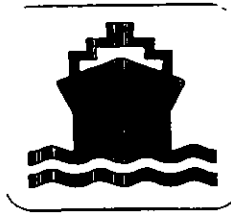


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DEPARTMENT OF AGRICULTURE [NI]
AGRICULTURAL AND ENVIRONMENTAL SCIENCE DIVISION
(Aquatic Systems Group)



CRUISE REPORT - LF/38/96A & LF/38/96B

NW IRISH SEA BENTHIC SHELLFISH: 16-20 and 23-27 September 1996

PERSONNEL

LF3896A: 16-20 September

R. Briggs. PSO [SIC]
M. McAliskey, SO
C. Reavey, SO
J. Peel, ASO
C. Maguire. QUB
N. Lefrancois, QUB
B. Stewart, SSO (16/9/96)
P. Elliott, SO (16/9/96)
Safety Inspectors (16-17/9/96)

LF3896B: 23-26 September

R. Briggs, PSO [SIC]
M. Service. SSO
M. McAliskey, SO
C. Reavey, SO
J. Peel, ASO
C. Burns. ASO
VIP Party (23/9/96)

OBJECTIVES

- To trawl selected stations sampled during earlier cruises and perform qualitative and quantitative analysis of catches.
- To collect live female *Nephrops* for fecundity studies at C-mar, Portaferry (LF3896A)
- To assess the prevalence of the dinoflagellate parasite *Hematodinium* in *Nephrops* catches.
- To film substrate transects over the *Nephrops* grounds using underwater video and sledge.
- To carry out a survey of the *Nephrops* grounds using the ground discrimination system RoxAnn.
- To provide a demonstration of procedures for Safety Audit Inspectors (16-17/9/96)
- To accommodate a VIP visit and to demonstrate methods used to study benthic shellfish.

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*. The contribution of finfish in catches was quantified and their length compositions measured. Stratified sampling procedures were similar to those used during whitefish cruises. Live female *Nephrops* at ovary stage "4" and berried animals were retained alive in a deck tank connected to the seawater tap to provide a continuous supply of fresh seawater.

Activities during the first day of LF3896b comprised of a demonstration of scallop dredging and underwater filming over the Scallop Grounds of NE Belfast Lough. The remainder of LF3896b was spent trawling and filming over the western Irish Sea *Nephrops* grounds. RoxAnn was run continuously throughout the cruise (LF3896b).

NARRATIVE

Monday 16 September:

The day was spent demonstrating the deployment of oceanographic equipment to Safety Audit Personnel; docking into Belfast at 20h.00 where Mr Stewart and Mr Elliott disembarked. Dr Briggs and the two QUB postgraduate students joined the vessel at 20h.30.

Tuesday September:

RV Lough Foyle sailed at 09h.00 and steamed to the *Nephrops* Grounds off Portavogie. Mechanical problems with the net drum prevented the net being shot until 15h.10. After hauling at 15h.45 the vessel set course for Belfast, docking at 19h.50 where the Safety Audit Team, Captain Waters and Mr Bolton, disembarked..

Wednesday 18 September:

The vessel put to sea again despite strong SE winds and returned to the *Nephrops* grounds. The net was shot at station 2/35 at 10h.30 followed by stations 30 and 20. The night was spent dodging south towards station 106 where work would commence the next day.

Thursday 19 September:

Station 106 yielded a good catch and was followed by stations 107, 8, 7 and 101. *RV Lough Foyle* then returned to Belfast, docking at 22h.30.

Monday 23 September:

The VIP party boarded at 08h.00 and the vessel sailed at 09h.15 to the scallop grounds to the North of Belfast Lough. Demonstrations of RoxAnn, Underwater filming and dredge sampling were completed, after which *RV Lough Foyle* returned to Belfast, docking at 15h30. The vessel put to sea again at 19h.00. The night was spent completing an east/west RoxAnn survey over the northern part of the *Nephrops* grounds (Figure 2).

Tuesday 24 September:

A camera tow was completed on the most eastern margin of the *Nephrops* grounds (Figure 1) and the transition from hard compacted sand to soft mud, typical of the *Nephrops* habitat, was

observed. This was followed by two trawl tows at previously unfished stations (by *RV Lough Foyle*) 208 & 209 on the eastern side of the *Nephrops* grounds. A final haul for the day was performed in the region of station 20. The night was spent at anchor off the Skerries in order to be in position to survey the more southern extremities of the *Nephrops* grounds the next day.

