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DEPARTMENT OF AGRICULTURE [NI]
AGRICULTURAL AND ENVIRONMENTAL SCIENCE DIVISION

CRUISE REPORT - LF/06/95

NW IRISH SEA NEPHROPS STOCKS 10-14 April 1995

PERSONNEL

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OBJECTIVES

1. To trawl selected stations sampled during earlier cruises and perform qualitative and quantitative analysis of catches.

2. To assess the incidence of the dinoflagellate parasite *Hematodinium* in *Nephrops* catches.

METHODS

Trawls of 30 to 60 minutes duration were performed at each station as shown in figure 1 using a custom made *Nephrops* net of 43.2($\pm$1.25)mm mesh size with a cod-end of 48.7($\pm$1.57)mm mesh size. Catch bulk was quantified by counting baskets filled from the catch. Sample baskets of catch were sorted to provide an assessment of species composition. The *Nephrops* in each sub-sample were divided into male and female components and the ovary maturity stage of the females noted. Carapace length frequency distributions of both male and female *Nephrops* were measured and the number of recently moulted (soft shelled) animals counted.

Whole animals were examined and the pleopods removed from *Nephrops* samples from 10 tows and examined microscopically for prevalence of the parasitic dinoflagellate *Hematodinium*. Blood samples were also taken from selected *Nephrops* and other crustaceans for future analysis at Glasgow University.

The contribution of all fish species in catches was quantified and their length composition determined.

NARRATIVE

*Sunday 9 April*:
Scientific staff boarded the vessel and a pre-cruise briefing included a safety demonstration by the Fishing Master who also gave a tour of the ship's emergency exit points. R.V. Lough Foyle sailed at 23h.00 and proceeded south to the *Nephrops* grounds off

the County Down coast where the vessel remained on station ready to start work.

*Monday 10 April:*

The net was shot for the first tow (station 1) at 07h.08 and hauled again at 08h.10. This yielded 20 baskets of catch bulk, a high proportion of which was *Nephrops*. Pleopod and blood samples were taken at this station for assessment of *Hematodinium* infection. Trawling continued at stations 2,35,17 and 30. The night was spent drifting in the vicinity of station 109. The weather was calm and sunny all day.

*Tuesday 11 April*:

Work commenced at station 109 at 07h12 which was followed by stations 20,10,102 and 7. Good *Nephrops* catches were made at all five stations. Pleopod and blood samples were taken at stations 109 and 7 for assessment of *Hematodinium* infection. With the weather remaining calm the vessel remained drifting on station ready to continue work the next day

*Wednesday 12 April*:

Stations 8,107,106,104 and 105 were completed in perfect conditions. *Hematodinium* infection was assessed at stations 8,106 and 105. The night was spent drifting west of station 105.

*Thursday 13 April:*

The net was shot at 07h.07 at a new station (200) which was followed by another new station (201) to the east station 104. These were followed by stations 103 and 102 after which the vessel steamed for Belfast, docking at 22h.10.

**RESULTS**

During the cruise 19 trawl stations were performed and all objectives were completed. The position of these stations are shown in Figure 1. Table 1 is a summary of data on the stations fished and the mean size, catch rates and proportion of female *Nephrops* are shown in table 2. *Nephrops* size frequency data from all hauls are presented in table 3 and demonstrates the wide variability between stations. By-catches consisted of over 40 taxa which were identified weighed and measured from sub-samples. Data on fish bycatch were captured using the same format to that used on DANI fish surveys and will be computerised using the same software in due course. The predominant by-catch species was whiting (*Merlangius merlangus)* and Figure 2 shows the pooled whiting size composition data expressed as catch at length per 3nm. Figure 3 shows the proportion of *Nephrops*, whiting and other species by station.

