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DEPARTMENT OF AGRICULTURE [NI]
AGRICULTURAL AND ENVIRONMENTAL SCIENCE DIVISION
(Aquatic Systems Group)

CRUISE REPORT - LF34/97

NEPHROPS AND BYCATCH 17- 27 August 1997

PERSONNEL

Richard Briggs, PSO *[SIC]*
Matt Service, SSO *(18-22/8)*
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OBJECTIVES

- To film the seabed at the established stations sampled during previous cruises.
- To take beam trawl samples of epifauna at each station.
- To trawl each station using the standard *Nephrops* gear used in previous cruises and perform qualitative and quantitative analysis of catches.
- To collect ovigerous and mature (Gonad stage 3-4) female *Nephrops* for *invitro* studies at C-mar, Portaferry.
- To assess the prevalence of the dinoflagellate parasite *Hematodinium* in *Nephrops* catches.
- To collect squid specimens for a UCC based genetics project.

METHODS

Camera tows of 20-30 minute duration followed by beam trawl sampling of the benthic and epibenthic fauna were completed at each station (Figure 1). A technique for beam trawling was developed, with 5 minute tows at around 2 knots speed giving the best results. The 2 metre beam trawl was fitted with a fine mesh (10mm) codend and very fine (5mm) liner. The catch was passed through a 2mm sieve and the retained fauna identified and quantified.

Hauls of 30 to 60 minutes duration were completed at each station during the second week of the cruise using the DANI *Nephrops* trawl. This gear was the same as was used in earlier cruises and is a custom made *Nephrops* net of nominal mesh size 50mm throughout. 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 female animals 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 for the prevalence of the parasitic dinoflagellate *Hematodinium*. Ovigerous and mature (stage 3-4) female *Nephrops* in catches were preserved in 4% formalin for future egg counts. The contribution of finfish in catches was quantified and their length compositions measured. Stratified sampling procedures were similar to those used during groundfish surveys. Mature female *Nephrops* were retained alive in a large tank will be used in future studies at the C-mar laboratory in Potaferry. Specimens of squid were preserved in ethanol for a genetics project based at University College Cork.

NARRATIVE

Sunday 17 August:

Scientific staff boarded during the evening and a safety meeting was convened by the Fishing Master. The vessel sailed at 23h.00 and steamed towards the northern part of the western Irish Sea *Nephrops* grounds.

Monday 18 August:

RV Lough Foyle proceeded to station 1 (Figure 1) where the sledge and underwater video were deployed. After 20 minutes filming the sledge was recovered and the beam trawl deployed in the same area and towed for 10 minutes. This exercise was repeated at stations 2,35,17, 30 and 20. Although a diverse range of benthic taxa were recovered from the beam trawl the amount of mud made sieving difficult. The night was spent performing an east/west RoxAnn survey grid.

Tuesday 19 August:

The camera was deployed at station 208 followed by a 10 minute beam trawl which when recovered contained such a large amount of mud that it was only possible to pass a quarter of the catch volume through the 2mm sieve. Following a camera tow at station 209 the beam trawl was once again deployed. This time the tow time was reduced to 5 minutes in an attempt to reduce the volume of mud retained. This procedure was repeated at stations 109 but large amounts of mud still accompanied the catch. At station 10 the towing speed of the beam trawl was increased to about 2 knots which resulted in a much cleaner catch. The same technique was repeated at station 101. The night was spent continuing the RoxAnn survey grid initiated the previous night.

Wednesday 20 August:

Camera deployment followed by a 5 minute beam trawl at 2 knots was repeated for stations 108,102,7,8 and 207. The RoxAnn survey continued through the night.

Thursday 21 August :

Having established a satisfactory routine of filming and beam trawling, stations 107, 103,104,106,105 and 200 were similarly sampled. This completed the filming and beam trawl phase of the cruise. The night was spent completing the east/west RoxAnn survey.

Friday 22 August:

The fishing gear was prepared and the net was shot at station 200 at 07h.55 and hauled at 08h.55. This provided a catch of a wide range of species dominated by large female *Nephrops*. Station 106 was then fished after which the vessel set course for Dublin, docking at 16h.00 for a cruise break. Dr Service disembarked at 17h.00 and Mr McAliskey and Ms O'Sullivan embarked for the remainder of the cruise.

