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Mesh-selection experiments on Nephrops norvegicus

by

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As part of the investigations currently being undertaken on suitable methods for conserving small Nephrops, a series of experiments was carried out in the Irish Sea involving two vessels, m.f.v. Kenure and m.f.v. Green Eagle, making parallel tows for a standard duration of 2½ hours with two trawls were exchanged at intervals to compensate for inter-boat variation in catching power.

The following Irish '25 fm' Nephrops trawls with the following mesh sizes were used:-

GEAR	MEAN	MESH	SIZE (mm)
A. Standard trawl by Messrs. I.C. Trawl Ltd.,	42.8	45.2	57.3
B. Standard trawl by Messrs. Bridport-Gundry Ltd.,	35.4	45.6	46.2
C1. Uniform 70 mm trawl by Messrs. I.C. Trawl Ltd.,	71.2	70.2	69.5
C2. As C1, with 40 mm cod-end	33.9	70.2	69.5

These nets were compared in the following combinations:-

VESSEL	N		E		T		S	
Kenure	A		C1		A	C2	B	C1
Green Eagle	C1		A		C2	A	C1	B
Number of hauls	3*		3		2	2*	2	2
Catching power factor Kenure/Green Eagle		1.73				1.62		2.03

*including one abnormal haul by Green Eagle; pair of hauls excluded from calculations

The considerable inter-vessel disparity in catching-power is believed to have been due to different types of otter-boards and bridles in use. In addition, small-meshed covers were affixed to the outside of the trawl on the lower side at the base of the wings, near the selvedge, to obtain an indication of the length range of Nephrops escaping through the trawl.

Samples numbering from 750 to 1,500 from the (main) catches were measured to establish carapace length frequency, and these values were raised to total catch values, those of the Green Eagle being additionally raised to equate the catching power of the two vessels. Mean numbers caught in the larger-meshed trawls of each pair compared are presented as percentages of those caught in the smaller-meshed in Table 1.

It was found that the trends in percentages whilst levelling out in the 30-35 mm carapace-length range did not do so at exactly 100%, but at about 91% in the case of nets A and C1 and 104% with nets B and C1, so percentage values were further adjusted by factors 1:10 and 0.96 respectively to correct for this effect. The comparison between nets A and C2 yielded rather obscure results, which are not further considered here.

The data shows that the 70 mm net caught 50% of the standard IC Trawl catch at 22mm carapace length and 50% of the Bridport-Gundry net catch at about 23 mm. The 75 % value occurred at about 25 mm and 27 mm respectively for the two pairs of nets and 90% at around 29 mm and 30 mm respectively. Decreasing in length below 22 mm, the fall in percentage values was not sustained however, but as this is a region in which the small-meshed covers showed that a relatively low proportion of the Nephrops encountered by the trawl were actually retained, this effect is of minor importance.

The length-frequency of the small-meshed cover catches also showed that whereas very few Nephrops of over 23 mm carapace length escaped through this part of the I.C. or Bridport-Gundry trawls, they did so in some numbers up to about 28 mm carapace length from the uniform 70 mm trawl.

The uniform 70 mm trawl released around 50% of Nephrops below 25% carapace length caught by the standard trawls and around 20% in the 25-30 mm length range, whilst above 30 mm. releases were extremely few. In view of the fact that Nephrops under 25 mm carapace length comprised approximately 50% of the catch with the standard type trawls and those of 25-30 mm carapace length a further 35-40%, these reductions have a considerable effect on the numbers of Nephrops in the catch. These results are in marked contrast to those obtained by A.C. Simpson and C.B. Duggan of Co. Down in 1964 (unpub., C.B. Duggan, pers. comm.) who found that a uniform 70 mm mesh trawl yielded a reduction of over 90% in catches compared to one of 40 mm uniform mesh. However, fairly large Nephrops were observed to escape in some numbers from the 70 mm cod-end during hauling in the course of the

present experiments. It is regrettable that results with the 70 mm trawl and 40 mm cod-end were so inconclusive, for whilst the effect of the uniform 70 mm trawl in releasing small Nephrops would appear to be beneficial for conservation, this appears to be slightly offset by a loss of valuable individuals through the 70 mm cod-end.

Table 1: Selection (retention) data for uniform 70 mm *Nephrops* trawl compared with standard I.C.Trawl and Bridport-Gundry *Nephrops* trawls.

Carapace length (mm. mid-point)	Uniform 70 mm Standard I.C. Unadjusted	Uniform 70 mm Standard I.C. Adjusted	Uniform 70 mm Standard B. Unadjusted	Uniform 70 mm Standard B. Adjusted
20.5	42.8	47.1	33.8	32.4
21.5	45.3	49.8	31.9	30.6
22.5	51.3	56.4	44.3	42.5
23.5	61.0	67.1	52.7	50.6
24.5	60.6	66.7	61.4	58.9
25.5	76.7	84.4	64.6	62.0
26.5	74.4	81.8	73.5	70.6
27.5	84.7	93.2	81.2	78.0
28.5	75.3	82.8	93.1	89.4
29.5	99.9	108.9	79.4	76.2
30.5	69.7	76.7	108.0	103.7
31.5	97.8	107.6	89.6	86.0
32.5	88.1	96.9	108.9	104.5
33.5	107.5	118.2	109.4	105.0
34.5	80.8	88.9	146.4	140.5
Carapace length) 50%	22.5	21.5	23.0	23.5
(to 0.5 mm) at per- 75%	25.5	25.0	26.5	27.0
centage) retention points) 90%	30.0	27.5	28.2	29.5