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DEPARTMENT OF AGRICULTURE FOR N. IRELAND  
AQUATIC SCIENCES RESEARCH DIVISION

CRUISE REPORT: CRUISE LF/16/92 DEMERSAL FISH SURVEY

VESSEL: R.V. Lough Foyle (DANI)

DATES: 21 June - 4 July

AREA OF OPERATION: Irish Sea (North); ICES Division VIIa

TYPE OF SURVEY: Otter trawl

PERSONNEL:	M. Armstrong,	SSO	(SIC)
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OBJECTIVES

1. To obtain indices of abundance of juvenile gadoids to facilitate predictions of stock-size and yield of recruited fish in future years;
2. To investigate the diets of predatory fish species in relation to the distribution and relative abundance of their fish prey, with particular emphasis on predation on commercial species;
3. To obtain further information on distribution of different age-classes of fish to facilitate interpretation of data from commercial catches;
4. Obtain information on distribution and relative abundance of cephalopods.

METHODS

A commercial Rockhopper trawl fitted with a fine-mesh liner in the cod-end was towed for one hour or three nautical miles at the stations shown in Figure 1. Gear and towing procedures were those employed on all previous DANI groundfish surveys.

The catch at each station was sorted to species using a multiple-stage sampling procedure, and length-frequencies were recorded for each species. Subsamples of cod, whiting,

hake and haddock were taken for recording of length and mass, and for removal of otoliths for ageing. Stomachs were taken from samples of predatory fish and frozen for analysis on shore. All squid and cuttlefish were frozen for a project on cephalopods at the University College of Cork.

Immediately after each station, a CTD recorder was deployed to provide information on surface and bottom temperature and salinity.

For the purpose of analysis, the survey area was divided into seven strata defined by depth and substratum (Fig. 1):

Stratum	Region	Depth	Substratum
1	Ards Peninsula - North Channel	< 100 m	Mixed
2	Co. Down - Dublin	< 50 m	Sand and finer
3	Co. Down - Dublin	50 - 100 m	Sand and finer
4	IOM West Coast	50 - 100 m	Sand and finer
5	North IOM	< 50 m	Coarse sediments
6	Solway Firth - Liverpool Bay	< 50 m	Sand and finer
7	Anglesey - IOM	< 100 m	Coarse sediments

Although the stations mostly utilize known trawl lanes, it is emphasized that they have a semi-random distribution within each stratum, with greatest emphasis on strata in the western Irish Sea where highest densities of juvenile gadoids are expected.

#### CRUISE NARRATIVE

21-22 June: Lough Foyle departed Belfast harbour at 22h.30 on 21 June and proceeded southwards to commence the first trawl station (No. 81 off Ardglass) at 06h.50 local time, 22 June. Stations 81, 205, 101, 17 and 87 were completed in light northerly winds. The vessel then drifted off Dundrum Bay during the night. The Fishing Master demonstrated emergency procedures to the scientific staff on the evening of departure. The CTD was switched from the non-conducting hydrographic wire to the conducting wire after the first station, as there was insufficient tension to continuously turn the block that provides the wire-out reading for the non-conducting system.

Tuesday 23 June: Commencing at 06h.00, stations 100, 70, 80, 71 and 11 were completed in calm conditions. The belly of the net was badly torn on station 100, requiring the spare net to be rigged pending repairs. Station 70 was aborted after the Furuno netsonde indicated unusual behaviour of the net, and the station was repeated successfully. During the evening the vessel drifted to the south of station 11.

Wednesday 24 June: Commencing at 06h.00, six stations were completed (88, 208, 89, 73, 78 and 79) in good conditions. The vessel then proceeded to Skerries Bay and dropped anchor at 19h.00.

Thursday 25 June: The anchor was lifted at 05h.55. Stations 92, 75, 90, 56 and 93 were then completed in S to SW winds moderating from 16-18 mph to 10 mph in the afternoon. The vessel then anchored at 18h.30 off Howth.

Friday 26 June: The anchor was lifted at 04h.30, after which five stations were completed (91, 95, 103, 50 and 98) in calm conditions. The vessel drifted during the night before steaming southwards in the morning to fish station 96.

Saturday 27 June: Work commenced at 06h.00, but only four trawls (stations 96, 51, 48 and 216) were carried out because of an increased diversity of species in the catches which resulted in more time spent sorting and measuring fish. On completion of work, the vessel anchored off Peel at 18h.40.

