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

CRUISE REPORT - LF/ 17/96

NW IRISH SEA *NEPHROPS* STOCKS: 22-26 April 1996

PERSONNEL

R. Briggs, PSO [SIC]
W. McCurdy, SSO
M. McAliskey, SO
J. Peel, ASO
C.Burns, ASO

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.

3. To collect non-biodegradable debris recovered from trawl catches as part of an ongoing collaborative study with DOE.

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 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 from all stations for the prevalence of the parasitic dinoflagellate *Hematodinium*. *Nephrops* blood and tissue samples were taken for future diagnostic examination using histological and immunostaining techniques. The contribution of cod, whiting, hake and haddock in catches was quantified and their length compositions measured. Sampling procedures were similar to those used during whitefish cruises

NARRATIVE

Sunday 21 April:
Scientific staff boarded the vessel and a pre-cruise briefing included a safety demonstration by the Fishing Master. *R.V. Lough Foyle* sailed at 23h.30 and proceeded to the mouth of Belfast Lough where strong southerly winds were encountered. The vessel moved south for a while but the severity of the weather conditions lead to the decision to return to shelter in Bangor Bay .

Monday 22 April:
Continued strong southerly winds forced the vessel to remain in Bangor Bay for the day.

Tuesday 23 April:
Work commenced at station 1 at 07h.35. This was followed by stations 2, 35, 17, 30, 109 and 20. *Nephrops* catches were adequat for sampling but poor compared to earlier surveys. This was attributed to the strong prevailing tides. Weather conditions were calm which permitted a good days work. The night was spent at anchor in Dundalk Bay.

Wednesday 24 April:
Stations 8,7,101,10,103 and 103 were completed in good weather conditions. The night was spent at anchor off Skerries..

Thursday 25 April:
The net was shot at 07h.18 at station 106 which was followed by stations 104,107,105 and an additional haul in a shallow water area that has not been fished for several cruises (station 207 in Figure 1). *RV Lough Foyle* then set course for Belfast, docking at 22h.00.

RESULTS

During the cruise 18 trawl stations were performed and all objectives were completed. The position of these stations are shown in Figure 1. Table 1 shows the mean size, catch rates and the proportion of female *Nephrops* by station. It was noted that catch rates were significantly lower than in April 1995 and was attributed to the stronger tides encountered during the 1996 cruise. This is a well known phenomenon by commercial fishermen and the present cruise has provided substantial information which when examined in conjunction with data from other surveys and tidal data may contribute to our understanding of the affect of tides on *Nephrops* catches.. *Nephrops* size frequency data were smoothed using a floating mean procedure by applying the expression:

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

Nephrops smoothed length frequency distributions for each tow are presented in Figure 2.

The predominant by-catch species was whiting (*Merlangius merlangus)* and Figure 3 shows the pooled whiting size composition data expressed as catch at length per nautical mile. Figure 4 is a similar plot of the pooled haddock data. Table 2 shows the proportion of *Nephrops*, cod, whiting, hake, haddock and other fish caught at each station.

During the cruise all sampled *Nephrops* were examined for the prevalence of *Hematodinium*. Visible changes in infected animals included distinctive body coloration, whiteness of claws and characteristic milkiness of the haemocoel. A total of 479 biopsies of heart, hepatopancreas and tail muscle were preserved in 10% buffered formalin for subsequent histopathological confirmation of infection. A further 40 *Nephrops* blood films were prepared for immunoflourescent screening. Initial examination of *Nephrops* during the cruise showed all stations to have infected animals as indicated in Table 3, with levels ranging from 2.5% to over 30% of animals examined. It is noteworthy from this preliminary examination that infection in females was most abundant in immature animals (stage 1) with negligible infection in more mature *Nephrops*.

In addition to adding to the DANI time series data-base on *Nephrops*. data from this cruise will contribute to a recently initiated EC funded project on the estimation of *Nephrops* biomass from larval production.

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 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.

