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

1973 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 4

STAFF

A Jamieson
J P Bridger 14-26 April
J H Nichols
R J Turner
J K Curtis (Grimsby)
D Wright (Fleetwood)
A Smith (W.F.A.) 14-26 April
A Wheeler (B.M.)
R A Bray (B.M.)
G M Burnell (Hatfield student) 26 April-11 May
A Urquhart 14 April only
Mr Wright (S. G. Brown) 14 April only
Mr Tuthill (S. G. Brown) 14 April only

DURATION

Left Grimsby 0300 h, 14 April

Arrived Grimsby 0200 h, 11 May

LOCALITY

West of Britain

West of Iceland

AIMS

1. To investigate fish stocks at depths of about 900 m.
2. To collect fish tissues and fish larvae for immunogenetics and parasitology.

NARRATIVE

Leaving Grimsby at 0300 h, 14 April the vessel proceeded south and through the English Channel. Messrs Urquhart, Wright and Tuthill tested the Doppler log and satellite navigation system before disembarking at Brixham on 15 April.

On arrival at the first area chosen for deep water trawling, the so-called South Hake Ground, a fleet of at least 6 Russian trawlers was encountered. One of them, a very large stern freezer was using a pelagic trawl but the rest appeared to be bottom trawling in about 200 fms. Four hauls of 1½h duration were made in this area at depths of 200-560 fms before setting course for the deep water to the south of the 'Farm'. Here a further 4 hauls were made on 17 April at depths of over 500 fms.

The daylight hours of 18 April were spent in a fruitless echo sounder and sonar search of the northern half of the Hecupine Bank for spawning mackerel. Mackerel eggs and larvae were however taken there with plankton nets. Overnight the vessel steamed to the continental slope to the west of Tory Island. Three deep trawl hauls were made in this area on 19 April and the next day a

further 4 hauls were made on the slope southwest of Barra Head.

On 21 April 5 hauls were made to the west of St Kilda in 330-610 fm before moving north to make 3 more hauls north west of the Flannan Islands.

A longer overnight steam was then made to the slope NE x N of Rona where 6 deep hauls were made to the east of the Wyville-Thompson Ridge on 23 and morning of the 24 April.

Crossing the ridge two hauls were made in deep water along its western side and a further four hauls on the slope W.N.W. of Sulisher on 25 April before setting course for Stornaway. On 26 April Captain Sellers, Skipper Argumont, and Messrs Wheeler, Bridger and Smith left the ship at Stornaway and Mr Burnell joined the ship for the second half of the cruise.

Exceptionally fine weather prevailed throughout the first half of the cruise and no time was lost due to weather.

The remaining half of the cruise was concerned mainly with obtaining specimens of pelagic cod larvae drifting from the spawning grounds at southwest Iceland.

CIROLANA left Stornaway at 0800 h 27 April and arrived off northwest Iceland on the evening of 29 April. A tintow net of 20 inches diameter and a 2 m diameter ring net sampled very sparse moribund plankton along latitudes 65°30'N off Latrabjarg, 64°50'N off Snaefellsness and 64°00'N off Reykjanes and in a triangular grid of stations from the latitude of Reykjanes southwards to the Grenadiers limited by the 200 m contour and the 12 mile fishing limit. No cod egg or larva was seen to have drifted round Reykjanes, at least outside the 12 mile limit. During this grid search for plankton radio conversations on fishing trawlers and with the Marine Research Institute, Reykjavik described large concentrations of actively spawning cod on the inshore banks between Reykjanes and the Vestmannaeyjar region. The cod had started to spawn about mid-April. This was noticeably later than local expectations and 3 weeks late by our own experience in recent years. The quest for larvae was postponed for two days to be resumed and continued from 3 May.

Conventional Granton trawl gear secured specimens of immature cod west of Latragrun at north west Iceland on 1 May and again on Dohrn Bank on 2 May. Cod were bled and tissue specimens were dissected out and stored for protein analyses. A new method for preserving cod haemoglobin specimens was used at sea for the first time. This method extends the life of the material and obviates haemoglobin typing at sea. Tissues of other species were frozen to meet requests from outside laboratories.

On route back to south west Iceland, the continuing absence of plankton production was confirmed along the latitudes mentioned above and at 10 mile intervals along the fishing limit. When the search was extended along the limit line through the 'Grenadiers' and eastwards along the south coast past the Vestmannaeyjar region, slight traces of cod spawning started to appear where the course of the limit line shoaled above the 200 m isobath. The most productive station in the survey was at 63°22'N, 22°03'W. This station yielded 5 cod larvae and a few eggs in a single haul. CIROLANA returned to that position where she remained as a plankton collecting platform for the 3 remaining working days at Iceland. The yield of cod larvae per haul remained small and a heavy bloom of diatoms on 7 May reduced the fishing efficiency of the net. A 1 m ring with 60 mesh per inch net was found to be the best device for collecting cod larvae. A representative sample numbering 234 cod larvae at stage I were secured also a selection of identified larvae of other teleosts to act as controls. All larvae collected for protein type analyses were picked out alive from among the plankton, verified by Mr Nichols under a stereoscopic zoom microscope and placed in liquid nitrogen. This intricate work was feasible in sea conditions up to

force 4 in CIROLANA's clean laboratory.

The homeward journey started on the evening of 7 May, a deckhand was rushed by Scrabster lifeboat and by ambulance to hospital in a seriously ill condition. CIROLANA reached Grimsby at 0200 h, 11 May.

RESULTS

Deep trawling

The extra heavy otter boards worked well and housed nicely on the stern. Due to their weight and the long lengths of warp used, up to 1150 fms, the warps sometimes cut deeply into the stern rail. This damage was repaired at Stornaway. The heavy spherical rubber bobbins also worked well. Some of the headline floats and a steel dan leno bobbin imploded on the deeper hauls but otherwise the gear damage sustained on these uncharted grounds was remarkably light.