Sunday 28 June: The anchor was lifted at 04h.30 and work commenced at 06h.00. Three stations (97, 46 and 99) were completed in good conditions. The vessel then proceeded to Dublin, berthing at 17h42 at No. 6 Berth on the South Wall. On the way, the spare Rockhopper trawl was removed from the net drum and cleaned pending replacement by the original net after mending in Dublin.

Monday 29 June: The vessel remained berthed in Dublin throughout the day. The damaged trawl net was repaired by the Fishing Master and crew following delivery of replacement netting.

Tuesday 30 June: After casting off at 06h.08, the vessel proceeded to station 94 off Dublin, and thereafter to stations 77 and 76 off the south of the Isle of Man. On completion of work at 17h.30, anchorage was found in Dulas Bay on the Anglesey coast at approx. 21h.15.

Wednesday 1 July: The anchor was heaved up at 04h.50, and the vessel proceeded to fish stations 245, 246, 247 and 249 in easterly winds reaching 25 mph in the afternoon. The vessel then commenced to drift for the night in the vicinity of the next station (243).

Thursday 2 July: Four stations were completed (243, 242, 250 and 259) in 20 mph easterly winds. The vessel anchored off St. Bees Head at 16h.38.

Friday 3 July: The anchor was heaved at 05h.00 and the vessel proceeded to station 257, where work commenced at approx. 06h.00. Four stations were completed (257, 258, 64 and 256) in 20 mph SE winds. On completion of work at 16h.20, the vessel proceeded to the Point of Ayre on the NW Manx coast, where anchorage was found at 19h.15.

Saturday 4 July: The vessel departed at 03h.00 for the first station (83) off Portavogie, commencing work at 06h.00. Three trawl stations were completed in moderate conditions (83, 86 and 35). Having completed the survey at approx. 12h.45, the vessel then dodged off Kilroot while the last catch was being sorted, and then returned to Belfast harbour, berthing at approx. 15h.00.

#### WORK COMPLETED

Fifty one hauls were completed from 22 June to 4 July (Fig. 1). The positions of the trawl stations and the total catches of fish are given in Table 1. The catches of selected species are given in Table 2, by survey stratum. Sixty percent of the total amount of fish caught was sorted to species level, and length-measures were carried out on approximately 36 500 fish. Otoliths were taken from 360 cod, 576 whiting, 286 hake and 23 haddock. Stomachs were removed from approx. 2800 fish and frozen for analysis of prey consumption. Catches of squid and cuttlefish were frozen for a project on cephalopods at the University College of Cork. All trawl data were captured on computer using the Groundfish Survey PC software obtained from T.W. Boon at MAFF, Lowestoft.

The WS Oceans portable CTD was deployed at the end of each trawl station. Stations 41 and 48 gave erroneous readings due to water leakage at the electrical connection.

#### RESULTS

This survey is the third in the time-series of summer young-fish surveys of the western Irish Sea employing the Lough Foyle, and the first summer survey providing coverage of the eastern Irish Sea by this vessel. Indices of abundance of juvenile whiting, cod and hake from these surveys will eventually be included in the assessments of the stocks by ICES, once a sufficiently long time-series becomes available. Information on diet composition of predatory fish collected during the survey will contribute to the formulation of multi-species assessments of Irish Sea fish and Nephrops. The broad spatial coverage of surveys at three

different times of year (March, June/July and September) will provide valuable information on the seasonal distribution of fish species, and indicate regions where potentially high rates of discarding of young fish could be expected.

**ACKNOWLEDGEMENTS**

Thanks are extended to the Captain, Fishing Master, Officers, Engineers and Crew of the Lough Foyle for their enthusiastic cooperation throughout the cruise, and to the Chef and Chief Steward for their excellent catering and service. The Fishing Master and Crew are particularly thanked for successfully mending an extensively damaged trawl net whilst at sea and in Dublin harbour. The scientific staff are acknowledged for their efficient and accurate processing of a very large quantity of samples from a record number of stations for a Lough Foyle trawling survey in the Irish Sea.

Signed:

Scientist in charge..... *M.J. Arnold* ..... date. *4/7/92*.....

Ships master..... *C. Martin* ..... date. *4/7/92*.....

Division Head..... *S.D. Heaney* ..... date. *6/7/92*.....