Saturday 20 August:
The day was spent in Dublin where essential supplies were loaded.

Sunday 24 August:
RV Lough Foyle sailed at 09.h.00 and fishing operations resumed at station 105. This was followed by stations 104, 103 and 102. The night was spent on a north/south RoxAnn survey grid.

Monday 25 August:
A strong smell of burning from the bridge was diagnosed as a fault in the main echo sounder which then ceased to function. This meant an immediate end to RoxAnn survey work on this cruise, though fishing operations could continue. Stations 107,207,8,7,101,10 and 20 were completed and the night spent at anchor off Peel, Isle of Man.

Tuesday 26 August:
Stations 208,209,109,30,17,35,2 and 1 were fished in the one day, owing to warnings of imminent SE gales later in the day. Fortunately these gales did not manifest in time to impede progress which allowed this "record" number of stations to be fished. On completion of station 1 the vessel proceeded to an overnight anchorage off Bangor.

Wednesday 27 August:
The anchor was heaved at 08h.00 and *RV Lough Foyle* set course for Belfast, docking at 08h.45.

RESULTS
During the first week of the cruise 22 camera and beam trawl stations were sampled (Figure 1). At several stations poor camera visibility was experienced but better quality film of burrow densities was obtained at a number of stations. The beam trawl survey produced interesting results and proved to be a useful tool for sampling epibenthos, with over 50 taxa being recorded in the >2mm category (Table 1). Many of these were burrowing organisms whose presence will assist interpretation of film burrow data. Preliminary analysis of epibenthos data using a cluster technique showed a marked grouping (Figure 2) of stations according to fauna and will later be correlated with sediment type and *Nephrops* population data. The beam trawl was especially useful for sampling juvenile *Nephrops*. Samples from station 107, for example, gave a clear indication of likely modal lengths of "0" group and "1" group animals (Figure 3).

During the fishing phase of the cruise 21 stations were sampled as indicated in Figure 1. Table 2 is the mean size, catch rate, proportion females. Figure 4 is a summary of mean *Nephrops* size, catch numbers and sex ratio by station and Figure 5 shows catch rate by area. About 50 ovigerous female *Nephrops* were preserved in 4% formalin for future fecundity studies and about 200 live mature female *Nephrops* were retained for an *in vitro* study of fecundity at Portaferry. Infection levels by *Hematodinium* was less than 1% of animals examined during the cruise.

The predominant by-catch species was whiting (*Merlangius merlangus)* and Figure 6 is the pooled whiting size composition data expressed as catch at length per nautical mile. Table 3 shows the proportion of *Nephrops*, cod, whiting, hake, haddock, brown crab and other fish caught at each station.

In addition to contributing to the DANI time series data base on *Nephrops*, information from this cruise will contribute to a recently initiated EU funded project on the estimation of *Nephrops* biomass (DGXIV: 95/015).

ACKNOWLEDGEMENTS

Captain Niblock, Officers and Crew of *RV Lough Foyle* are thanked for their enthusiastic co-operation throughout the cruise. The scientific personnel are congratulated on their dedication to duty throughout the cruise.

R. P. Briggs

A. Niblock (Seen in draft)

27 August 1997

TABLE 1

Taxa identified from beam trawl catches

Pennatulaceae	*Munida rugosa*
Cerianthus spp.	*Hyas araneus*
Nemertini	*Macropodia spp.*
Platyhelminthes	*Euagurus spp.*
Notomastus spp.	*Liocarcinus depurator*
Paraonis fulgens	*Pinnotheres spp*
Aphrodite spp.	*Carcinus maenus*
Lagis koreni	*Goneplax rhomboiodes*
Panthalis oerstedi	*Crangon spp.*
Nephtys spp.	*Pasiphaea spp.*
Glycera spp.	Euphausids
Owenia fusiformis	*Dichelopandalus bonneri*
Sabella pavonina	*Pleuronectes platessa*
Ophelia spp.	*Glyptocephalus cynoglossus*
Lumbriconereis spp.	*Limanda limanda*
Opistobranchiata	*Hippoglossoides platessoides*
Dentalium spp.	*Liparis liparis*
Buccinum undatum	*Gobius fresii*
Scaphander spp.	*Gobius spp.*
Cuspidaria spp.	*Enchelyopus cimbrius*
Aporrhais pes-pelecani	*Argentina sphyraena*
Phaxas pellucidus	*Trisopterus minutus*
Nucula spp.	*Trisopterus esmarki*
Parvicardium	*Merlangius merlangus*
Abra spp.	*Eledone cirrosa*
Calocaris macandreae	*Sepia spp.*
Ampelisca spp.	*Asterias rubens*
Jaxia nocturna	Ophiuroidea
Nephrops norvegicus	*Brissopsis spp.*
	Scyphomedusae (2 species)