Wednesday 25 September:

A camera tows were completed at stations 105 and 104 but visibility was poor. This was thought to be due to the windy weather the previous day and the activities of commercial trawlers. Station 104 was then fished followed by station 105. The catch at station 105 included particularly large *Nephrops* (mean $CL = 30\text{mm}$) and substantial amount of mixed invertebrate bycatch dominated by *Macropipus depurator*. A camera tow to the west of station 105 completed the days work. Despite a day of relatively calm weather camera visibility remained poor. The night was spent completing an east/west RoxAnn survey over the southern part of the *Nephrops* grounds (Figure 2).

Thursday 26 September:

Strong winds from the south forced a decision to end the cruise and *RV Lough Foyle* set course for Belfast, docking at 13h.35.

RESULTS

During the two cruises 14 trawl stations were fished as indicated in Figure 1. Figure 2 shows the cruise track and includes the two overnight RoxAnn surveys performed. Table 1 is the mean size, catch rate and the proportion of female *Nephrops* by station.. *Nephrops* size frequency data were smoothed using a floating mean procedure by applying the expression:

$$\text{Smoothed catch at length } (N_{i \text{ smoothed}}) = (N_{i+1} + N_i + N_{i-1}) / 3$$

Nephrops smoothed length frequency distributions for selected tows are presented in Figure 3 and demonstrate the variability between stations and Figure 4 is a summary of female *Nephrops* maturity data. Over 100 live female *Nephrops* were collected during LF3896a and transported to a tank system in Portaferry for *invitro* fecundity studies as part of EC funded project '95/015'.

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. Small haddock (*Melanogrammus aeglefinus*) were predominant at most stations and Figure 6 is a plot of the pooled length frequency data. Table 2 shows the proportion of *Nephrops*, cod, whiting, hake, haddock and other fish caught at each station.

All *Nephrops* sampled were examined for the prevalence of *Hematodinium*. Visual examination indicated a prevalence of less than (7% Table 2) which was similar to the prevalence noted during the June cruise (LF2596) and significantly lower than in April (LF1796) when levels of up to 30% were recorded for some stations.

Camera tows provided film of the seabed at the eastern extremity of the western Irish Sea *Nephrops* grounds. Preliminary analysis of video and RoxAnn data suggests that the bottom varies significantly between stations on the *Nephrops* grounds. These data will be subjected to further detailed analysis and should make a significant contribution to our understanding of the *Nephrops* habitat. In addition to contributing to the DANI time series data-base on

Nephrops information from this cruise will contribute to a recently initiated EC funded project on the estimation of *Nephrops* biomass (95/015).

ACKNOWLEDGEMENTS

The Master, officers and crew of *MRI Lough Foyle* are thanked for their enthusiastic co-operation throughout the cruise. The scientific staff once again worked as "a well oiled machine" and are to be congratulated for their example of effective team work in completing the cruise objectives despite the inclement weather conditions.



R.P. Briggs
(Scientist in Charge)



A. Niblock (Seen in draft form)
(Master)

26 September 1996

TABLE 1

Nephrops data by station

| TOW | STN | MEAN MALE | MEAN FEM | No per N. Mile | No per N. Mile | % fem | <i>Hematodinium</i> Infection | | |
|-----|------|--------------|-------------|-------------------|-------------------|-------|-------------------------------|---------|-----------|
| | | | | | | | % male | % Femal | % overall |
| 1 | 1 | 24.7 | 21.9 | 2546 | 22.7 | 43.0 | 1.14 | 2.50 | 1.72 |
| 2 | 2/35 | 26.5 | 23.1 | 113 | 1.3 | 40.1 | 1.68 | 4.17 | 2.68 |
| 3 | 30 | * | * | * | 0.2 | * | * | * | * |
| 4 | 20 | 26.9 | 21.8 | 2443 | 28.6 | 35.1 | 2.77 | 3.85 | 3.15 |
| 5 | 106 | 25.7 | 22.9 | 4034 | 45.1 | 41.2 | 0.73 | 1.05 | 0.86 |
| 6 | 107 | 25.4 | 22.4 | 8379 | 81.7 | 40.9 | 1.56 | 3.91 | 2.51 |
| 7 | 8 | 25.0 | 21.9 | 3125 | 29.1 | 40.5 | 6.10 | 7.30 | 6.59 |
| 8 | 7 | 27.3 | 22.6 | 803 | 10.1 | 32.1 | 2.46 | 2.08 | 2.34 |
| 9 | 101 | 28.9 | 23.5 | 610 | 10.5 | 29.8 | 2.14 | 2.02 | 2.11 |
| 10 | 208 | 21.7 | 20.1 | 1618 | 14.0 | 45.5 | 2.25 | 2.69 | 2.45 |
| 11 | 209 | 27.9 | 22.6 | 1578 | 21.9 | 30.6 | 1.75 | 0.99 | 1.16 |
| 12 | 20 | 25.5 | 21.6 | 2743 | 26.9 | 41.8 | 2.66 | 4.76 | 3.71 |
| 13 | 104 | 28.2 | 22.3 | 312 | 4.4 | 32.3 | 2.05 | 1.07 | 1.74 |
| 14 | 105 | 32.4 | 27.3 | 427 | 10.1 | 15.8 | 1.78 | 0.00 | 1.50 |

