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10CR89

FRV *CLUPEA*

Cruise 10/89

**REPORT**

21 August - 8 September 1989

Personnel

J A Morrison	SSO	(in charge)
J Gamble	PSO	30 August - 2 September
C Shand	HSO	
I Gibb	ASO	
F Burns	ASO	
A Gallego	(visiting MSc student ) 21-28 August	

Objectives

1. To investigate likely herring spawning areas in ICES areas IVa (west) and IVb (west) using a "Day" grab, the ROV "Sea-pup", a commercially available ROV and the sledge-mounted underwater TV system - in an attempt to pinpoint exact herring spawning locations.
2. To carry out TV and bottom substrate surveys in Oil Exploration Blocks 5/24, 5/25, 6/30 and 26/4 which lie in areas identified as extremely important herring spawning grounds.
3. To map and sample quantitatively the herring spawning ground discovered off Rattray Head in August/September 1988 and any other areas of egg deposition that are identified.
4. To assess the usefulness of a commercially available ROV for this type of work.
5. To carry out a limited amount of fishing to obtain biological samples of fish occurring on the spawning grounds.

Narrative

Scientific staff joined *Clupea* before lunchtime on 21 August but the ship did not sail until 0600 the following day because of poor weather. Work was commenced at Rattray Head where a TV and grab survey was carried out in the area of the egg patch discovered in 1988 but no eggs were found. That evening *Clupea* made for Fraserburgh to correct an equipment malfunction and the following day set off for the Orkney area, arriving off Stronsay at 1500. One dive with the TV sledge was carried out close to the east side of the island before *Clupea* made for Stronsay harbour for the night. The following day was spent carrying out TV and grab surveys in Oil Blocks 5/24 and 5/25 in rather poor weather, with the boat returning to Stronsay harbour the same evening.

On 25 August *Clupea* steamed out to Oil Block 6/30 to begin a TV and grab survey. The survey was started at 1050 that day and was continued until 1200 on 26 August. *Clupea* then steamed back to Orkney, spending the night in Kirkwall before proceeding south to Rattray Head. At Rattray a second TV survey was carried out in the region of the 1988 spawning patch

to check for spawning subsequent to the initial survey on 22 August. No spawn was found and *Clupea* proceeded to Aberdeen Bank. Here a TV and grab survey was carried out in an area in which a herring shoal had been reported in the preceding week. A few scattered herring traces were observed on the echosounder at this location, but no areas of spawn were encountered during the TV transect. The pelagic trawl was prepared and one unsuccessful trawl haul was made in the morning before *Clupea* proceeded to Aberdeen for the half-landing.

Scientific staff rejoined *Clupea* at 0900 on 30 August and the ship returned to Aberdeen Bank to continue searching for likely herring spawning areas. During a TV and grab survey a small spawning patch was discovered and mapped out. The survey was terminated by 1600 and *Clupea* proceeded to Oil Block 26/4 - searching for herring marks en route. Only a few very small marks were encountered and no trawling was attempted. A TV and grab survey was started in Oil Block 26/4 at 2100 the same evening. The survey was carried on continuously until 1300 the following day when *Clupea* made for Aberdeen for a break, arriving there at approximately 1800.

*Clupea* left Aberdeen again at 0630 on 1 September and returned to Oil Block 26/4 where the TV and grabbing survey was restarted. This work had been completed by 1300 the same day and *Clupea* made for Montrose Bank searching for herring marks en route. No significant marks were encountered, however, and *Clupea* steamed north overnight in steadily worsening weather. By 0800 on 2 September it was clear that the weather would prevent further work that day and *Clupea* made for Fraserburgh for shelter, arriving there at 1100.