During the course of routine sampling, subsamples of *Nephrops* were examined for the presence of *Hematodinium*, a protistan endoparasite implicated in causing mortalities in Scottish populations, by staff from Glasgow University. The text table below shows the prevalences of *Hematodinium* infection in subsamples of *Nephrops* at the stations indicated. Further casual observations indicated that *Hematodinium* infection was present at every site where *Nephrops* were caught. Prevalences observed this

year are similar to those seen during last year's cruise (April 1994). The trend of higher prevalences in females and in smaller animals typical of *Nephrops/Hematodinium* infections was again marked. In addition to prevalence estimates, fixed blood smears were taken from a large number of decapods of several species (*Cancer pagurus*, *Dichelopandalus* sp, *Crangon* sp., *Goneplax rhomboides*, *Callianasa* sp., *Liocarcinus depurator*) for later immunofluorescent diagnosis of latent *Hematodinium* infection of these species. Samples of *Nephrops* tissues and blood were taken for diagnosis confirmation and detection of disease prepatency. Staff from DANI and DOM Dublin were instructed in disease recognition and diagnosis.

| Haul | Station | Date | *Hematodinium* prevalence (% sample) Males | Females | Overall |
|---|---|---|---|---|---|
| 1 | 1 | 10/4 | 10.36 | 16.70 | 13.38 |
| 6 | 109 | 11/4 | 8.94 | 15.48 | 11.54 |
| 10 | 7 | 11/4 | 15.10 | 19.63 | 16.61 |
| 11 | 8 | 12/4 | 7.24 | 6.16 | 6.81 |
| 13 | 106 | 12/4 | 7.50 | 12.30 | 9.66 |
| 15 | 105 | 12/4 | 10.87 | 13.22 | 11.80 |
| 17 | 201 | 13/4 | 8.37 | 28.26 | 11.58 |

In addition to contributing to the DANI fish data base data from this cruise will contribute to ongoing EU funded projects on gear selectivity and discarding in the Irish Sea.

**ACKNOWLEDGEMENTS**

The Master, officers and crew of MRV Lough Foyle are thanked for their enthusiastic co-operation throughout this very successful cruise. The scientific staff are to be congratulated for their example of effective team work in completing all objectives effectively.

R.P. Briggs
(Scientist in Charge)

J.McCormick.
(Master)

14 April 1995

Stations sampled during April *Nephrops* cruise and details of amount of *Nephrops* caught per 3nm trawled

| | | Shooting | | | Hauling | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Trawl Stn. | time (GMT) | lat. | long. | lat. | long. | mean* depth m | dis. tow nm | total Nephrops catch kg/3nm |
| 10 Apr | 1 | 06.08 | 54 17.3 | 5 16.2 | 54 14.7 | 5 15.5 | 78/83 | 2.7 | 230.2 |
| | 2 | 08.08 | 54 13.8 | 5 19.5 | 54 11.5 | 5 19.4 | 62/82 | 2.4 | 98.9 |
| | 35 | 10.07 | 54 14.3 | 5 23.1 | 54 11.6 | 5 24.3 | 47/52 | 2.4 | 0.5 |
| | 17 | 11.57 | 54 09.8 | 5 27.2 | 54 07.3 | 5 27.5 | 52/64 | 2.6 | 1.3 |
| | 30 | 14.16 | 54 07.9 | 5 34.4 | 54 05.5 | 5 36.6 | 48/46 | 2.7 | 0.1 |
| 11 Apr | 109 | 06.12 | 54 07.2 | 5 19.0 | 54 04.6 | 5 18.6 | 88/114 | 2.6 | 106.0 |
| | 20 | 08.18 | 54 01.4 | 5 22.3 | 54.00.6 | 5 26.5 | 93/108 | 2.6 | 95.7 |
| | 10 | 10.18 | 53.57.6 | 5 23.4 | 53 54.7 | 5 22.6 | 96/107 | 2.5 | 56.9 |
| | 101 | 12.15 | 53 54.1 | 5 21.2 | 53 51.3 | 5 20.9 | 112/97 | 2.9 | 52.5 |
| | 7 | 14.36 | 53 53.5 | 5 28.0 | 53 51.1 | 5 27.7 | 98 | 2.6 | 36.1 |
| 12 Apr | 8 | 06.12 | 53 55.9 | 5 37.7 | 53 53.2 | 5 38.2 | 90/97 | 2.7 | 139.6 |
| | 107 | 09.10 | 53 48.0 | 5 40.5 | 53 45.0 | 5 41.6 | 86 | 2.8 | 162.2 |
| | 106 | 10.30 | 53 39.3 | 5 43.0 | 53 36.5 | 5 42.8 | 77/76 | 2.9 | 40.4 |
| | 104 | 12.27 | 53 36.8 | 5 38.7 | 53.39.6 | 5 39.0 | 94 | 2.8 | 16.1 |
| | 105 | 14.50 | 53.30.6 | 5 41.6 | 53 30.4 | 5 36.9 | 73/84 | 2.8 | 170.6 |
| 13 Apr | 200 | 06.07 | 53 36.3 | 5 53.2 | 53 35.5 | 5 49.3 | 47/66 | 2.6 | 6.0 |
| | 201 | 08.53 | 53 37.8 | 5 26.1 | 53 40.2 | 5 25.9 | 102/101 | 2.5 | 86.3 |
| | 103 | 10.50 | 53 42.5 | 5 23.0 | 53 40.2 | 5 24.7 | 88/93 | 2.9 | 3.1 |
| | 102 | 13.05 | 53 46.8 | 5 23.1 | 53 49.1 | 5 23.5 | 88/98 | 2.4 | 13.8 |

