

CRUISE REPORT: LF/43/98: DOUGLAS BANK HERRING SURVEY

VESSEL: R.V. *Lough Foyle* (DANI) **DATES:** 19 - 23 October 1998

AREA OF OPERATION: Irish Sea ; ICES Division VIIa

TYPE OF SURVEY: Acoustics / midwater trawling

PERSONNEL:

M. Armstrong	(DANI; S.I.C.)
M. Dickey-Collas	(DANI)
M. McAliskey	(DANI)
x J. Peel	(DANI)

OBJECTIVES

1. To estimate the biomass and population structure of spawning herring on the Douglas Bank, Isle of Man east coast.
2. To carry out a survey of herring larvae off the east coast of the Isle of Man

METHODS

A sphere-calibrated Simrad EK-500 acoustic system with 38 kHz split-beam transducer mounted in a towed body was employed to carry out echo integrations along transects off the east coast of the Isle of Man, in the region where spawning aggregations of herring were expected based on recent surveys and reports (Fig. 1). The instrument settings used during the survey were as obtained during calibration on 10 October 1998 (TS gain and offsets from "Lobe" program; Table 1). Acoustic targets were identified by means of aimed tows of a Marlin 54m x 47m midwater trawl fitted with a 20-mm stretched-mesh liner and a Furuno netsonde. Species compositions and length frequencies were recorded from trawl catches. Subsamples of up to 50 herring were taken from each catch for recording of age and other biological parameters. Length-weight parameters were estimated for fish species contributing significantly to the acoustic integrals.

The larva survey was carried out on the systematic grid of stations employed on the October 1997 acoustic survey, using the DANI high-speed plankton sampler fitted with 40cm nose cone. Tow trajectory, internal and external flow, temperature, salinity and fluorescence were recorded using the Pro-Net software. All herring larvae were sorted on board and preserved in ethanol. The remaining plankton was preserved in buffered formaldehyde solution.

CRUISE NARRATIVE

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The vessel left Belfast during late evening on Sunday 18 October and proceeded overnight to Laxey Bay on the east coast of the Isle of Man. The acoustic survey was then carried out in two stages - an initial zig-zag grid covering the area where herring

were expected, and a more intensive grid of parallel transects at 0.5 mile spacing covering the area where spawning herring were located. The acoustic survey finished during early morning on Tuesday 20 October. The larva survey commenced at Laxey after breakfast on Tuesday. Due to an imminent gale, the survey was broken off at Douglas and the vessel was berthed in Douglas harbour during early afternoon. At approximately 22h.55, the Isle of Man Steam Packet Company ferry *Ben-my-Chree* was pushed by strong winds into the *Lough Foyle*, causing structural damage to the funnel and A-frame and also causing distortion to the port side of the vessel where it was pushed against the quayside. The *Lough Foyle* remained in Douglas until Friday morning and was then returned to Belfast.

WORK COMPLETED

Echo sounder calibration

The transceiver settings from the most recent calibration were adopted and are shown in Table 1 together with other relevant instrument settings.

Echo integration

The survey grid is shown in Figure 1. Data were captured using the EP-500 software and were backed up on digital audio tapes.

Target identification and biological analysis

One midwater trawl tow was carried out on the main herring aggregation. (Fig. 1 and Table 2). Fifty herring were sampled for length, weight, age and maturity.

Larva survey

Only eight stations were sampled before the vessel had to berth in Douglas (Fig. 1).

Results

Some small herring targets were detected near Douglas. A comparatively large aggregation was located approximately 4 miles east of Langness point, close to where herring had been detected at the end of trawl survey LF4098 and where other vessels including the Port Erin Marine Laboratory research vessel *Roagan* had recently reported concentrations of herring.

The ship's personnel and the scientific staff are thanked for their contribution to this cruise.

Signed

SIC *M.J. Arman*

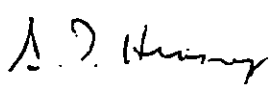
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Head of Aquatic Sciences



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Table 1 EK-500 instrument settings used during cruise LF4398
(Revised 38 kHz settings after calibration on 12 October 1998)

Transducer	ES38B
Serial No.	28877
Frequency	38 kHz
(1) TRANSCEIVER MENU	On-axis calibration
Absorption coefficient	10 dB/km
Pulse length	Medium (1.0 ms)
Bandwidth	Wide
Max. power	2000 W
Angle sensitivity	21.9
2-way beam angle	-20.5 dB
Sv transducer gain	26.08 dB
TS transducer gain	26.03 dB
3 dB beamwidth Alongship	7.1 deg
3 dB beamwidth Athwartship	6.6 deg.
Alongship offset	-0.12 deg
Athwartship offset	0.08 deg

TS gain, beamwidth and offsets from "Lobe" calibration

(2) OTHER SETTINGS	
Operation menu:	Ping rate = 0.6 s (50m,100m, 150m range); 0.8 s (250m range) [25m range not used]
Log menu:	Mode = ping based Ping interval = 1490 (50, 100, 150); 1115 (250m range)
Layer menu:	Super-layer = 11 - 100 metres Layers: 8-11, 11-20, 20-25, 25-30, 30-35, 35-40, 40-45, 45-50, 50-100 m
Printer / EP-500 settings:	Sv colour min. = -70 dB TS colour min. = -60 dB
TS detection menu: (both frequencies)	TS min. = -60 dB Min. echo length = 0.8 Max. echo length = 1.3 Max. gain compensation = 3.0 dB Max. phase deviation = 4.0 dB
Bottom detection menu:	Minimum level = -45 dB

Table 2. Details of trawl 1.