BLE 1. Cruise LF1692 demersal fish trawl survey:  
 Details of trawl stations

Date	trawl	shooting		hauling			mean depth (m)	dist. towed (nm)	total fish catch (kg)
		time	lat.	long.	lat.	long.			
June	81	5.50	54 14.4	5 24.5	54 11.2	5 23.9	52	3.10	59
	205	8.31	54 14.2	5 19.5	54 11.0	5 21.1	63	3.17	51
	101	10.12	54 08.8	5 18.8	54 06.2	5 18.4	91	2.79	76
	17	12.50	54 07.3	5 31.6	54 05.1	5 34.1	54	2.84	97
	87	14.45	54 03.2	5 40.1	54 00.7	5 43.1	44	3.04	297
June	100	5.10	54 09.8	5 39.5	54 06.5	5 40.8	28	3.40	325
	70	10.18	54 00.2	5 45.8	53 56.7	5 48.3	42	3.71	437
	80	12.30	54 00.5	5 52.2	53 58.7	5 53.0	33	1.89	177
	71	14.07	53 54.6	5 50.6	53 55.3	5 56.4	38	3.30	818
	11	16.35	53 50.6	5 45.2	53 50.1	5 46.2	57	3.50	278
June	88	5.09	53 55.8	5 39.9	53 52.4	5 40.1	82	3.32	187
	208	7.17	53 47.3	5 45.7	53 43.6	5 45.9	64	3.67	353
	89	9.44	53 48.1	5 54.8	53 51.2	5 56.2	39	3.31	770
	73	11.55	53 50.8	6 04.6	53 52.2	6 08.0	24	3.00	686
	78	13.55	53 48.0	6 04.7	53 46.0	6 01.9	27	2.56	328
	79	15.48	53 43.5	6 00.6	53 40.8	5 57.1	34	3.35	138
June	92	6.00	53 34.3	5 53.5	53 36.6	5 55.1	43	2.47	301
	75	8.04	53 39.8	5 50.0	53 42.3	5 47.5	59	2.97	289
	90	10.30	53 38.3	5 39.6	53 34.7	5 39.7	88	3.22	181
	56	12.43	53 31.8	5 44.3	53 29.5	5 41.8	66	2.73	727
	93	15.05	53 28.6	5 49.3	53 31.6	5 50.0	54	3.07	457
June	91	5.27	53 32.4	5 47.7	53 29.5	5 46.5	72	2.97	689
	95	7.40	53 31.7	5 37.6	53 33.8	5 35.1	96	2.79	60
	103	10.00	53 33.4	5 25.6	53 36.1	5 25.2	91	2.75	52
	50	12.30	53 44.8	5 21.1	53 47.5	5 19.9	79	2.90	552
	98	14.30	53 51.2	5 13.8	53 53.6	5 12.5	66	3.00	183
June	96	5.15	53 49.3	5 06.5	53 52.2	5 04.9	70	3.00	326
	51	7.20	53 51.7	4 58.0	53 54.7	4 59.1	75	3.00	391
	48	9.23	53 59.2	4 58.7	54 02.2	4 59.8	64	3.02	331
	216	13.38	53 57.9	5 10.2	53 55.3	5 12.4	64	3.00	54
June	97	5.12	54 20.5	4 55.2	54 17.6	4 53.8	70	3.00	109
	46	7.27	54 11.4	4 57.4	54 08.4	4 55.6	78	3.00	97
	99	9.29	53 07.4	5 01.7	53 04.7	5 04.2	84	3.02	260
June	94	6.58	53 21.0	5 46.8	53 24.3	5 45.5	62	3.00	310
	77	12.04	53 49.0	4 45.0	53 50.2	4 41.7	78	2.27	123
	76	15.05	53 59.0	4 29.1	53 59.9	4 26.0	41	2.04	120

TABLE 1. Cruise LFI692 demersal fish trawl survey:  
 (CONTD.) Details of trawl stations