* poor catch

Hematodinium prevalence was assessed by visual examination of cardiac tissue and overall appearance. Samples of cardiac muscle and whole animals were fixed in 4% neutral buffered formaldehyde for cytological/histological confirmation of infection. All infection in females was in stage 1 individuals

TABLE 2

Catch (kg) per nautical mile of tow

| TOW | STN | NEPHROPS | COD | WHITING | HAKE | HADDOCK | O. FISH | CANCER |
|-----|------|----------|-----|---------|------|---------|---------|--------|
| 1 | 1 | 22.7 | 3.9 | 37.4 | 0.0 | 4.7 | 32.6 | 0.9 |
| 2 | 2/35 | 1.3 | 0.0 | 6.5 | 17.3 | 6.3 | 19.5 | 0.5 |
| 3 | 30 | 0.2 | 0.3 | 45.9 | 3.6 | 2.1 | 10.2 | 0.5 |
| 4 | 20 | 28.6 | 3.6 | 11.0 | 0.0 | 9.0 | 6.5 | 2.1 |
| 5 | 106 | 45.3 | 0.1 | 24.9 | 0.0 | 9.4 | 18.4 | 0.0 |
| 6 | 107 | 81.7 | 2.9 | 36.5 | 0.0 | 6.6 | 73.0 | 0.9 |
| 7 | 8 | 28.8 | 0.5 | 14.7 | 0.3 | 6.0 | 28.4 | 0.0 |
| 8 | 7 | 10.1 | 2.7 | 4.5 | 0.0 | 5.3 | 7.7 | 0.0 |
| 9 | 101 | 10.4 | 3.8 | 1.7 | 0.0 | 0.2 | 1.9 | 0.9 |
| 10 | 208 | 14.0 | 0.0 | 29.3 | 0.0 | 5.7 | 12.0 | 0.4 |
| 11 | 209 | 21.9 | 5.6 | 8.7 | 2.0 | 5.1 | 9.5 | 0.0 |
| 12 | 20 | 26.9 | 0.5 | 41.5 | 0.0 | 1.8 | 54.1 | 1.2 |
| 13 | 104 | 4.4 | 2.8 | 1.3 | 0.0 | 0.1 | 8.2 | 0.0 |
| 14 | 105 | 10.1 | 0.1 | 6.5 | 0.0 | 8.2 | 29.6 | 0.0 |

