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MINISTRY OF AGRICULTURE, FISHERIES AND FOOD FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1976 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 7

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STAFF

A Jamieson J G Pope B C Bedford B E Riches B J Knights M W Easey R J Turner D Whittaker (Scarborough) R A Bray (BM)

DURATION

Left Grimsby 1800 h, 28 June

Arrived Grinsby 1930 h, 29 July

LOCALITY

Farce, North of Scotland

AIMS

1. Survey 0-group fish around Faroe (A3.5 and A4.1)

2. Sample cod and saithe for blood type analyses of races (1.7(3)1 and 1.7(3)2)

NARRATIVE

### 28 June to 9 July

CIROLANA left Grimsby at 1800 h, 28 June to proceed to Faroe. Station 1 of the O-group survey commenced on Faroe Bank at 1700 h, 30 June. Thereafter the survey continued without interruption, at rates of 10 to 11 stations per 24 hour period, until the final O-group sample, station 92, was hauled at 0400 h, 9 July. The capelin trawl was operated swiftly and effectively using the net drum winch. This fifth in a series of annual surveys was carried out on the same grid of stations and in the same fashion as in previous years. Echo levels were continuously monitored around the grid. At grid points the trawl sampled the thickest part of the echo trace. Hydrographic observations were taken both at the surface and at 50 m depth on each trawl station. In addition to the 86 standard stations of the basic grid in earlier surveys, 6 additional deeper water stations were sampled in response to a radio request from Mr Kjartan Hoydal. A cruise course diagram showing station points is attacned to this report.

# 9 to 12 July

The capelin trawl was wound up and the Granton trawl used throughout the remainder of the cruise. Still at Farce, CIROLANA joined a concentration of vessels from Grimsby, Aberdeen and Farce fishing west of Myggences. Populations of cod, saithe and haddock were bled, dissected and described before proceeding to Aberdeen. Arrival time was 0015 h, 12 July. Messrs Pope and Riches left the ship, taking the 0-group data with them. Messrs Easey and Turner boarded. Liquid nitrogen was replenished. Visits were made to the DAFS Laboratory and to their District Inspectorate.

## 13 to 17 July

CIROLANA left Aberdeen 1400 h, 13 July to trawl Solan Bank and several grounds in the vicinity of Rona, Flannans and St Kilda. Populations of cod, saithe and haddock were sampled for blood specimens in the course of 12 hauls. 15 cod were bled, tagged and released.

#### 18 to 19 July

Unproductive trawling west of the Orkneys and Shetlands yielded little other than small haddocks, but a herring population sample was secured off Noup Head, Westray and some haddocks bled at Fair Isle.

#### 20 to 21 July

To the east of the northern islands, Viking and Bressay grounds provided an ample sample of saithe and a limited number of cod for bleeding.

### 22 to 23 July

The northern parts of the Moray Firth provided more small haddocks but 13 larger haddocks caught alive off Wick were bled, tagged and released.

### 24 to 28 July

The trawl was hauled 26 times in the Southern Trench of the Moray Firth. This steep gulley goes down to 240 m in places. It lies 4 to 10 miles offshore, and is almost parallel to the north coast of Aberdeenshire. Trawling along the contours of this feature produced an average of 12 baskets of cod per hour. Most of the cod approached 90 cm and were judged to be maturity stage I-III (ie ripening for the first time). Among approximately 1500 cod captured 364 were bled, tagged and released to trace the future movements of genotypes: also 96 were bled, dissected and described. One tagged and bled cod was recaptured by CIROLANA and released again one day after bleeding.

Only 2 of the 26 hauls in the Southern Trench yielded appreciable catches of saithe. Both were taken on the same day. In one of those hauls all the saithe measured between 40 and 49 cm and were exclusively maturity stage I. All of the saithe in the other haul measured between 71 and 101 and all were stage II. Blood samples and otoliths were taken from 60 saithe representing both hauls.

