

In Confidence Not to be quoted without prior reference to the Laboratory

FRV "Clupea"
Cruise 10/85

Report

21 August - 10 September 1985

Personnel

| | |
|----------------|-------------------------------|
| M R Heath | SSO (in charge) |
| J C Gamble | PSO (21-27 August) |
| P M MacLachlan | HSO |
| J Dunn | HSO (27 August - 3 September) |
| R D Adams | SO |
| D L Baird | ASO |

Objectives

1. To locate and follow the movements of a patch of herring larvae and sample in such a way as to allow the estimation of mortality rates.
2. To investigate variability in the hydrographic features and plankton communities which may be of relevance to the survival of herring larvae.
3. To obtain samples of adult herring in spawning condition for the acquisition of biological material.
4. To collect a water sample for radio caesium analysis.

Narrative

"Clupea" sailed from Buckie at 1700 on 21 August and proceeded through the Pentland Firth to the west side of Orkney. Bad weather prevented work in this area so a passage was made to Loch Eriboll. During 23-25 August a grid of Stations was completed off the north coast of Scotland.

The first of the half landings was taken in Stromness on 26 August and the vessel sailed again on 27 August, exchanging scientific equipment and personnel in Scrabster. From 27 August to 2 September, plankton survey work was carried out in the area between Whiten Head and the Pentland Firth, except for 1 September when strong northerly winds confined the vessel to Scapa Flow where calibration of flowmeters was carried out.

Following the second landing in Stromness on 3 September, further plankton survey work was carried out to the west of Orkney until 5 September when strong northerly winds again confined the vessel to working in Scapa Flow. With a heavy swell running to the west of Orkney and the prospect of further strong winds, further work off the north coast was abandoned and "Clupea" sailed through the Pentland Firth during the night of 6-7 September and commenced plankton and hydrographic survey work in the northern Moray Firth, finally arriving in Buckie at 1730 on 9 September.

Results

Persistent bad weather during the cruise caused some restriction of the survey work. General coverage of the area to the north of Scotland was achieved only during the first week, and the objective of performing a second coverage at the end of the cruise could not be attempted. Instead, further investigations were carried out in the northern part of the Moray Firth where spawning of herring has been reported in the past. Trawling operations were not carried out at any time during the cruise as few fish marks were seen on the echo sounders.

Hydrographic data were collected using reversing bottles, with a CTD, and using a thermosalinograph. Microzooplankton populations were sampled using 10 l water bottles, material being collected by filtration through 40 μ plankton mesh. Further water samples were filtered through glass-fibre filters which were retained for chlorophyll analysis. Herring larvae and zooplankton were sampled using either a 1m diameter drum net or a Gulf III high speed sampler. All net-caught samples were examined fresh and the herring larvae picked out and preserved separately in 4% formaldehyde solution. A water sample for radio-caesium analysis was collected in the Pentland Firth on 7 September.

1 Investigations to the north of Scotland

Between 23 and 25 August, full hydrobiological and plankton data were collected at a series of stations giving wide coverage of the survey area (Figure 1). Herring larvae were not widespread during this period, being found only between Strathy Point and Loch Eriboll. On 27 August a more restricted survey was carried out in this area and this was successful in identifying a patch of post-yolk sac larvae with a concentration in the centre of approximately 250 larvae/100m³. Over the following 8 days, a further 12 surveys of this patch were carried out as it drifted first east along the coast, and then north, passing to the west of Hoy (Figure 2). There was no evidence to suggest that any significant part of the population in the patch entered the Pentland Firth.

During this period, 5 parachute drogues were deployed at positions close to the patch centre and tracked for up to 48h.

2 Investigations in the Moray Firth

Between 7 and 9 September a patch of herring larvae situated close to the coast off Clythness was studied by repeated survey grids. Five such surveys were carried out in this period. A parachute drogue was deployed close to the centre of this patch and tracked for 48h.