Map of stations fished during cruise

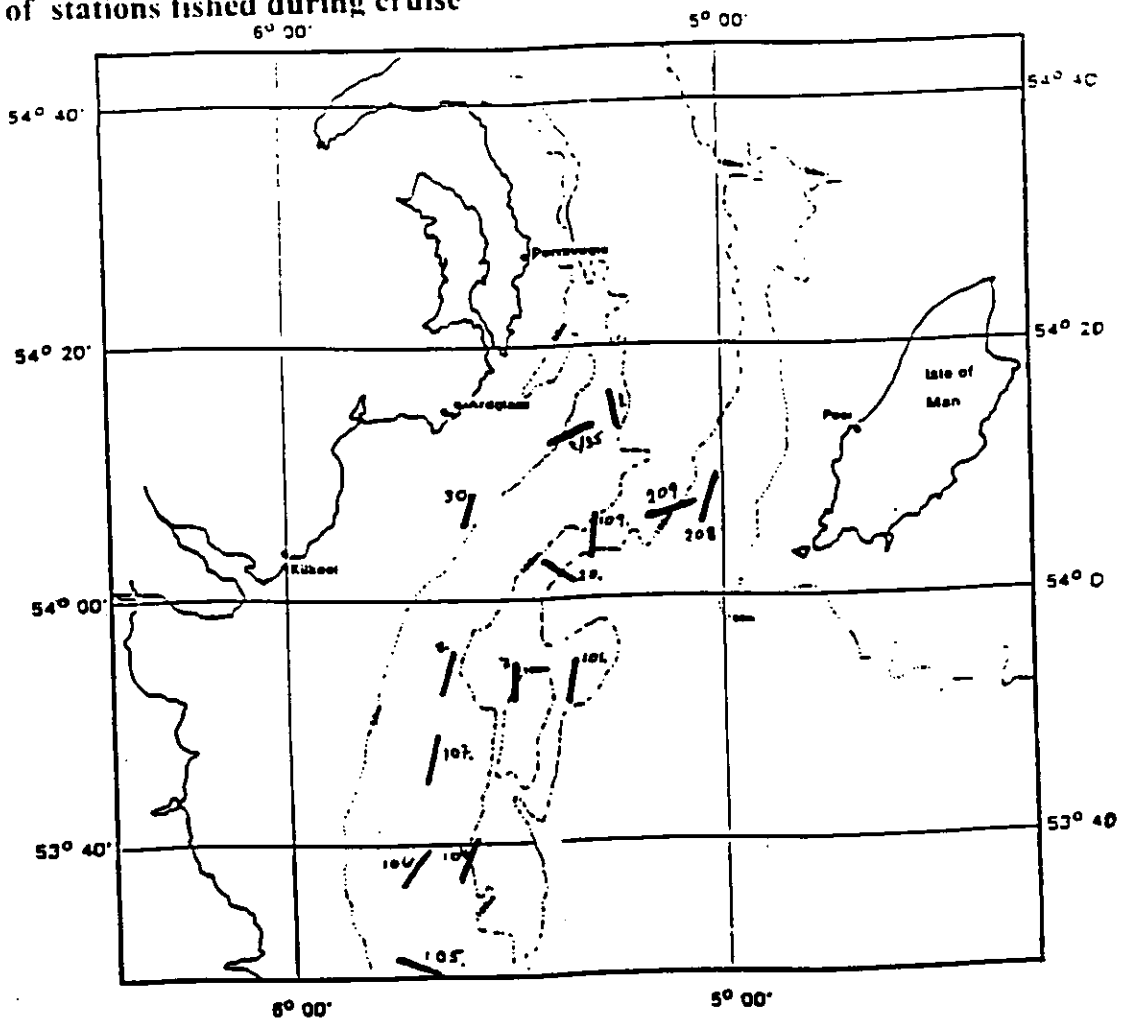


FIGURE 2

Cruise track from RoxAnn