A population of herring was sampled off Fraserburgh for the Lowestoft Laboratory.

### 29 July

CIROLANA set course for Grimsby at noon on 28 July and docked at 1930 h, 29 July.

RESULTS

- Aim 1. Faroe O-group survey. At mid-cruise the completed set of data for the 5th English O-group survey at Faroe was carried by Mr Pope to Mr Blacker at Lowestoft.
  - Echo levels recorded on the integrator were similar to those of last year. Strong traces were obtained on the Faroe Bank and the inshore stations around the islands, particularly to the North and West.

<u>O-group Cod</u> caught in the survey were considerably more numerous than in the previous year. The greatest single station catch being approximately 60,000 fish. This is almost 4 times the number of the most prolific station of the 1975 survey. Numbers of cod were higher than in 1975, both on the bank and the plateau. Samples of O-group cod were frozen for protein analysis.

<u>O-group Haddock</u> seemed to be more prolific on Faroe Bank than in 1975, but on the plateau the numbers were rather similar to those observed in 1975. As in previous surveys haddock were more widely distributed than the cod or Norway pout.

O-group Norway pout seemed more prolific than in 1975.

1.1.1

Predation on O-groups was studied in gut contents of various species taken in a Granton trawl at Farce.

To the west of Myggences the saithe were feeding entirely on O-group gadoids and sandeels. Norway pout were also a significant predator on O-group fish. At the trawl stations on the northern slopes of the Farce Bank these species were only occasional predators on O-group fish. This difference in diet probably results from the relative abundance of O-group fish in the two areas; the former area showing much higher catch rates than the latter.

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# Aim 2. Blood samples and tags

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Populations of cod saithe and naddock from different sea areas were bled and dissected on board. All of the 394 fish tagged during the cruise were bled before being released. The extraction of blood specimens from live fish at the same time as tagging was through a fine needle inserted laterally into the blood vessel immediately below the caudal vertebrae. This method generally works at the first insertion, and is now preferred for general application to a wide range of marine fish species. The main fish species bled and tagged are shown in table 1. The blood samples were processed on board. Red cells were stored in liquid nitrogen and plasma specimens blast frozen in freeze files for genotype analyses at Lowestoft.

A recaptured tagged cod had survived one day in the Southern Trench after being bled and tagged and was released for a second time. This was the first piece of evidence supporting the competence of this technique.

Otolith samples are enumerated along with bloods in Table 1 attached.

With the relatively calm conditions permitting use of microscopes all the otoliths were read on board by Mr Bedford soon after collection.

COMMON!

Cod sampled at Faroe were mostly 2, 3 and 4 years old and below 70 cm in length, although all age groups between 2 and 9 years were present in the total length range from 35 to 111 cm.

The West of Scotland cod sample was also mainly of 2 and 3 year: old fish. Mean lengths of 2 and 3 year olds here were approx. 58 to 72 cm respectively. The small sample of cod in the Northern North Sea was mostly 2 and 3 year old codling between 40 and 70 cm. Those from the Moray Firth Trench were markedly different from elsewhere with more than 60% of the cod sampled being 3 and 4 years old and between 65 and 90 cm total length.

Only small samples of <u>naddock</u> were taken at any of the grounds the most interesting being at West of Scotland where the very abundant 1967 year-class still contributes considerably to the fishery. More than 50% of the fish in the sample were 9 year olds ranging in length between 39 and 57 cm, although it should be noted that the sample was biased by the selection of larger fish for bleeding purposes. Large haddock were also selected in the Moray Firth but here no fish older than 6 years were found.

Saithe at Faroe were mostly 3 and 4 years old, though with this species (as with cod) all age groups up to 9 years were fairly well represented.

