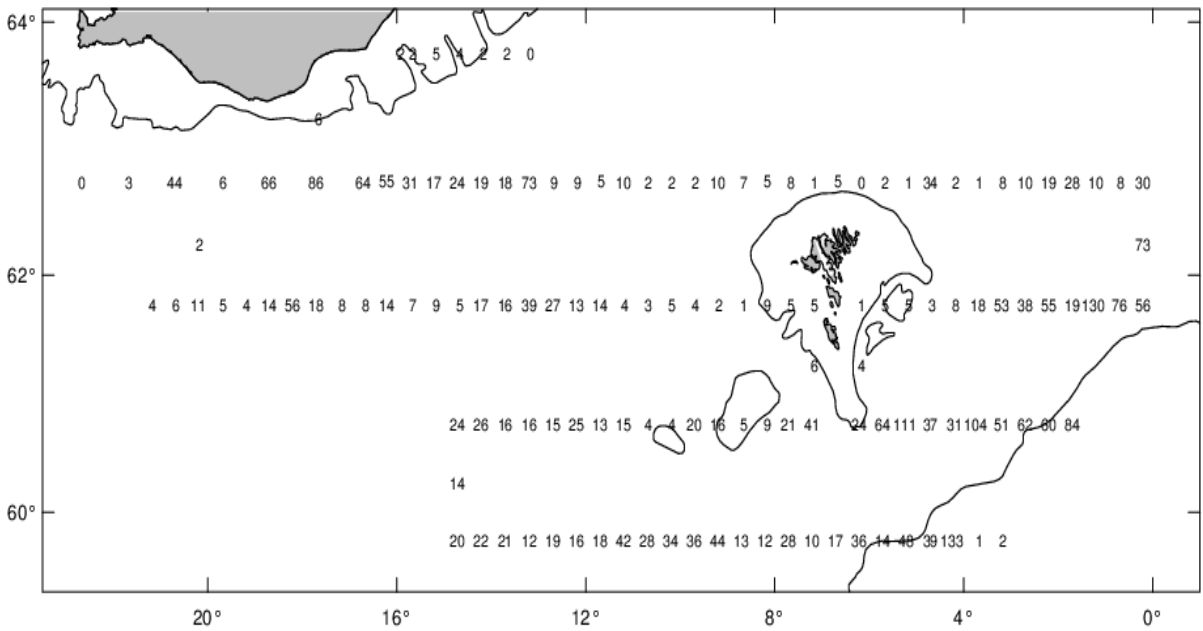


Fig. 3. Total numbers of mackerel eggs during the research cruise B4-2013 10-26 June 2013 (period 5).

