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Some results of the Soviet investigations  
of deep-water fish supply in the Faeroe  
economic zone in 1979

by

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#### Introduction

In June/July 1979 oceanographic and biological investigations were conducted on the FRV "Artemida" in the Faeroe Islands waters. Works were carried out in accordance with Proceedings of the Second Session of the 1978 Mixed Soviet-Faeroe Commission on Fisheries. Some results of these investigations are described below.

#### Materials and methods

Oceanographic stations were made on tacks of hydroacoustic surveys and during trawlings with a bottom trawl. In all 43 stations were made on which water temperature was measured at the depths of

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### Résumé

Au cours des mois de juin et de juillet à bord du b/r "Artémida" dans les eaux des Iles Faeroer on a effectué les recherches océanographiques et biologiques. Les travaux ont été accomplis conformément au protocole N°2 de la session de la Commission mixte soviéto-faerøer sur la pêche entre l'URSS et le gouvernement des Iles Faerøer du 1978. Quelques résultats de ces recherches sont exposés ci-dessous.

### Abstract

The main results of the Soviet oceanographic and biological investigations carried out on the FRV "Artemida" in June/July 1979 are summarized in the paper.

Waters temperature and salinity are considered, their low heat content compared with the long-term mean is pointed out. Data on distribution, length composition and biological state of round-nose grenadier and slickhead are given.

0, 10, 20, 30, 50, 75, 100, 150, 200, 300, 400, 500, 600, 800, 1000 and 1500 m; and salinity, oxygen and phosphorus samples were taken. The long-term mean water temperature (Table 1) was calculated according to data collected by PINRO in 1954-1975 (Solonitsyna, 1975).

Scouting works and fisheries were carried out with the aid of echo sounder HAG-432 and bottom trawls. The fishes caught were measured and weighed, their gonads maturity stage and index of stomach fullness were determined, the qualitative composition of food bolus and fatness were analysed.

Deep-water trawlings with a bottom trawl were conducted in the zone south-westward of the Faeroe Islands. In all 21 trawlings were made.

#### Oceanographic investigations

Hydrological observations were made on the stations the position of which is given in Fig.1.

The analysis of data showed that waters running from the north-west to the south-east (the 3-4° isotherms) were observed at the 50 m depth (Fig.2A,B). Water salinity was equal to 34.9‰. To the east of the Faeroe Islands there were waters of the warm North-Atlantic Current with the temperature of 7-8° and salinity of 35.2‰ and to the south-west the temperature and salinity of waters distributed from 60° to 62°N between 6° and 13°W were 8-10° and 35.3‰.

At the 500 m depth (Fig.2C,D) cold abyssal waters with temperature below 0° and salinity 34.9‰ covered the area to the north-east of the Faeroe Islands and eastward of them the water temperature and salinity reached 2-5° and 34.9-35‰, in the south-west the water masses temperature and salinity were 5-8° and 35.2‰.

\* The heat content of water masses in the 0-500 m layer on some

stations of the area surveyed in June 1979 compared with the long-term mean is presented in Table 1.

As is seen from Table 1 negative anomalies prevailed on three stations north-westward of the Faeroe Islands and slight positive anomalies - on two stations. In June 1979 the 0-500 m layer waters were colder compared with the norm by 0.6°C.

#### Biological investigations at great depths

From June 29 to July 7 1979 fisheries were carried out in the Faeroe economic zone for the purpose of studying supply of fish at the depth of 700 to 1600 m. Roundnose grenadier, slickhead and deep-water shark made up the bulk of catches; blue ling, black scabbard-fish, beaked redfish and other bathypelagic fishes were found in minute quantity. Catches of deep-water fishes varied from some kg to 4 t per trawling.

Roundnose grenadier - *Coryphaenoides rupestris* - did not form commercial concentrations during the survey, their catches varied from 0.05 to 0.75 t per trawling at the water temperature of 6.5 - 7.7°C and from 0.05 to 0.1 t - at temperature below 4.3°C.

Grenadier 36 to 122 cm long (Fig.3, Table 2) were observed on the Outer-Bailey and Bill-Baileys Banks. Besides, young fish 7 to 22 cm long were found in trawls.

It is seen from Table 2 that larger grenadier were distributed at the depths of 720 to 900 m compared with those found at the depths of 1040 to 1600 m.

The mean length of females was greater than that of males.

On the Outer-Bailey Bank the mean weight of males and females was 1122 and 1475 g respectively. Being of the same length females were, as a rule, heavier than males; difference between the mean

weight of large males and females of the same length was greater than that of small ones.