TABLE 2

Catch(kg) mean carapace length(mm) and proportion of female *Nephrops* caught during cruise

| TOW | STN | CATCH kg/3nm | MEAN CL MALE | MEAN CL FEMALE | PERCENT FEMALE |
|---|---|---|---|---|---|
| 1 | 1 | 230.2 | 24.6 | 22.5 | 46.0 |
| 2 | 2 | 98.9 | 23.3 | 21.3 | 49.7 |
| 3 | 35 | .5 | * | * | * |
| 4 | 17 | 1.3 | * | * | * |
| 5 | 30 | .1 | * | * | * |
| 6 | 109 | 106.0 | 26.9 | 22.8 | 39.7 |
| 7 | 20 | 95.7 | 24.8 | 21.5 | 41.8 |
| 8 | 10 | 56.9 | 27.0 | 22.7 | 30.2 |
| 9 | 101 | 52.5 | 27.3 | 22.5 | 32.6 |
| 10 | 7 | 36.1 | 26.8 | 22.3 | 35.2 |
| 11 | 8 | 139.6 | 24.2 | 22.5 | 41.5 |
| 12 | 107 | 162.2 | 24.0 | 21.7 | 53.8 |
| 13 | 106 | 40.4 | 25.3 | 22.7 | 45.3 |
| 14 | 104 | 16.1 | 28.6 | 22.5 | 34.9 |
| 15 | 105 | 170.6 | 28.5 | 24.4 | 39.2 |
| 16 | 200 | 6.0 | 25.0 | 22.8 | 36.7 |
| 17 | 201 | 86.3 | 28.9 | 24.4 | 16.6 |
| 18 | 103 | 3.1 | 30.5 | 23.0 | 18.1 |
| 19 | 102 | 13.8 | 27.6 | 22.8 | 30.7 |