(1) Shooting position

Time	19h.31
Latitude	54° 2.7
Longitude	4° 29.3

(2) Catch composition: 100% herring (69.08 kg)

(3) Length frequency of herring and number by sex and maturity stage in biological sample

Length (cm)	Nos.	Male			Female		
		5	6	7	5	6	7
		ripe	running	spent	ripe	running	spent
20	1						
20.5	3		2				
21	21	1	1				
21.5	21		1				
22	30		2			1	
22.5	26		2				
23	35				1	2	
23.5	22					1	
24	29		1			3	
24.5	16		1			3	
25	18						
25.5	26				1	1	
26	45		1	2		1	1
26.5	51	1					
27	50	1				1	
27.5	28			1	1	3	
28	14		1	1		2	
28.5	2		1	1		2	
29	3			1	1		
29.5	1		1			1	
30	0						
30.5	0						
31	0						
31.5	0						
32	1				1		
mean length	25.0 cm						
mean weight	0.156 kg						
mean TS	-43.195						

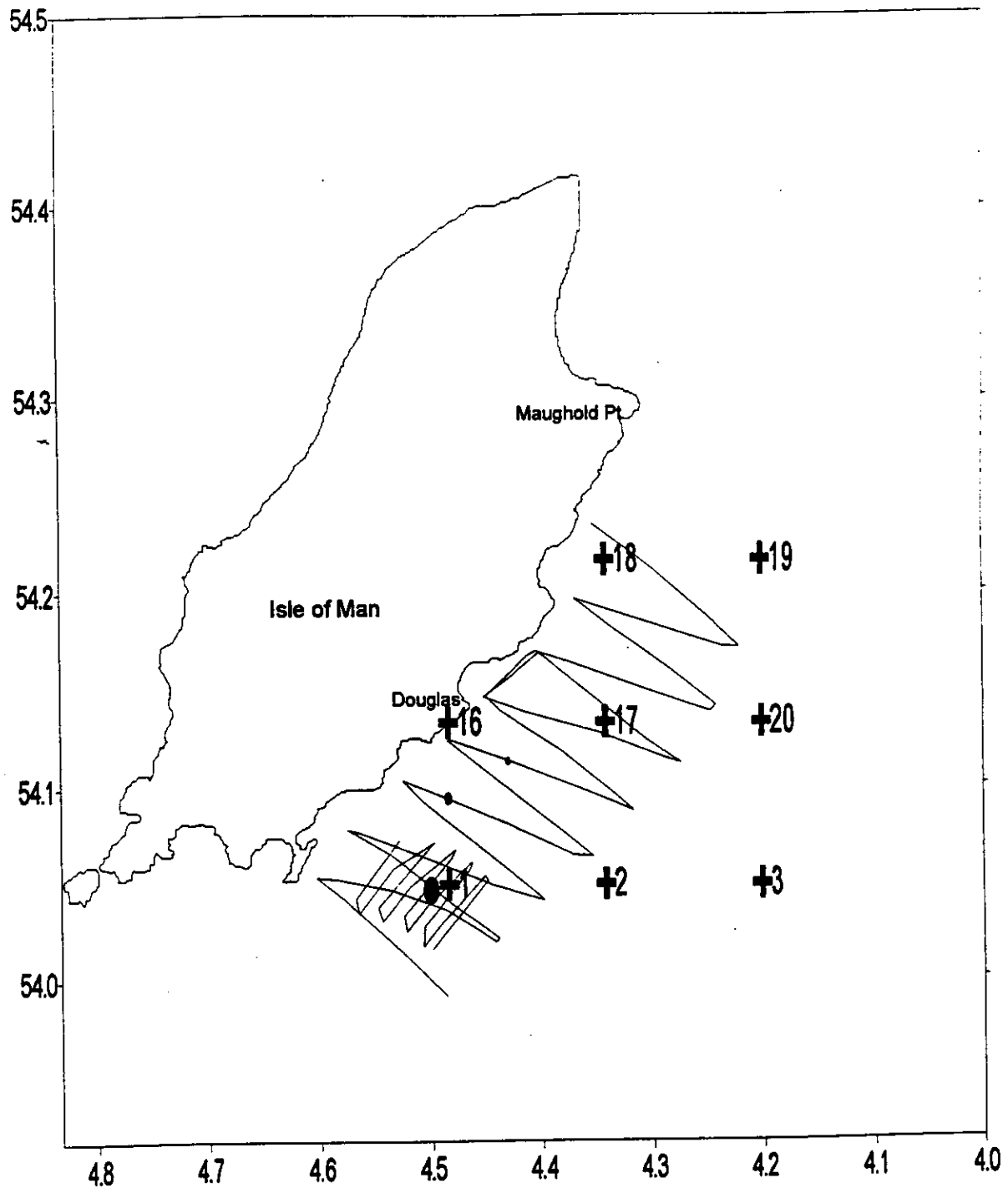


Fig. 1 Cruise track for acoustic survey of the Douglas Bank spawning grounds. Solid circles indicate position of herring schools or aggregations (areas of circles indicate relative size of targets: S_A values = 17, 340, 5620 respectively for 15-minute intervals). Positions of plankton stations sampled during cruise are indicated by crosses. Trawl 1 was carried out at the position of the large herring aggregation ($54^{\circ} 2.8'N$, $4^{\circ} 30'W$).

The large herring aggregation was approximately 430m wide. If circular and bisected through the centre, the biomass would be approximately 660t. A similar aggregation 300-400m wide was found in the same location and at the same time in October 1997, and was estimated by shoal mapping to comprise 1200 t of fish.