R.P. Briggs
(Scientist in Charge)

A. Niblock
(Master)

25 April 1994

Table 1

Details of *Nephrops* catches during crise

Tow	Station	male mean cl	female mean cl	Nos per nm	kg per nm	% female
1	1	25.5	23.0	1889	19.6	45.3
2	2	26.3	24.2	1393	15.6	50.4
3	35	26.6	24.4	1993	23.0	53.8
4	17	25.3	24.3	4353	50.2	60.9
5	30	25.4	24.0	630	6.9	47.1
6	109	25.9	22.8	214	2.4	49.5
7	20	24.5	23.0	731	4.2	60.9
8	8	27.3	23.4	357	4.3	42.3
9	7	25.3	21.8	1469	14.2	50.5
10	101	25.2	21.9	606	6.0	45.0
11	10	24.6	21.0	445	4.1	45.6
12	102	25.5	21.9	1878	17.7	48.0
13	103	28.3	24.9	64	0.8	49.4
14	106	27.5	24.0	154	2.0	34.8
15	104	26.8	22.0	278	3.4	51.3
16	105	28.7	25.0	202	3.4	26.4
17	107	24.7	22.4	960	8.6	53.9
18	207	25.0	24.3	1281	14.0	56.0

Table 2

Catch (kg) per nautical mile of tow

TOW	STN	*NEPHROPS*	COD	WHITING	HAKE	HADDOCK	O. FISH	CANCER
1	1	19.6	0.7	31.1	0.2	0.3	5.2	1.1
2	2	15.6	0.0	4.2	0.9	0.5	11.6	0.7
3	35	31.0	1.2	15.7	0.3	0.4	13.1	0.8
4	17	45.0	0.6	17.7	0.6	1.1	17.3	0.3
5	30	6.9	0.7	12.0	0.3	0.7	42.2	0.0
6	109	2.4	0.7	5.8	0.2	0.7	2.2	0.0
7	20	4.2	2.3	1.2	0.0	0.0	3.0	0.0
8	8	4.3	0.0	11.6	0.0	0.2	2.5	0.4
9	7	14.2	0.0	7.9	0.3	0.6	8.8	0.0
10	101	6.0	8.2	1.3	0.7	0.0	2.4	0.0
11	10	0.3	3.1	4.2	0.3	0.7	3.3	0.3
12	102	17.7	0.6	102.2	0.0	0.6	7.8	0.9
13	103	0.4	4.1	62.1	0.0	19.0	5.3	0.0
14	106	2.0	3.8	35.7	0.5	11.0	7.3	0.0
15	104	3.4	0.0	7.9	0.0	0.6	3.4	0.3
16	105	3.4	5.6	66.1	0.0	11.7	17.4	0.0
17	107	8.6	2.0	2.9	0.2	0.3	1.2	0.0
18.0	207.0	14.0	0.0	17.4	0.2	2.7	34.2	0.0

Table 3

Percentage of *Nephrops* infected by *Hematodinium*
(based on visual diagnosis from external examination)

Tow	Station	Males	Females	Total	Depth m
1	1	20.9	18.7	19.9	77.0
2	2	29.9	22.7	26.4	68.0
3	35	31.6	30.7	31.1	47.5
4	17	20.6	12.9	15.9	59.0
5	30	38.8	35.3	37.1	48.0
6	109	16.4	31.0	23.6	108.5
7	20	10.1	10.7	10.4	99.5
8	8	9.5	16.3	12.4	90.5
9	7	12.6	21.7	17.3	94.5
10	101	14.2	26.1	19.5	111.0
11	10	12.8	25.0	18.4	97.5
12	102	12.4	18.5	15.3	89.5
13	103	2.5	2.6	2.5	97.0
14	106	10.0	16.2	12.2	80.5
15	104	9.0	17.5	13.3	92.5
16	105	14.9	28.6	18.5	69.0
17	107	10.1	7.5	8.7	85.5
18	207	21.6	20.8	21.2	49.0

