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CRUISE REPORT

FRV "MARA"

PART I 26 August - 6 September, 1974

[Note The subsequent joint research project with RV "Clione", Cruise 13, MAFF, Lowestoft, 11-26 September 1974 is reported separately - attached]

OBJECTIVES

1. Observation of fish reactions to the seine net. Specifically, an attempt to maintain continuous commentary of single flatfish from the time of first movement of the net concurrently with a full instrument record of gear parameters.
2. Development of a device to attach transponding tags to the seine net rope.
3. Establishment of a routine for attaching transponding tags to flatfish without previous capture.

RESULTS

The seine net was fished in Spey Bay off Lossiemouth in 18-23 m on a sandy bottom. The main fish observed by divers were plaice and dabs and there were notable numbers of sprats and 1st year haddock (10-15 cm).

Established techniques of recording gear parameters by instruments were used. Divers equipped with cameras and tape recorders made recordings of fish behaviour.

One of the major questions outstanding from analysis of previous observation of fish observed in front of the seine net has been; why do we obtain very few observations of fish swimming for long periods at the slow herding speeds of the early part of the haul?

In the present series of 10 working days, divers were able to observe 28 hauls. It was found possible to follow flatfish on several occasions for long periods of 5-10 minutes. However, this often involved complicated movements by the observer from one extreme of the headline to the other. Many observations were broken off by loss of visible contact with the identified fish while the diver was traversing the gear. Particularly common was loss of fish from view while crossing behind the centre region of the headline. However, sufficient records were made to allow a reasonably certain conclusion that fish do remain swimming for relatively long periods ahead of the footrope in the early slow moving stages between the start of the first forward movement and $1\frac{1}{2}$ knots (ie up to 10 minutes after first movement).

Bias against making long observations of fish in the early stages of hauling is a combination of two or more of the following:

1. Restricted visibility, usually less than 10 m.
2. Low probability of encountering fish at the start of hauling.
3. Freedom of fish to swim along complete length of groundline when net is still stretched straight out.
4. The difficulty for divers of moving all over the net whilst keeping one fish permanently in view.

The transponding tags housed in perforated trawl floats were floated above specific points on the seine net ropes about which the linkage was free to rotate. Thus the tags were maintained permanently about 1 m above the rope.

Baiting tests to attract flatfish for tag attachment devices were disappointing mainly due to the low density of large enough fish in the area. One day was given to testing a backless gear for the herding of flatfish for tagging. The gear was composed of two seine net wings linked by a normal headline but the footrope was unweighted and made to float as an arch linking the base of the two wings, thus leaving clear undisturbed sand between the wing ends. It was found possible for divers to drop back with a selected fish and tag this fish as it settled on the sand.

With future experiments in mind the same rig was also tested in conjunction with the neutrally buoyant diverters. One successful arrangement was the presentation across the gap between the wings of a 15 metre length of seine net rope and 5 metres behind this a similar length of tickler chain. Divers were able to count fish in the region of the rope and chain. The single test showed that this rig was stable for long periods at speeds less than 0.5 knots and would be useful for future observations of the reaction of fish to a wide range of basic gear stimuli, particularly herding devices.

C S WARDLE
15.10.74

PART II 11-24 September 1974

Joint operations involving FRV "Mara" and FRV "Clione" (MAFF, Lowestoft).

OBJECTIVES

1. To assess the change in shape of seine net ropes during fishing by attaching transponding tags to the ropes and observing their position with the ARL sector scanner.
2. To observe the behaviour of fish carrying the transponding tag when being herded by seine net ropes.
3. To compare the behaviour of flatfish of Lowestoft origin with others tagged 'in the wild'.

NARRATIVE

Experimental work was carried on in Spey Bay and on the Bellings ground north of Buckie. Two transponding tags were attached (as described in Part I) either one to each rope, one coil from the wingend, or both on the port rope at one coil and two coils from the wingend.

Normal instrument recordings were made aboard 'Mara' and on some hauls observations of the attitude and depth of the tags and ropes were made by divers.

More effective use was made of ship's time by working continuously through the cruise period inclusive of Saturdays and Sundays when weather allowed. Several days were in fact lost due to poor weather conditions.

RESULTS

A total of 21 hauls was made in the period of which 17 were valid with more or less continuous positioning of the tags etc. Video and audio records were made aboard 'Clione' of the successive positions of the rope tags, the net and 'Mara' during the whole process of hauling. From these records a geometric analysis can be made of the change in shape of the gear, and on the hauls when fish were released, of the fish movement also.

On three occasions tagged fish were released into the area round which the gear was shot. On the first haul, herding by the port rope was observed for several seconds. The rope then over-ran the fish which escaped. On the second occasion the fish was herded by the rope and passed back towards the net until when close to the wing end on its own side, it swam rapidly across the net mouth and out in front of the opposite wing. The third fish was not herded by the rope which was at this point some distance off the bottom.

No wild fish of suitable size was attracted to the baited lines, and so no work on objective three was possible.

ACKNOWLEDGEMENT

The success of the joint work was ensured by the very effective liaison between the two research ships for which the officers and staff of both ships, particularly Mr French of the 'Clione' and Mr Reid of the 'Mara' must be thanked.

C C HEMMINGS
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