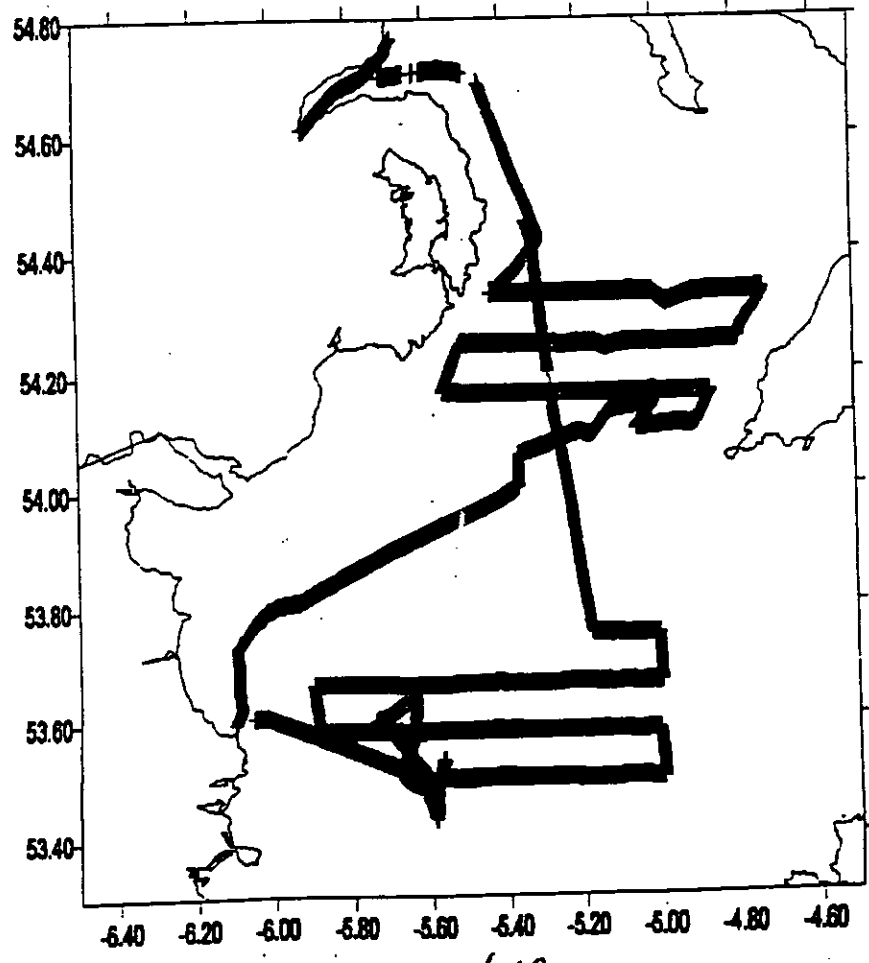


FIGURE 3

SMOOTHED NEPHROPS LENGTH COMPOSITIONS: SELECTED STATIONS

(number caught per nautical mile of tow)

