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RRS *Challenger*

Charter 0196H

REPORT

Loading and Unloading

21 May - 31 May 1996 (Aberdeen to Aberdeen)
Departure: Aberdeen
End port: Aberdeen

Personnel

P J Wright	HSO (SIC)
J R G Hislop	PSO
I M Gibb	SO
F M Kennedy	Contract staff
J Dunn	HSO
C Hall	SSO
M Arnold	PhD student

Objectives

1. To investigate the distribution of pelagic phase juvenile gadoids in the northern North Sea.

2. To collect samples of 0-group haddock for otolith studies and lipid analyses.

3. To collect live specimens of juvenile haddock for aquarium studies.

4. To collect samples of sandeels for molecular studies.

5. To collect microzooplankton samples and physical data.

Out-turn days per project: 11 days GCI1

Narrative

Scientific staff joined the vessel at 0800, 21 May and the vessel sailed at 1600. A pole with a SCANMAR receiver was fitted to the side of the vessel in Aberdeen Bay and the vessel then proceeded to the first station. Flowmeter calibration tows for the Methot sampler were conducted at the first station at 1900, before sampling began. A Methot sampler with a 1,500 µm mesh net and a towed body, containing a CTD, fluorimeter, transmissometer, optical plankton counter and two pup nets, were deployed at all stations. In addition to these two samplers, three other gears were deployed at selected stations. An Ocean sampler plankton net was deployed at every third station to obtain a depth stratified plankton

sample for comparison with results from the optical plankton counter. A specially designed multi-panel net attached to a Methot frame was used to assess whether haddock above the size range taken by the Methot sampler were present and to collect live fish. A 1 m plankton net was deployed in a vertical haul at four stations in order to obtain a plankton sample for lipid analysis.

The only problems encountered during the cruise were a fault with one of the flowmeters and damage to the SCANMAR pole during steaming on the 10th day of the cruise. The latter involved a shearing off of the shoe that attached the pole to the vessel. This problem was remedied by welding another shoe on to the pole. Poor weather conditions hampered sampler deployment on the morning of 23 May and during 28 May. Bad weather on 31 May led to the curtailment of fishing operations by early morning and *Challenger* docked at Aberdeen at 1500.

Results

A total of 286 sampler deployments from 51 stations (seven stations were added to the original cruise plan) were made during the survey (Fig. 1). The Methot multi-panel net was successful in capturing juvenile haddock and was deployed at 14 stations. Based on samples obtained using this gear it would appear that the size range of 0-group haddock present during the survey was within the range taken by the 1,500 µm Methot net (up to 30 mm TL). This contrasts with data from a similar survey in 1995 which found a significant number of 0-group > 30 mm TL. Haddock collected from 30 stations were frozen or preserved in 95% ethanol for otolith analyses. Sandeels were also taken from 15 stations for genetic and otolith studies. Samples of haddock and plankton from seven and four stations, respectively, were frozen in liquid nitrogen for biochemical analyses.

Mean density of 0-group haddock in 1996 was markedly lower than that found during the same time and region in 1995 (1995: 6.87×10^{-3} m^{-3} ; 1996: 4.7×10^{-3} m^{-3}). Few haddock were caught at stations south of 59°N, with the exception of a high concentration at station 64 to the east of the Moray Firth. The highest density of haddock was found in the central Northern North Sea between 59°15'E-59°45'N, 01°30'E-02°00'E. Samples from these stations also contained the broadest size range of haddock. Salinity profile data from these stations indicated the presence of a halocline, with surface salinity of <34.5‰. The occurrence of a surface layer of low salinity water in this area could be due to an incursion of Baltic water into the North Sea. Thermal stratification of the water column was only seen north of 60°N and south of 58°15' N, during the last days of the cruise.

0-group sandeels were present at almost all stations and occurred at densities of up to 0.53 m^{-3}. The main areas of concentration were close to known spawning grounds (Table 1). Whilst there is little comparable data for the entire survey region from previous years, densities of 0-group sandeels in the region around Fair Isle and Bressay Bank during 1989, 1991 and 1995 were lower than those found in the same area in 1996. Further, 0-group density near all sandeel spawning grounds in 1996 was far greater than that found in Shetland coastal waters during years of high recruitment to the Shetland grounds.

P J Wright
7 June 1996

Table 1. Densities of 0-group sandeels caught by Methot sampler (1,500 µm mesh net) at stations within 20 km of spawning banks. Density refers to numbers per m^2 water column.

Location	Year	Range in density
Shetland (south east)	1991	0.2-3.5
	1995	0.1-0.2
	1996	0.2-4
Fair Isle (east)	1989	2-10
	1991	8-13
	1995	0-1.4
	1996	11-17
Bressay Bank	1989	10-14
	1995	3.6-5.7
	1996	70-73
Viking Bank	1989	10-14
	1995	3.6-5.7
	1996	70-73
Long Forties	1995	0.5-11.5
	1996	30-33
Marr and Wee Bankie	1996	5-14

Figure 1. Methot sampler stations 0196H