TABLE 2

***Nephrops* trawl data from LF3497**

TOW	1	2	3	4	5	6	7	8	9	10
STATION	200	106	105	104	103	102	207	8	107	7
MALE CL	31.3	25.9	32.8	28.1	25.5	26.4	25.6	24.0	23.6	29.0
MALE CL	31.9	24.4	30.2	25.2	24.8	24.1	23.6	21.2	21.9	23.1
No per Nm	1175	4262	1503	247	2411	5714	2615	3830	15407	481
kg per Nm	28.6	51.3	34.9	3.3	28.0	65.3	28.7	35.3	117.3	6.7
% female	73.5	51.9	41.3	53.6	47.1	62.5	54.4	57.7	58.5	52.3

TOW	11	12	13	14	15	16	17	18	19	20	21
STATION	101	10	20	208	209	109	30	17	35	2	1
MALE CL	24.7	23.6	24.3	24.8	28.0	26.1	27.2	28.4	26.7	22.8	25.8
MALE CL	23.9	23.3	22.5	23.9	25.9	22.2	24.4	25.0	24.5	21.7	22.7
No per Nm	2889	6406	5130	16054	2488	7890	123	902	2024	9893	835
kg per Nm	29.1	55.5	51.7	162.6	32.9	75.1	1.7	12.4	24.1	77.3	9.7
% female	58.6	54.6	56.8	63.5	54.6	60.5	47.8	51.2	46.4	60.1	45.2

TABLE 3

Catch (kg) per nautical mile of tow with *Nephrops* trawl

TOW	STN	*NEPHROPS*	COD	WHITING	HAKE	HADDOCK	CANCER	O. FISH
1	200	28.64	0.27	27.56	0.00	32.26	0.84	48.70
2	106	51.34	2.15	17.43	0.00	1.99	0.00	28.80
3	105	34.88	6.76	22.15	0.00	8.44	0.00	23.75
4	104	3.26	0.26	0.40	0.00	1.08	0.00	6.33
5	103	28.02	2.20	11.26	0.00	2.48	0.00	6.17
6	102	65.25	0.00	13.18	0.00	0.71	0.00	18.21
7	207	28.65	0.00	34.58	0.00	0.15	0.79	10.87
8	8	35.26	0.27	8.04	1.44	0.43	0.00	10.00
9	107	117.33	0.44	11.44	0.00	0.58	0.00	15.83
10	7	6.68	1.20	2.74	0.78	1.64	0.00	9.15
11	101	29.07	9.40	1.36	0.00	0.19	0.54	9.64
12	10	55.53	0.59	4.97	0.00	1.59	1.37	23.02
13	20	51.71	0.47	0.25	0.00	4.59	1.18	20.53
14	208	162.60	0.00	28.65	0.00	12.17	0.00	80.27
15	209	32.87	0.00	0.80	0.00	0.03	0.74	8.66
16	109	75.10	1.21	22.22	0.00	2.71	2.31	24.13
17	30	1.66	-	11.73	-	-	-	11.82
18	17	12.38	-	33.59	-	-	-	13.91
19	35	24.13	-	32.53	-	-	-	29.78
20	2	77.32	0.39	50.73	0.00	2.80	2.54	17.69
21	1	9.68	0.41	6.19	0.00	1.02	1.51	18.14