Date	trawl	time	shooting		hauling		mean depth (m)	dist. towed (nm)	total fish catch (kg)
			lat.	long.	lat.	long.			
1 July	245	5.20	53 31.5	4 17.2	53 30.4	4 12.5	41	3.00	410
	246	7.50	53 28.9	3 49.0	53 28.9	3 43.2	33	3.32	278
	247	11.10	53 33.2	3 29.0	53 35.7	3 32.6	31	3.00	493
	249	14.06	53 46.5	3 39.8	53 47.9	3 44.5	35	3.00	278
2 July	243	5.23	53 47.2	4 08.1	53 49.4	4 11.5	45	3.00	115
	242	8.12	54 04.6	4 01.2	54 07.5	4 02.1	31	3.00	320
	250	11.10	54 04.2	3 36.3	54 07.1	3 37.3	31	3.00	416
	259	13.23	54 15.4	3 40.1	54 18.0	3 42.8	37	3.00	184
3 July	257	5.15	54 27.1	3 47.1	54 25.0	3 43.8	24	3.00	228
	258	8.07	54 18.5	3 54.3	54 21.6	3 55.0	35	3.00	425
	64	11.53	54 35.3	3 43.3	54 38.3	3 45.0	22	3.00	230
	256	14.15	54 37.8	3 56.7	54 36.9	4 02.1	41	3.00	246
4 July	83	5.18	54 21.8	5 17.4	54 24.8	5 18.4	88	3.00	72
	86	7.49	54 35.3	5 25.5	54 37.6	5 26.3	40	2.38	96
	35	10.45	54 43.4	5 41.1	54 44.2	5 37.6	12	2.17	361

Cruise IF/16/92: catches of selected species in kg per tow.

STN.	dist. towed	COD	WHITING	HAKE	HADDOCK	POUTING	POOR COD	NORWAY POUT	HERRING	SPRAT	PLAICE	DAB GURNAARDS	LESSEE SP. DOG	SPEC. NEPHEU DOG
35	2.17	4.95	32.60		11.60		.03		.88	255.00	.47	.08		38.00
86	2.38	4.98	57.70	.82	2.04		4.53	.06	1.39	.07	1.24	.39	.39	16.90
83	3.00		59.40	.62		.34	2.86	.77	.47	.85	.51	.31	.23	4.71
81	3.10	.09	26.27	3.83	.02		.24	.16	5.86	11.83	.35	1.62	.99	4.87
100	3.40	13.63	126.30	3.70	83.31		6.80		5.17	13.65	29.27	11.58	2.57	10.08
87	3.04	5.80	92.97	1.75	30.02		.41		38.38	104.10	3.62	.56	.72	6.25
70	3.71	.22	89.16	1.37	41.37		.05		103.20	177.20	2.29	.82	.32	4.80
80	1.09	1.22	53.52	1.57	1.96		2.66		10.56	82.00	5.01	.63		10.12
71	3.10		72.43	3.22					7.00	720.00	1.48	.05	.53	4.86
73	3.00		16.61	.44					38.00	625.00	.74	.82	.40	1.72
89	3.31		65.40	1.45				.04	180.00	518.00	2.83	.54	.28	
78	2.56		13.87	.17					10.60	298.00	1.42	.88	.04	
79	3.35		66.29	.41			.04		14.16	48.20	4.56	.68	.08	
92	2.47	1.15	263.00		4.00		1.69	.10	6.93	.39	12.04	3.18	1.16	
94	3.00	3.27	182.00		18.60		32.90	15.80	3.03	2.39	19.20	33.80	.54	.80
205	3.17	.46	26.92	4.57	.01		.46	1.67	5.91	1.62	.13		1.09	3.52
101	2.79		65.34	1.58			1.76	1.63	4.50				.56	
17	2.84		78.38	1.71			.17	.39	2.38	2.58	.11	.36		1.94
88	3.32	.54	149.90	10.63	.28		.66	14.72	4.20	1.04			2.87	
11	3.50	.29	166.82	1.76			.30	5.35	19.65	44.22		.05	.65	
208	3.67		282.81	7.70	.22		.41	51.32	6.24	.08		.20	2.26	
75	2.97	.26	254.00	3.92	.92		.07	17.62	3.70	4.95	.45	.50	1.68	
90	3.22	3.44	156.00		.50		.13	14.22	5.99	.19		.21	.44	
95	2.79		50.75		.34		.05	5.30	3.68	.06			.22	
56	2.73	12.20	647.00	.90	12.70		7.08	15.24	13.79	.09	6.04	2.74	3.86	
91	2.97	.93	650.00		9.30		5.76	16.10	.69	.10	1.73		2.46	
93	3.07	13.24	96.20		152.00		13.67	151.00	13.81		7.70	.43	.81	2.81
97	3.00	.28	83.30	.05	.65		1.80	1.98	13.92		.51	.49	.46	.71
46	3.00		78.80	8.22			1.33	.64	2.40		.40	.10	.33	
99	3.02	.27	168.00	9.88			4.74	2.11	49.80			.25	.27	
48	3.02	1.27	100.00	27.30	25.50		48.00	73.50	22.70		.17		1.69	18.30
216	3.00		44.80	.11		.18	.75	4.00	.97	2.46			.52	
98	3.00		139.00	7.83			.44	23.25	10.44		.51		1.15	
96	3.00	5.48	235.00	16.24	2.67		13.38	41.25	1.25				1.15	1.84
51	3.00	2.47	175.00	7.09	64.20	2.74	28.90	47.50	2.35		2.88	2.60	1.41	33.00
50	2.90	2.25	493.00	2.33			4.17	45.94	.34		.22		1.86	
103	2.75	7.19	24.42	4.42	.00		5.08	6.82	3.06	.02			.35	

