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FRV *Clupea*

CRUISE 1391C

## REPORT

11 September-1 October 1991

## PERSONNEL

### Part 1 (11-20 September)

R D Galbraith	HSO (in charge)
J Main	SSO
P J Barkel	PTO
R J Kynoch	ASO
J T M Hunter	PTO
W K T Gray	PTO (11-12 September)
I Stevenson	Visitor (13 September)
A Wallace	Visitor (18-19 September)

### Part 2 (21 September-1 October)

J Main	SSO (in charge)
R D Galbraith	HSO
P J Barkel	PTO
R J Kynoch	ASO
G I Sangster	HSO
F G O'Neill	SO

## OBJECTIVES

- Part 1. To test a new design of rigid sorting grid fitted to a rockhopper net.
- To conduct both engineering trials and RCTV observations on a selection of "enhanced swept area" commercial fishing gears.
- Part 2. To carry out fishing trials with the above sorting grid and examine the influence of bar spacing on catch selection.

## NARRATIVE

### Part 1

*Clupea* sailed from Aberdeen on 11 September but, due to problems with the RCTV cable counter, the RCTV winch gearbox, the RCTV cable and the RCTV camera, work did not commence until 15 September using a hand-hauled cable system towed from the net drum. Four TV hauls and two instrumented hauls were carried out off Cromarty with the twin crown net on 15 and 16 September. On 17 September bad weather prevented further work so *Clupea* returned to Buckie to change gear. While filming an experimental rope trawl on 18 September the RCTV and the net suffered substantial damage when they struck a water logged tree on the sea bed. *Clupea* put into Invergordon overnight to land the vehicle for welding repairs. The following day, again off Cromarty, an instrumented haul had to be abandoned when the scraper prawn trawl came fast on aeroplane debris, causing considerable damage to the net. A further instrumented haul was carried out with an extended wing scraper whitefish trawl but this gear proved somewhat heavy for the soft bottom. *Clupea* then steamed to Buckie for the half landing.

## Part 2

On Friday 20 September the diving gear was loaded and the trawl was prepared with the addition of the grid separation system.

The RCTV winch gearing parts arrived and were fitted satisfactorily but the repaired cable on the RCTV failed again on the second haul. Work for the remainder of the cruise was carried out using the hand hauled system as employed during Part 1.

On Saturday, after taking fresh water, *Clupea* sailed at 1000. The weather was poor with southerly gales but work was possible using the RCTV to make observations on the trawl in the sheltered waters off Ardersier. The vessel anchored off Ardersier for the night. With continuing bad weather on Sunday 22 September, diving on the trawl gear using the TUVII was conducted close under the land. The grid separation system was observed and video-film records made.

Whilst at anchor during the evening of the same day the opportunity was taken to give Mr Kynoch some instruction and practice in the use of the TUVII in shallow water. New diving emergency equipment was also tested satisfactorily.

Work continued in deeper water off Nairn using the RCTV during Sunday 22 September. In the late afternoon *Clupea* sailed north to the Clythness area but the winds increased forcing *Clupea* to return to sheltered water off the Dornoch Firth where the vessel anchored for the night.

On Monday 23 September with severe westerly gales the vessel sailed for the fishing grounds close to Copinsay, Orkney Islands. One short haul was obtained including the use of the RCTV before strong southerly winds made the vessel shelter in Inganess Bay. Severe gales continued during the night and during the whole of the next day and *Clupea* remained at anchor.

Work commenced off Copinsay on 25 September and observations of haddock and whiting were made reacting to the grid separation system. *Clupea* spent the night alongside Kirkwall pier. Work commenced the next day further north, off Start Point but very few fish were encountered so the vessel moved again nearer to Copinsay.

On 27 September with continuing bad weather forecasts one haul was made close to Copinsay where only small squid were encountered. A passage was made for the fishing grounds on the north coast off Dounreay. Large numbers of small haddock and whiting were encountered giving good video recording of their reactions to the grid. *Clupea* anchored off Scrabster for the night.

On 28 September work continued on the north coast off Stormy Bank but there was little improvement in the catch composition. With a big swell running, the vessel spent the night at Stromness.

On 29 September one haul was made off Hoy Island but with a continuing big swell and few fish a move was made to the Moray Firth where a haul was made on Smith Bank. Some good shots of fish behaviour in the vicinity of the grid were recorded. *Clupea* dodged south during the night to a position off Buckie where the best shot of fish was encountered for the cruise, with 11 baskets of fish in the top cod-end and 15 baskets in the bottom. The haddock in the top cod-end ranged between 12-36 cm and in the bottom between 11-41 cm; whiting in the top ranged between 10-29 cm and in the bottom between 11-34 cm.

One haul was made off Fraserburgh before entering the harbour at 1700.

*Clupea* was off-loaded and the trawl gear, underwater vehicles and cables returned to Aberdeen on 1 October.

## RESULTS

### Part 1

Due to time lost because of gear breakdown and damage, very little work on enhanced swept area trawls was possible, with the exception of the twin crown net, where both RCTV observations and instrumented measurements were obtained. A short video tape of an experimental scraper trawl was also recorded. Trials with the rigid sorting grid were postponed to the second part of the cruise.

### Part 2

The net used had two cod-ends, one above the other. A rigid metal grid was placed so that it covered the entrance to the top cod-end. The 1 m x 0.5 m grid was formed of 22 mm bars whose spacing could be altered; it could also be slanted forwards at varying angles from the selvedge to the top sheet. A rigid vent 0.5 m x 0.7 m was attached immediately ahead of the lower end of the grid and fastened to the selvedge to allow larger fish to pass unhindered into the lower cod-end. An inclined canvas sheet attached between the front of the vent and the belly netting steered fish up to the separator device.

Three different slopes of the grid of 35°, 45° and 60° to the horizontal were tried with two different bar spacing, 40 mm and 50 mm.

From the small number of hauls it would appear that a 45° slope with 40 mm bar spacing was the best configuration in this trial.

Study of the preliminary results in Table 1 suggests that most small haddock and whiting (10-20 cm) pass through the grid and into the top cod-end. Haddock and whiting in the range 21-30 cm split equally between passing through the grid and going down through the vent into the lower cod-end. Most of the larger fish are diverted down into the lower cod-end through the vent.

The TV observations showed, furthermore, that there were large numbers of small fish escaping through the meshes both in front and behind the grid. Thus the small fish entering the lower cod-end will be a smaller proportion of the total numbers of small fish passing through the net than is apparent in the table attached.

Detailed analysis of the catch data and the video tapes will be undertaken in the Laboratory.

R D Galbraith  
J Main  
8 November 1991

Table 1

Size range	Bottom cod-end			Top cod-end		
	10-20 cm	21-30 cm	31 cm	10-20 cm	21-30 cm	31 cm
Grid 50 mm bar spacing with 45° slope						
Haddock	65	77	5	222	151	3
Whiting	7	655	10	104	1992	9
Grid 40 mm bar spacing with 45° slope						
Haddock	4067	201	32	6969	186	5
Whiting	857	416	4	4224	662	9
Grid 40 mm bar spacing with 60° slope						
Haddock	3874	32	51	1164	13	3
Whiting	4577	26	5	5543	23	5
Grid 40 mm bar spacing with 35° slope						
Haddock	3583	696	107	1332	423	42
Whiting	6490	319	13	7999	1220	7