FIGURE 1

Map showing location of stations sampled

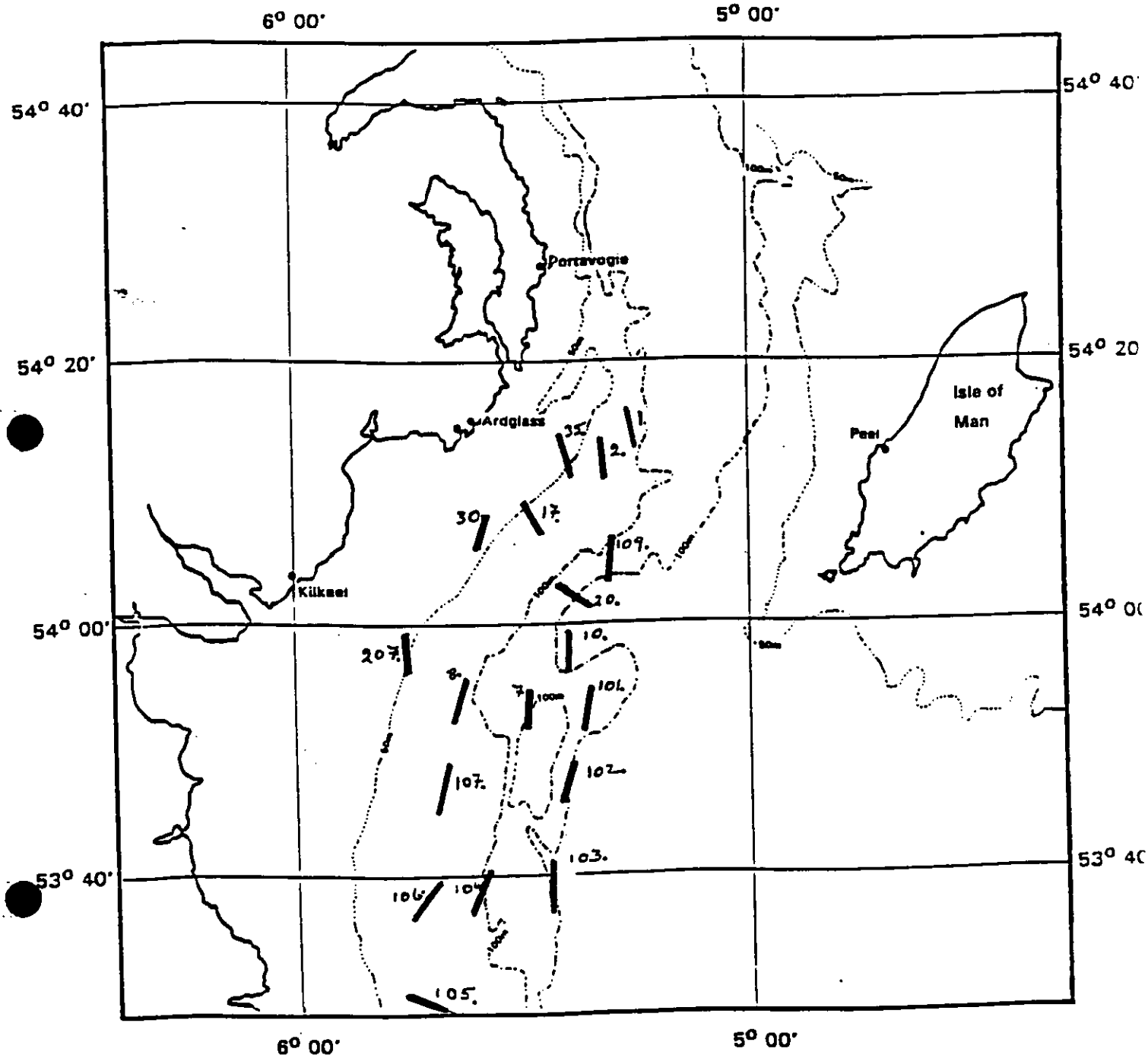

FIGURE 2 (continued)