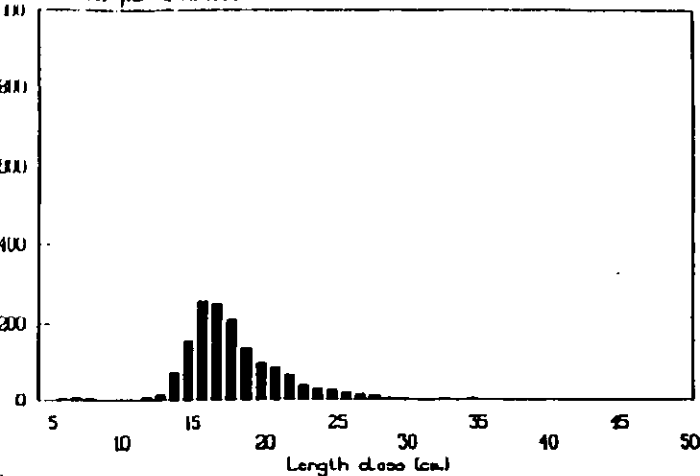
Cruise LF/16/92: catches of selected species in kg per tow.

STN.	dist. towed	COD	WHITING	HAKE	HADDOCK	POUTING	POOR COD	NORWAY POUT	HERRING	SPRAT	PLAICE	DAB	GURNAEDS	LESSER SP. DOG	SPUR NEPHROD DOG
256	3.00	2.00	178.00	.69		1.46	11.00		5.44	.04	16.30	4.26	2.70	13.40	1.57
64	3.00	.20	159.00			.29	.28		4.85	2.37	10.12	20.20	10.30	9.09	4.55
257	3.00	3.35	171.00			6.85	5.09		9.21	19.45	5.34	2.74	.40		
258	3.00	25.50	314.00	.57		4.51	6.15	.22	26.80	.94	9.12	20.90	.14	1.07	5.10
259	3.00	.99	171.00			.50	3.92	.02	1.81	8.94	6.10	1.65	.10		4.40
250	3.00	17.50	320.00			3.11	13.60		11.80	2.29	7.72	22.00	3.60	.99	
242	3.00	2.58	153.00	2.04			3.84		28.60	3.16	2.20	1.52	7.00	79.00	31.00
249	3.00	12.75	179.00	1.30		.95	2.25		37.10	.44	12.67		2.09	4.80	
247	3.00	50.20	219.00	1.09		3.71	57.20		22.40	.67	13.54	53.90	19.40	8.64	
246	3.32	8.75	65.90	1.15		10.82	47.60		14.95	1.54	3.18	.96	5.80	78.50	
76	2.04	.13	8.83	14.15	1.41		4.25		40.50			.31	2.70	25.00	9.34
77	2.27	4.86	41.80	9.15	22.20	.34	17.02	.30	3.06	.05	3.21	1.04	3.76	9.94	
243	3.00	9.13	20.00	5.28		3.22	1.73		9.37		.30		6.93	30.70	11.50
	3.00	38.70	190.00	1.42		8.00	14.50		6.35		.10	2.34	2.17	79.50	



