Hall

R.1/7 14MR63

IN CONFIDENCE: Not to be quoted without reference to the Laboratory.

CRUISE REPORT

F.R.V. "M A R A"

14th October-1st November, 1963

Narrative

Scientific gear was loaded in Buckie and "Mara" set sail for Stornoway on 14th October. The forecast at the time was too bad to recommend a direct passage round the north of Scotland and instead the alternative route through the Caledonian Canal was preferred. The passage through the canal was accomplished without delay but on her arrival on the west coast, "Mara" was delayed by a succession of southerly gales to such an extent that it was not until 21st October that she was able to cross the Minch and reach Stornoway.

Southerly gales persisted for much of the time, but owing to the sheltered position of Broad Bay with respect to these winds the programme of diving work was able to proceed almost without interruption.

Finally, work in Broad Bay was terminated on 31st October and "Mara" proceeded to Corpach, arriving there on 1st November.

Personnel

W. Hemmings replaced J. Main throughout the whole of the cruise.

Experimental Procedure

The object of the programme was to introduce tagged and untagged haddock into a cage and to keep them under observation for as long as possible. The cage used for this purpose was made of small meshed netting, supported on metal hoops. It measured 30 feet in length by 9 feet in breadth and was 7 feet high in the centre. On the first day it was secured on a smooth sandy bottom in about 11 fathoms of water in Broad Bay. Observations were subsequently made on three groups of haddock:

(a) Fish that had been trawled from 12 fathoms, tagged on board "Mara", and subsequently taken down and put in the cage.

(b) Fish that had been trawled from 12 fathoms, tagged on the bottom while still in the codend and subsequently put in the cage without ever leaving the bottom.

(c) Control fish that had been trawled from 12 fathoms and put in the cage, untagged, without ever leaving the bottom.

Mortality

The heaviest mortality rate was observed amongst the haddock that had been tagged on board "Mara". Many deaths occurred during the first two days after tagging but on the third day there was no evidence of any fish having recently died. Out of a total of 43 tagged fish, only 13 were present and alive on the fourth day after tagging. Unfortunately, by that time the framework of the cage had become distorted and the possibility that some of these fish had escaped through a small aperture cannot be eliminated. From observations on the numbers of other haddock in the cage, however, it seems likely that any loss from this cause would have been quite small. An estimate of the percentage mortality of these tagged fish as being somewhere between 50% and 70% seems reasonable. This result is all the more interesting when considered in conjunction with the fact that at the time of tagging, all of the fish, which had been brought up from only 10-12 fms. of water, were judged to be in first-class condition.

Of the fish that were tagged on the bottom, 8 out of 10 survived. Of the two casualties one was probably a fish that had had some of its scales rubbed off while being tagged in the codend. The other simply disappeared and may have escaped from the cage.

No mortality was observed amongst the control fish.

Behaviour

All the haddock in the cage were of medium size except for one untagged "jumbo". At the beginning of each observation period, the medium size fish were distributed in a shoal with 8" to 10" between individuals, and 5' to 6' from the bottom. This shoal was always located at the same end of the cage but no consistent reason, such as direction of tide, could be found to account for this.

There appeared to be no difference in the behaviour of the tagged and untagged fish which were uniformly mixed throughout the shoal.

The "jumbo" haddock pursued an independent existence patrolling up and down the length of the cage.

Reaction to bait

At no time were any of the haddock seen to show any interest in a small bag of crushed mussel on the bottom of the cage. This observation is of interest since the local line fishermen who work from Broad Bay, can catch haddock, using mussel as bait, but only during the hours of darkness.

Observations on other animals

At the beginning of the experiment the cage was situated on a superficially featureless bottom of fine shelly sand. A preliminary survey covering an estimated 1000 sq.yds. of sea bottom detected, amongst other things, only one Cancer. Within 24 hours of there being dead fish in the cage there were three Cancer inside the cage and four more were seen actually approaching, two from either side and all four walking across the tide. Two days later there were about 150 Cancer on, in or around the cage.

Towards the end of the experiment, when no more fish appeared to be dying the numbers of Cancer began to decline. Finally on the last day, a number of small sand Gobies were observed around the cage for the first time.

Photographic work

The trawl camera was used for several purposes:

(a) to photograph the fish in the cage throughout a 24 hour period.

(b) to photograph throughout a 24 hour period, bags of herring and mussel on the sea bed at a position close to where the local line fishermen were known to shoot their lines.

(c) the camera was also used, mounted on the trawl headline, to take bottom photographs inside and outside Broad Bay.

Additional photographs of interest in and around the cage were taken by Mr. Hemmings using a "Calypsophot" underwater camera.

R. JONES
20th November, 1963.