

**Ministry of Food, Agriculture and Fisheries
Danish Institute for Fisheries Research**

Cruisereport

Dana Cruise 04 2003 Silde Akustik

Department HFI
Projectleader Bo Lundgren
Projectno 2302
Cruisearea Skagerrak og Kattegat
Cruiseleader Bo Lundgren
Ass. Cruiseleader Lotte Worsøe/Torben FJensen

Port of departure Hirtshals - 27-06-3
Port of call Hirtshals - 29-06-2003
Port of arrival Hirtshals - 11-07-2003

Crew

Bo Lundgren HFI 27/6-11/7
Karl-Johan Stæhr (udgår)
Mogens R Sørensen ITT 27-29/6
Thyge Dyrnesli ITT 27-29/6
Bo Tegen Nielsen ITT 27/6-11/7
Steen Silberg ITT 27-28/6
Helge A Thomsen HØK 27-28/6
Hjalte Parner HØK 27-28/6
Hans Jørgen Hansen MacArtney A/S 27-28/6
Lars Jørgensen MacArtney A/S 27-28/6
Steen Worsøe MacArtney A/S 27-28/6
Lotte Worsøe HFI 27/6-11/7
Torben Filt Jensen ITT 27/6-11/7
Uffe Nielsen HFI 30/6-11/7
Lise Sindahl HFI 30/6-11/7
Tommy Henriksen HFI 30/6-11/7

Mette Sørup HFI 30/6-11/7
Rasmus F Jensen HFI 30/6-11/7

Objectives

Three main goals: Testing the performance of the Triaxus steerable paravan from MacArtney A/S, calibrating the Simrad EY500 echosounders on Dana and carrying out a hydroacoustic biomass survey of the herring stocks in the area that Denmark is responsible for, namely Skagerrak east of 6°E and north of 57°N and Kattegat.

Progress

Functional test of the Triaxus-paravane 27/6:

Dana left Hirtshals at 12.30 to start the tests of the actively steered Triaxus-paravane, produced by the company MacArtney A/S. The test team represented the future users of the paravane and the producer. A minimum depth of 75 m was required to start the tests. After about 1 hour's sailing a seawater cooler supply pipe broke, which made it necessary to back to harbour for repair. A new departure was made at 18.30 after which detailed functional tests were carried out underway across Kattegat until about 06.00 the next morning. The tests, which were reasonably satisfactory, will be reported elsewhere by the test team.

Some tests of the echosounder equipment and some preparations for the calibration next day were carried out as well. A leaky connector was found in the 38 kHz transducer paravane. The problem showed up only when paravane was in the water.

Echosounder calibration 28/6 – 29/6:

Dana took a pilot onboard around 09.00 at the Swedish coast near Lysekil and continued towards the calibration site on the northern side of the Bornö Island in the Gullmar Fjord, where the anchor was dropped at about 11.30. During this period the paravane equipment was packed away and the echosounder calibration rig put in place. The part of the test team not participating in the calibration was set ashore around 13.00.

The weather was very calm the first day which favoured getting the calibration quickly started and helping make up for the initial delay of the cruise start. During the afternoon and evening the lobe diagrams and the sensitivity constants for both the 38 kHz paravane transducer and the 38 kHz hull transducer were acquired. In parallel with this a new test rig for the paravane was tried during the evening. The rig was provided with magnetic feet to hold the paravane attached to the shipside. The purpose was to be able to direct the paravane transducer beam towards the same calibration target as used with the hull transducer and at the same time increase the possible calibration range to more than just below 10 m as possible with the present rig. This larger range is recommended by the survey coordination working group.

The trials were not successful, mainly because the magnets were not strong enough and not mounted suitably, but valuable experience regarding future rig design was gained.

During the following day, less calm than the day before, the calibration

constants of the 38 kHz transducers were rechecked and the lobe diagram and the calibration constants for the 120 kHz transducer obtained. Also a complete check of the impedance as a function of frequency within a 3 kHz band around the center frequency of the transducer elements in all the three transducers was carried out. The calibration results showed that the echosounders works stably and that the calibration constants were within 0.5 dB of previous calibrations.