During 8 September the area was covered by a general survey in which full hydrobiological and plankton data were collected at each sampling position (Figure 3). Few larvae were caught except in the immediate vicinity of Clythness. These larvae were very much smaller than those sampled off the north coast of Scotland and were probably only a few days old. The more detailed surveys of this patch (Figure 4) indicated very little residual drift although strong tidal movements were apparent.

Using the ship's sonar and a grab sampler, an area of shell and gravel was located in the vicinity of the centre of the patch which could represent a suitable spawning substrate. However there was no evidence of herring eggs in any of the grab samples.

M R Heath

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Seen in Draft: J A Calder

GENERAL SURVEY SAMPLING POSITIONS

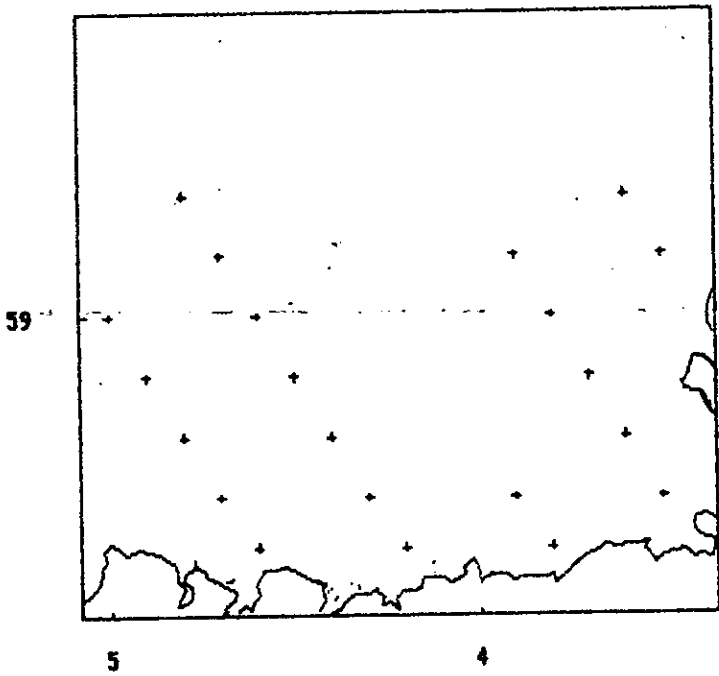


Fig 1.

PATCH SURVEY SAMPLING POSITIONS

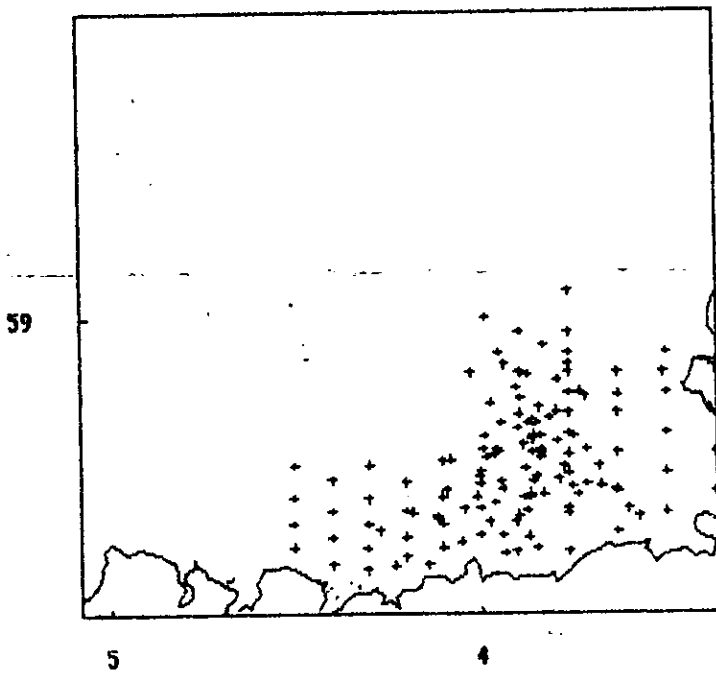


Fig 2.

