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AQUATIC SCIENCES RESEARCH DIVISION

PART 1.

CRUISE REPORT: CRUISE LF/20/93: Dundalk Juvenile Gadoid Survey

VESSEL: R.V. Lough Foyle (DANI)

DATES: 22 July-25 July 1993

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

TYPE OF SURVEY: Pelagic survey with MIK net and Gulf III

PERSONNEL:	M. Collas	HSO (S.I.C.)
	C. Reavey	SO
	J. Peel	ASO

OBJECTIVES

1. To investigate the distribution of pelagic juvenile gadoids in the vicinity of Dundalk Bay.
2. To collect otoliths to investigate the growth rates of juveniles in the area.
3. To compare the selectivity of MIK nets during darkness and light.
4. To test the design of the MIK net and Gulf III type high speed plankton sampler.
5. To further improve the ichthyoplankton survey methods on *Lough Foyle*.

METHODS

During the first four days, a Methot Isaacs Kidd (MIK) net was to be deployed twice at each station during the hours of darkness, and at 8 stations to make light/dark comparisons. This was to be repeated during the following four days. However due to equipment failure the cruise was abandoned after many attempts to repair the net.

CRUISE-NARRATIVE

Thursday 22 July 1993

All scientific crew boarded by 09:00 and the *Lough Foyle* left the dock at 10:10. By 19:00, the *Lough Foyle* was on station (No. 24, 05°35.25'W 53°35.00N) and the MIK nets and Gulf III were ready for deployment. The MIK net was initially deployed without the cod-end attached so as to test the Furuno transponder. However whilst in the water, the net

broke at a seam and had to be resewn. At 21:00, the survey was delayed as the cooling system of the hydraulics failed. It restarted at 23:15.

The MIK net was deployed, for Haul 1, at 23:20. The net broke again at the same seam, and further tears were noticed. However the sample was taken. The CTD was lowered, and then a Gulf III was used to take the final sample at station 24 but the sampler hit the seabed and the haul was considered invalid. It was decided to try using the Gulf III at station 23 ($05^{\circ}43.50'W$ $53^{\circ}35.00N$), so the ship moved to position. The Gulf III was successfully deployed twice (Haul 3 and 4) and the CTD was lowered.

As the Gulf III caught few fish larvae, and no post-metamorphic fish, work was suspended at 03:30. It was hoped that the netting of the MIK net could be repaired the following day. The *Lough Foyle* anchored off Howth.

Friday 23 July 1993

Net makers in the Howth area, and ASRD, were consulted by 09:00. Further enquiries to net makers in Belfast, HEYN, and a further inspection of net of the MIK net, lead to the decision to return to Belfast. At 10:00, the *Lough Foyle* took up anchor and began the journey back to Belfast, docking at 18:30. Apart from the seams coming apart the netting was very brittle and easily ripped. Apparent glue drops on the net seemed to have caused further damage to the mesh. The net was sent to J. Cavanagh from Greencastle, C. Donegal, for repairs.

Saturday 24 July 1993

In dock at Belfast.

Sunday 25 July 1993

The scientists returned to ship by 10:00. The ship sailed at 16:30 from Belfast, and the MIK net was tested at $05^{\circ}25.17'W$, $54^{\circ}43.90N$ at 18:30 hrs to a depth of 115 metres. The test failed, as only the frame and the depressor (with Furuno attached) returned. The mesh of the net had ripped away just below the collar. The ship then returned to dock.

RESULTS

Despite the failure of the netting on the MIK net, the cruise successfully showed that the design of the MIK net frame and depressor was suitable for gadoid pre-recruit studies. The scientific staff gained valuable experience on the deployment of ichthyoplankton samplers, and the sorting and preservation of samples. The Gulf III samplers performed well and the deployment and hauling techniques were improved.

Otoliths of 40 pelagic 0-group whiting were collected. They will be vital for comparisons with the otolith microstructure of demersal 0-group whiting collected during the cruise LF-18-93.

ACKNOWLEDGEMENTS

The work of the crew, the master, fishing skipper, and other officers is gratefully acknowledged. Their help, advice and good will ensured that the cruise proceeded well despite the failure of the scientific equipment. The help of Mr Walsh is also greatly appreciated. Colm Reavey and John Peel are also acknowledged for their patience, hard work and enthusiasm throughout the cruise.

Signed:

Scientist in charge..... *M. Collins* date..... *26/7/93*

Ships master..... *[Signature]* date..... *25/7/93*

Division Head..... date.....