NB: Only *Nephrops* and whiting quantified from stations: 30,17 & 35

Figure 1

LF3497 Map showing location of stations

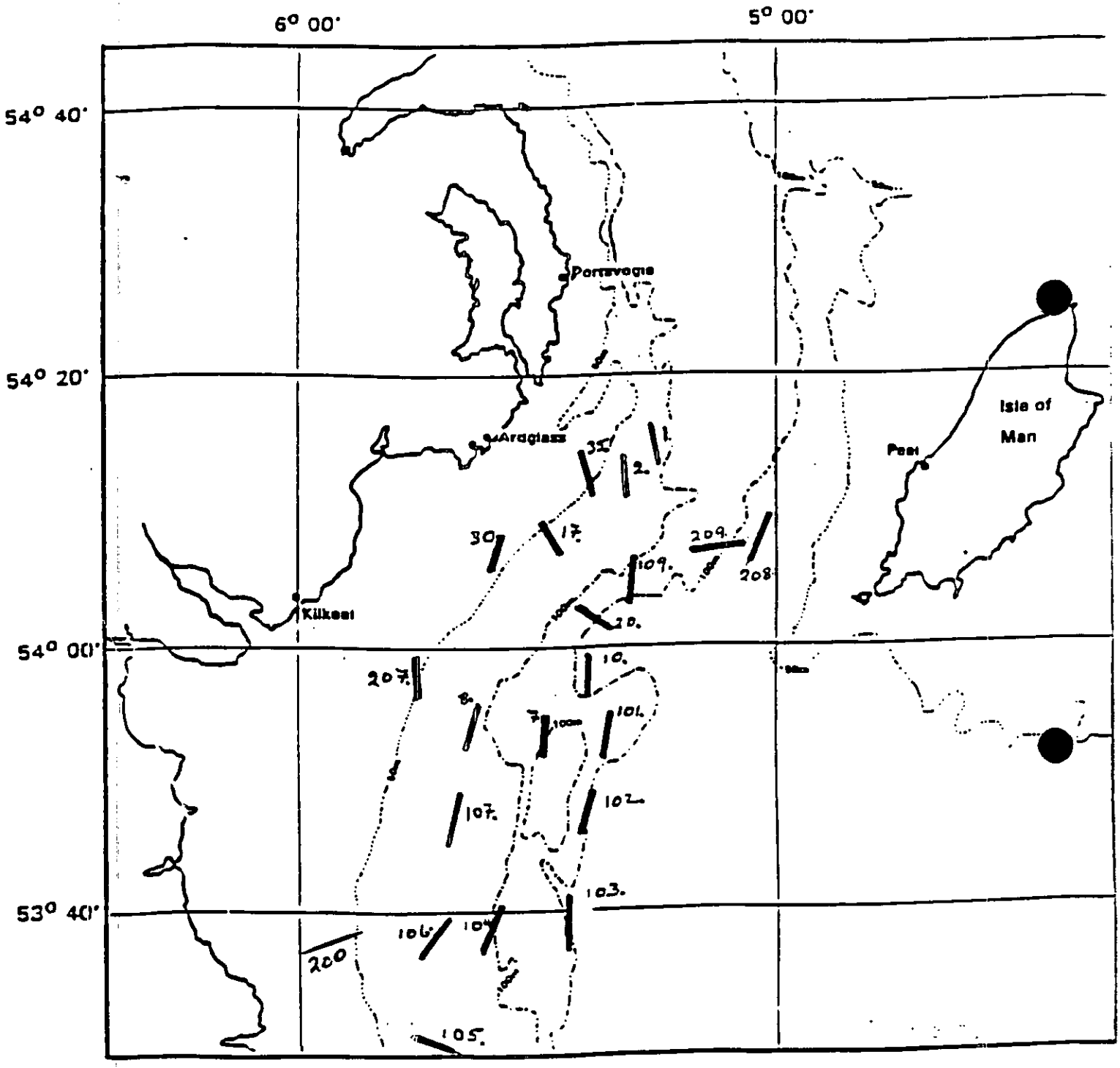

Figure 2

Preliminary cluster analysis of selected stations based on species caught in beam trawl