GENERAL SURVEY SAMPLING POSITIONS

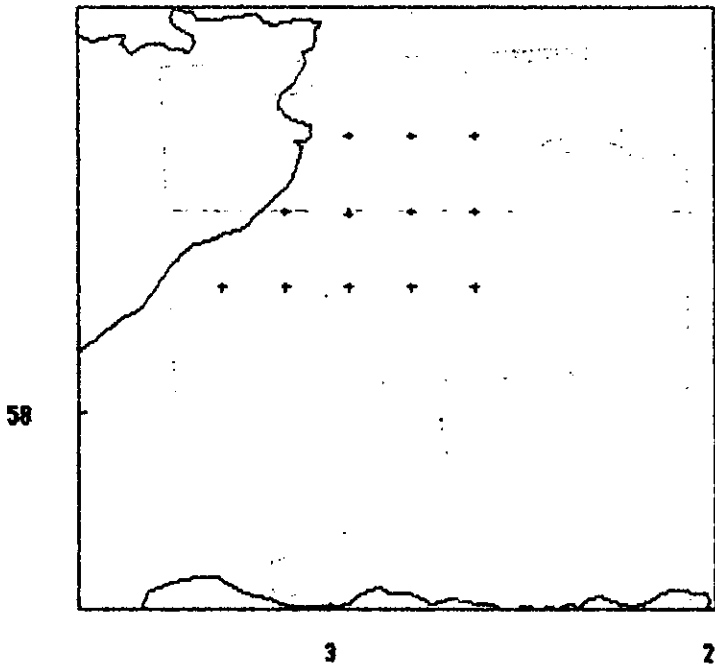


Fig 3.

PATCH SURVEY SAMPLING POSITIONS

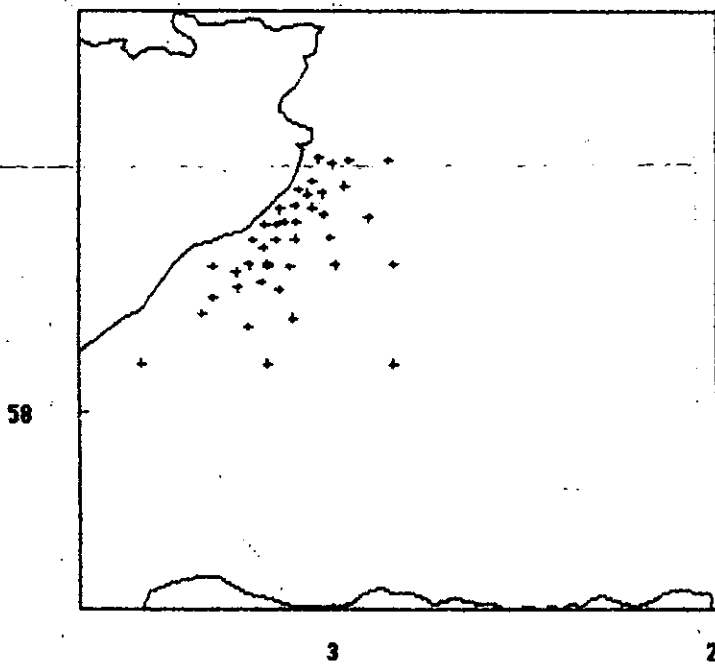


Fig 4.