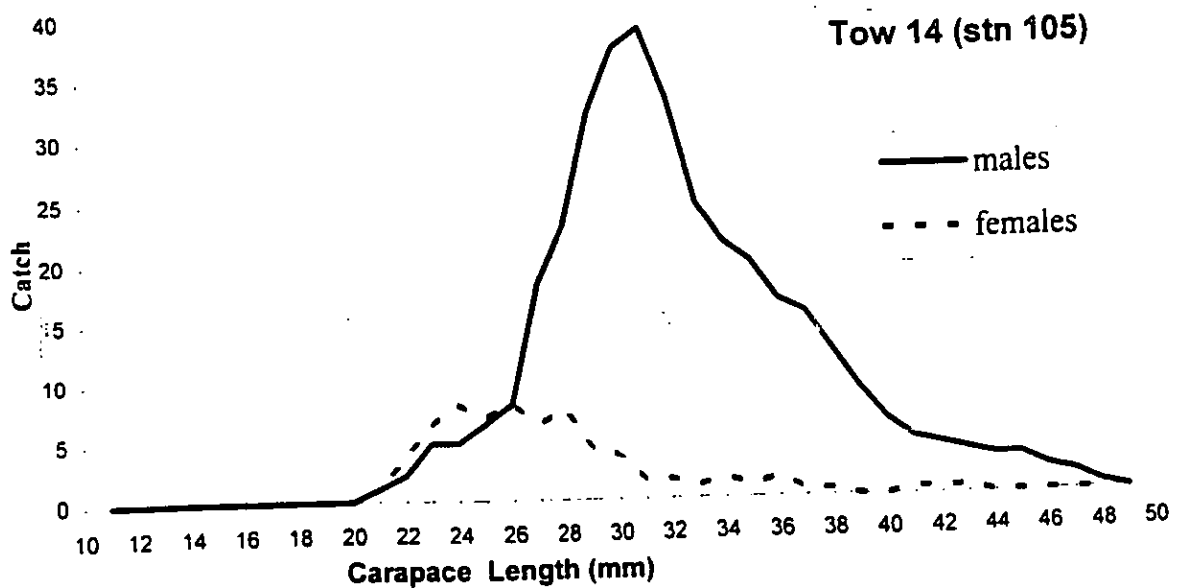
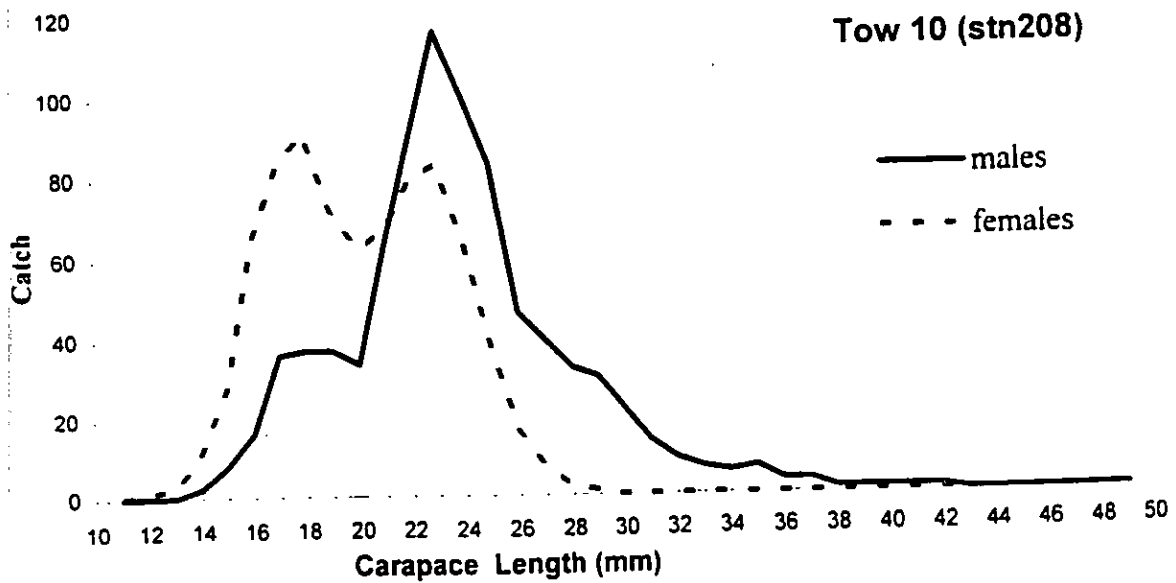
