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FRV *CLUPEA* 7CR89

Cruise 7/89

REPORT

12-27 June 1989

Personnel

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Objectives

1. To conduct selection experiments using a 400 hp divided trawl to assess the difference in selection at two towing speeds.

2. To investigate the influence of flow and codend shape on the escape of fish from codends.

3. To investigate the relationship between codend mouth diameter and codend parameters.

Narrative

Clupea sailed from Buckie at 1800 on 12 June. Selection trials with the 400 hp divided trawl commenced at 0600 on 13 June. Fifteen hauls were completed on grounds at Fair Isle, Fetlar and Balta. The same trawl was used for a further 5 hauls up to 18 June to assess different methods of rigging codends to change the flow characteristics.

The half landing was taken in Kirkwall on 19 June. Thereafter, until 24 June, fifteen hauls were made at Copinsay to study fish behaviour in codends and to measure codend geometry. Early on 25 June passage was made to the Moray Firth in poor weather. One haul was attempted in shallow sheltered water but it was not possible to operate the remote controlled television vehicle effectively and work was abandoned for the day. A further three hauls were made on 26 June before *Clupea* docked in Buckie that evening. Trawl gear and instrumentation were unloaded on the morning of 27 June.

Results

Fifteen hauls were made to study the effect of speed on codend selection. It was not possible to tow at two discrete speeds (fast and slow) because of the large variations in tidal strength in the areas fished. A range of speeds from 2.3 knots to 3.5 knots was achieved. The data will therefore be used to test whether selection parameters such as 50% retention length have a significant variation with speed. Preliminary analysis suggests that there is not a significant relation. It was

found that the catch, particularly of haddock, was not split evenly in the two sides of the divided trawl when major course changes were made during a tow. The main species caught was whiting. Comprehensive film of the divided trawl was obtained in clear water, including shots of the central panels from inside the trawl mouth.

Wire grommets were used to constrict the diameter of codends, mainly at their mouths. It was possible to achieve high water flows out of the codends ahead of these constrictions. It was found, however, that few fish escapes occurred even though the fish were accumulating ahead of the constriction. To encourage escapes, it seemed that several conditions needed to be met simultaneously. High outflows nearly normal to the netting and sufficiently open meshes were important. Escapes also seemed to occur more frequently when the fish were moving around in the net voluntarily or involuntarily. For instance, more fish escapes were observed in areas of slack, flapping netting which seemed to cause the fish to make quicker darting movements as they fell back along the net. Most fish escapes were observed near the end of the codend just ahead of the fish catch where all these conditions are met.

The escape behaviour of haddock and whiting was observed in square and diamond mesh extensions. It was found that there were more escapes along the square mesh extension. Compared to the diamond mesh case, the square meshes were more open but it may have been as significant that the netting was folded and tended to wave about in the flow. The diameter of the square extension did not reduce along its length so that the codend mouth and hence codend meshes were wider open, which would be expected to lead to improved selection in the codend.

A method of measuring codend geometry was developed using a laser in conjunction with the underwater television. Square and diamond mesh codends and a narrow codend with only 60 meshes around its circumference were tested with and without extensions. Measurement of flow inside the nets was not possible due to malfunction of the instrumentation.

All data will be analysed in detail in the Laboratory.

R S T Ferro
28 July 1989

Seen in Draft: G B Calder