

P17/8

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Charter Vessel MV *Challenge II* (UL 33)

Charter Cruise 1901H

REPORT

29 October - 12 November 2001

Ports

Loading: Peterhead

Unloading: Peterhead

Half-Landing: 5 November at Peterhead

Personnel

R J Kynoch (In charge)

E Jones

I Penny

B Barkel (29 September - 5 November)

K Summerbell (5-11 November)

Objectives

1. To determine the effect of extension length on the selectivity of a 110 mm diamond mesh cod-end rigged with a 90 mm square mesh panel using the twin trawl method.
2. To carry out underwater observations of the gear and fish reactions to it using the RCTV.
3. If no significant effect of extension length is found, the effect on selectivity of using double twine in the aft 150 meshes of the extension will be measured.
4. To measure, as time allows, the selectivity of a 110 mm diamond mesh cod-end with no square mesh panel using hooped small mesh covers. This rig will replace the 40 mm diamond mesh cod-end attached to the control net.

Narrative

Staff and equipment joined *Challenge II* at Peterhead on 29 October 2001. The RCTV and fishing gear were rigged aboard the vessel in Peterhead harbour. The vessel sailed during the morning of 30 October to fishing grounds 10 miles east of Peterhead. Observations were then made using the RCTV to assess the rigging of the square mesh panel and the cod-end lifting becket. The vessel returned to Peterhead during the evening of 30 October to enable modifications to be made to the vessel's fish deck. The vessel sailed on the morning of 31 October to fishing grounds 20-25 miles east of Peterhead. Cod-end selectivity trials were thereafter carried out with the experimental cod-ends attached to the starboard trawl and a small

mesh cod-end attached to the port trawl. A half landing was made into Peterhead on 5 November to change over staff and offload the RCTV. The vessel sailed during the afternoon of 5 November, to the same fishing grounds east of Peterhead to continue cod-end selectivity trials.

During the cruise the selectivity of three different extension piece configurations were measured all with a diamond mesh size of 110 mm (nominal). Cases 1 and 2 were constructed entirely from single twine and were 100 and 250 meshes long respectively. Case 3 was 250 meshes long and consisted of 150 meshes of single twine in the forward section and 100 meshes of double twine in the aft section. All were attached to the same 110mm diamond mesh cod-end, which was 50 meshes long and constructed from 5 mm diameter double twine. No lifting bag was fitted to the cod-end as per regulation (Scottish Statutory Instrument 2001 No 250) which came into force 1 August 2001. For all test cases a 90 mm square mesh panel was rigged in the top sheet of the net with its rearmost row of meshes 8.95 m from the codline.

The cruise ended at Peterhead on 12 November with staff and equipment returning to Aberdeen

Results

Initial underwater observations made prior to the start of the selectivity trials found that the rigging of the square mesh panel was satisfactory. There was no distortion or twisting of the panel or the surrounding diamond mesh netting. There were enough bars across the width of the panel to prevent constriction of the surrounding diamond meshes. Observations of the cod-end lifting becket found it to be rigged so that it was floating above the cod-end and not causing any constriction of the surrounding meshes. This is the normal rigging practice for the dogrope and lifting becket aboard *Challenge II*. Because of the poor water clarity, artificial light had to be used during gear observations and therefore no conclusions could be drawn regarding fish behaviour to the experimental gear. After the first day of underwater observation the weather conditions deteriorated and prevented the deployment of the RCTV for the remainder of the first half of the cruise.

To minimise the risk of a net bias, on each haul the vessel towed a straight course either with or against the tide, thus ensuring that the gear fished symmetrically. Most hauls were about 3.5 hours duration (range three to four hours) and the towing speed over the ground ranged between 2.4 kts and 3.5 kts.

There were sufficient quantities of haddock on the grounds for every haul with fish lengths ranging from 12-48 cm. For whiting there were large quantities of fish below 30 cm but very few above 100% retention length (>40 cm). Small numbers of cod were caught throughout the trials but not in sufficient quantities for selectivity analysis.

Twenty six hauls were made of which five were invalid due to debris in the test cod-end or the gear becoming fouled on the seabed.

The mean selection parameters for haddock are given in Table 1. Preliminary analysis shows that for the two changes in gear design tested during these trials - increasing the extension/cod-end length from 150 to 300 meshes and constructing the aft 150 meshes entirely from double twine - had no significant effect on cod-end selectivity.

Table 1. Haddock mean selection parameters for each extension/cod-end test case. L50 is the fish length at which 50% of the fish are retained by, and 50% escape from the cod-end.

Test case	Number of Valid hauls	Haddock	
		L50	SR
Case 1 - 150 meshes overall length (Extension - 100 meshes single 5mm + Cod-end - 50 meshes double 5 mm)	7	33.5	4.3
Case 2 - 300 meshes overall length (Extension - 250 meshes single 5mm + Cod-end - 50 meshes double 5 mm)	7	33.8	5.1
Case 3 - 300 meshes overall length (Extension - 150 meshes single 5mm + 100 meshes double 5 mm + Cod-end - 50 meshes double 5 mm)	7	33.7	4.8

For the population of fish on the grounds at the time of the trials, the % retention rates for the juvenile and % escapes of marketable haddock and whiting are given in Tables 2 and 3. The percentages are expressed in terms of total numbers of juveniles or marketable fish entering the cod-end. They are based on the assumption that both nets fished the population on the grounds evenly and therefore the values may change with further analysis.

The % values indicate that the length of the extension/cod-end and the use of longer sections of double twine in the aft section had no significant effect on retention rates.

For haddock only a small percentage of juveniles entering each of the test cases were retained although many thousands passed into the net each haul. Around 60% of marketable fish escaped from each of the test cases. However, most of the escapes were in the 30-32 cm size range and therefore if there were more large marketable fish (>40 cm), then the % escapes of marketable fish would be smaller. A similar picture is seen for whiting where insignificant numbers of juveniles or marketable fish were retained in any of the test cases. For cod there were few fish (average = 195 fish in the length range 12 to 66 cm) retained for each test case and no conclusions have been drawn regarding retention rates. A fuller statistical analysis will be carried out in the laboratory.

Table 2. Percentage retention rates of juvenile and % escapes of marketable haddock entering each cod-end.

Test case	% retained below 30 cm	% escapes 30 cm and above
Case 1	6	64
Case 2	8	58
Case 3	8	62

Table 3. Percentage retention rates of juvenile and % escapes of marketable whiting entering each cod-end.

Test case	% retained below 27 cm	% escapes 27 cm and above
Case 1	0	96
Case 2	0	97
Case 3	0	98

R J Kynoch
10 December 2001