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

CRUISE REPORT - LF16/97

NEPHROPS AND BYCATCH 14 - 18 April 1997

PERSONNEL

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OBJECTIVES

- To trawl selected stations sampled during earlier cruises and perform qualitative and quantitative analysis of catches.
- To collect ovigerous female *Nephrops*.
- To assess the prevalence of the dinoflagellate parasite *Hematodinium* in *Nephrops* catches.
- To assess the amount of litter in catches as part of a DANI/DOE project.

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 nominal mesh size 50mm. 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 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.

NARRATIVE

Sunday 13 April:

Scientific staff boarded during the evening and a safety meeting was convened by the Fishing Master. The vessel sailed at 23h.45 and steamed towards the Northern part of the western Irish Sea *Nephrops* grounds.

Monday 14 April:

The net was shot at station 1 at 07h.10 and hauled again at 07h.52 in calm but overcast weather conditions. This yielded a good *Nephrops* catch and was followed by stations 2, 35, 208, 209 and 109. *RV Lough Foyle* then steamed to Dundrum Bay for overnight anchorage.

Tuesday 15 April :

The anchor was lifted and *RV Lough Foyle* moved to station 30 where the net was shot at 07h.09 and towed for 60 minutes. This was followed by station 17. Although neither of these stations yielded any *Nephrops* on this occasion, they have done so in the past surveys, under conditions of strong tides when fished during twilight. Stations 20, 10, 101 and 7 were then trawled and gave good catch rates. The night was spent drifting off Lambay Island. While steaming to this area the moorings positioned over the Irish Sea frontal region by the Biological Oceanography Section of AESD were checked as a formality. All seemed to be in order.

Wednesday 16 April:

The most southern Station (105) was fished, followed by 106, 104, 106, 104, 103 and 102. Good catches of *Nephrops* were made at all five stations. Weather conditions were calm and sunny all day. The night was spent off Skerries in the region of Station 107.

Thursday 17 April:

The net was shot at station 107 at 07h.05 and hauled again at 08h.05. This was followed by stations 8 ans 207. Station 207 contained no *Nephrops* and is in the same category as stations 30 and 17 discussed earlier. As this completed the scheduled stations for the cruise *RV Lough Foyle* set course for Belfast, docking at 17h.50.

RESULTS

During the cruise 20 trawl stations were fished as indicated in Figure 1. Table 1 is the mean size, catch rate, proportion females and infection levels of *Hematodinium* by station. *Nephrops* size frequency data were smoothed using a floating mean procedure by applying the expression:

$$\textit{Smoothed catch at length } (N_{l\,smoothed}) = (N_{l+1} + N_l + N_{l-1}) / 3$$

Smoothed *Nephrops* length frequency distributions for selected tows are presented in Figure 2 and demonstrate the variability between stations. Figure 3 is a summary of mean size, catch numbers and sex ratio by station. All *Nephrops* sampled were examined for *Hematodinium* infection and indicated an overall prevalence of 12.4% of animals (Table 1, Figure 4) which is lower than during April 1996. This result agrees with those obtained by Scottish workers (Atkinson, pers, comm.) for the Clyde Sea area *Nephrops*. Infection appears to be confined to small individuals as in earlier surveys. About 50 ovigerous female *Nephrops* were preserved in 4% formalin for future fecundity studies.

The predominant by-catch species was whiting (*Merlangius merlangus*) and Figure 5 is the pooled whiting size composition data expressed as catch at length per nautical mile. Table 2 shows the proportion of *Nephrops*, cod, whiting, hake, haddock, brown crab and other fish caught at each station and Figure 6 is a summary of these data. Litter debris was assessed from the catch of each tow.

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 Hughes, Officers and Crew of *RV Lough Foyle* are thanked for their enthusiastic co-operation throughout the cruise. Although it was initially considered that the minimum number of scientific staff required to complete the cruise objectives was 5 (preferably 6), those participating did an impressive job; working as a "a well oiled machine" and setting a supreme example of effective team work.