# TABLE 3

## *Nephrops* catch at length over standardised 3nm trawl

MALES

| CL | TOW 1 | TOW 3 | TOW 4 | TOW 5 | TOW 6 | TOW 7 | TOW 8 | TOW 9 | TOW 10 | TOW 11 | TOW 12 | TOW 13 | TOW 14 | TOW 15 | TOW 16 | TOW 17 | TOW 18 | TOW 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 37 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 9 |
| 15 | 0 | 0 | 0 | 0 | 0 | 72 | 0 | 0 | 0 | 37 | 73 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 21 | 72 | 13 | 0 | 17 | 112 | 290 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 460 | 0 | 0 | 0 | 124 | 72 | 0 | 0 | 0 | 150 | 399 | 36 | 4 | 0 | 7 | 0 | 0 | 9 |
| 18 | 506 | 0 | 0 | 0 | 145 | 217 | 25 | 11 | 0 | 336 | 798 | 72 | 15 | 0 | 3 | 0 | 2 | 9 |
| 19 | 553 | 0 | 0 | 0 | 227 | 163 | 38 | 32 | 35 | 262 | 399 | 63 | 4 | 115 | 17 | 0 | 0 | 36 |
| 20 | 737 | 0 | 0 | 0 | 206 | 307 | 88 | 75 | 43 | 262 | 835 | 127 | 12 | 77 | 20 | 48 | 4 | 45 |
| 21 | 414 | 0 | 0 | 0 | 227 | 397 | 138 | 108 | 78 | 710 | 327 | 45 | 15 | 77 | 17 | 32 | 4 | 81 |
| 22 | 645 | 0 | 0 | 0 | 83 | 469 | 227 | 237 | 130 | 636 | 290 | 81 | 42 | 421 | 37 | 111 | 0 | 108 |
| 23 | 967 | 0 | 0 | 0 | 206 | 686 | 289 | 270 | 216 | 860 | 798 | 172 | 77 | 613 | 37 | 190 | 7 | 144 |
| 24 | 1519 | 0 | 0 | 0 | 310 | 596 | 264 | 226 | 130 | 897 | 653 | 208 | 42 | 421 | 43 | 206 | 24 | 207 |
| 25 | 1151 | 0 | 0 | 0 | 413 | 578 | 214 | 205 | 147 | 935 | 871 | 254 | 42 | 651 | 30 | 238 | 20 | 207 |
| 26 | 1105 | 0 | 0 | 0 | 413 | 307 | 214 | 194 | 156 | 636 | 472 | 254 | 27 | 307 | 33 | 491 | 22 | 126 |
| 27 | 875 | 0 | 0 | 0 | 496 | 397 | 227 | 205 | 113 | 561 | 1016 | 172 | 54 | 307 | 23 | 301 | 37 | 117 |
| 28 | 645 | 0 | 0 | 0 | 351 | 271 | 227 | 172 | 104 | 252 | 798 | 172 | 31 | 498 | 17 | 396 | 31 | 117 |
| 29 | 737 | 0 | 0 | 0 | 268 | 181 | 201 | 172 | 182 | 224 | 181 | 72 | 42 | 575 | 10 | 301 | 17 | 162 |
| 30 | 460 | 0 | 0 | 0 | 310 | 144 | 164 | 108 | 52 | 112 | 327 | 127 | 15 | 651 | 27 | 301 | 37 | 126 |
| 31 | 230 | 0 | 0 | 0 | 248 | 199 | 101 | 54 | 52 | 75 | 145 | 45 | 31 | 383 | 7 | 222 | 17 | 54 |
| 32 | 92 | 0 | 0 | 0 | 124 | 181 | 126 | 108 | 87 | 187 | 73 | 63 | 19 | 613 | 3 | 143 | 24 | 99 |
| 33 | 0 | 0 | 0 | 0 | 62 | 181 | 50 | 151 | 78 | 75 | 109 | 0 | 46 | 383 | 10 | 111 | 28 | 108 |
| 34 | 0 | 0 | 0 | 0 | 124 | 36 | 63 | 43 | 43 | 75 | 36 | 27 | 19 | 307 | 3 | 174 | 22 | 63 |
| 35 | 138 | 0 | 0 | 0 | 83 | 108 | 76 | 54 | 43 | 150 | 36 | 9 | 38 | 77 | 3 | 190 | 26 | 63 |
| 36 | 46 | 0 | 0 | 0 | 41 | 18 | 38 | 11 | 43 | 75 | 73 | 9 | 15 | 77 | 0 | 95 | 4 | 54 |
| 37 | 92 | 0 | 0 | 0 | 103 | 18 | 0 | 32 | 17 | 37 | 73 | 18 | 15 | 77 | 0 | 79 | 17 | 36 |
| 38 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 11 | 9 | 0 | 36 | 9 | 23 | 115 | 0 | 63 | 6 | 9 |
| 39 | 0 | 0 | 0 | 0 | 41 | 18 | 0 | 22 | 0 | 0 | 0 | 0 | 12 | 38 | 0 | 16 | 4 | 18 |
| 40 | 46 | 0 | 0 | 0 | 145 | 18 | 50 | 11 | 0 | 0 | 0 | 0 | 8 | 38 | 3 | 16 | 9 | 9 |
| 41 | 92 | 0 | 0 | 0 | 62 | 18 | 0 | 22 | 0 | 0 | 0 | 0 | 4 | 38 | 0 | 32 | 4 | 9 |
| 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 36 | 0 | 15 | 115 | 0 | 16 | 4 | 0 |
| 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 36 | 0 | 0 | 38 | 0 | 0 | 2 | 27 |
| 44 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 11 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 6 | 0 |
| 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |

FEMALES

| CL | TOW 1 | TOW 3 | TOW 4 | TOW 5 | TOW 6 | TOW 7 | TOW 8 | TOW 9 | TOW 10 | TOW 11 | TOW 12 | TOW 13 | TOW 14 | TOW 15 | TOW 16 | TOW 17 | TOW 18 | TOW 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 46 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 43 | 0 | 181 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 21 | 90 | 0 | 0 | 17 | 37 | 109 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 92 | 0 | 0 | 0 | 62 | 108 | 0 | 0 | 0 | 37 | 399 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 276 | 0 | 0 | 0 | 103 | 108 | 0 | 11 | 0 | 150 | 690 | 36 | 12 | 0 | 0 | 16 | 2 | 0 |
| 18 | 645 | 0 | 0 | 0 | 206 | 235 | 38 | 11 | 9 | 224 | 1089 | 91 | 8 | 77 | 3 | 0 | 6 | 0 |
| 19 | 1013 | 0 | 0 | 0 | 268 | 271 | 38 | 54 | 17 | 187 | 472 | 118 | 27 | 115 | 10 | 16 | 6 | 9 |
| 20 | 645 | 0 | 0 | 0 | 227 | 415 | 151 | 140 | 35 | 411 | 581 | 100 | 19 | 498 | 27 | 32 | 6 | 81 |
| 21 | 599 | 0 | 0 | 0 | 186 | 578 | 126 | 183 | 139 | 598 | 544 | 109 | 42 | 307 | 27 | 0 | 2 | 171 |
| 22 | 829 | 0 | 0 | 0 | 165 | 813 | 164 | 302 | 225 | 860 | 1415 | 172 | 85 | 307 | 43 | 32 | 13 | 153 |
| 23 | 1566 | 0 | 0 | 0 | 392 | 668 | 289 | 226 | 156 | 1122 | 1270 | 290 | 58 | 498 | 17 | 111 | 9 | 189 |
| 24 | 1566 | 0 | 0 | 0 | 351 | 488 | 252 | 151 | 173 | 748 | 1960 | 254 | 38 | 307 | 17 | 158 | 13 | 162 |
| 25 | 1151 | 0 | 0 | 0 | 599 | 199 | 76 | 75 | 78 | 598 | 1234 | 172 | 35 | 460 | 27 | 127 | 9 | 81 |
| 26 | 599 | 0 | 0 | 0 | 206 | 108 | 63 | 54 | 35 | 224 | 472 | 235 | 12 | 651 | 13 | 143 | 11 | 36 |
| 27 | 599 | 0 | 0 | 0 | 289 | 36 | 50 | 22 | 0 | 112 | 181 | 63 | 23 | 651 | 13 | 79 | 6 | 18 |
| 28 | 92 | 0 | 0 | 0 | 62 | 0 | 0 | 11 | 26 | 150 | 109 | 18 | 4 | 192 | 3 | 32 | 2 | 0 |
| 29 | 46 | 0 | 0 | 0 | 21 | 0 | 13 | 0 | 9 | 0 | 0 | 0 | 0 | 307 | 3 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 115 | 0 | 0 | 0 | 9 |
| 31 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

FIGURE 1.

