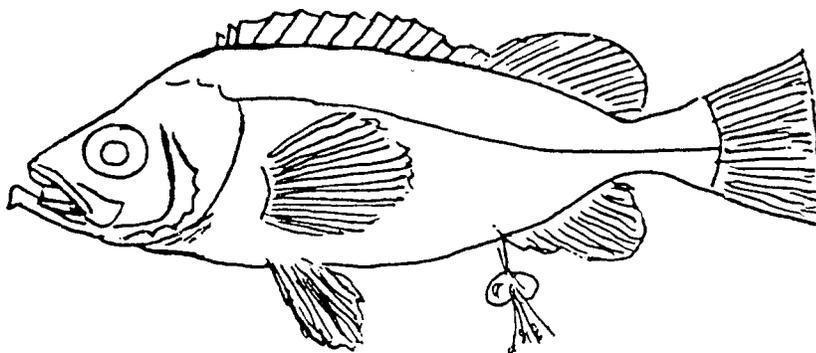


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International Council for the  
Exploration of the Sea

C.M.1994/G:4



## **REPORT OF THE STUDY GROUP ON REDFISH STOCKS**

Copenhagen, 2 - 3 May 1994

This document is a report of a Study Group of the International Council for the Exploration of the Sea and does not necessarily represent the views of the Council. Therefore, it should not be quoted without consultation with the General Secretary.

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## 1 INTRODUCTION

### 1.1 Participants

Lehmann, K	Greenland
Magnusson, J. (Chairman)	Iceland
Nedreaas, K.H.	Norway
Rätz, H.J.	Germany
Reinert, J	Faroe Islands
Shibanov, V.N.	Russia

(See Appendix 1 for addresses.)

### 1.2 Terms of Reference

At the ICES 81st Statutory Meeting it was decided (C.Res.1993/2:29) that the Study Group on Redfish Stocks should meet at ICES Headquarters from 2-3 May 1994 to coordinate the international survey to be held in June/July 1994.

In addition a request from NEAFC was passed on to the Study Group by the Chairman of the North-Western Working Group. The request was to "provide quantitative information on the distribution and migration of the 'oceanic' stock of *Sebastes mentella*".

## 2 REPORTING ON SURVEYS IN 1993-1994

Magnusson presented a Working Paper (afterwards also presented to the North-Western WG) giving a summary of the Icelandic oceanic *S. mentella* survey in the Irminger Sea in September 1993. The survey was primarily conducted to examine whether it was feasible to conduct an acoustic survey at that time of the year, and to examine the distribution of the oceanic redfish at that time. It turned out to be possible to make an acoustic survey in September, but the longer nights (compared to summer), which keep the scattering layer at shallower depths for a longer period, should be taken into account. Bad weather conditions are also more likely to hamper the survey in autumn. It will, however, be interesting to cover the stock at the copulation time (i.e., September-October) when the sex ratio is expected to be more equal. Compared with previous surveys in June/July, this survey in September showed the greatest fish concentrations further to the east, suggesting an eastward migration of the fish after June/July. It is therefore likely that there is a back and forth migration of oceanic *S. mentella* in the Irminger Sea. This back and forth migration is supported by the movements of the fishing fleet. No acoustic estimate was obtained.

Reinert reported on the Faroes acoustic survey which was carried out at the same time as the Icelandic survey in September 1993. The fish distribution was similar to that reported in the Icelandic survey. The redfish catches

taken by pelagic trawl (Norwegian herring trawl) were small, but this may have been due to the scattered fish registrations, the trawl geometry and the towing speed (2.5 knots). No acoustic estimate was obtained.

Shibanov reported on the Russian surveys in April-July 1993. A report on these surveys was presented to the North-Western WG. The ichthyoplankton survey in April-May estimated the total stock to be 3.0 million tonnes. The trawl-acoustic survey in June-July estimated the total biomass to be 2.5 million tonnes. A paper summarising the Russian time series from oceanic *S. mentella* trawl-acoustic surveys was presented at the North-Western Working Group also. These papers will also be presented to the ICES Statutory Meeting later this year. The temperature in the 3K-section in April 1993 was the lowest observed during the last ten years. Russia has temperature measurements from the 3K-section for approximately 25 years, but only the last ten years have been analysed.

A German survey was carried out in the Irminger Sea in a limited area in the northern part of the international waters in the corner between the Greenland and the Icelandic EEZ for 7 days in April 1994. This survey was carried out mainly to carry out experiments with the new R/V "Walter Herwig III". A towed transducer (SIMRAD) was used only, down to 50 m. The oceanic *S. mentella* were distributed homogeneously within the 150-450 m depth interval. Males constituted 90% of the fish in the samples. The predominant maturity stage of the females was stage 3C (i.e., extrusion of larvae). The average catch was 30 kg/h using a herring trawl with a vertical opening of approximately 20 m.