Richard Briggs

Alan Hughes (Seen in draft)

17 April 1997

TABLE 1

Nephrops data from LF1697 (no *Nephrops* caught at stations 30, 17, and 207)

TOW	1	2	3	4	5	6	7	8	9	10
STATION	1	2	35	208	209	109	30	17	20	10
MALE CL	24.5	24.1	22.8	23.8	29.3	26.2			24.3	26.2
FEMALE CL	22.1	21.7	22.6	20.8	22.0	22.3			20.5	22.0
No per Nm	7303	2836	27	3751	948	5346	0	0	5118	2499
kg per Nm	69.7	25.8	0.2	35.9	17.5	66.9	0.0	0.0	49.1	29.8
% female	43.8	46.8	46.7	42.7	23.8	39.7			43.7	36.9
% Hem Males	7.7	10.8	12.5	17.4	8.8	9.1			9.1	11.5
% Hem Females	9.9	17.5	14.3	16.0	20.3	8.8			11.3	13.9
% Hem Overall	8.5	14.0	13.3	17.0	11.5	9.0			9.6	12.3

TOW	11	12	13	14	15	16	17	18	19	20
STATION	101	7	105	106	104	103	102	107	8	207
MALE CL	29.2	28.9	30.9	24.3	27.1	27.1	27.8	24.4	24.2	
FEMALE CL	22.3	22.8	26.2	20.6	22.6	21.3	23.2	21.8	22.2	
No per Nm	371	480	4786	4382	4250	6997	2480	10091	5971	0
kg per Nm	5.5	7.3	64.9	47.3	62.8	100.9	34.6	99.8	55.6	0
% female	35.0	27.2	33.4	33.0	33.9	35.4	38.0	48.9	45.0	
% Hem Males	10.1	13.7	11.6	7.7	4.8	9.7	8.1	12.8	11.7	
% Hem Females	28.2*	25.6*	13.5	20.1	12.8	15.6	13.8	12.6	15.8	
% Hem Overall	15.9	16.9	12.5	11.4	7.5	11.8	10.2	12.5	13.6	

* small samples

TABLE 2

Catch (kg) per nautical mile of tow

TOW	STN	*NEPHROPS*	COD	WHITING	HAKE	HADDOCK	CANCER	O. FISH
1	1	69.7	9.9	53.4	0.5	19.6	0.3	3.9
2	2	25.8	1.6	27.6	0.6	1.8	0.3	9.9
3	35	0.2	4.2	26.0	0.3	2.6	0.8	9.5
4	208	35.9	3.3	41.7	2.6	7.7	0.0	23.3
5	209	17.5	6.0	4.9	0.3	0.0	1.5	10.3
6	109	66.9	1.7	50.8	1.3	1.4	1.6	15.5
7	30	0.0	2.7	55.6	0.7	1.2	1.6	44.2
8	17	0.0	4.8	39.2	0.1	9.1	1.4	30.5
9	20	49.1	1.8	21.9	0.1	3.9	4.3	15.6
10	10	29.9	1.1	7.3	0.2	3.1	0.0	5.5
11	101	5.5	2.8	6.4	0.0	0.4	0.0	3.7
12	7	7.3	3.2	6.9	1.1	0.3	0.9	4.3
13	105	64.9	5.8	43.0	0.0	7.2	0.0	29.0
14	106	47.2	9.0	44.0	0.0	2.3	0.0	15.7
15	104	62.8	0.9	11.2	0.0	0.6	0.0	3.5
16	103	100.9	6.9	17.9	0.0	4.2	0.5	23.8
17	102	34.6	0.3	11.7	0.3	10.1	0.0	6.1
18	107	99.8	1.8	50.4	0.9	7.4	0.0	6.5
19	8	55.5	1.1	35.5	0.1	4.7	1.1	10.2
20	207	0.0	6.8	17.1	0.5	2.6	0.0	51.1

