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FRV *Clupea*

Cruise 0891C

REPORT

22-31 May 1991

Personnel

J H B Robertson	HSO (in charge)
P J Barkel	PTO
J T M Hunter	PTO
R J Kynoch	ASO
K Arkley	SFLA

Objectives

1. To test new materials for use in square mesh window cod-ends.
2. To observe, with underwater television, the effect of placing supporting rings around small mesh covers, to establish the best rig for pair trawl selectivity measurements and to measure the water flow in covered cod-ends.
3. To observe square mesh windows in diamond mesh cod-ends designed to aid the escape of juvenile cod and other species and to measure the changes in water flow in cod-ends due to the insertion of windows.

Narrative

Staff joined *Clupea* in Buckie on 22 May but bad weather prevented work on that day. Underwater camera work commenced the next day in the Moray Firth and thence to east of Orkney on the 25 and 26 May. Mechanical problems with the RCTV cable winch guiding-on gear required engineering work in Kirkwall on the 27th. However, damage to the guiding-on shaft bearings during the repair could not be rectified until the evening of 28th. To save time, camera work was conducted on the 28th, using the aft deck crane to guide the RCTV cable onto the winch. This was a stop-gap measure but in the circumstances enabled the vessel to work. Further work was completed using the now functional RCTV winch east of Orkney then in the Moray Firth on 29th and 30th. The cruise ended in Buckie on 31 May when staff returned to Aberdeen.

Results

1. A total of 13 hauls were obtained covering all three objectives. New materials for use in square mesh window cod-ends concentrated mainly on plastic sheeting with squares and oblongs cut out. The "holes" were equivalent approximately to the fishing opening of 90 mm mesh netting. "Road menders" plastic fencing allowed juvenile haddock, whiting, herring and sprats to escape. The escapes occurred mainly at the forward end of the window as was the case with the netting windows previously observed and verified on this cruise. Thin opaque plastic sheeting was also good but tended to be less robust although more flexible than the fencing. Thicker plastic sheeting would give a sturdier construction. Although it is not suggested that the materials in the form tested would ultimately be used by the industry, the trials did suggest that juvenile roundfish will readily escape through a "window" having openings cut in it and that the window can be constructed from material other than conventional nylon or polyethylene netting twine. Comparative fishing trials would be needed to ascertain the strength and selectivity of these materials under commercial fishing conditions.
2. With a single 2.5 m diameter plastic ring attached to the outside of a 30 mm mesh cod-end cover over a 90 mm mesh, 6.1 m long, cod-end, there was a 0.5 m separation between the top of the cod-end and the cover netting, with a smaller separation between the cod-end underside and the cover. Haddock, whiting, herring and sprats were observed to escape through the cod-end meshes on the top side of the "bulge" but inevitably quite different behaviour patterns than normal (ie without a cover) were observed after escape. The fish swam for sometimes long periods (ie 10-30 mins) above the area of escape and forward between the cod-end and cover. The presence of these fish outside the cod-end could modify the behaviour of fish inside the cod-end and as they escape. The behaviour may be associated with a dramatic drop in flow between inside the cod-end (0.44 m/s in front of the lifting becket) and outside the cod-end next to the cover netting where there was little or no flow with a trawl speed of 1.31 m/s. Flow outside the cod-end without an enveloping cover and next to the cod-end netting was 0.51 m/s at a trawl towing speed of 1.36 m/s. It would seem that flow outside a cod-end is affected by an enveloping small mesh cover and the resulting change in fish behaviour even with the modified ringed cover may be cause for concern. It must be stressed, however, that few hauls were obtained with flow measurements and that verification of the results are needed, particularly to ascertain whether the flow meters were affected by cross flows and, if so what the resultant flow is. Improvements could be made to the ring design to aid safer handling.
3. There were water flow changes outside square mesh window cod-ends compared to normal diamond mesh cod-ends. A 40 to 70% reduction in flow was measured at the front and rear outside of the square mesh window (90 mm mesh) compared to the diamond mesh cod-end (90 mm mesh) over a net towing speed range of 1.3 to 1.6 m/s. The flow adjacent to the top sheet netting inside the cod-end was equivalent in both cases. This result is based on two tows. Further work is needed to verify the result and in particular to check that flow was not at an angle to the flow meters. No cod were observed in the square mesh window cod-ends. Diverting panels in the cod-end moved haddock and whiting towards either the top or lower sheet. A clump of 3 floats and lengths of chain inside a red plastic sleeve, all neutrally buoyant, spread across

the lower sheet at the front of the cod-end also diverted haddock and whiting upwards. Noise may have had a part to play in the diverting process since the chain was arranged to bang and rub against the floats. Further observations with good quantities of cod are required.

J H B Robertson
7 August 1991