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FRV "CLUPEA"  
CRUISE 3/88

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Report

11-29 April 1988

Personnel

J Morrison	SSO	11-29 April (in charge)
R Mitchell	SSO	11-12 April
C Shand	SO	11-29 April
P Rankine	SO	11-29 April
I Gibb	ASO	12-29 April

Objectives

1. To locate egg patches on Ballantrae Bank by means of grab and TV surveys.
2. To estimate patch size and spawn density using a "Day" grab.
3. To test the new TV plankton winch.
4. To deploy and recover a frame-mounted current meter on Ballantrae Bank.
5. To make temperature and salinity measurements over the Bank during the period of the cruise.
6. To deploy small mesh tangle nets in the vicinity of any spawn patches to examine fish predation on eggs and larvae.
7. To collect sandeels from grab samples to assess predation on herring eggs and larvae.
8. To carry out metre net surveys to check for newly-hatched herring larvae.

Narrative

"Clupea" was loaded at Greenock on the afternoon of 11 April and proceeded to Troon that night and Ballantrae the following day, where work was started in the area in which the egg patch had been discovered in 1987.

The "Seapup" remote operated vehicle (ROV) was initially deployed drifting and later at anchor and very good film of bottom substrate, shoals of herring swimming over the spawning beds and areas of spawn deposition was obtained. Once areas of spawn had been located a call was made to the Laboratory so that a diving team could travel down to Ballantrae. "Clupea" returned to Troon the same night to drop off R Mitchell, who had set up the ship-board part of a "Trisponder" location system.

On 13 April a set of six hydro stations on the Bank was completed and "Clupea" used "Seapup" to further explore the areas of spawn deposition. This work was continued the following day and a frame-mounted current meter was deployed within, and to the west side of the egg patch. The same day, the diving team from Aberdeen began their initial survey of the Bank in the area outlined for them by "Clupea".

"Clupea" proceeded to Campbeltown for fuel on the night of 14 April. To enable her to work through the night, in an attempt to obtain film of herring spawning, the ship did not leave again until 1500 on 15 April. Work was restarted at the egg patch at Ballantrae at 1800 and 16 dives with the "Seapup" were carried out overnight. Although "full" herring were again observed on the spawning beds during several of the dives, no spawning was observed. "Clupea" resumed normal working on 17 April and completed another nine dives with the "Seapup" and 49 grab stations before proceeding to Troon on the evening of 18 April for the half-landing.

After the half-landing, "Clupea" returned to Ballantrae and during the period 20-22 April worked out of Cairnryan on a daily basis. Extensive surveys with the "Seapup" were carried out over this period in areas of the Bank which had been spawning beds during the late 1950's and early 1960's. Despite 27 dives with the "Seapup" and several more with the towed sledge, only one very restricted area of spawn was found outside the area of the egg patch found in 1987. Also during this period, "Clupea" completed a further 76 grab stations in the vicinity of the main egg patch.

On 23 April three marker buoys were put down to denote the north, central and south positions of the egg patch for the diving team. Between 23 and 27 April a set of six hydro stations and 35 dives with the "Seapup" were completed and the sledge was also deployed on several occasions in order to take still photographs of the bottom; 25 mm and 80 mm mesh gill nets were also deployed to attempt to catch potential predators on the beds of spawn. In addition, on 26 April the current meter was recovered.

The last working day of the cruise was 28 April when "Clupea" laid another marker dhan for the divers, carried out a meter net station over the egg patch and a hydro station in the same area, and finished taking grab samples from a small area of the egg patch that had been obstructed by the presence of the current meter. Thereafter "Clupea" made for Greenock, arriving there in late afternoon. "Clupea" was unloaded that night, and staff and most of the crew travelled back to Aberdeen the following day; some remained on-board to supervise the fitting of the new TV/plankton winch.

G Moore (visitor) was unable to join "Clupea" on this cruise.

## Results

### TV Surveys

On this cruise 101 dives were carried out with the "Seapup" and a further four with the towed underwater sledge. During these dives an egg patch was observed at Ballantrae in very much the same position but rather smaller in area than that detected during a grab survey carried out by "Goldseeker" in 1987. In this area eggs were deposited on gravel ridges running in a north/south direction which over the central area of spawn deposition had wave lengths of 0.9-1.75 m

and wave amplitudes of 18-23.5 cm (measurements by diving team). Eggs were thickly layered on the gravel ridges and clearly visible on the TV picture as a white reflective surface. Herring eggs were deposited from three to ten layers deep over about 80-90% of the central area of the egg patch, but there was also a one-layer-thick covering of eggs in the troughs between the gravel ridges.

In addition to the above, those parts of the Bank which had contained areas of egg deposition in the late 1950's and early 1960's were extensively surveyed and although large areas of apparently suitable gravel ridges were encountered, only one other very limited area of eggs was observed. The total observed area of egg cover in 1988 was thus very small compared with the historical extent of the egg patches.

Very good film of "full" herring swimming over the spawning beds was obtained during the first few days of this cruise, but no actual spawning was observed.

#### Grabbing

Two hundred and sixteen grab stations were completed on this survey, and location of the position of these stations with the "Trisponder" system enabled an accurate map to be drawn of the extent of the egg patch. Replicate samples of eggs were cored from egg mats taken by the "Day" grab to enable egg counts to be used to estimate total egg deposition.

#### Testing of new plankton winch

This objective was abandoned as the new winch did not arrive in time.

#### Current meter

This meter was deployed within the egg patch from 14 to 26 April and was placed on top of one of the gravel ridges with the meter approximately 70 cm above the egg mass. The records are being analysed in the Laboratory.

#### Hydrography

Fourteen hydro stations were carried out on the Bank during this survey, four of them directly over the egg patch. Bottom water temperatures between 7.5<sup>o</sup> and 7.7<sup>o</sup>C were recorded during this period.

#### Sandeel work

During this survey only three sandeels were caught in the "Day" grabs, but over 200 Greater sandeel (Hyperoplus lanceolatus) were caught in a 25 mm mesh size drift net anchored in the egg patch, and of these, 75 contained significant numbers of herring larvae in their stomachs. Sandeels were frequently seen swimming around the egg patch both in the film taken from "Seapup", and by the divers. Good film was also obtained by the divers of sandeels darting in and out of the gravel ridges through the layers of eggs. The sandeels were thus in an ideal situation to prey on the larvae once the eggs had hatched.

#### Metre net surveys

Egg samples taken during the first working day of the survey suggested that the eggs had been laid several days previously, but some spawning continued during the first few days that "Clupea" was working at Ballantrae. Thus while occasional metre net surveys were carried out over the egg patch to check for hatching,

no significant numbers of yolk sac larvae were obtained, even on the morning of 28 April when it was clear that the main hatch had not yet occurred. In 1987 although some hatching occurred from 24 April onwards, the main hatch did not occur until 28/29 April. It is likely in view of the development stage of eggs taken in grab samples on 28 April, that in 1988 the date of the main hatch may have been only slightly later than this.

#### Diving operations

During this cruise "Clupea" as well as carrying out her own programme, also acted as a base for diving operations on Ballantrae Bank by diving teams headed by John Gamble and John Main.

J A Morrison

1 June 1988

Seen in draft: G B Calder

CLUPEA 3/88 11 - 29 APRIL 1988

BALLANTRAE BANK SURVEY