FIGURE 1

Map showing location of stations

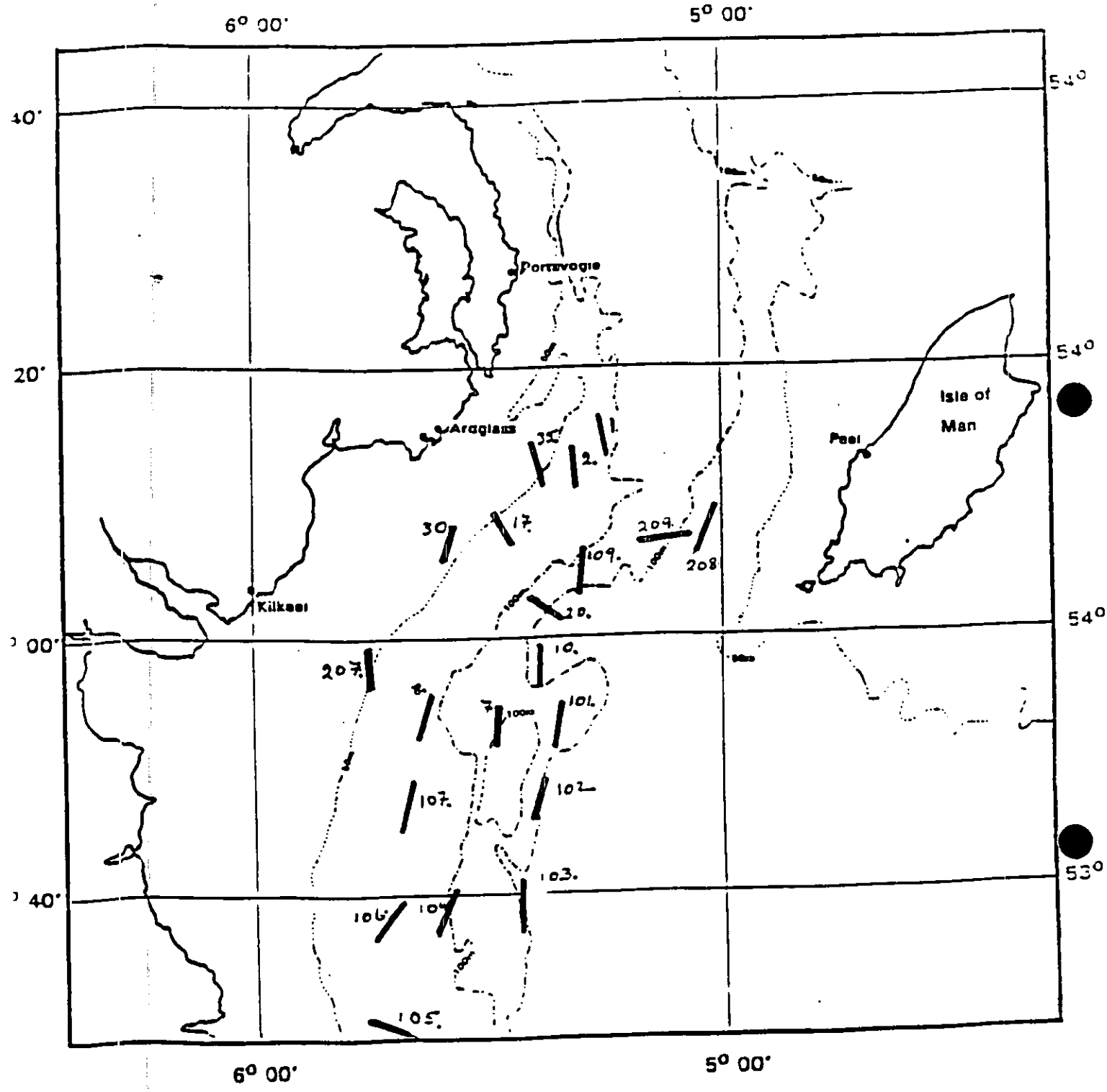