Map showing location of stations sampled

(—●— stations sampled for *Hematodinium* prevalence)

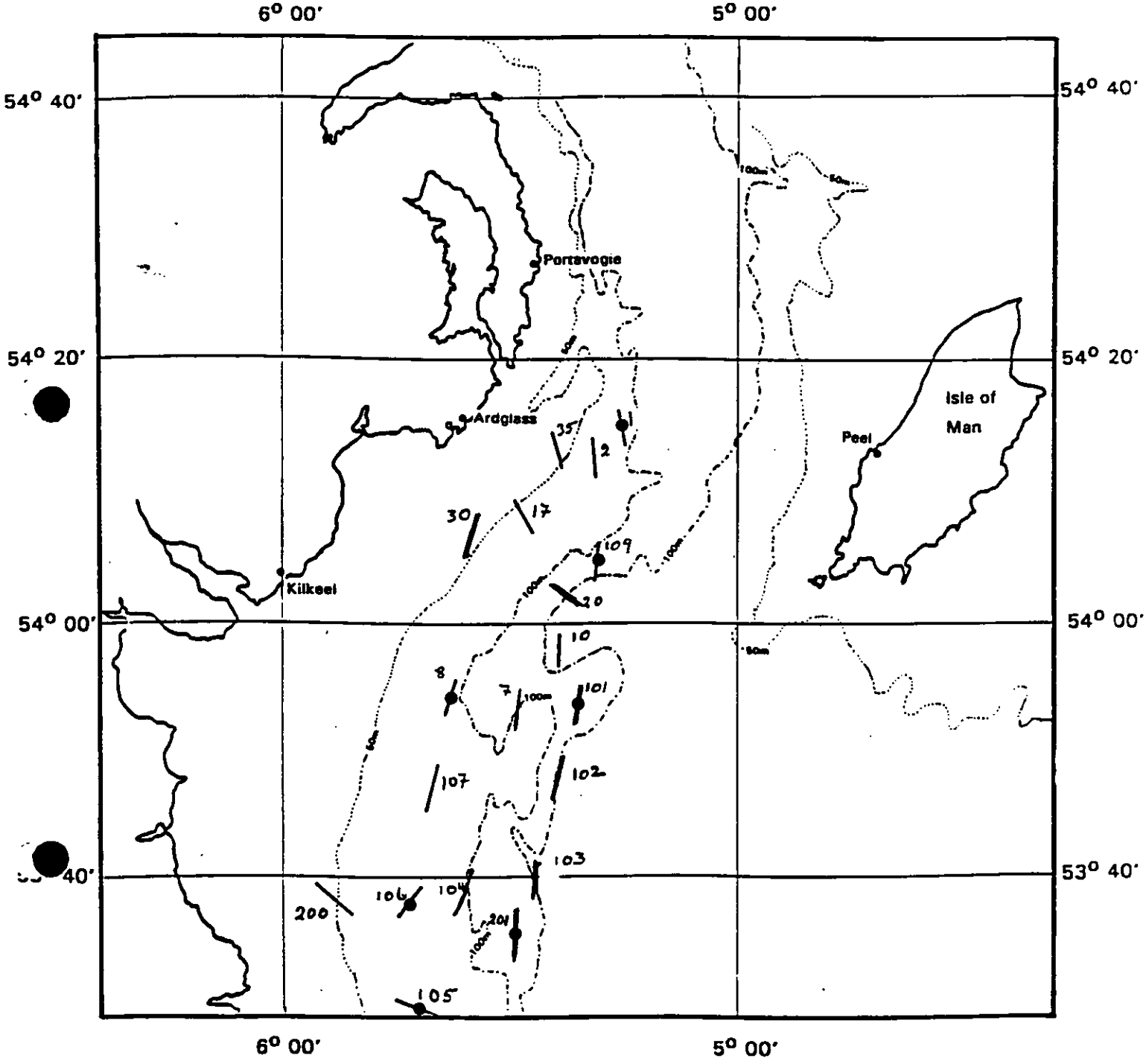

FIGURE 2