Both immature and mature grenadier with gonads at different maturity stages (Table 3) were found in catches in all the areas surveyed. On the Outer-Bailey and Bill-Baileys Banks the minimum length of mature males was 72 to 77 cm and that of females - 81 to 86 cm whereas in the area north-westward of the above-mentioned Banks mature males and females were registered with the length of 63 to 65 cm.

A list of roundnose grenadier food objects in the areas surveyed included 12 names. Shrimp, squid and bathypelagic fishes were found most commonly in grenadier stomachs.

Index of stomach fullness of females was higher than that of males (Table 3).

On the Outer-Bailey Bank fatness of grenadier males determined as the ratio of liver weight to fish body weight was 1.49%, that of females - 1.41%.

In the south-western Faeroe economic zone slickhead - *Alepocephalus bairdi* - was taken as a by-catch to grenadier on the Outer-Bailey and Bill-Baileys Banks at the depths of 720 to 1500 m.

Slickhead length composition is presented in Table 4. The largest fishes were found on the Bill-Baileys Bank (68.93 cm); the mean length of females was greater than that of males and on the Outer-Bailey Bank males were larger than females. The mean length of slickhead caught at depths over 1000 m was greater than that of the fish caught at the depths of 840 to 860 m (Table 5).

On the Outer-Bailey and Bill-Baileys Banks the mean weight of females was less than that of males (Table 6). On the Outer-Bailey Bank mean weights of males and females were less than those on the

### Bill-Baileys Bank.

Females were more numerous than males on the Outer-Bailey and Bill-Baileys Banks. Prevalence of males was observed only in length groups of 66 to 74 cm, in the other groups females predominated.

Slickhead fed little. Among 481 stomachs 390 were empty. The mean index of fullness was 0.19. Medusa and shrimp were the main food objects of slickhead.

### Conclusion

In June 1979 the heat content of water masses in the Faeroe economic zone was 0.6° below the long-term mean.

Commercial concentrations of deep-water fishes were not detected.

Relatively productive areas were found on the northern and north-eastern slopes of the Outer-Bailey Bank (depths 750-960 m) and southern slope of the Bill-Baileys Bank (900-1100 m). Roundnose grenadier, slickhead, blue ling and other fishes made up the bulk of catches at those depths.

To determine the commercial importance of areas it is necessary to carry out observations all the year round.

Table 1

Long-term mean water temperature in the 0-500 m layer (T), water temperature in June 1979 ( $T_I$ ) and its anomalies on stations of the Faeroe economic zone

Position of stations	T	$T_I$	Anomalies
64°50' N 06°00' W	2,51	0,61	-1,90
64°20' N 05°00' W	2,78	2,08	-0,70
63°05' N 05°00' W	3,71	2,96	-0,75
63°05' N 01°45' W	4,85	5,00	0,15
63°03' N 06°45' W	5,42	5,81	0,39

Table 2

Length composition of roundnose grenadier in the Faeroe economic zone in July 1979

Area	Depth, m	Number of fishes measured	Minimum length, cm	Maximum length, cm	Mean length, cm	
Outer-Bailey Bank	740-950	males	516	51	116	88,3
		females	390	54	119	92,6
Bill-Baileys Bank	720-900	males	89	54	107	83,6
		females	135	60	122	91,9
		males	38	57	95	73,0
	1040-1200	females	96	46	122	78,4
Area north-westward of Outer-Bailey Bank	1040-1600	males	45	36	89	67,5
		females	85	39	110	72,5

Mean index of stomach fullness and quantitative ratio of roundnose grenadier and their gonads at different maturity stages in the Faeroe economic zone in July 1979

Area	% of fishes with gonads at different maturity stages				number of spec.	Depth, m	mean index of stomach fullness
	I, II	III-IV	V	VI, VI-II			
Outer-Railey Bank							
males	8,0	66,2	15,5	10,3	399	740-950	0,89
females	21,3	32,9	1,4	44,4	298		1,18
Bill-Baileys Bank							
males	29,0	62,3	2,9	5,8	69	720-900	1,05
females	21,5	41,4	-	37,1	117		1,16
males	87,9	9,1	3,0	-	33	1040-1200	1,00
females	74,5	4,4	-	21,1	92		1,66
Area north-westward of Outer-Railey Bank							
males	82,2	17,8	-	-	45	1340-1600	0,90
females	35,3	12,9	-	51,8	89		1,29



