

In confidence

FRV MARA

Cruise 4/79

REPORT

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(includes co-operative work with RV Solea, Hamburg, 21-22 May 1979)

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Objectives

To investigate by direct observation the role of the various parts of the fishing gear in allowing small fish to escape.

Place

Broad Bay, Stornoway

Results

In earlier preliminary tests observing model boards it had been found possible to eliminate the sand cloud by raising the boards on stilts lifting the lower edge a few centimetres from the sand. In the present tests with the full scale flat boards fitted with 25 and 50 cm stilts the sand cloud drawn in behind the board was eliminated but behind the board a considerable sand cloud was thrown up by the vortices in the wake acting like small tornadoes lifting the fine sand. The sand cloud was thinner but still substantial at the wing ends and no behaviour observations of sweeps without sand clouds or commercial fishing tests without the sand cloud were made. Spread was not lost when the boards are lifted on the stilts. TV films of these experiments were recorded and will be analysed.

The bobbin rig was fished without the net and close up observations of the behaviour of small fish and sand eels swimming with the rig and then dropping back were made. TV films will be analysed.

An experimental rig using diverter boards allowed observation of fish reactions to  $3\frac{1}{4}$ " wire,  $\frac{3}{8}$ " chain and  $2\frac{1}{2}$ " combination wires. Each was fished with different combinations of speed between 2-4 knots and angles of attack between 0-45°

inclination to the tow. Nine TV films will be analysed for skate, dogfish, sandeel and flat fish reactions. Preliminary conclusions from these observations suggest that there is a selective function for different size ranges at different combinations of angle and speed.

Two days were spent in co-operative work with the German research vessel Solea and Mr Klaus Lange from the Hamburg Laboratory. Three versions of a semi-pelagic net one conventional, one with front parts of the net replaced with ropes and the third with long parallel ropes spaced about 1 m apart replacing substantial parts of the belly square and wings of the net. The long rope trawl was observed fishing in contact with the sea bed and TV tapes were made illustrating its underwater behaviour. Some observations of sandeel behaviour in relation to the mouth and the long belly ropes were recorded and will be analysed. Some film of the circular steel boards illustrates these working well on the bottom. During one tow the ship was stopped so that the boards dropped concave or warp side down and TV film showed how they easily rose to a working position as speed increased. On another occasion the same board convex side down would not rise to a working position at any towing speed. TV film of the conventional net was made to compare with the rope version. Seven TV films of these pelagic nets will be analysed and edited.

The prototype bioluminescence meter worked well and some paper trace recordings were made on Solea in Broad Bay and in Stornoway harbour. These traces indicate the need for a discriminator with several channels counted separately to give the best measure of the bioluminescent level.

5 days, out of 15 working days, were lost due to weather and or sea conditions being unsuitable for the diving procedure.

As seen in draft James A Calder