## 3 RECENT INFORMATION ON THE FISHERY

Magnusson reported that the Icelandic fishery for oceanic *S. mentella* in 1994 had already started in the second half of March with good catches in the area just outside and inside the Icelandic EEZ. Mature females predominated in the catches at this time.

It was also reported that the Russian and German fleets started their fishery at the same time in the same area as the Icelandic fleet, just outside the Icelandic EEZ.

In 1994, the Norwegian trawlers started their fishery for oceanic *S. mentella* in the second half of April.

## 4 COORDINATION OF THE INTERNATIONAL SURVEY TO BE CONDUCTED IN JUNE/JULY 1994

An international trawl-acoustic survey for oceanic *S. mentella* is to be conducted in the Irminger Sea in

June/July 1994 as recommended by last year's Study Group on Redfish Stocks (Anon., 1993). Magnusson reported from the coordination meeting held in Bergen on 6-7 April 1994 between the three countries participating in the survey, i.e., Iceland, Norway and Russia. A report from this meeting is given in Appendix 2.

Magnusson proposed that the acoustic estimation of the stock should be the main purpose of the survey, and that it should not be hampered by biological recording not required for the main purpose of the survey.

An international exchange of scientists will take place during the survey. Klaus Lehmann from the Greenland Fisheries Research Institute will participate in the survey on board the Russian research vessel, while Yuriy Bakay from PINRO, Murmansk, will participate on board the Norwegian vessel. Three Icelandic biologists from the Marine Research Institute, Reykjavik, will also work on board the Norwegian vessel.

## 5 RECOMMENDATIONS FOR FUTURE WORK

No new recommendations were made, and the Study Group therefore draws attention to last year's Study Group Report (Anon., 1993).

The Study Group wishes to remind and encourage redfish scientists to participate in the ICES Workshop on Redfish Age Reading to be held in Bremerhaven, Germany, during the first week of December 1994 under the co-chairmanship of Dr. Bruce Atkinson, Canada, and Dr. Klaus Kosswig, Germany. Contributions to this long-lasting problem are welcomed in advance of the Workshop.

## 6 WORKING DOCUMENTS AND REFERENCES

Anon. 1993. Report of the Study Group on redfish stocks. Copenhagen, 12-14 May 1993, ICES, Doc. C.M.1993/G:6.

Magnusson, J. The acoustic survey on the oceanic redfish in September 1993 (B-12/93) with notes on the migration pattern. 4 pp.

## APPENDIX 1

### LIST OF PARTICIPANTS

<i>Name</i>	<i>Address</i>	<i>Telephone</i>	<i>FAX</i>	<i>E-mail</i>
Dr (Ms) J. Magnusson (Chairman)	Marine Research Institute P.O. Box 1390 121 Reykjavik ICELAND	+354 1 20240	+354 1 623790	
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## APPENDIX 2

### REPORT FROM A MEETING IN BERGEN (6-7 APRIL 1994) TO PLAN THE INTERNATIONAL SURVEY FOR OCEANIC *S. MENTELLA* IN THE IRMINGER SEA, JUNE-JULY 1994

(Kjell H. Nedreaas, Rapporteur)

(including some revisions made during the "Study Group on Redfish Stocks" at ICES 2 May 1994)

#### Participants

Jakob Magnusson	Iceland
Kjell H. Nedreaas	Norway
Vladimir Shibanov	Russia

#### Research vessels participating in the survey:

"*Bjarni Sæmundsson*" (radio call sign TFEA), 24 June-15 July (disembarking Reykjavik 15 July after finishing the survey).

"*Pinro*", ultimo May - 24 July, acoustic survey 20 June-18 July (disembarking Reykjavik 18 July after finishing the survey).

"*Michael Sars*" (radio call sign LHUW) 25 June-15 July (calling in at Reykjavik 8 July for change of crew and disembarking 16 July after finishing the survey).

A meeting is to be held in Reykjavik 18-19 July to discuss the results and to write a joint report.

The Icelandic research vessel will be the head vessel to which the other two vessels will report once a day (GMT 9 hrs). The first contact will be made on the emergency channel (2182 kHz) every three hours after GMT 9 o'clock, and then participants should agree upon a suitable working channel (channel dependent on the distance between the vessels).

During intercalibration the VHF radio will be used.

#### Contents of the final survey report

List of participants in the Appendix.

#### Introduction

Short review of the history behind this investigation. Terms of reference: "To assess the total stock size, if possible, of the oceanic *S. mentella* in the Irminger Sea

and adjacent waters by trawl-acoustic methods. In addition, to sample biological data of oceanic *S. mentella* and to provide hydrographic information from the investigated area".