The pilot came onboard at 20.00 and Dana left the calibration site at around 21.00 and arrived in Hirtshals at about 06.00 the next morning.

Acoustic Herring Survey in Skagerrak and Kattegat 30/6-10/7:

The Triaxus-paravane equipment was unloaded during the morning and the new participants came on board. Dana left Hirtshals at 12.00 on June 30 with a westerly course to start the survey of Skagerrak and Kattegat, which is the Danish contribution to the International Acoustic Herring Survey.

The survey work (acoustic integration) started at 20.00 on the position 57° 53' N 06° 56' E in the western part of the Skagerrak. Totally the survey covered about 1600 nautical miles mainly using the 38 kHz paravane transducer running at depths of 4 – 6 m depending on the sea state and sailing direction relative to the waves. Acoustic raw data (up to 3000 samples per ping) were collected on the echosounder-PC's.

In order to identify the species composition in the various areas, 33 trawl hauls were taken, generally bottom hauls with an EXPO-trawl but some deep pelagic hauls with a FOTÖ-trawl during daytime and surface trawls with the FOTÖ-trawl during dark hours. An overview of the principal preliminary data (date and time, position, trawl type, trawl depth, bottom depth, total weight of catch, most frequent species in the catch and weather/sea conditions) for the trawl hauls is presented in Table 1. A CTD station was taken immediately before or after each trawl haul. As planned salinity calibration samples were taken at regular intervals, but no oxygen samples.

During each trawl station the acoustic integration continued using the 38 kHz hull transducer instead of the paravane transducer and was supplemented with acoustic integration and collection of acoustic raw data with the 120 kHz echosounder as well using the 120 kHz hull transducer. At some occasions 120 kHz data were also collected along selected sections.

Apart from the standard processing of the catch (for example determining species composition, size distributions and length-weight-relations, taking otolith samples for aging and taking samples for maturity determinations), samples were taken for discrimination between North Sea autumn spawners and Baltic Sea spring spawners. Special samples were taken for the analysis of the gall bladder content of saithe and a special sprat sample for a PhD-project.

The weather was generally quite good during the cruise except for two short periods with winds up to 20 m/s. On July 1st it was judged that good fishery was not feasible and therefore postponed until the wind decreased in the evening. The acoustic surveying continued, but with low speed and with the paravane deep. The number of fishing stations in the westernmost part of Skagerrak is therefore lower than optimal. On July 7th in the southern part of Kattegat the surveying speed had to be lowered and the paravane run deeper than optimal.

During the last part of the cruise there had been increasing noise from the net drum for the FOTÖ-trawl indicating beginning mechanical failure. The EXPO-trawl was therefore used for both surface and bottom trawling

during the last shallow stations of the Kattegat area. With a day left of cruise time it would not have been practical to go back to the western Skagerrak to make supplementary FOTÖ-hauls.

Dana arrived in Hirtshals on July 10th at about 11.00

Preliminary observations:

The general impression was that catches of herring were lower than the 2002 catches. The total catch of herring for the whole cruise was about 4 tons about half the 2002 catch. In the echograms clearly distinguishable concentrations of herring were not seen often and only in daytime. These were usually found along the bottom at depths of about 100 m in the Skagerrak area and at depths decreasing from 100 to 30 m in the Kattegat area. Similarly concentrations of blue whiting were found at depths of about 150 -200 m in the Skagerrak area.

In some catches in the eastern Skagerrak the concentration of krill was quite high. The higher concentrations of krill are clearly visible in the echograms with the standard settings of the echosounders. The echograms also indicate that the ratio of acoustic reflectivity at 120 kHz and 38 kHz is higher for krill aggregations than for fish.

The concentrations of jellyfish were often very high in the eastern Skagerrak and Kattegat, actually almost 1/3 of the total catch for the whole cruise was jellyfish. The jelly fish aggregations are also visible in the echograms, but in this case they indicate that the ratio of acoustic reflectivity at 120 kHz and 38 kHz for jelly fish aggregations is lower than for fish.

Achievements

Comments

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