Almost all the saithe sampled at West of Scotland were 'sullocks' less than 55 cm long and 2 and 3 years old in the ratio of 2 to 1. Mean length of the 2 year olds was approx. 42 cm and the 3's 50 cm. In the Northern North Sea saithe of similar size were found but these were all 1 year older at 3 and 4 years. The two distinct groups of saithe taken in separate hauls in the Moray Firth were also sampled, the smaller fish being 2 and 3 years old and similar to those at West of Scotland while the larger, all adult saithe were all between 6 and 11 years old.

#### Parasites on fish

A scientific guest on the cruise, Mr R A Bray, collected fish parasites. Monogenetic and digenetic trematodes, cestodes, nematodes, copepods and leeches were obtained from 193 specimens of 57 fish species. The parasites were from the alimentary canal, skin, gills, body-cavity, gall and urinary bladders and heart of the hosts.

Some blood-fluke Aporocotyle spinosicanalis were collected and fixed for electron microscopy for Mr J V Smiths (DAFS).

Samples of juvenile blue whiting were also collected for parastological investigations at the Marine Laboratory, Aberdeen.

#### Unusual fishes

At Faroe one leptocephalus, one blackfish and 2 Ray's breams were caught also 20 specimens of an unnamed fish. Unusual geographic sightings of fish species around the north of Scotland were 24 pearl fish, 1 Sebastes mentella, 24 thickback soles and 12 spotted dragonetts.

Mr Whittaker has undertaken to make a further tabulated account of geographic distributions for Mr Wheeler at the British Museum.

#### Collections

The following items were collected for distribution after the cruise:-

3106 specimen tubes of fish erythrocytes and pla	asma N.I.C.
250 0-group cod	N.I.C.
1179 pairs of otoliths	Mr Bedford
100 herring from Noup Head, Orkney	Mr Wood
100 herring from off Fraserburgh	Mr Wood
10 x 1 Kg bags of mixed sprats and small gado.	ids Dr Lincoln
10 pairs of fillets from cod exceeding 50 cm	Dr Lincoln
3 Kg dogfish livers	Mr Bridger
20 cod livers for cytochrome oxidase	Dr Wilson
20 assorted 'mint condition' specimens for ra	diography Miss M Darling
193 parasite specimens	Mr R A Bray
29 rockling specimens for taxonomy	Mr A C Wheeler
3 blood-fluke specimens for electron-microsc	opy Mr J W Smith
50 blue whiting juveniles for parasitology	Mr J W Smith
SEEN IN DRAFT: WJS, THF	Alan Jamieson (NIC) 4 August 1976
INITIALLED: AJL	
DISTRIBUTION:	
Basic List B C Bedford M W Easey	R A Bray (BM) A C Wheeler (BM
A Jamieson B E Riches R J Turner	Dr M T Wilson J W Smith 🗃 🗛
J G Pope B J Knights Dr Whittaker (Sca	rborough) Miss M Darling

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Cod blood + otolith	130	118	3	<b>39</b>	4	96	771
Cod blood + tag	-	15		<u>ب</u>	2	364	
Saithe blood + otolit	h 187	192	<b>62</b>	111	<b></b>	60	550
Haddock blood + otoli	th		20	<del>.</del>	11	25	232
Haddock blood + tag	-	-	<b>сан</b>	-	13	80	

Table 1

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Table 1 shows the total numbers of fish in the 3 main species bled in different areas. Otoliths, lengths and maturity stages were scored for most specimens, whereas the tagged and bled fish provided length data. Otoliths were read on board during the cruise. Blood specimens are to be analysed at Lowestoft

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Figure 1.

The fifth annual O-group fish survey at Farce on RV CIROLANA in July 1976. As on earlier surveys, the grid intervals were 15' latitude from  $60^{\circ}30^{\circ}N$  to  $63^{\circ}N$  and  $30^{\circ}$  longitude for  $4^{\circ}30^{\circ}W$  to  $9^{\circ}30^{\circ}W$ . More than half the grid point stations were beyond the 200 m contour. On this occasion, six additional deep stations west of the plateau were added to the 86 standard stations normally worked in this time series.