SMOOTHED *NEPHROPS* LENGTH COMPOSITIONS BY STATION

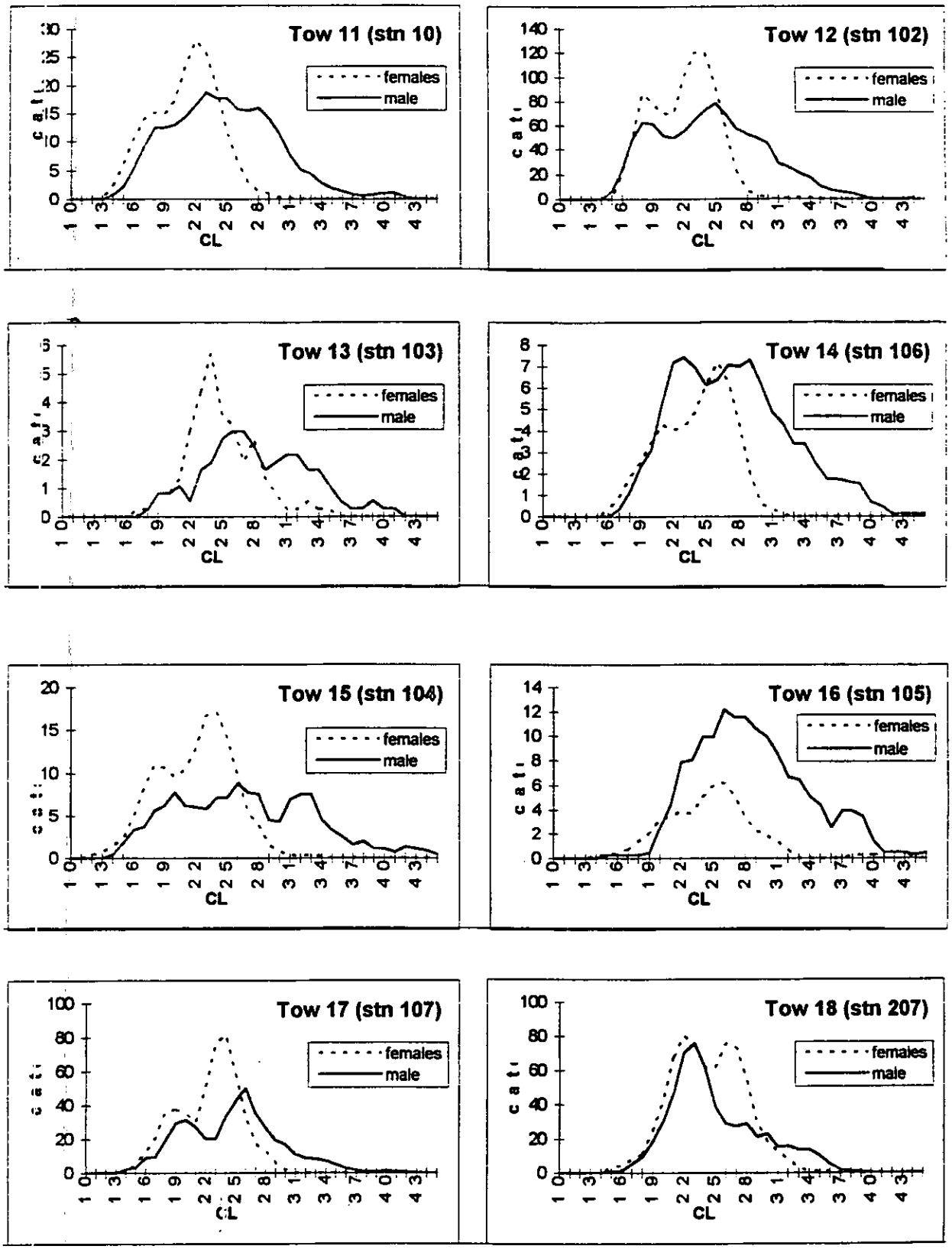

FIGURE 2 SMOOTHED *NEPHROPS* LENGTH COMPOSITIONS BY STATION

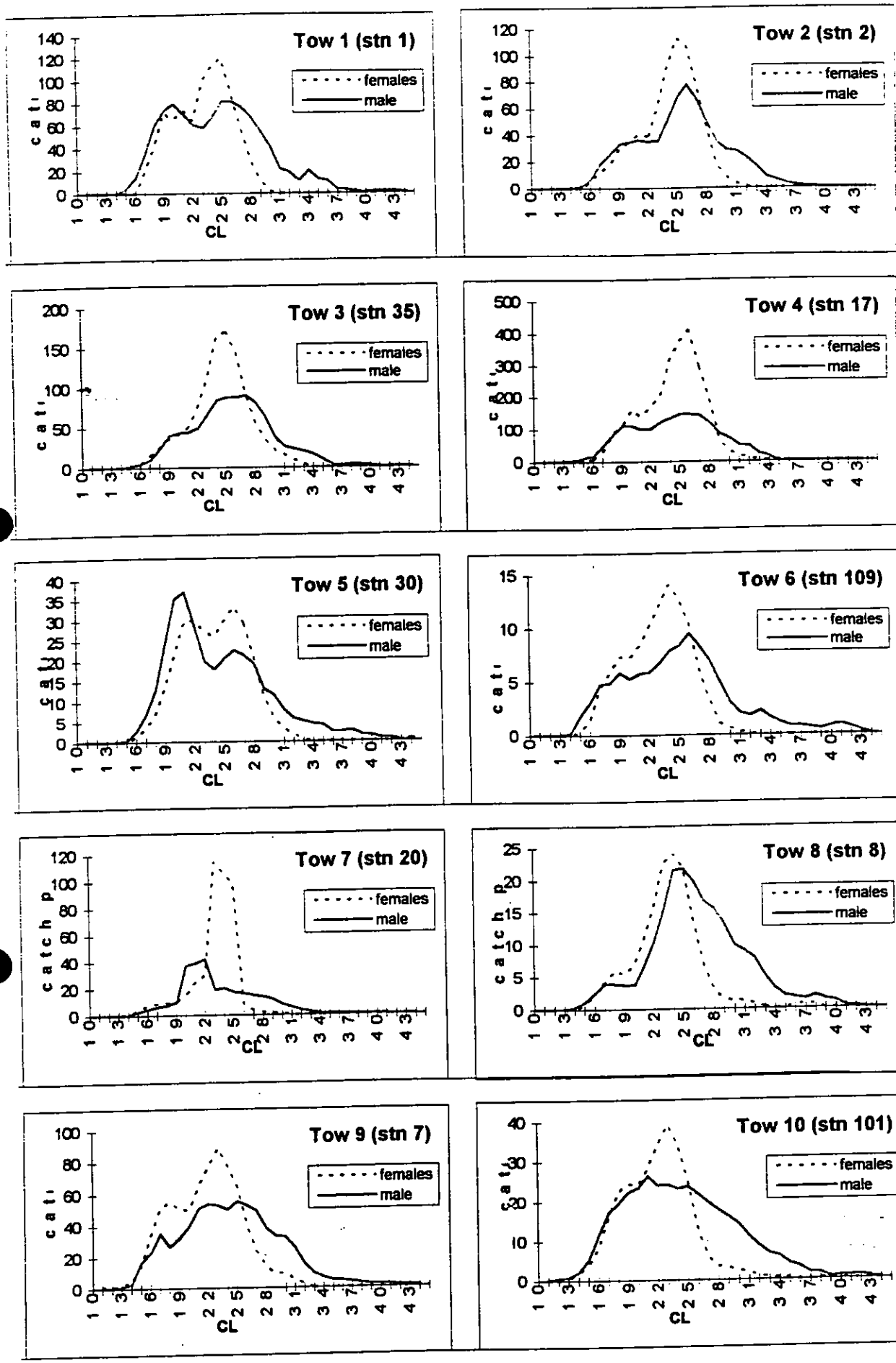