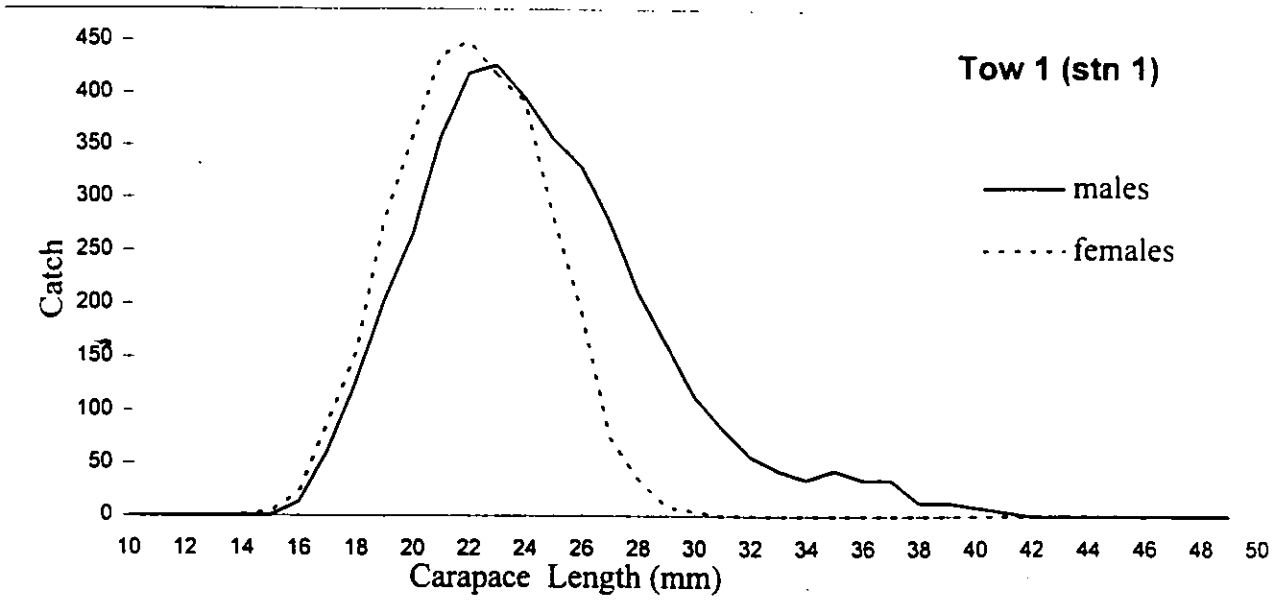
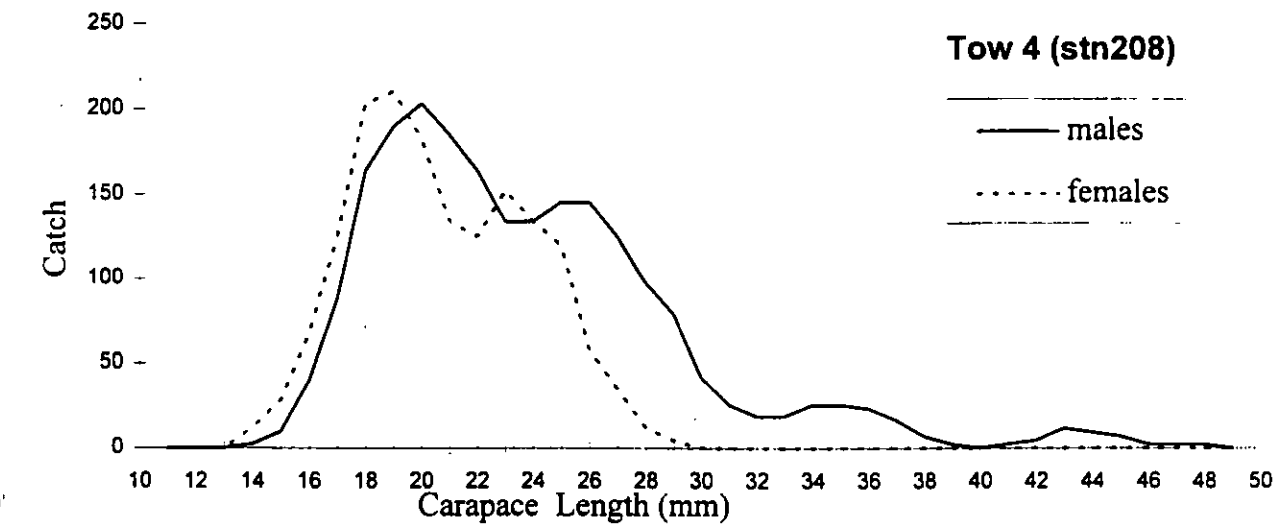