#### Material and methods

Material and methods for each vessel should be worked up at sea, and then put together at the meeting (this should also include a table similar to Table 1 in ICES, Doc. C.M.1992/G:51)

#### Results

##### *Acoustic measurements*

- Target strength
- Intercalibration (parallel intercalibration "Bjarni Sæmundson" vs. "Michael Sars" and "Bjarni Sæmundson" vs. "Pinro")
- Acoustic estimation — a table presenting the acoustic estimate in numbers and biomass per length and per sex for each sub-area covered.

##### *Temperature conditions and distribution of oceanic *S. mentella*.*

##### *Biological information*

- see chapter 2.3 Sampling strategy, point 3, in ICES, Doc. C.M.1993/G:6;
- length-weight relationship;
- a summary table showing maturity stages for each sub-area A-G (similar to Table 5 on page 20 in ICES, Doc. C.M.1992/G:51);
- just state that sampling of otoliths and scales has taken place;

- infestation rate of *Sphyrion lumpi* split on sex for each sub-area A-G

one table containing external abnormalities (see enclosed example)

the table should contain an overview of spots (all kinds together) and infestation (live parasites plus remnants).

no. of fish examined, no. of fish with abnormalities (both spots and remnants), also as percentage  
one table containing muscular abnormalities (see enclosed example)

- observation on stomach contents, just a summary table (similar to table 3, page 8, in ICES, Doc. C.M.1992/G:51), comments on eventual differences between sub-areas
- if plankton sampling has been conducted, then just mention it in the text
- presentation of stomach analyses and plankton sampling will be according to decisions made at the Reykjavik meeting.

#### Figures

Figure 1. One figure showing all survey tracks, trawl stations, plankton hauls and hydrographic stations.

Figure 2. Horizontal distribution chart showing the different densities (in  $m^2/nm^2$  of oceanic *S. mentella* using the Russian scaling (the exact scaling to be used in the report will be decided upon in Reykjavik).

Horizontal temperature distribution, one map for 150 m (Figure 3) and one map for 200 m (Figure 4).

Vertical temperature. The routine Russian section 3K (Figure 5) and a routine Icelandic section along 60°N (Figure 6). In addition one or two more figures depending on fish distribution.

#### Some points concerning the running of the survey

(see also attached map).

Unless anything else is stated the survey will be conducted according to the plans described in last year's Study Group report (ICES CM 1993/G:6).

Temperature and salinity should preferably be sampled with CTD for each 50 nautical miles sailed, and down to a depth of 800 m. Alternatively a XBT sampler can be

used (e.g., in combination with CTD for every 30 n.m. sailed). The 3K section should be sampled down to 1000 m.

Deep-sea hauls, i.e. deeper than 500 m, are not obligatory, but acceptable if special registrations are recorded and in order to get samples for specific purposes (e.g., genetic analyses).

All fixed trawl stations (see ICES, C.M.1993/G:6, pages 7 and 9) are flexible to such a degree that they can be taken where suitable fish registrations are found in that area.

Stratified sampling of both otoliths and scales from the same fish should be conducted every day by each vessel. Otoliths and scales should be sampled from 1 female and 1 male per 1 cm length-group per day. In addition one representative (random) sample of 50 otoliths and scales should be sampled by each vessel from each sub-area A-G during the survey.

Sampling of *Sphyrion lumpi* will be conducted using the Russian sheets by the Russian vessel, and using the Icelandic sheets by the Icelandic and Norwegian vessels.

Every day at 9.00 hrs (GMT) new information (from the previous 24 hours) on the A, B (only redfish integrator values), C and D-sheets (only 150 m and 200 m) (see enclosed copies) should be transferred via radio to the head vessel "Bjarni Sæmundson" after radio contact between all three vessels has been achieved. "Bjarni Sæmundson" will report back similar information to the other two vessels. The E-sheet containing specifications of the acoustic instruments will be exchanged via radio if necessary.

At the meeting in Reykjavik on 18-19 July summary tables should be exchanged. All A, B, C, D and E-sheets should also be exchanged. Exchange of raw data will only take place after further agreement between the scientists participating in the survey.

It is important that all three participating vessels calibrated their acoustic instruments in advance of the survey.

The survey tracks were discussed and the area of investigation was "shared" between the vessels (Appendix Figure 1). "Bjarni Sæmundson" will go from Reykjavik on 24 June, "Michael Sars" from Reykjavik on 25 June, while "Pinro" will start on the acoustic part of its cruise from around Cape Farewell on 20 June. Methods and areas for intercalibration were agreed upon.

The method will be that described in the "Report on an intership-calibration between the research vessels G.O.

Sars, J. Hjort, Fr. Nansen, and Pr. Marti, 22 and 23 September 1993" (by K.A. Hansen, E. Øvretveit, and J.A. Kristiansen).