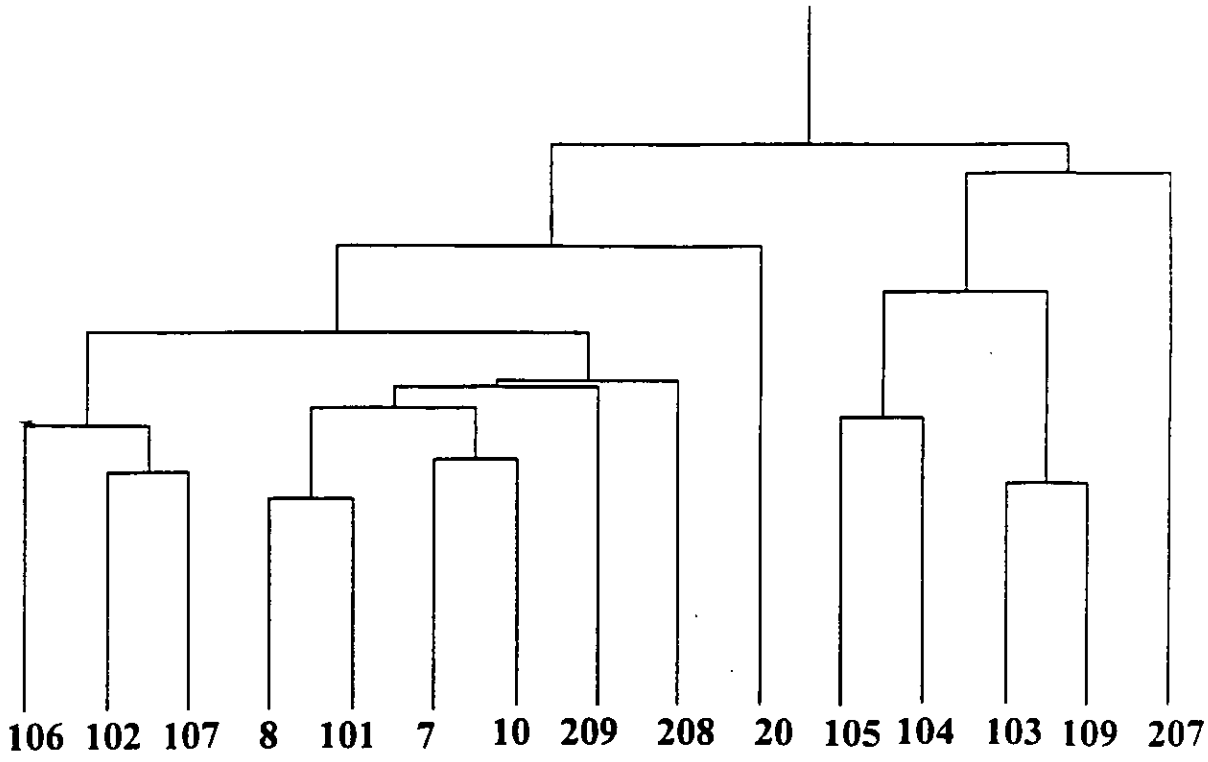

Figure 3

Nephrops length composition from beam trawl sample at station 107 in which modes could represent 1995, 1996 and 1997 year classes