FIGURE 2

Smoothed *Nephrops* length compositions: Selected stations

(number caught per nautical mile of tow)





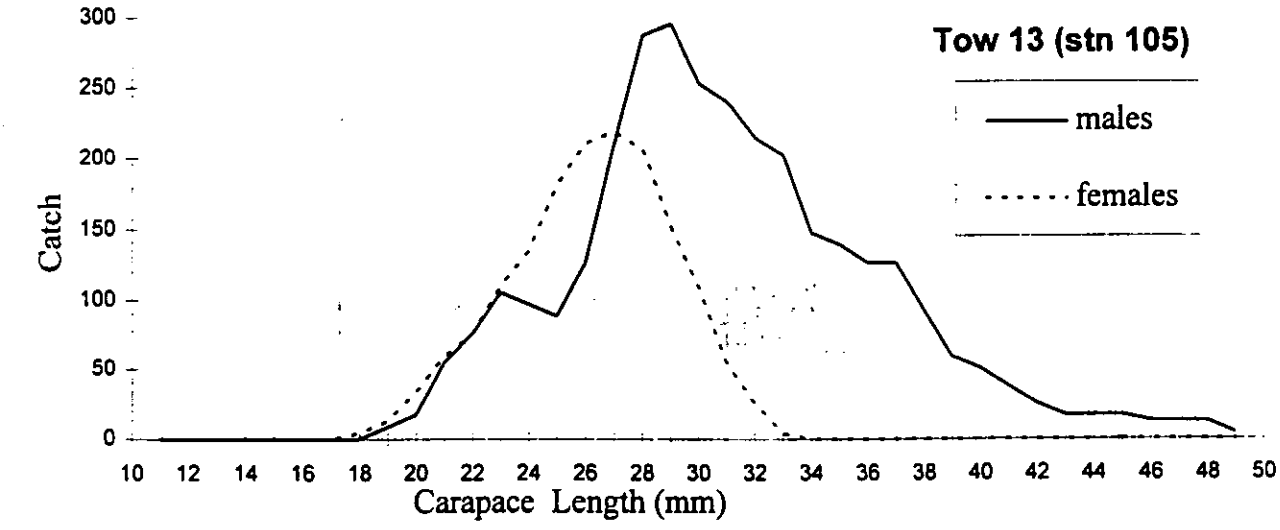
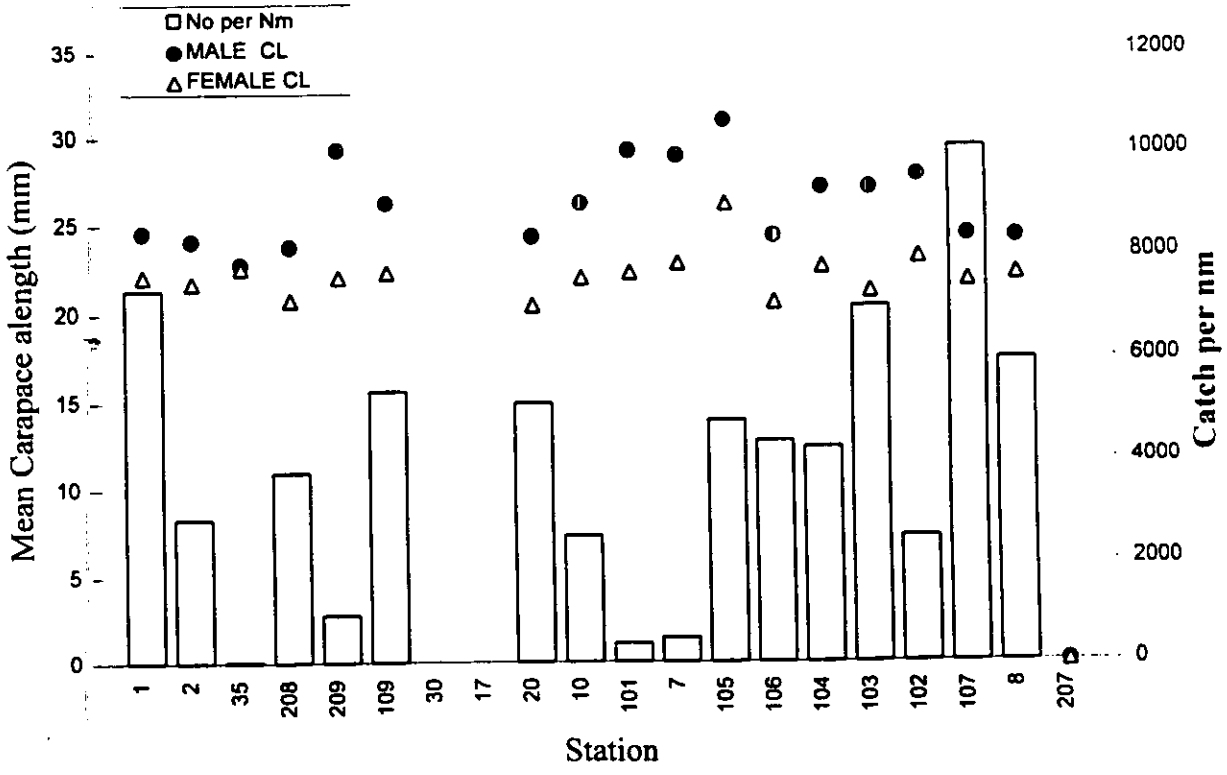