A 78 ft headline Granton trawl on 40 fm bridles with a small mesh liner was used for all these hauls.

In all 35 hauls, each of $1\frac{1}{2}$ hours duration, were made at 8 widely spaced areas along the continental slope between the Great Sole Bank and the Shetlands. Catches ranged from virtually nothing to 180 baskets but very few currently marketable species were taken in deep water.

The first haul near the Russian trawlers purchased a basket of hake in 200 fms and to the west of Barra and St Kilda two to three baskets of hake were taken in depths of 300-350 fms. At depths exceeding 360 fms not a single hake was taken.

Two hauls to the west of the Flannan Islands produced 23 and 16 baskets respectively of blue ling, Molva byrkelange, in depths down to 470 fms but at greater depths this species was either scarce or absent.

North East of Rona to the east of the Wyville-Thompson Ridge catches of all species were negligible. Six hauls in this area produced only $7\frac{1}{2}$ baskets of fish, mainly rays, in 9 hours fishing.

Since at other places catches of 20-180 baskets were taken in hauls at similar depths it seems reasonable to conclude that fish abundance there was really very low. Further the absence of hake and blue ling in the deepest hauls may be taken to mean that at this season very few of these species are to be found in deep water along the slope. Virtually all the fish caught were weighed, counted and measured.

Various sharks and dogfish together with Hoplostethus, the Black Scabbard Aphanopus carbo and various macrurids, made up the bulk of the catches at over 450 fms but the smoothhead, Alepocephalus bairdii produced the biggest single catch, 137 baskets of this species being taken in one haul. A sample of this species was deep frozen for Torry Research Station for palatability tests.

Mackerel larvae and blood and tissue samples were taken from hake for electrophoresis. Samples of blue whiting, Micromesistius poutassou, were deep frozen for fish ball manufacture and samples of various flatfish were deep frozen for the MBA as well as samples of Helicolenus flesh for Seattle.

Apart from the USSR vessels around 49°30'N 11°20'W a single French trawler was seen West of Tory Island in 150 fm, two modern Spanish pair trawlers and a Russian side trawler off the Flannan Islands. No British trawlers were encountered.

National Collection (British Museum)

We were privileged to have the British Museum (Natural History) represented on this cruise. Hence the confident taxonomic description of all unusual species.

(a) Fishes

Many specimens of fishes poorly represented in the National Collection were formalin preserved or frozen for the BM. Representative collections of echinoderms and crustaceans were also made for the Museum. Specimens of fishes of "difficult groups" were preserved for later critical identification; many of these are usually regarded as "rare".

The stomach contents of some of the less well-known species of fishes were analysed (these included Raja hyperborca, Deania calceus, Centrophorus squamosus, Alepocephalus bairdii, and Aphanopus carbo). Notes were also made on gonad condition of these and other species.

(b) Parasitology

Fish parasites seen during the cruise included digenetic and monogenetic trematodes, cestodes, nematodes, acanthocephalans and parasitic copepods. They were collected from the alimentary tract, gills, heart and skin of 165 fish of 62 different species. The parasites were obtained by examination of the host tissues with a low-power binocular microscope and were individually fixed in glacial acetic acid and preserved in 70% alcohol.

Fish larvae

375 initial stage larvae were sorted out alive from plankton and immersed in liquid N, each in a separate tube for subsequent protein typing. They included the following numbers and species.

100	Mackerel	Porcupine Bank
22	Long rough dabs	Selvogs Bank
17	Haddock	" "
1	Coley	" "
1	Redfish	" "
234	Cod	" "

Cod

178 cod were bled and dissected for tissue specimens. Duplicate blood specimens were got for Dr Dando, Plymouth. Erythrocytes were stored at -196°C , and other tissues at -40°C . The samples represented East Greenland and West Iceland cod as follows:-

102	Dohrn Bank
76	West of Latragrum

Hake

77 hake were caught at 3 positions along the western shelf. They were bled and dissected for heart, liver, white muscle and gill specimens. Numbered specimens, all packed separately were stored at -40°C

16	Great Sole
50	West of Barra
11	West of Sulisker

Blue Whiting

136 blue whiting intended for a fish balls experiment were processed in six different treatments as requested by Torry Research Station.

Black scabbard

4 specimens of Aphanopus were stored frozen for the TRS taste panel.

Smooth Head

4 specimens of Alephocephalus bairdii were stored frozen for TRS taste panel.

Flatfish

Muscle and liver specimens from flatfish were obtained for Dr Birley, Genetics Department, University of Birmingham as follows:-

31	Witches	West of Barra Head
48	Mock halibut	West of Sheland
20	" "	on Dohrn Bank
74	Long rough dabs	on Dohrn Bank

Dr Dando, Plymouth requested megrim muscles from a specified area
69 specimens were sampled on Great Sole Bank.

Redfish

161 muscle samples from Halicolenus dactylopterus were secured west of Tory Island for Dr Johnson, Seattle.

Otoliths

Otoliths were removed from all cod sampled. Otoliths from a number of uncommon fish species were secured for Dr Fitch, State of California Marine Dept.

A Jamieson
21 May 1973

Seen in draft: D I Dunkley

W J Saxby

Initialled: HAC

Distribution:

Basic List
A Jamieson
J P Bridger
J H Nichols
R J Turner
J K Curtis (Grimsby)
D Wright (Fleetwood)
A Smith (WFA)
A Wheeler (BM)
R A Bray (BM)
G M Burnell (Hatfield student)
A Urquhart
Mr Wright (S G Brown)
Mr Tuthill (S G Brown)
(Continued overleaf)

Distribution (Contd)

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California
USA