The Russian vessel will cover the area west of Cape Farewell, and together with the Icelandic vessel also the area south of 56°N. The Icelandic vessel will cover the area south of 62°N outside East-Greenland mainly within the Greenland EEZ. The Norwegian vessel will cover the area from 62°N and, in parallel with the Icelandic vessel, mainly outside the Greenland EEZ southwards to approximately 58°N.

The Russian hydrographic 3K-section will be carried out by R/V "Michael Sars" in the period 8-15 July 1994.

**Table xx.** Oceanic *S. mentella*. Incidence of external and internal abnormalities.

<i>External abnormalities</i>			
	Males	Females	Total
No. of fish examined . . . . .			
No. of fish with external abnorm . . . . .			
% with external abnorm . . . . .			
No. with external spots . . . . .			
No. with <i>Sphyrion lumpi</i> and/or remnants			

<i>Muscular abnormalities</i>			
No. of fish examined . . . . .			
No. of fish with muscular abnorm . . . . .			
% with muscular abnorm . . . . .			

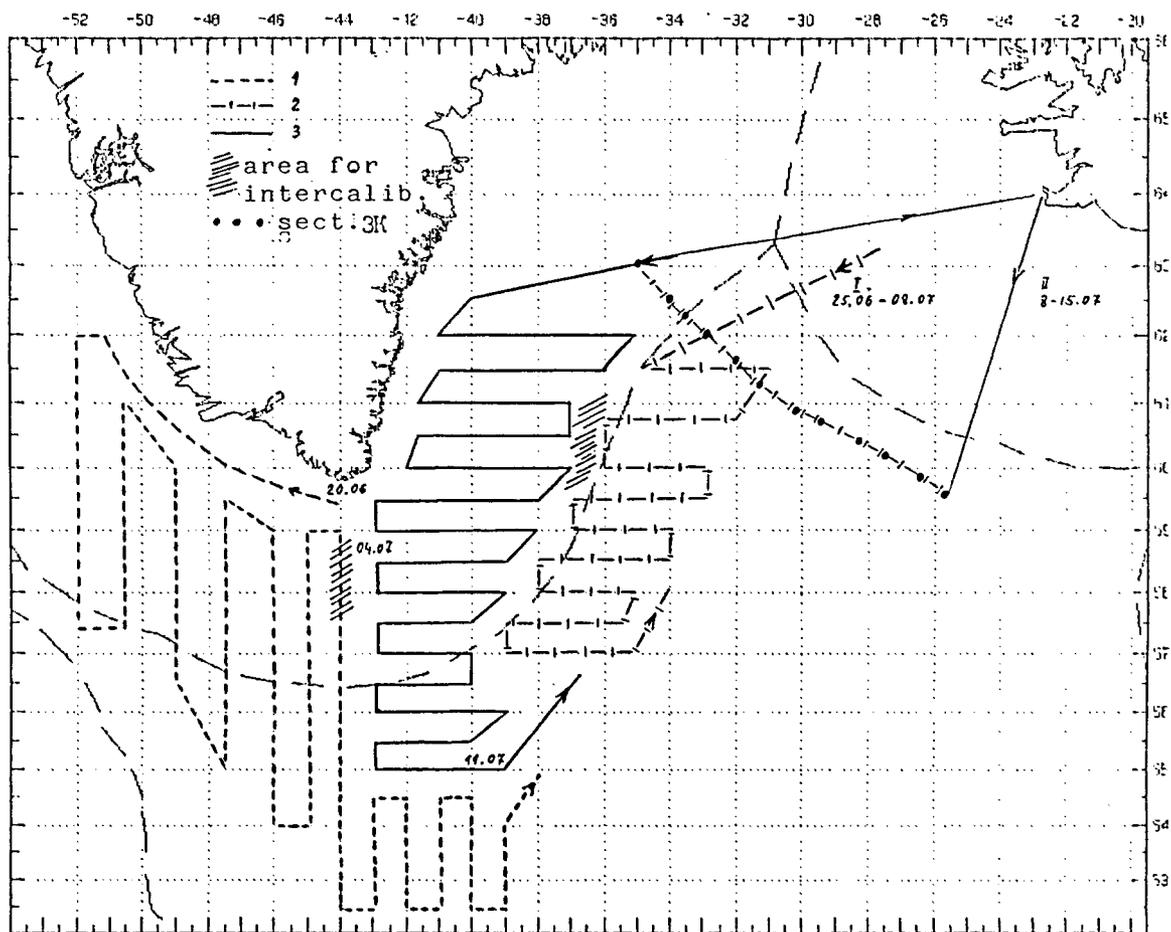


Figure 1. Planned survey tracks of the Russian (1), Norwegian (2), and Icelandic (3) research vessels in June-July 1994.