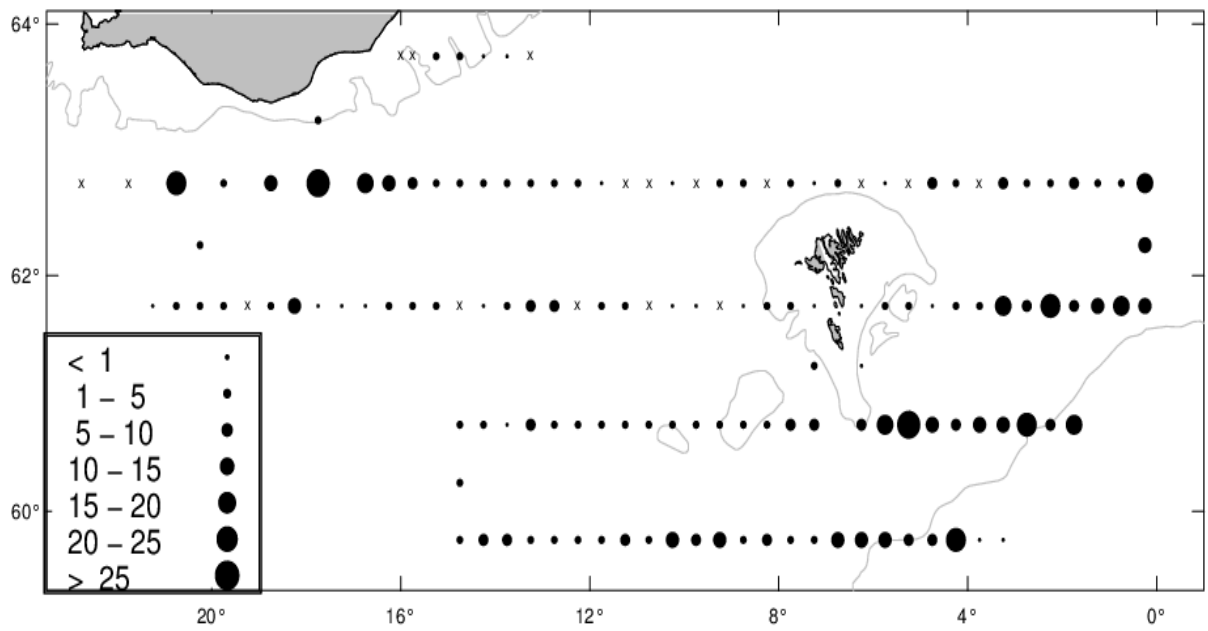


Fig. 4. Number of stage 1 mackerel eggs per m^{-2} during the research cruise B4-2013 10-26 June 2013 (period 5).

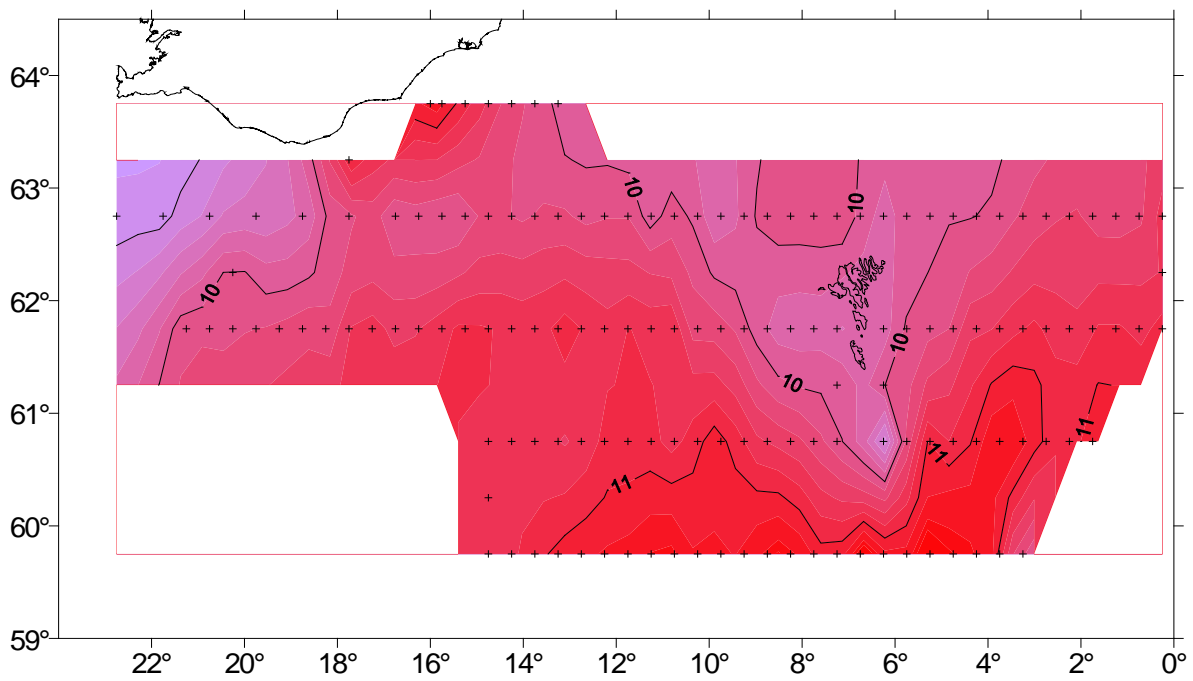


Fig. 5. Temperature at the surface (5m) during the research cruise B4-2013 10-26 June 2013 (period 5).