Table 4

Length of slickhead caught on the Outer-Bailey and Bill-Baileys Banks in July 1979

Sex	Outer-Bailey Bank			Bill-Baileys Bank		
	number of spec.	mean length, cm	length frequency, cy, cm	number of spec.	mean length, cm	length frequency, cy, cm
Males	463	68,57	39-89	208	68,31	42,69
Females	545	65,40	30-89	247	69,47	36,92
Total:	1008	66,98	30-89	455	68,93	36,82

Table 5

Mean length of slickhead caught at depths up to and over 1000 m in the Faeroe economic zone

Depth, m	Sex	number of spec.	mean length, cm
840 - 860	males	70	67,45
	females	64	67,12
	Total:	134	67,28
1040 - 1200	males	78	67,23
	females	94	68,08
	Total:	172	67,40

Table 6

Mean weight of slickhead (*Alepocephalus bairdi*) in the Faeroe economic zone

Sex	Outer-Bailey Bank		Bill-Baileys bank	
	number of spec.	mean weight, g	number of spec.	mean weight, g
Males	255	2604	208	2772
Females	298	2320	247	2766
Total:	553	2543	455	2769

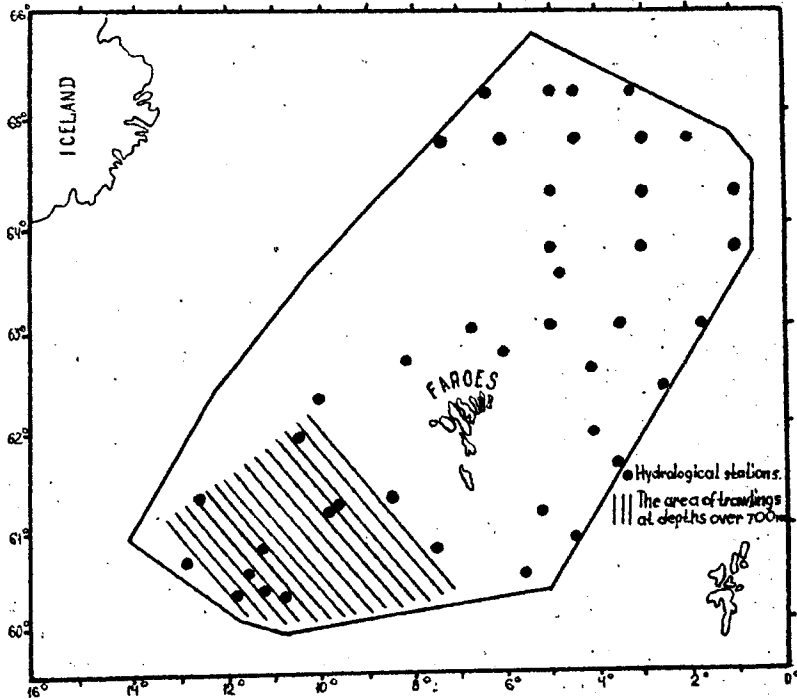
References

Solonitsyna L.R. 1975. Long-ranged changes in temperature and salinity of the Norwegian Sea waters. Trudy PINRO, vyp.35.

Headings for Figures

to the paper by A.A.Glukhov et al. "Some results of the Soviet investigations of deep-water fish supply in the Faeroe economic zone in 1979"

Fig.1 Position of oceanographic stations and area of deep-water trawlings.