*Clupea* left Fraserburgh again on the morning of 3 September making for the spawning location at Rattray Head. There, a third TV and grab survey was carried out around the area in which the herring spawning had been observed in 1988. No eggs were identified during these surveys. *Clupea* continued work at Aberdeen Bank where grab surveys were carried out round the clock in 3 separate areas to characterise bottom substrates in possible spawning locations. When this work had been completed *Clupea* returned to Fraserburgh before making for the Clyth Ness spawning grounds off the Caithness coast on the morning of 5 September. En route the trawl was shot in an area of heavy fish marks in the deep water off Fraserburgh - but only a few sprats were retained in the large mesh codend.

*Clupea* arrived off Clyth Ness by 1300 the same day and commenced a TV survey of the inshore grounds near the Clyth Ness light. This survey was continued until mid-afternoon when it was abandoned due to bad weather and *Clupea* made for Wick for the night. The TV and grab survey was continued the following day east of Wick and in the inshore area between Clyth and Berriedale in areas identified as herring spawning grounds by local fishermen. The weather deteriorated again however and *Clupea* made for Buckie for the night, continuing work in the Troup Head area the following day. Here, one trawl haul and a grid of grab stations were completed before *Clupea* steamed for Aberdeen at the end of the cruise.

## **Results**

### **Herring spawning areas**

Using the towed sledge with underwater TV combined with regular sampling of the bottom substrates with a "Day" grab, widespread searches were carried out in the 4 Oil Blocks, and in the Aberdeen Bank, Rattray Head, Troup Head and Clyth Ness areas, in attempts to locate herring spawning grounds. ROV "Sea-pup" was not used during these surveys because in most of these areas the bottom substrates allowed the use of the sledge which enabled available time to be used most effectively to cover the widest possible area. Two hundred and seventy-five

grab samples were taken on this cruise to characterise bottom substrates observed on video; still photographs (taken with a sledge mounted camera) were also used to help achieve this objective. No commercial ROV was available for trial during this cruise.

A herring spawning ground was located on Aberdeen Bank on 30 August. TV film and grab samples of eggs and underlying substrate were obtained at this location which was also mapped during the grab survey. The areas of this spawning ground was relatively small, but the density of egg deposition was very high with egg densities of up to 4.2 million eggs/m<sup>2</sup>. The bottom substrate in this area consisted of coarse shell-grit with an overlying layer of large dead shells composed mainly of *Glycymeris glycymeris*. The eggs were at an advanced stage of development and were probably laid between 20 and 24 August based on estimated development rates. Apart from this no other areas of spawn deposition were discovered.

#### Oil Blocks 5/24, 5/25, 6/30 and 26/4

Intensive surveys were carried out in these blocks using sledge mounted TV and grabbing techniques. Most effort was devoted to Blocks 6/30 and 26/4 for which drilling licences have been issued. In each of these 2 blocks a transect grid was run over the block for approximately 24 hours. Video film cross-referenced with time, date and position was recorded continuously during these transects and, in addition, colour stills and grab samples were taken to back-up the video data. The same procedures were carried out in Oil Blocks 5/24 and 5/25 but the sampling there was much less intensive.

#### Ratray Head spawning ground

Despite 3 separate surveys off Ratray Head no evidence of spawning was observed there during this survey. There is, however, some evidence that the Buchan spawning fishery took place earlier this year and it is possible that the eggs had already hatched before the surveys began. Estimated spawning date in this area in 1988 was 30 August. It is also possible that spawning in 1989 was less intensive than in 1988 and that the exact spawning position was not pinpointed.

#### Other sampling

Despite a limited amount of fishing no herring were caught on this survey - probably because the majority of the herring had already spawned and moved out of the area.

During this survey herring larvae were collected by metre net and stored in liquid nitrogen for DNA/RNA analysis by Aberdeen University.

The Dutch Gulf III sampler was deployed twice in the centres of Oil Blocks 6/30 and 26/4. In each case the samples contained rather low numbers of larvae, mainly in the 10-15 mm length range.

J A Morrison  
19 October 1989

Seen in Draft W Smith

# "CLUPEA" CRUISE 10/89 21 AUGUST - 8 SEPTEMBER 1989