GENERAL SURVEY SAMPLING POSITIONS

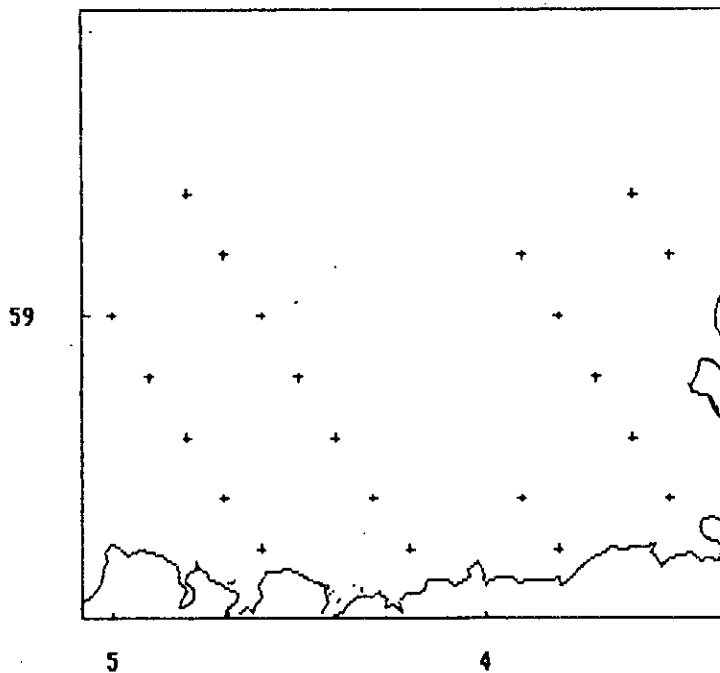


FIG 1.

PATCH SURVEY SAMPLING POSITIONS

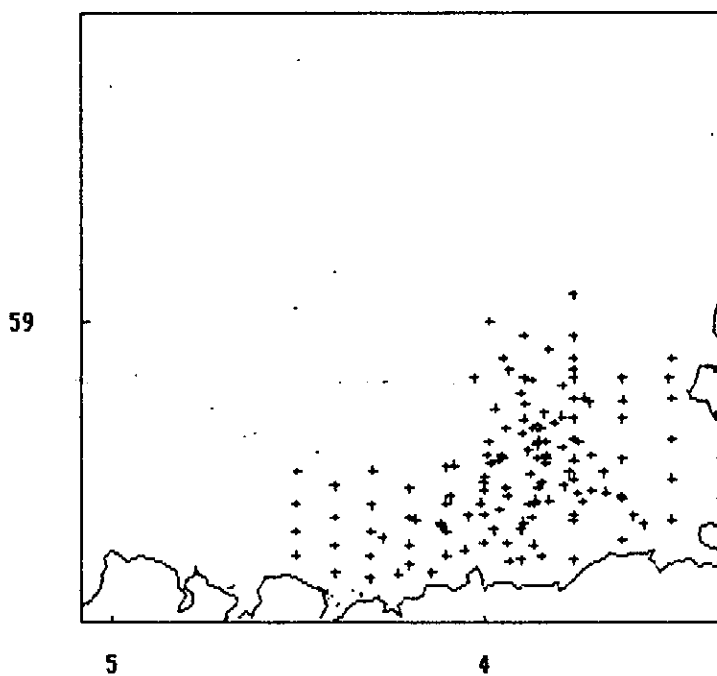


FIG 2.