FIGURE 3

Pooled Whiting Catch at Length per nautical mile

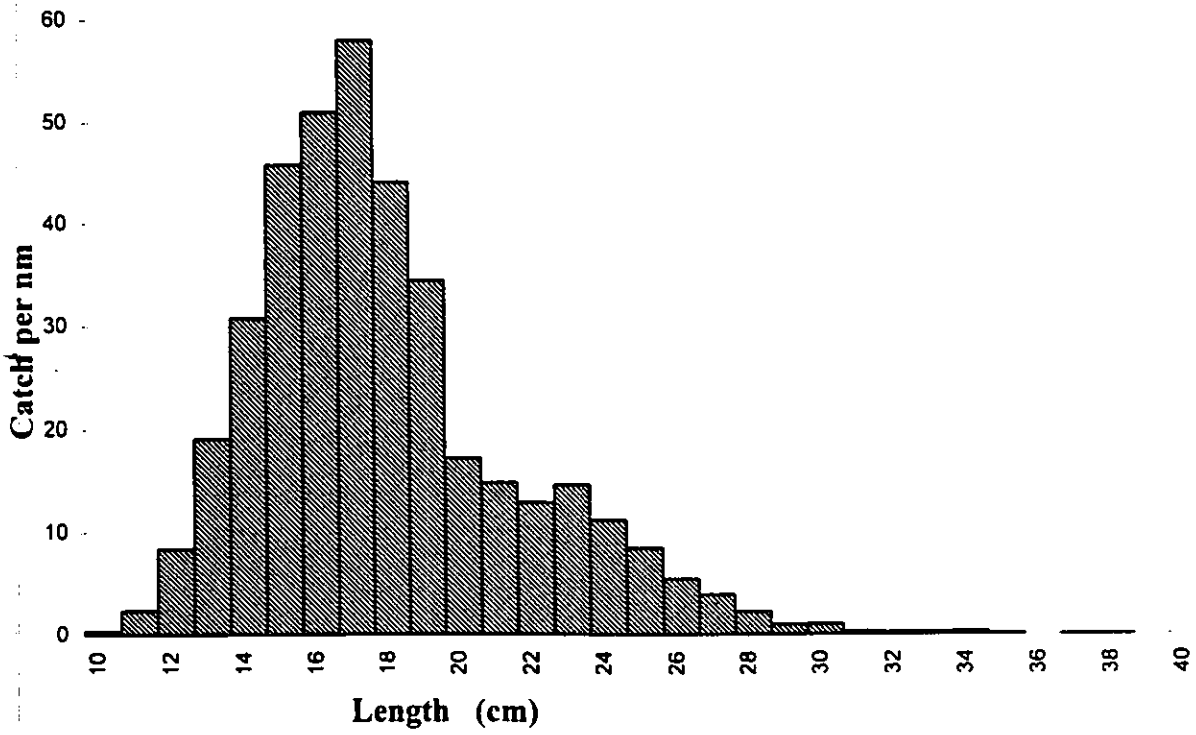

FIGURE 4

Pooled Haddock Catch (Total catch from all tows)