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

1970 RESEARCH VESSEL PROGRAMME

REPORT: RV ERNEST HOLT: CRUISE 4

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

- A Jamieson
- D Thompson
- C Humphreys
- J N Gregory
- R J Turner
- J Haddy
- J K Curtis (Grimsby)

DURATION

Left Grimsby 1500 hours 17 April

Arrived Grimsby 0230 hours 15 May

All times are British Standard Time

LOCALITY

Iceland

AIMS

1. To investigate the genetic structure of cod stocks at Iceland
2. To place Mr Thompson and Mr Turner ashore at Reykjavik for 20 days to genotype cod by testing blood samples collected on the ERNEST HOLT and on foreign research vessels.
3. To collect biological specimens requested by colleagues in the Ministry's Laboratories; also at St Bartholomew's Hospital and at Plymouth
4. To bring back live flatfish

NARRATIVE

The ERNEST HOLT left Grimsby at 1500 hours 17 April and arrived at Reykjavik at 1830 hours 21 April. Anticipating the ERNEST HOLT'S cruise programme, naturalists on the ANTON DOHRN and the HAFTHOR had landed cod blood specimens at Reykjavik. Two scientists left the ERNEST HOLT to set about genotyping this perishable material at the Marine Research Institute.

The Director of the Icelandic Laboratory was consulted on the current state of the cod sampling programme at Iceland. The ERNEST HOLT'S role was to continue the collection of cod blood specimens after the ANTON DOHRN'S

departure and to sample the concentration of spawning cod at South West Iceland and in adjacent areas. As Monday was considered the best day of the week to land blood at Reykjavik, the sampling programme and the subsequent tests on shore were conveniently divided into weekly stages. Permission was granted to fish inside Icelandic waters. The positions of commercial gill nets and longlines were noted.

Trawling commenced at 1800 hours 22 April. A copious supply of spawning cod was obtained for blood sampling at Eldy Bank. The following two days were spent trawling near the Westman Islands and on Selvogs Bank where cod were less abundant than at Eldy. However, sufficient dabs and megrims were taken to satisfy two requests for material. The numbers of cod improved towards Reykjanes on 25 April and large hauls on Eldy Bank on 26 April provided a considerable supply of fresh blood specimens to replenish the material on shore.

On 27 April the two shore scientists boarded the ERNEST HOLT from a pilot boat, assured those on board that they had set up their testing apparatus in the record time of three hours and had coped satisfactorily with the backlog of specimens. They returned on shore with enough fresh material to keep them occupied for another week. On the same morning two deckhands were taken ashore for medical and dental treatment. Both returned fit for work at midday. ERNEST HOLT set course towards East Greenland. The ice edge, first sighted off Angmagssalik Bank at $64^{\circ} 29' N$ $34^{\circ} 40' W$ at 2000 hours, 28 April, was followed south-westerly to $64^{\circ} 18' N$ $34^{\circ} 28' W$ searching for workable water. The edge of the solid packice practically coincided with the steep edge of the banks, and was followed north-easterly to $65^{\circ} 48' N$ $28^{\circ} 10' W$. These ice conditions prevented trawling at East Greenland and Dohrn Bank. Fortunately the German research vessel had succeeded in obtaining cod for blood samples on the south edge of the Dohrn Bank at 250 fathoms on 4 April. Trawling was resumed on 30 April in the Vikurall area at $65^{\circ} 50' N$ $26^{\circ} 39' W$ approximately 5 miles from the ice. Wilson's Corner, Kollual and positions in a lee south of Snowy were trawled on 1 May. The mounting numbers of cod blood samples were substantially increased on the Eldy Bank spawning area before the final consignment of blood was landed at Reykjavik at 1700 hours, 4 May.

Throughout the earlier parts of the cruise some morphometric data, tissue samples and specimens of various species were collected for colleagues, but from 5 May priority was switched to those subsidiary aims and deck tanks became available for holding live flatfish. Eldy Bank and Faxa Bay yielded material for samples of muscles, pincals, pituitaries also preserved and live whole fish. The least damaged flatfish were retained alive in tanks. The priority was halibut before plaice before dabs but their availability was in the reverse order. Unfortunately the trawled flatfish suffered injuries from the spines of numerous large searhins and casualties were high in the deck tanks. Rcds and lines were used at different stations in Faxa Bay. Catches were good, but no halibut accepted bait.

At 1000 hours, 9 May the vessel docked at Reykjavik to collect the two scientists who had completed their tests on shore. Crates of Ministry apparatus were loaded back on board, and the ERNEST HOLT sailed at 11.30 hours, 10 May. During the homeward passage, series of plankton hauls were made off Reykjanes, on Bailey Bank and on Faroe Bank. These hauls yielded few vertebrate eggs or larvae. Preliminary analyses of the cod genotypes were calculated on route.