**Length composition of whiting caught during cruise**

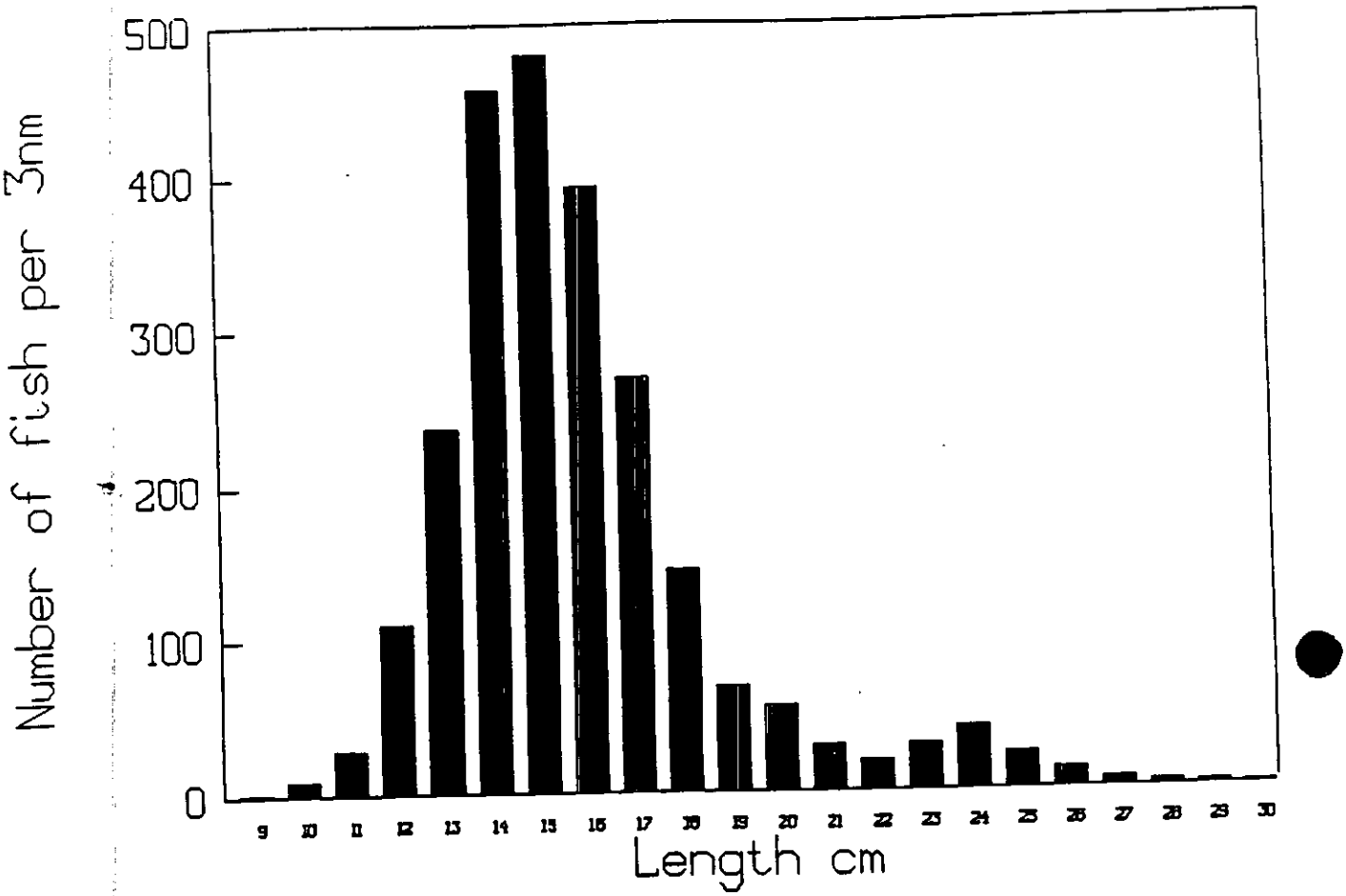


**FIGURE 3**

**Catch bulk standardised to 3nm of ground trawled**