FIGURE 3

a.) Mean size and catch rates of *Nephrops* by station



b). Sex Ratio expressed as percentage of females in catch

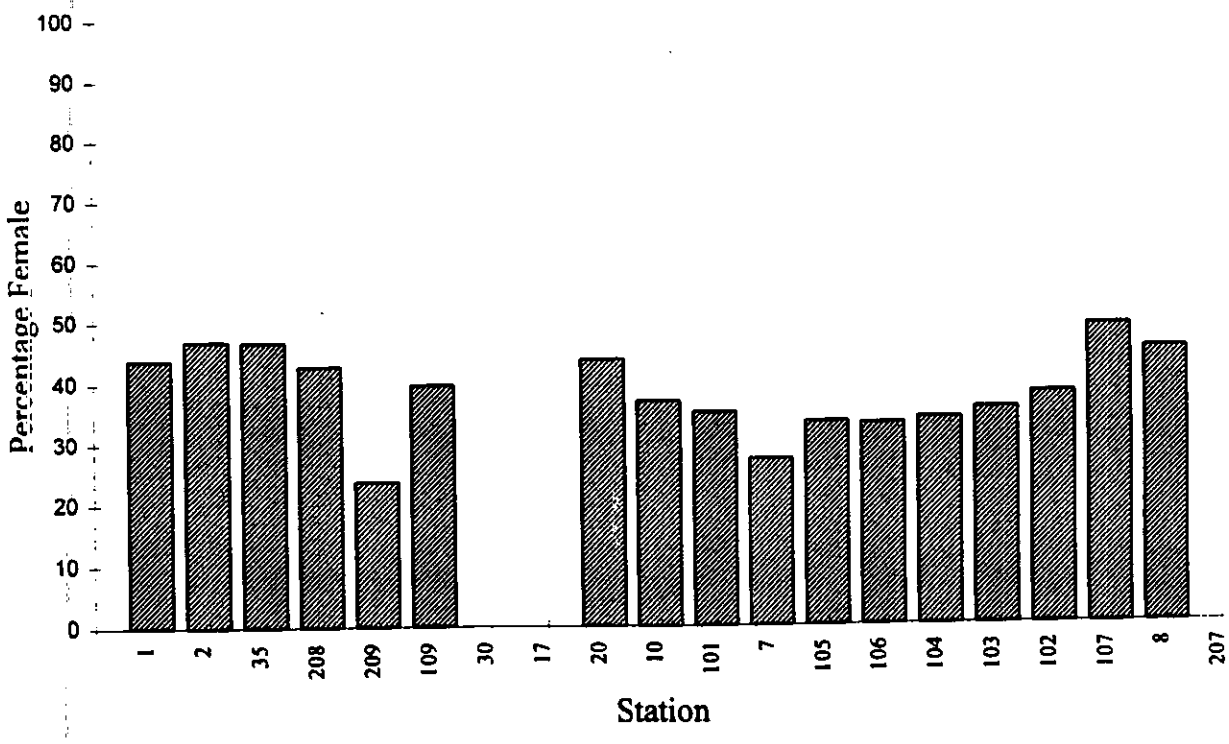


FIGURE 4

Proportion (%) of total catch infected by *Hematodinium* (pooled data)

