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Preliminary report on a specially designed Nephrops trawl for releasing undersized roundfish

by

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A mixed fishery for Nephrops norvegicus and small whiting (Merlangius merlangus) exists in the Irish Sea, to the west of the Isle of Man. Mesh selection experiments, carried out by the Fisheries Laboratories at Lowestoft and Burnham-on-Crouch, have shown that trawls with mesh sizes of 50 mm in the cod-ends give the maximum catches of marketable Nephrops in this fishery, but also catch undersized whiting which are present on the grounds at certain times of the year. On the other hand, a trawl with 70 mm mesh in the cod-end, although in the long term probably beneficial to the whiting fishery, because it would release undersized fish, would also allow the escape of large numbers of marketable Nephrops and is therefore unacceptable to Nephrops fishermen. For these reasons, the United Kingdom regulation requiring the use of nets of a mesh size conforming with NEAFC whitefish regulations in fishing for Nephrops does not apply in the Irish Sea (The Fishing Nets (North-East Atlantic) Order 1969).

A net allowing the escape of undersized whiting and other small fish, while still retaining the majority of marketable Nephrops, would be desirable in such a fishery. Experiments with courlene Nephrops trawls fitted with covers on several parts of the net have indicated that large numbers of small Nephrops escape through the lower surface of the net before ever reaching the cod-end (Cole and Simpson 1965), whereas large numbers of small whiting are believed to escape through the upper surface and sides of the trawl before reaching the cod-end (Margetts 1963). These differences in the behaviour of whiting and Nephrops inside the trawl led to trials of a net having a mesh of 70 mm (nominal) in the whole of its upper surface and upper cod-end, to release undersized whiting, and a smaller mesh of 50 mm (nominal) in the whole of its lower surface and lower cod-end, to retain the Nephrops. The cod-end was divided into two parts by a horizontal sheet of 50 mm mesh

netting which thus formed the bottom of the upper cod-end and the top of the lower cod-end. A metal oval hoop with a bar across the long diameter was set into the net at the fore-end of the cod-end to keep the entrances to the cod-ends open, the partition separating the two being attached to the cross-bar. A small-mesh (nominal 35 mm) net covered the whole of the 70 mm mesh surface of the upper cod-end, to retain any small fish and Nephrops which passed through the meshes of this part of the net.

Results

The results presented here came from eighteen successful 1 hour hauls on board the RV CORELLA in December 1969, working about 16 miles off Claghor Head in the Irish Sea. After each haul, the contents of the cover, top cod-end and bottom cod-end were kept separate and the commercial species divided into marketable and undersized. The Nephrops from the first three hauls and the whiting from all hauls were measured, and the numbers of all other species were counted.

Nephrops and whiting were caught in sufficient numbers to allow the results of individual hauls to be examined and these are summarized in Figure 1. The results were very consistent from haul to haul. An average of 79 per cent of the total catch of Nephrops was taken in the bottom cod-end and relatively few in the top cod-end or the cover. The majority of the marketable whiting (62 per cent) were caught in the top cod-end, and nearly 60 per cent of the undersized whiting were taken in the top cod-end cover.

Most other fish species were caught in small numbers and for this reason they have been combined into groups, i e. "commercial roundfish" (comprising mainly cod, coalfish and hake with a few haddock, pollack and ling), "non-commercial roundfish" (mainly Norway pout and poor cod), "commercial flatfish" (common dab, witch, lemon sole, turbot and plaice), "other commercial" (angler and gurnard) and "other fish" (a large range of species caught in small numbers). The numbers and percentages of each of these fish groups caught in all hauls combined are given in Table 1. The "commercial roundfish" were caught in similar proportions to the whiting, with most of the marketable fish being taken in the top cod-end and the undersized in the top cod-end cover. The distribution of the "non-commercial roundfish" was very similar to that of undersized whiting. The catches of "commercial flatfish" and "other commercial" groups were fairly equally divided between the top

and bottom cod-ends with, of course, more of the undersized than the marketable fish being taken in the cover.

