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the Laboratory

CRUISE REPORT

FRS "CLUPEA"

1-26 OCTOBER 1973

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OBJECTIVES:

To complete the comparative fishing experiment for Nephrops norvegicus and to commence a similar experiment on flatfish.

GENERAL:

The cruise started and finished in Aberdeen and experimental trawling for N. norvegicus took place in the Moray Firth between the positions 57°48'N, 2°56'W and 57°45'N, 3°42'W. A few trial hauls for flatfish were carried out in Burghead Bay and in Aberdeen Bay. Divers made observations on the fishing gear in Spey Bay and in the outer Dornoch Firth at a depth of 20 m. Only two working days were lost due to bad weather.

FISHING GEAR:

The fishing gear used was a 9 m beam trawl with a divided net and twin cod-ends. An electrode array was rigged on each side of the net; only one side being energised at a time. Power was supplied to the electrodes from a high current pulse generator mounted on the beam, and this unit was supplied with power from the towing vessel via an armoured electric cable. The stimulation pattern supplied to the electrodes was that found to be effective in previous behavioural experiments conducted by divers on a natural colony of N. norvegicus.

RESULTS:

Experimental trawling for N. norvegicus was conducted in daylight and darkness. In the inner Moray Firth N. norvegicus are active around dawn and dusk in October, and it was hoped that the electrified trawl would give good catches during the hours of daylight when the animals would normally be in their burrows and safe from capture. The anticipated result was not obtained however, and only small catches were recorded during daylight. During the hours of darkness catch rates were greater, and the mean ratio of the catch in the electrified side to that in the non-electrified side was 1.27.

For any single haul with this experimental gear to give statistically valid results, three requirements must be fulfilled.

- 1) The catch must be large enough to exclude random effects.
- 2) Both sides of the gear must fish identically.
- 3) The electrical system must function correctly throughout the haul.

In practice this proved to be a demanding set of requirements and of the 63 hauls completed, 27 gave useful information, and in only 12 of the 27 was the catch large enough for meaningful comparisons to be drawn. Unfortunately most of the largest hauls had to be disregarded. On two occasions divers inspected the gear (at 20 m depth) to check the rigging. The nephrops grounds were too deep for direct observations to be made on the gear in action. After each haul the net was inspected for tears; the degree of polish on metallic parts in contact with the bottom and the relative amounts of benthos in each cod-end were assessed to determine the validity of the catch comparison.

Little difficulty was experienced with the pulse generators, but cable handling problems were again encountered and the method of cable termination used will need further refinement.

The flatfish tows completed have given encouraging results. The electrified side usually caught more fish than the non-electrified, but because of the variety of species and wide size range, this can only be taken as an indication of the likely results of a prolonged experiment.

The results of this exercise on electrified trawling for N. norvegicus suggest that further study is required, to account for the lack of success with electrified daylight trawling which appears to contradict earlier behavioural observations. The ratio of electrified to non-electrified catch was lower than that obtained in the June 1973 trip in the Minch, when the ratio was 1.46. The average size of Nephrops caught in the June cruise was greater than that in this cruise, and since larger nephrops are known to react more strongly than smaller animals to electrical stimulation the difference in the ratio is not wholly unexpected.

P A M STEWART
5 November 1973