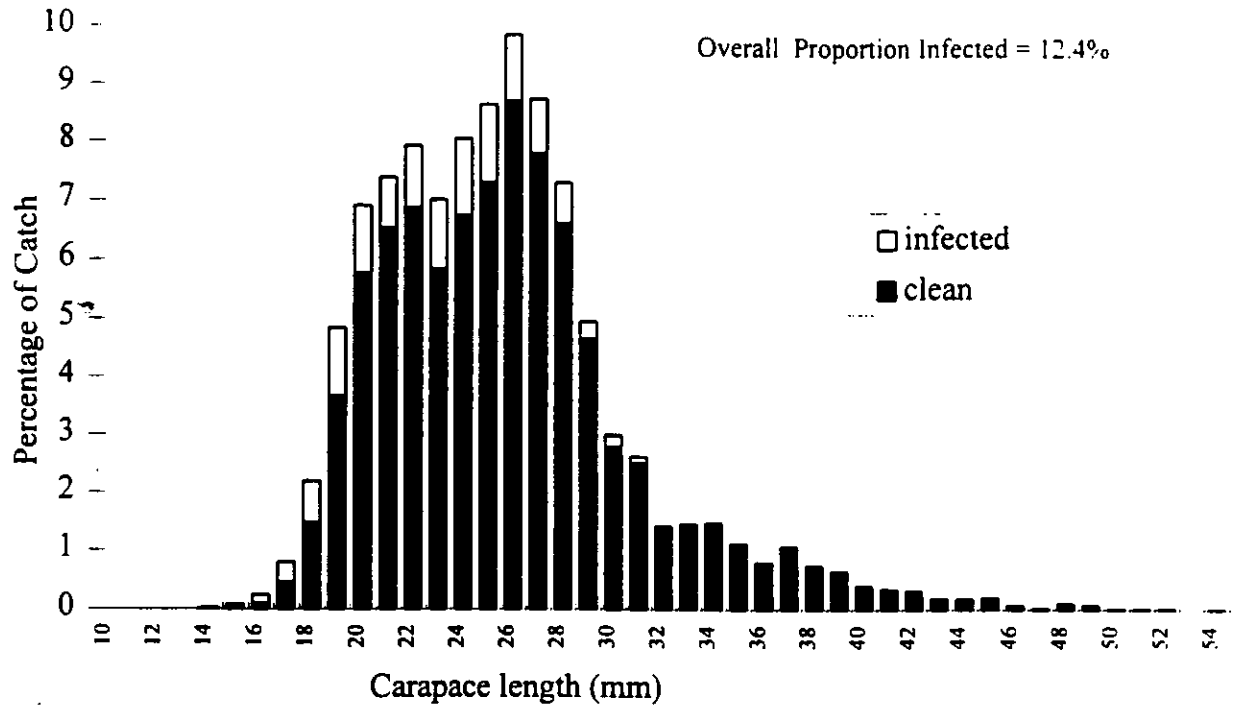


FIGURE 5

Mean Whiting Catch at Length per nautical mile