The length compositions of all whiting caught in the two cod-ends and cover are summarized as percentages in Fig. 2. Although the numbers of whiting entering the top cod-end, i.e. the numbers caught in the top cod-end and cover combined (4204), were much larger than those entering the bottom cod-end (1692), their percentage length compositions were very similar.

The numbers of Nephrops (males and females combined) in each 5 mm carapace length group are given in Table 2. The numbers taken in the top cod-end and cover were too small to indicate whether there were any differences in the length compositions of the Nephrops entering the two separate cod-ends.

Discussion

The results given above came from a small number of hauls (eighteen) but, even so, they show effective separation of whiting and Nephrops. The net also released undersized whiting through the upper surface of its cod-end and it is probable that many more escaped through the upper surface of the net itself (Margetts 1963).

Further research vessel trials with this gear are planned, using a modified hoop having a flattened base to minimize any tendency for the cod-ends to roll. Also, more work is required on the positioning of the hoop - better separation of species may be obtained by having the hoop (and therefore the entrances to the two cod-ends) further forward.

It is not known whether such a gear would be accepted by the fishermen themselves. It may be more difficult to handle on board commercial vessels, since two cod-ends would be involved and the contents of each should, ideally, be kept separate This would certainly be difficult when large catches are taken and two or more lifts are required, for when the first is being brought inboard, the rest of the catch would flow out of the cod-ends and become mixed in the main part of the net. A metal hoop may present difficulties, although it might provide a suitable lifting point for the cod-ends. On the other hand, by using this gear, less sorting of the catch would be necessary and as a result of their separation from Nephrops, most of the marketable roundfish would be in far better condition than those caught by existing gear. An important advantage of using this trawl is the possibility that, by allowing small whiting to escape, the fishery for marketable whiting might eventually improve.

Summary

Results are presented of trials with a specially designed Nephrops trawl, having a 70 mm mesh in its upper surface and top cod-end, to release undersized roundfish (particularly whiting), and a 50 mm mesh in its lower surface and bottom cod-end, to retain Nephrops. The two cod-ends were separated by a 50 mm mesh partition and kept open by a metal oval hoop.

In general, good separation of whiting from Nephrops was obtained. In addition large numbers of undersized roundfish escaped from the top cod-end.

The advantages and disadvantages of this gear over existing Nephrops trawls are discussed briefly.

References

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Table 1 Number of each species or group of fish caught in the bottom cod-end (BCE), top cod-end (TCE) and cover, all hauls combined. Percentages also shown

Species	BCE		TCE		Cover		Total No.
	No.	%	No.	%	No.	%	
Nephrops	14401	79.4	3303	18.2	444	2.5	18148
Whiting							
marketable	710	34.2	1278	61.6	88	4.2	2076
undersized	982	25.7	568	14.9	2270	59.4	3820
Roundfish							
commercial, marketable	41	22.3	143	77.7	0	0.0	184
commercial undersized	36	26.7	25	18.5	74	54.8	135
non-commercial	975	35.5	377	13.7	1392	50.7	2744
Flatfish							
commercial, marketable	25	43.1	33	56.9	0	0.0	58
commercial undersized	59	43.7	50	37.0	26	19.3	135
Other commercial species							
marketable	33	55.0	27	45.0	0	0.0	60
undersized	47	50.5	31	33.3	15	16.1	93
Other fish	242	41.2	107	18.2	238	40.6	587

Table 2 Length compositions of *Nephrops* taken in the bottom cod-end (BCE), top cod-end (TCE) and cover. Hauls 1, 2 and 3 combined

Carapace length group (mm)	BCE	TCE	Cover
10-14	4	-	-
15-19	689	58	32
20-24	965	73	18
25-29	744	53	7
30-34	468	53	2
35-39	178	21	1
40-44	63	11	-
45-49	12	5	-
50-54	4	-	-
Total	3127	274	60
Mean length (mm)	25.5	26.8	21.0