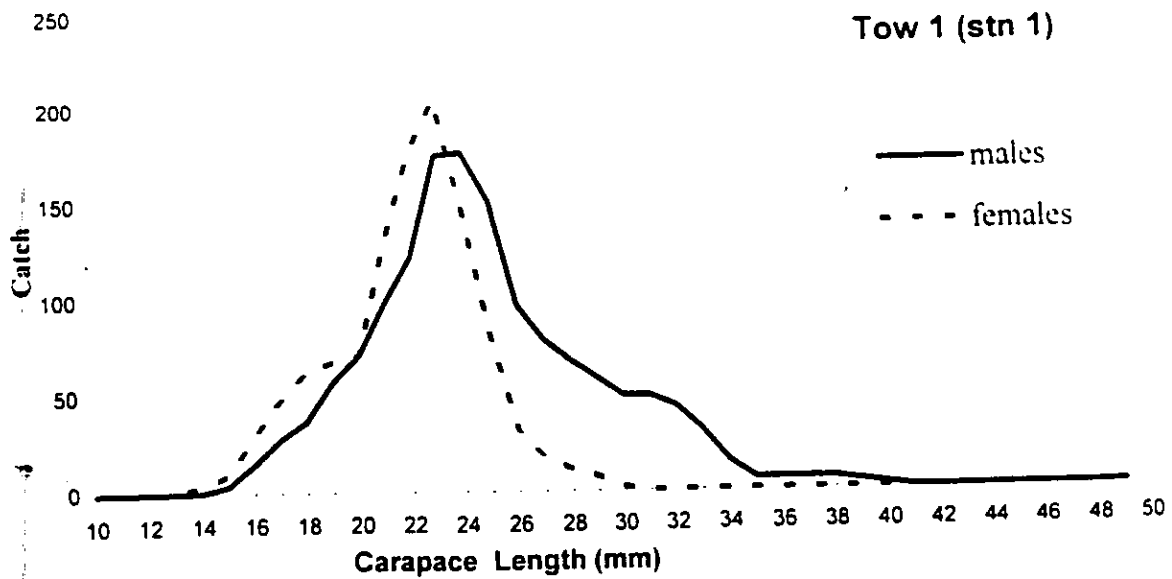
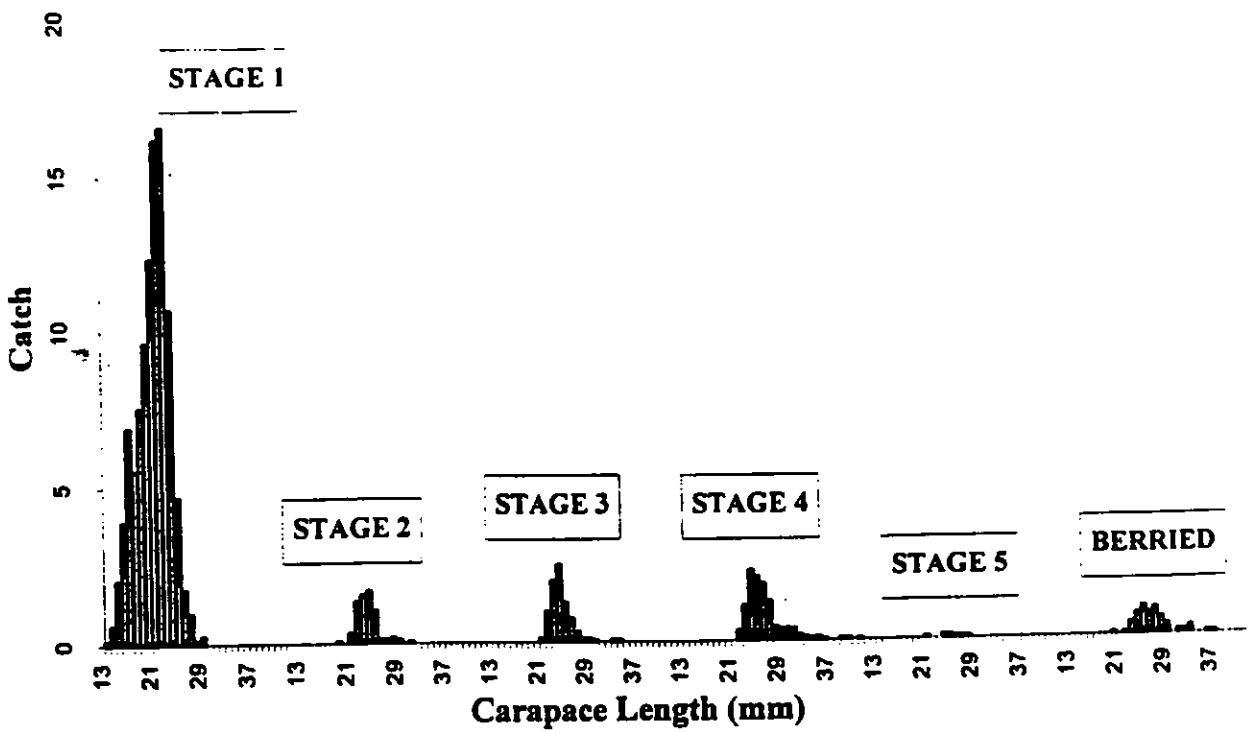