GENERAL SURVEY SAMPLING POSITIONS

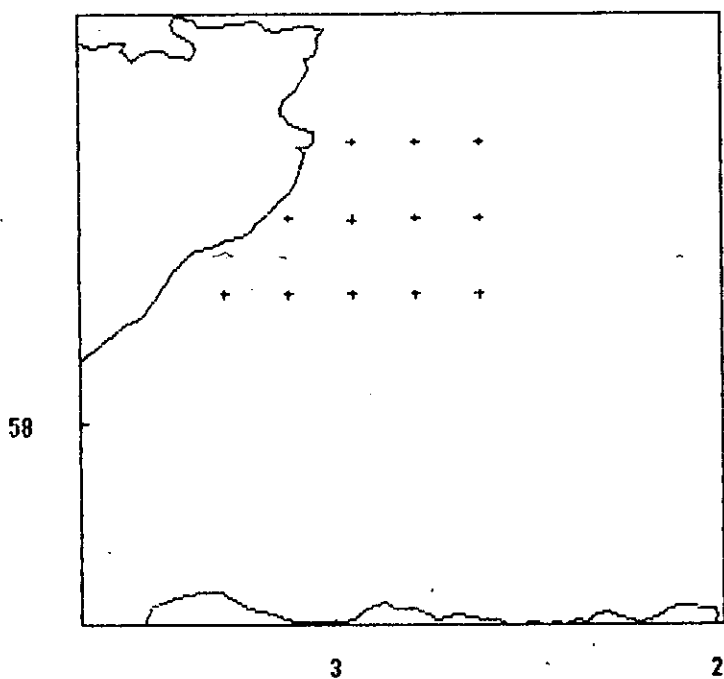


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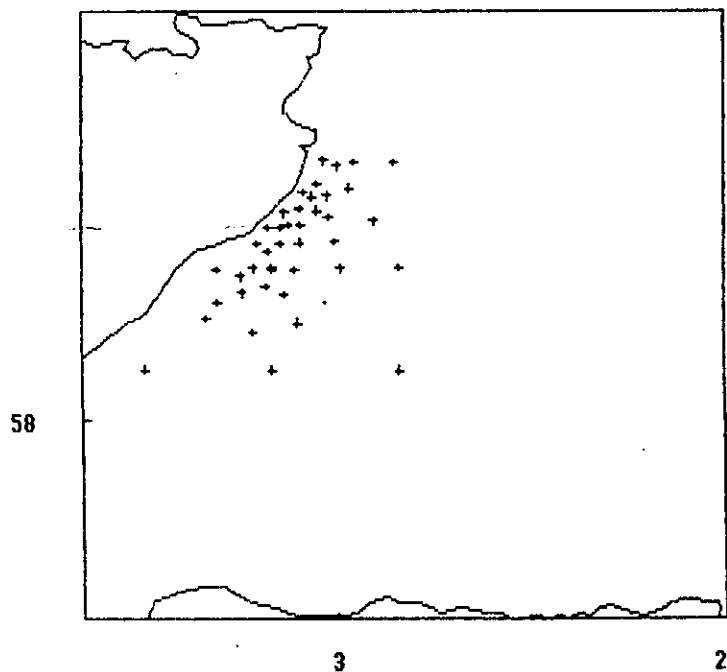


FIG 4.

GENERAL SURVEY SAMPLING POSITIONS

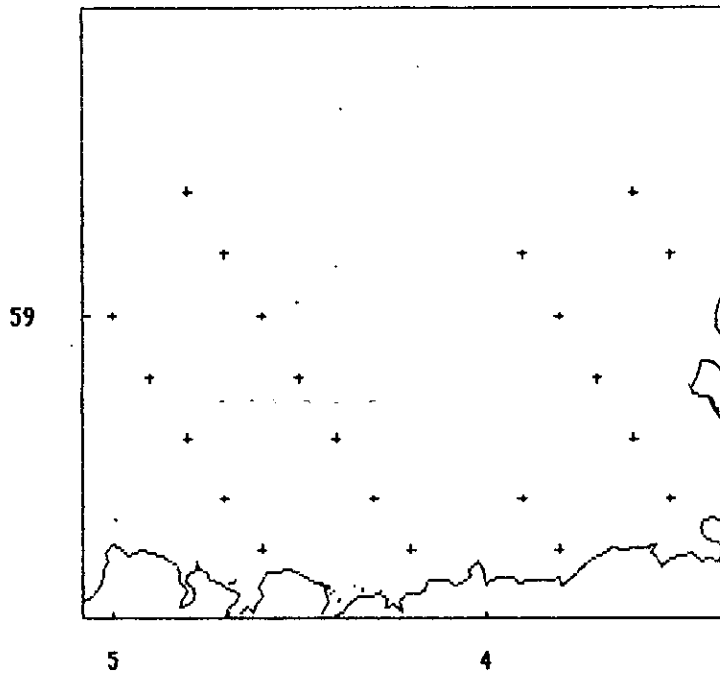


FIG 1.