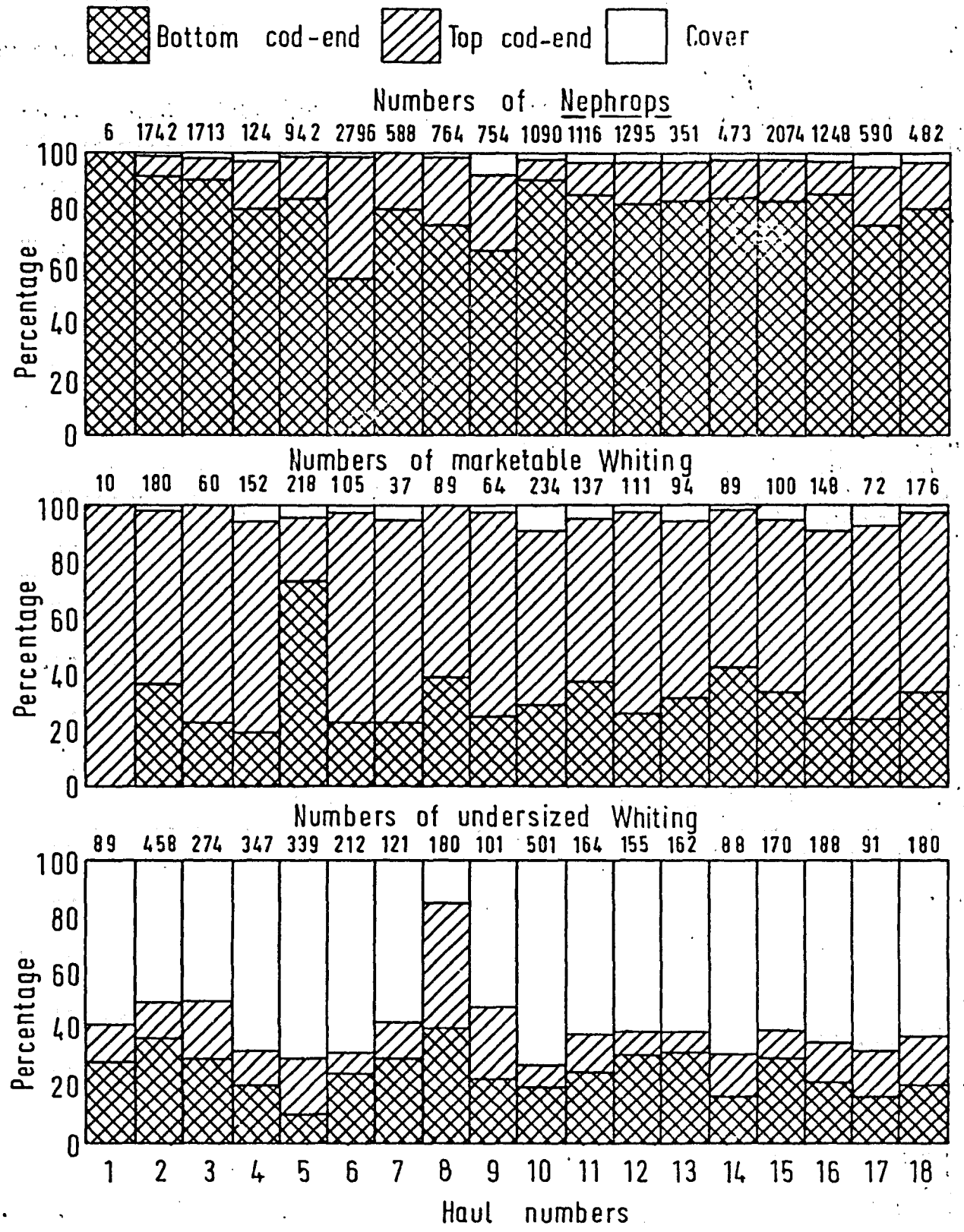

Figure 1 Percentage distributions of Nephrops, marketable whiting and undersized whiting in the bottom cod-end, top cod-end and cover for each haul.