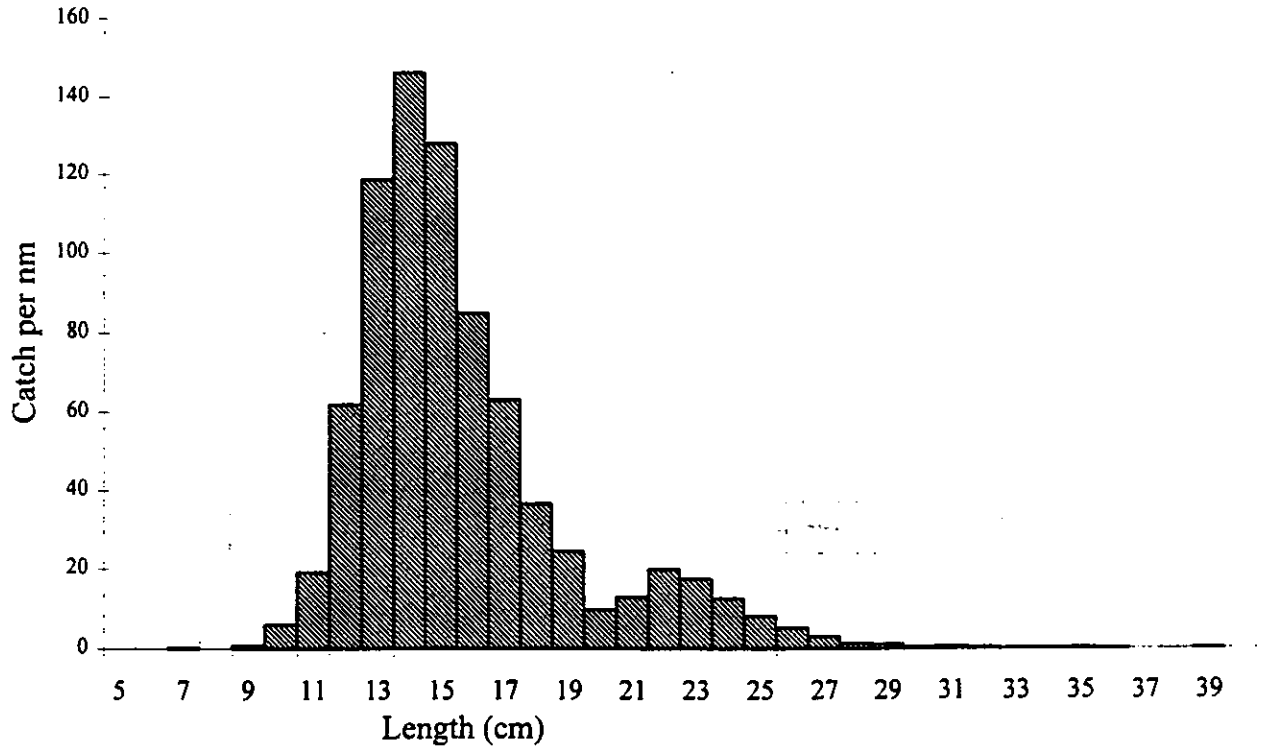


FIGURE 6

Catch composition (kg) of selected species (on same scale)