

In Confidence - Not to be quoted without reference to the Laboratory

3ER82

FRV "Explorer"

Cruise 3/82

REPORT

2-22 April 1982

Objectives

- 1 Remote vehicle to be used to observe fish reaction distance in conditions of poor visibility.
- 2 The contraction time of the lateral muscles from all large fish caught will be measured.
- 3 Fishing tows with no bioluminescence will be selected for night hauls to work for non-reaction of fish to gear in the absence of light.

Narrative

"Explorer" sailed 1300 on April 2 and after a short period adjusting the compass off Aberdeen sailed for an 8 am first tow off Wick on 3 April. The new vehicle was towed during the day and adjustments made. The haul landing was at Aberdeen on 12-13 April. Twenty-two hauls were made with the four panel 600 hp trawl during the cruise in a great range of visibility conditions from 40 m off Fair Isle to 20 m on the Turbot Bank. Most tows were observed at a depth between 70-100 m and only at the Fair Isle tow was there sufficient light at 100 m for natural light observations. Working the remote vehicle close to the seabed and the trawl in poor visibility lead to a number of problems including damage to the vehicle guard rails and tangling of cables but 23 video tapes and 2000 photographs were made showing many new aspects of gear and behaviour in these varied conditions and no equipment was lost. The computer logging system worked successfully during the cruise giving valuable background data on towing speed and position during the observed tows.

Results

A number of techniques were developed to observe the reaction of fish to gear in the various degrees of visibility encountered. Bright bioluminescence was found to be present in all waters sampled and observation of the fish capture process on several dark nights at 100 m depth showed fish still reacting by swimming forward in the front of the bobbin area and the sweeps. The vehicle was positioned using the TV camera and red lights, then when fish were seen in the area, the lights were extinguished and a series of flash photos spaced at 10 second intervals were made on 35 mm film. The photographs all show that the fish continued to swim forwards in these areas. Evidence for non-reaction in complete darkness must be sought earlier in the year when bioluminescence may be less developed. However in poor visibility there is evidence of close

encounter of many fish with parts of the gear. This was in contrast with observations on the daylight Fair Isle tow where in very clear water, a large proportion of the fish were seen to avoid the mouth of the net completely. These conclusions agree with diving observations in shallower waters. The good visibility together with darkness on a second Fair Isle tow showed that fish reacted much closer within the gear in darkness and the resulting catch was larger. A bonus in the Fair Isle daylight tow was observation and recording of a large school of 50 cm saithe that swam for 23 minutes in the mouth of the gear when they turned and as a school went into the codend (37 baskets). This large catch was filmed in the codend and observed to stretch the meshes of the extension piece trapping escaping sandeels in the stretched meshes. During tows on the cod spawning area in the Moray Firth it was found possible to record many observations of Nephrops reacting to the lower sweeps of the trawl. The video taped examples and flash photographs will be analysed and related to previous observations. Muscle samples were taken from many large cod (.90-1.3 m), saithe (.50-.70 m) and other species and their twitch contraction time measurements are being analysed in a programme to understand the swimming physiology and predict maximum swimming speeds in relation to temperature and size.

C S Wardle

24 August 1982

Seen in draft Walter Findlay