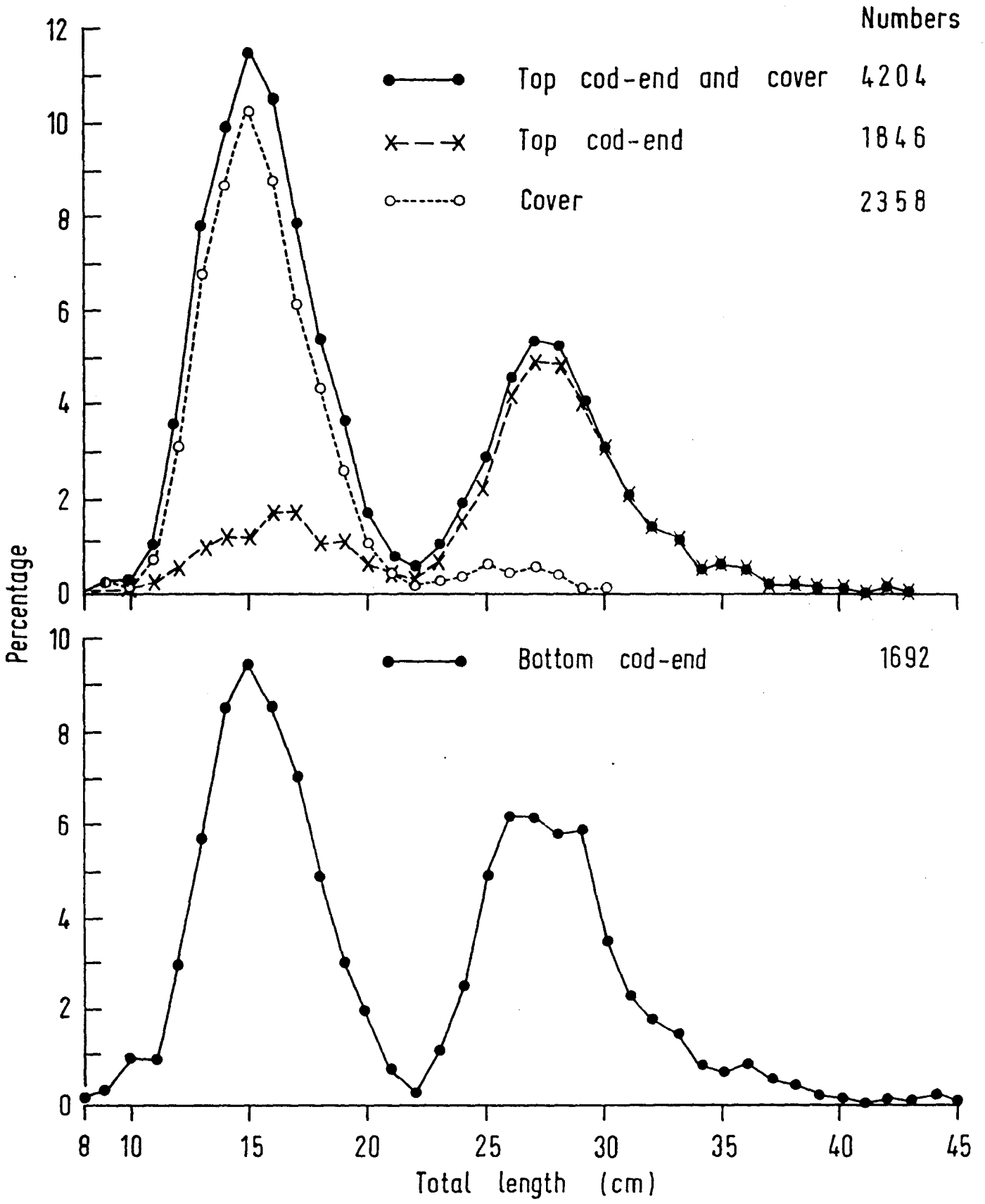

Figure 2 Percentage length compositions of whiting entering the top and bottom cod-ends, all hauls combined.