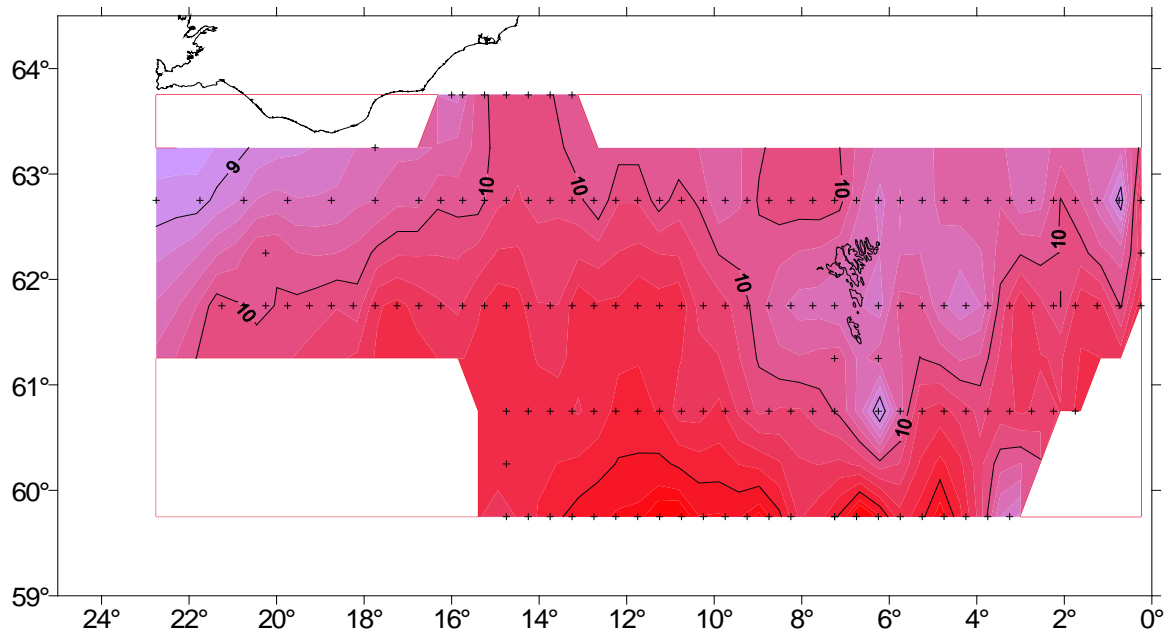


Fig. 6. Temperature at 20 m during the research cruise B4-2013 10-26 June 2013 (period 5).

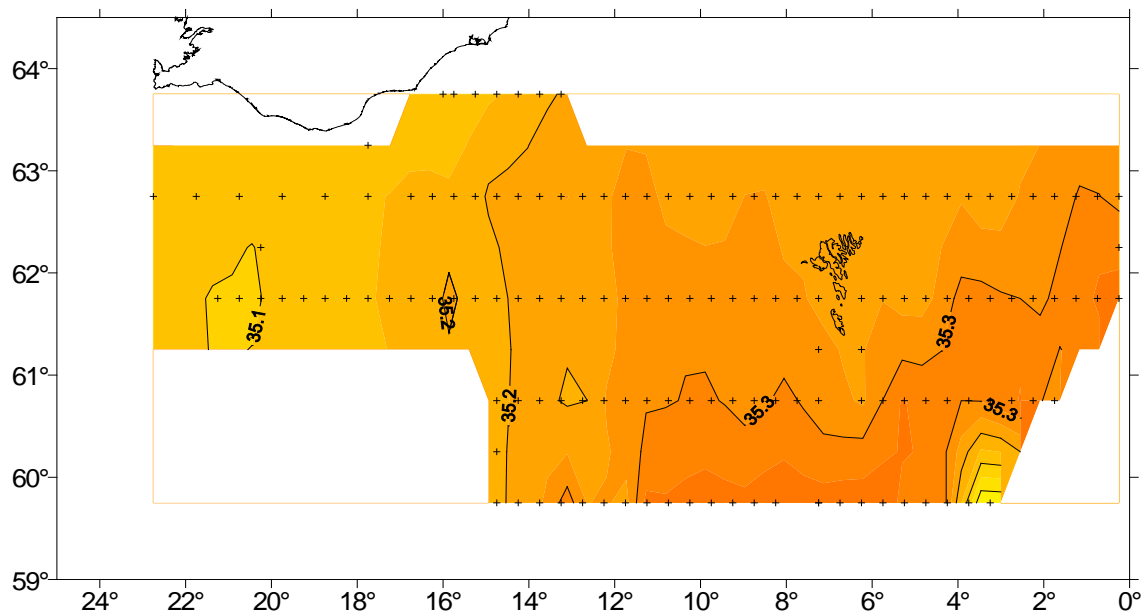


Fig. 7. Salinity at 20 m during the research cruise B4-2013 10-26 June 2013 (period 5).