FIGURE 4

4.1 Mean number of female *Nephrops* at each maturity stage



4.2 Proportion *Nephrops* at each maturity stage by Station

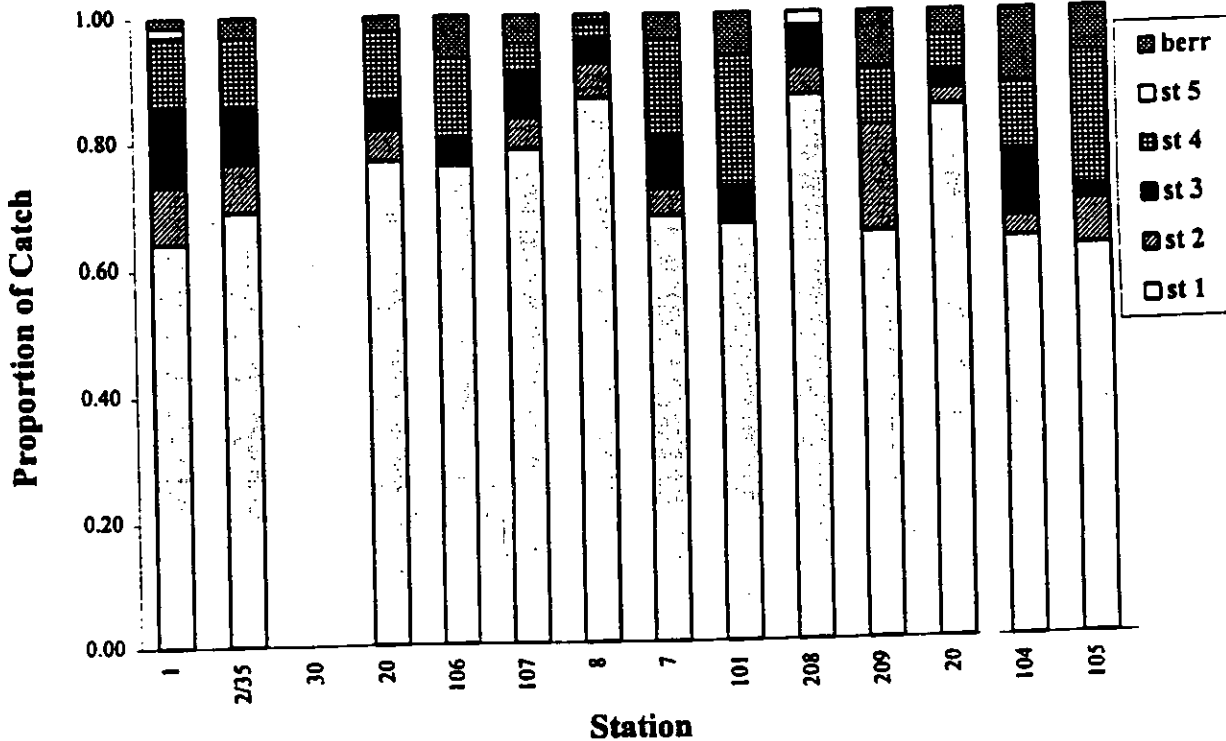


FIGURE 5

Mean Whiting Catch at Length per nautical mile

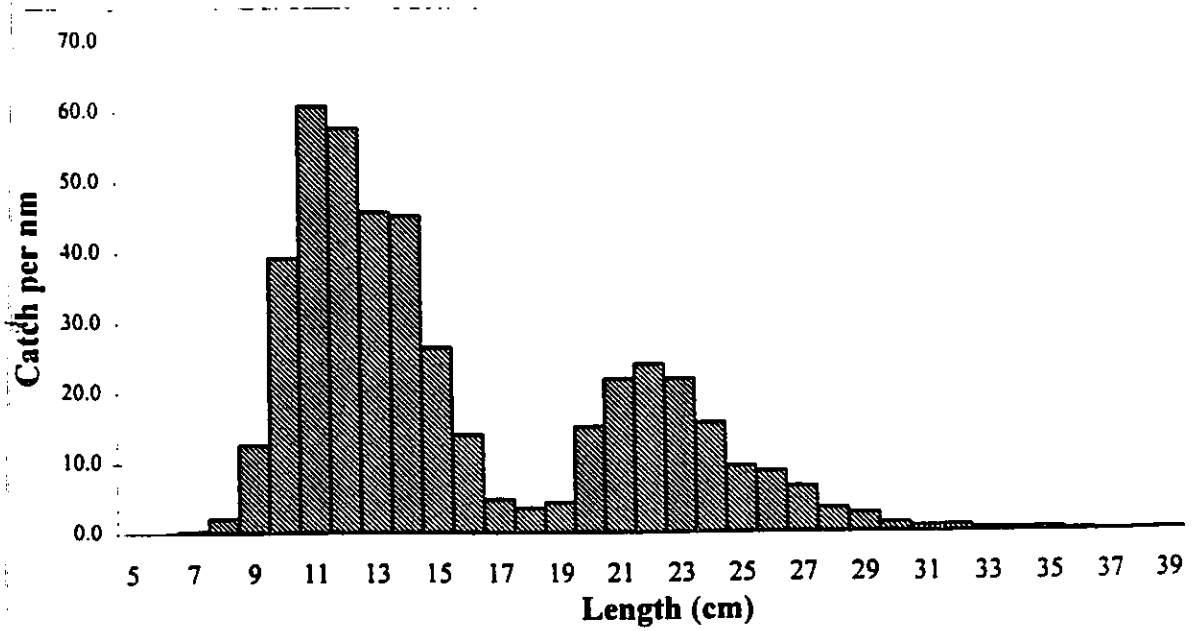


FIGURE 6

Mean Haddock Catch at Length per nautical mile

