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FIELD WORK REPORT

GAIRLOCH M/V "STELLA"

31 July to 20 August 1988

Personnel

J Main
G Sangster
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Objectives

1. To study the behaviour of haddock and whiting escaping from both diamond and square mesh codends.
2. To investigate the physiological conditions of fish at various stages of the trawling process by measuring the lactic acid levels before, during and after confinement in the codend at various towing speeds.
3. To continue monitoring the survivability of the fish held in the underwater cages from the previous cruise.

Narrative

Staff set up the experimental apparatus for towing the codends, off-loaded "Stella" from the transporter and prepared her for work. During the first day, the fish held in the underwater cages were visited twice for feeding. The codend frame was towed behind "Stella" at 3 knots and behaved satisfactorily.

"Stella" worked daily in the loch towing the codend arrangements and moored in Shildaig Bay each evening.

On 10 August the fish held in the underwater cages off Longa were released including the 90 tagged haddock. One tagged haddock was caught during the same day by an angler close to its release point, another was caught by one of our own team three miles further into the loch. This fish was released again.

The cages were lifted and the underwater site completely cleared on 16 August using a local boat to lift and transport the cages to Gairloch pier.

"Stella" was handed over to Dr Glass on Friday who sailed it to Aultbea.

All the experimental equipment, diving gear, mobile laboratory and staff returned to Aberdeen on 20 August.

Results

All three objectives were met. Tows with both 90 mm diamond and square mesh codends were conducted at 3 knots. Handline caught haddock (rested for 12 hours) were introduced at the mouth of the codend and observed until exhaustion or escape. These fish had previously been measured for length, circumference

and diameter at maximum body girth. When a fish escaped from the codend that mesh was measured for the actual opening. Using the measured diameter of the escaped fish the conical gauge was pushed into the mesh to that size to give an indication of the force used by the fish to escape; the conical gauge is fitted with a calibrated tension spring for this purpose.

Haddock were killed at various times during the tow up to exhaustion or escape and muscle samples taken and frozen for lactic acid level measurements. These samples have been returned to the Laboratory for analysis.

The opening width of the meshes presented to the fish for escape were measured using the conical gauge whilst towing at 3 knots.

The measurements were taken by just touching the bars of the mesh without opening it up. Starting with the third mesh forward from the codline and moving forward the widths in mm were as follows:

90 mm	Top Side	20	22	20	20	20	18	19	18	16	16	16	17	14	14	14	16	14
Diamond	Bottom	18	16	16	18	18	18	20	18	18	19	21	19	20	20	18	18	18

90 mm	Top Side	46	44	44	45	44	47	44	43	42	42	44	40	42	46	44			
Square	Bottom	48	44	45	44	46	42	41	42	42	42	42	43	40	41	46	41	40	42

The flow in and around the codend was measured using a hand held propellor type flow meter.

90 mm diamond mesh	Speed recorded	surface	3.2 knots
	Front of codend	outside	2.9
	" " "	inside	2.7
	Back " "	outside	2.8
	" " "	inside	1.7

90 mm square mesh	Speed recorded	surface	2.9
	Front of codend	outside	2.7
	" " "	inside	2.5
	Back " "	outside	2.7
	" " "	inside	2.4

During the last seven days of the cage experiment no fish died and the experiment was terminated.

Results of survival after at least 28 days in the nine cages:

		<u>Percentage Survival</u>
Control fish in cages	1	97
	2	100
	3	100
Escapes from diamond mesh	1	67
	2	74
	3	73
Escapes from square mesh	1	92
	2	92
	3	94

The significance of these results will require further analyses.

J Main

14 October 1988