RESULTS

1. Citrated whole blood specimens were taken from populations of cod, Gadus morhua. The sampling programme extended from 7 March to 5 May. The Icelandic contribution covered most of this period. German participation stopped before the ERNEST HOLT arrived. This collection of material was co-ordinated to cover South West Iceland from Isafiord to the Westman Islands. Particular fishing grounds were repeatedly sampled at intervals throughout the spawning season. The donors of blood specimens were numbered, measured and sexed and all otoliths were kept. The bloods were maintained at +1°C, and delivered to the shore laboratory in perfect condition for testing. Blood specimens collected by Dr H H Reinsch on the ANTON DOHRN and Dr G Jonsson on the HAFTHOR were much appreciated as on previous occasions.

2. Two of the scientific staff, Mr D Thompson and Mr R Turner, signed off the ship's articles at Reykjavik on 21 April and spent 20 days ashore testing cod blood. This work ashore was disturbed only by periodic landings of fresh samples. Free access to modern laboratory services was by courtesy of Mr Jon Jonsson and his staff.

The haemoglobin type results for the 2,784 cod are condensed in the following table. It shows how an allele called HbI₁ showed a dramatic drop in frequency about mid April. This observation indicated a change in the composition of the cod stocks at Iceland, and accounts for seasonal genetic anomalies noted in the past.

3. Flesh, blood and otolith specimens were taken from 97 cod, Gadus morhua over the range of lengths 40 cm to 100 cm and stored frozen for the Ministry's Radiobiological Laboratory.

Pituitaries were removed from 200 mature cod and stored frozen for Mr. A P Scott, Department of Chemical Pathology, St Bartholomew's Hospital.

Ovaries from 13 stage IV cod were preserved in Gilson's fixative for fecundity observations by Mr C Humphreys.

Pineal bodies from a total of 57 cod in length class groups between 16 cm and 110 cm were allocated equally to Bouin, Hollande and Formol saline as requested by Mr V Bye.

Individual samples of muscle from 50 megrims, Lipidorhombus whiffiagonis also three entire females and three entire males, were collected and stored frozen as requested by Mr P Dando, The Laboratory, Plymouth.

Entire dabs, Limanda limanda, numbering 50 females and 50 males spread over a range of sizes were collected at a single station and stored frozen for Mr C Lee.

Sundry species preserved in 5% formalin for Dr M Groer Walker included the following:- Acanthocottus scorpius; Anacrachichas latifrons, A. lupus, A. minor, Argentina sphyraena, Brosme brosme, Chimaera monstrosa, Cyclopterus lumpus, Drepanopsetta platessoides, Gadus esmarkii, G. virens, Hippoglossus hippoglossus, Hyperoplus lanceolatus, Lepidorhombus whiffiagonis, Lophius piscatorius, Molva molva, Lumpenus lapretaciformis, Mallotus villosus, Onos cimbrius, Raia batis, R. radiata, Sebastes marinus, Squalus acanthias.

Fishing Ground	Cod Hbl ¹ allele frequencies throughout the 1970 spawning season						
	1 March	10	20	1 April	10	20	1 May
Surtsey							
Selvogsbanki	0.17					0.04	
Reykjanes						0.02	
Eldyjarbanki		0.12				0.01	0.01
Jokubanki	0.17			0.16			0.02
Kollnall	0.16			0.14			0.02
Wilson's Corner		0.23		0.18			0.02
Virkurall				0.22		0.02	
Isafjardardup				0.11			
Bardagrunn							
Dohrn Bank							

The genetic composition of cod at West and South West Iceland changed about mid April 1970.¹ Note the considerable drop in the frequencies of the allele Hbl¹. As tests were made on 2,784 cod, the values are reliable.

Length frequencies of cod, haddock, coalfish and plaice were recorded throughout the whole cruise, and representative samples of otoliths from 65 coalfish and 71 plaice were taken.

4. The live fish which survived the journey to the Humber numbered 6 plaice, 6 dabs and 2 halibut. Tanks of plankton were brought back also. The live fish and plankton were for Dr Purdom.

5. Synoptic meteorological observations were made.

A Jamieson
1 June 1970

SEEN IN DRAFT

JEMB
GWA

INITIALLED

AJL

DISTRIBUTION

Basic List

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D Thompson
C N Humphreys
J N Gregory
R J Turner
J Haddy

J K Curtis (Grimsby)

Dr C E Purdom

Dr M Greer Walker

Mr V J Bye

Mr K Steele (Radiobiological Laboratory)

Mr C Lee

Mr Jon Jonsson)

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Dr H H Reinsch)

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Mr A P Scott

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