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In confidence: Not to be quoted without reference to the laboratory

FRV 'Clupea'

Cruise 9/78

Report

14-25 August 1978

Scientific Staff:

P A M Stewart	PSO	(In charge)
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Objective

To investigate electrotaxis as a means of sampling 0-group gadoids.

Narrative

Fishing gear and scientific equipment were loaded in Aberdeen on 14 August. Clupea sailed at 1630 and the electrotaxis equipment was tested in Aberdeen bay. The vessel then steamed for Shetland waters arriving on station shortly after mid-day on the 15th. Mid-water trawling, TV surveying and attempts at electrical sampling were carried out in this area until the 18th when Clupea entered Lerwick for the weekend. On the 21st Clupea returned to the survey area and worked there until about mid-day on the 22nd when she anchored close to Yell to permit work to proceed with the electrical sampling equipment. Later on the 22nd the vessel steamed to mid-Yell pier. On the 23rd experiments were carried out alongside the pier until 1930 when Clupea left for Aberdeen, arriving at 1930 on the 24th. Gear was unloaded on the 25th.

Results

Mid-water trawling was carried out at depths mainly in the range 10 to 30 fathoms below the surface. Catches consisted of Cyanea Spp. and 0-group gadoids. The gadoids caught were mainly Merlangius merlangus and a few specimens of Melanogramus aeglefinus were taken.

The underwater TV camera was lowered in places where marks were seen on the ship's echo-sounder. Many marks were inspected but fish were found in only two positions. In shallow water no lights were used but in deeper water (below 20 fathoms) lights were required. The intensity and colour of the lighting were varied to reduce its frightening effect on the fish but these alterations had no beneficial effect on the attempts to locate fish.

Pulsed and continuous DC stimulation were used in the electrotaxis experiments. The anode of the electrical system was a 1 m diameter sphere of copper wire covered in galvanised wire mesh. Observations made at sea, using the pulsed system, were inconclusive but useful observations were made at mid-Yell pier on the local population of 0-group Pollachius virens. Tests were carried out with pulsed stimulation at 15, 30, 40 and 50 Hz and with DC stimulation. Shoals were induced to move near the anode by the placing of bait. The most effective pulse frequency for inducing electrotaxis was judged to be 40 Hz, but DC was much more effective. The highest voltage tested was 115V which consumed 55 KW and this had an effective range around the anode of 1 m. Fish drawn to the anode were stunned and recovered rapidly when power was cut off. The effective range appears to be too small to be useful for the routine sampling of a widely scattered species.

It was observed that when the DC system was active the ship's compass deflected. The largest deflection noted was 16° when the power circuit was close to the wheelhouse.

Peter A M Stewart
4 September 1978

Seen in draft: A Mair