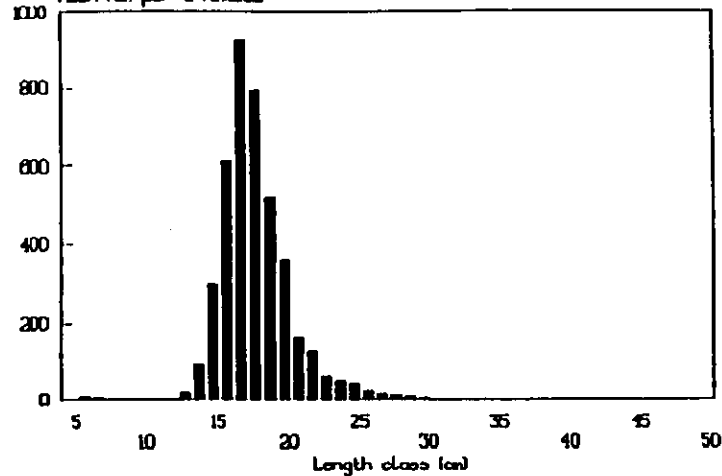
LF1692 WHITING Stratum 2

Mean No. per 3 nautical miles



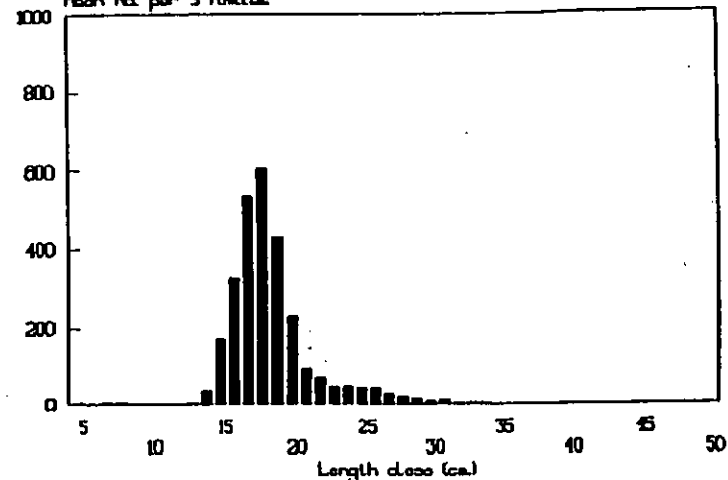
LF1692 WHITING Stratum 3

Mean No. per 3 nautical miles



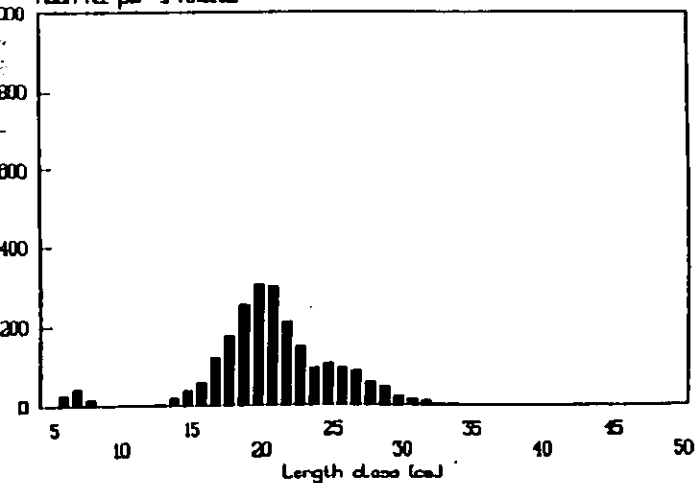
LF1692 WHITING Stratum 4

Mean No. per 3 nautical miles



LF1692 WHITING Stratum 6

Mean No. per 3 nautical miles



LF1692 WHITING Stratum 7

Mean No. per 3 nautical miles

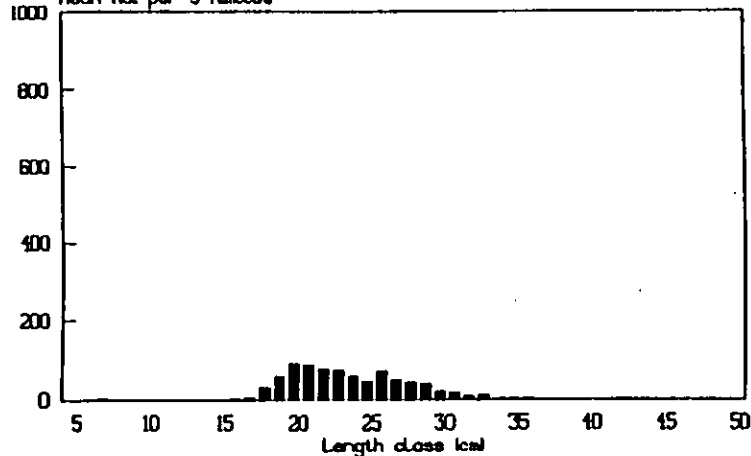


Figure 2. Length frequencies of whiting (in mean numbers caught per 3 nautical miles towed) by survey stratum (see Fig. 1) during the June/July 1992 groundfish survey on R.V. *Lough Foyle*. One-year-old whiting (approx. 14-21 cm) were most abundant in water of 50-100 m depth between the Isle of Man and Ireland (strata 3 and 4). Highest densities of