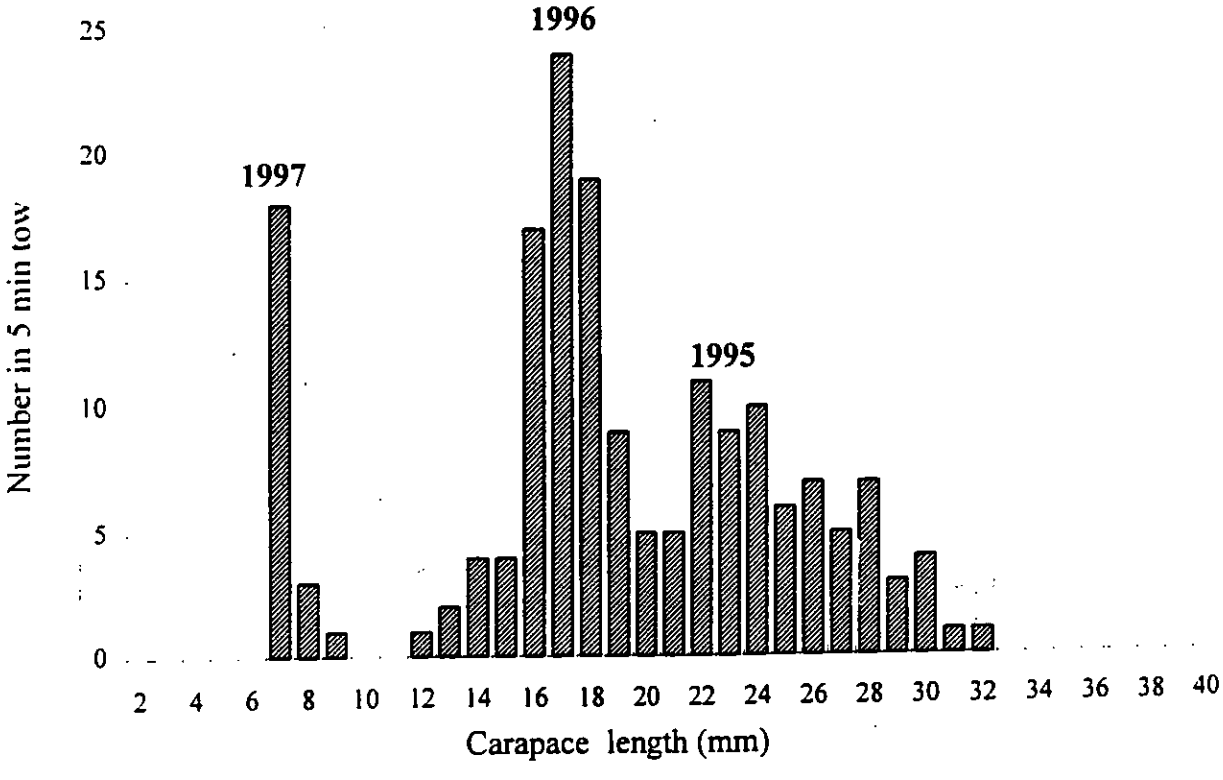

Figure 4

Mean size and catch rates of *Nephrops* by station (Nephrops trawl)

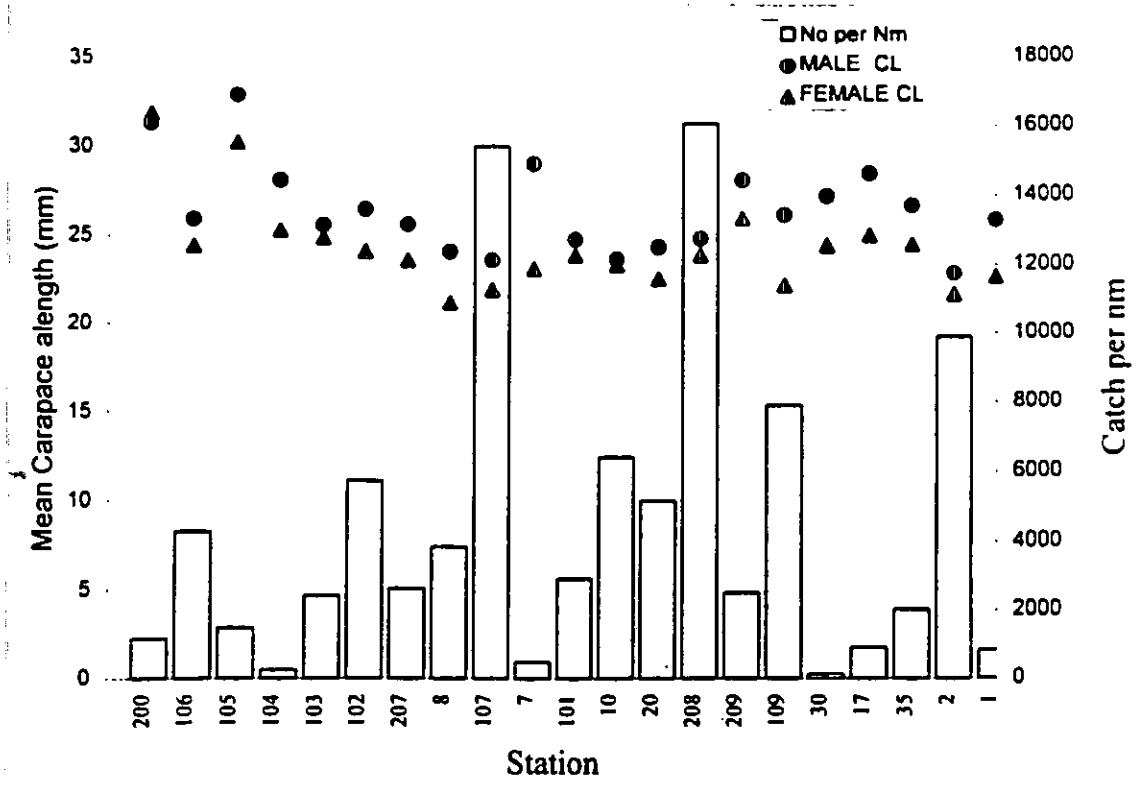

Figure 5

Number of *Nephrops* caught per nm by station (*Nephrops* trawl)
(size of spot proportional to number of animals)