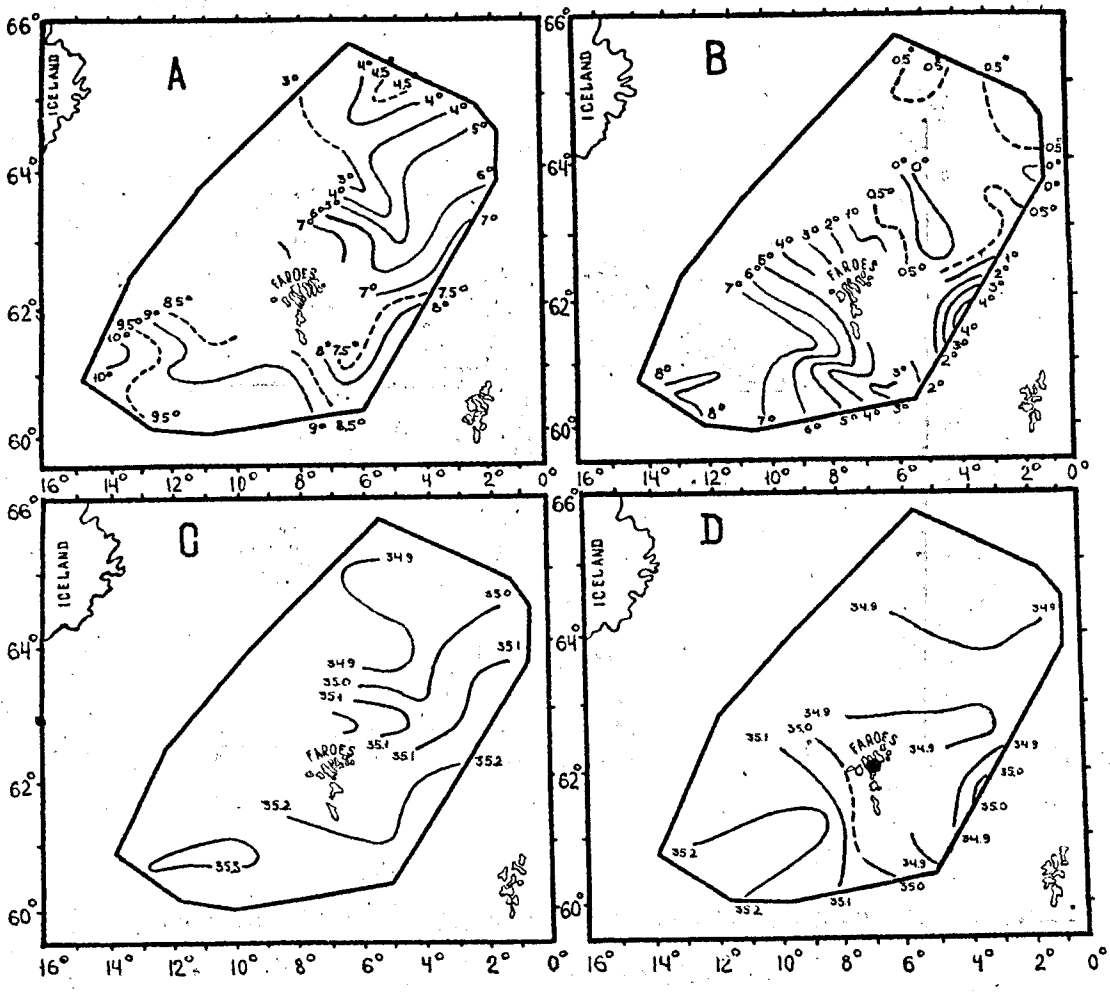


Fig.2 Water temperature and salinity in June/July 1979 in the area of the Faeroe economic zone.

A,B - at the 50 m depth

C,D - at the 500 m depth

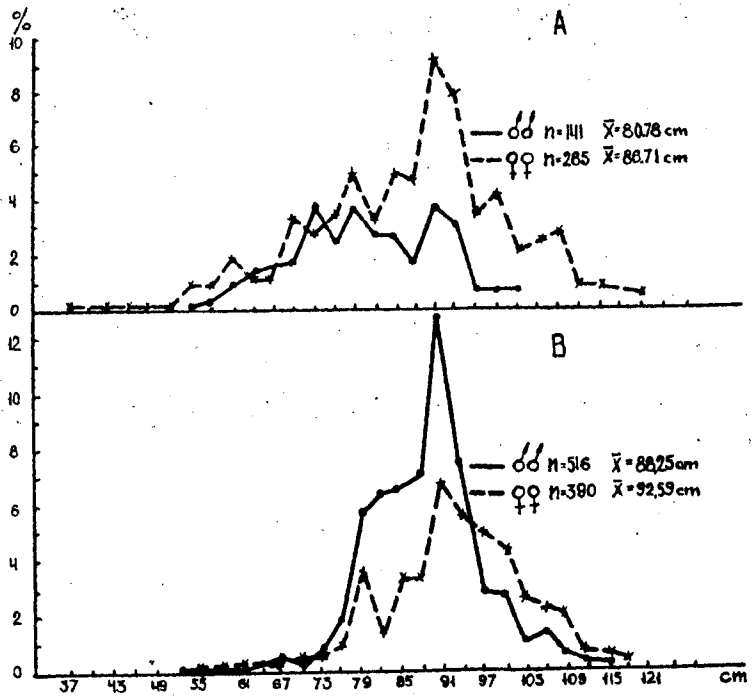


Fig. 3 Length composition of roundnose grenadier in catches taken on the Bill-Baileys (A) and Outer-Bailey (B) Banks.