PATCH SURVEY SAMPLING POSITIONS

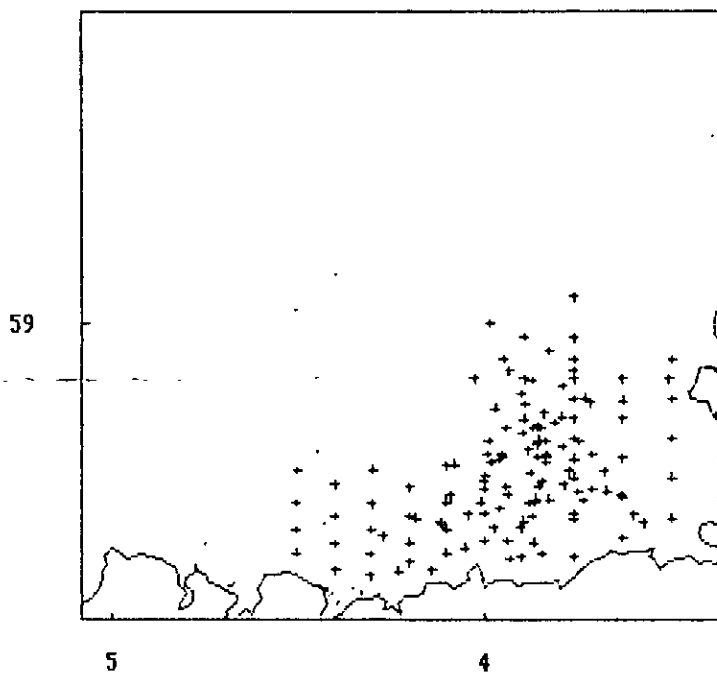
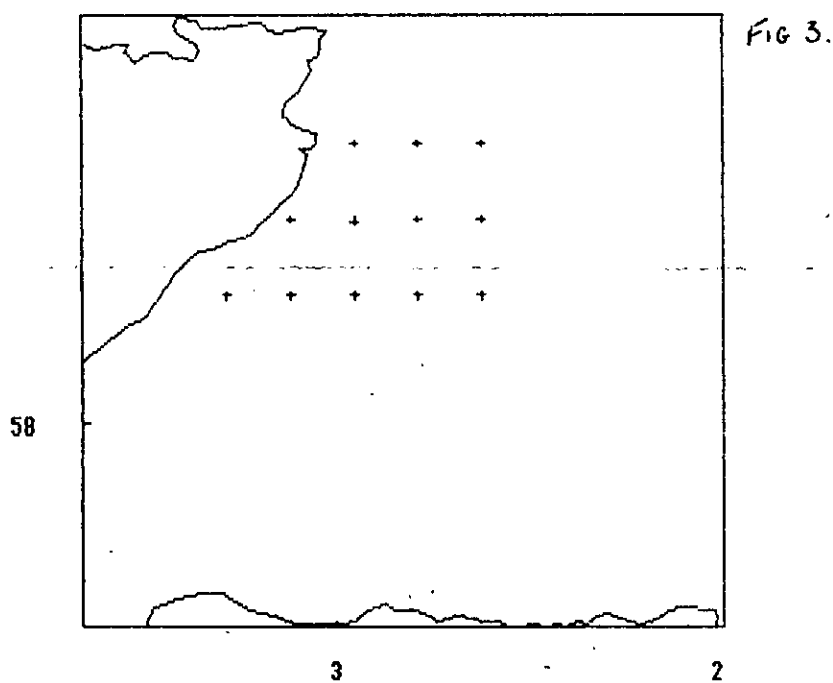


FIG 2.

GENERAL SURVEY SAMPLING POSITIONS



PATCH SURVEY SAMPLING POSITIONS