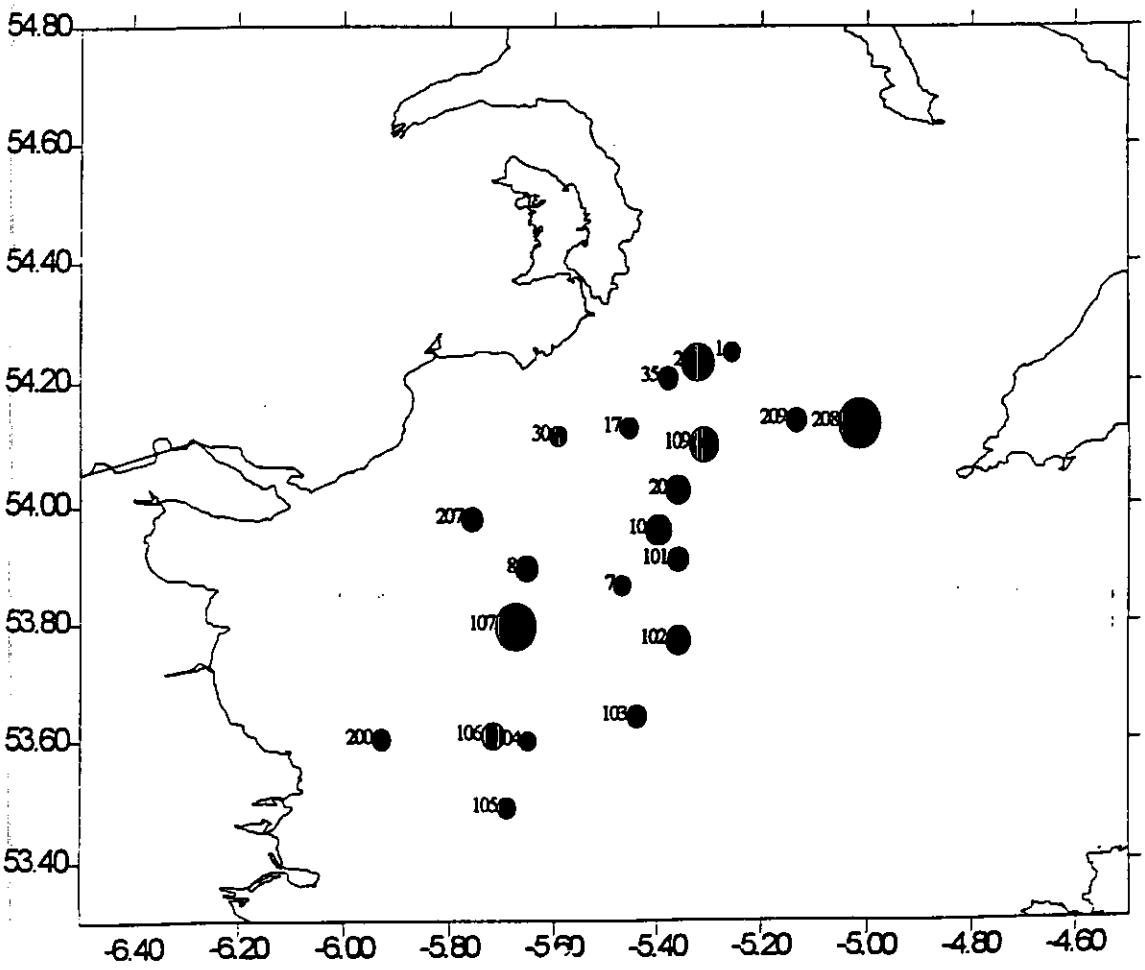

Figure 6

Mean Whiting Catch at Length per nautical mile