DEPARTMENT OF AGRICULTURE FOR N. IRELAND
AQUATIC SCIENCES RESEARCH DIVISION

CRUISE REPORT: CRUISE LF/20/93 Part 2: Dundalk Juvenile Gadoid Survey

VESSEL: R.V. Lough Foyle (DANI)

DATES: 5 August-9 August 1993

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

TYPE OF SURVEY: Pelagic survey with MIK net and Gulf III

PERSONNEL: M. Collas HSO (S.I.C.)
J. Peel ASO

OBJECTIVES

1. To investigate the distribution of pelagic juvenile gadoids in the vicinity of Dundalk Bay.
2. To collect otoliths to investigate the growth rates of juveniles in the area.
3. To compare the selectivity of MIK nets during darkness and light.
4. To study the rate of specimen shrinkage in alcohol and formaldehyde solution.
5. To further improve the ichthyoplankton survey methods on Lough Foyle.
6. To collect juvenile squid for Martin Collins of University College Cork.

METHODS

The Methot Isaacs Kidd net was deployed to 5m above the sea bed, twice at each station (Figure 1) over the four nights. The catch was sorted, the fish identified, and then weighed. Individual lengths and weights of all whiting were taken and a subsample of the catch had their otoliths removed for further microstructure analysis. The stomach contents of these whiting was also noted. At four stations (4, 10, 12, 22), two extra hauls were taken during daylight to compare the selectivity of the nets during light and darkness. At all stations the CTD was lowered to 10m above the sea bed, to determine the stratification of the water column.

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Samples of pre-measured juvenile whiting were individually preserved in either 98% ethanol or 4% buffered formaldehyde, or frozen, to monitor the shrinkage caused by fixation and preservation. Juvenile squid were preserved in 4% buffered formaldehyde. Plankton samples from the Gulf III hauls were washed and immediately fixed in 4% buffered formaldehyde.

CRUISE-NARRATIVE

Throughout this report each night is referred to by the date of the proceeding day.

Thursday 5 August 1993

All scientific crew boarded by 11:50. The Lough Foyle left the dock at 12:05 and proceeded to the net test site in the North Channel, off Belfast Lough ($05^{\circ}25.17'W$, $54^{\circ}43.90N$). At 14:10 the MIK net manufactured by IC Trawl, Howth, was deployed to 100m and retrieved intact. The Lough Foyle steamed to station 4 (Figure 1). The two daylight comparisons were made at 20:00, and then the survey proper began at 21:30. After station 4 the Lough Foyle proceeded to stations 3, 2, 7, 8 and 12, working south down the grid. Due to the break of day, only one haul was taken at station 12.

The Gulf III was deployed at 06:00 at station 12. A cod end of the MIK was lost during its second deployment at station 8, due to a large catch of jellyfish. Work finished at 06:30.

Friday 6 August 1993

The Lough Foyle drifted during the day. Work began at 19:30 with the first daylight deployment at station 12. Then stations 11, 15, 16, 20, 24 and 23 were surveyed throughout the night. The net proved sturdy, but two codends were damaged. Work finished at 06:45 and the Lough Foyle drifted during the day.

Saturday 7 August 1993

The new Spartel net was tested during the daylight hauls, and found to be much more resilient than the previous Spartel net. The daylight hauls were taken at station 22, and the night hauls commenced at 21:15, using the IC Trawl net. Stations 21, 17, 18, 19, 14, 13 and 9 were surveyed. The period spent at each station was much shorter due to the reduced depth of water. The Lough Foyle anchored off Clogger Head for the day.

Sunday 8 August 1993

Work began at 19:30 at station 10, 5 hauls were made (two daylight, one Gulf III and two night). Stations 6 and 5 were surveyed. Station 1 was completed by 12:45 and the Lough Foyle headed for Belfast.

Monday 9 August 1993

The Lough Foyle docked in Belfast at 7:00.

RESULTS

All stations were surveyed successfully (59 MIK and Gulf III hauls), one invalid haul occurred at station 8. O-group whiting and sprat dominated the catch inshore whereas euphausiids dominated off-shore (Figure 2, up to $1g/m^3$). The density of sprat reached levels of $272 mg/m^3$ in the shallow water (station 1, Figure 3) and the O-group whiting were more abundant at stations in the centre of the survey area, up to 10×10^{-3} per m^3 , at $50 mg/m^3$ (Stations 9 and 10, Figures 4 and 5). Haul 52, at station 10 caught no fish or crustacea. This was probably due to an early net blockage by jellyfish.

788 whiting were measured, and the otoliths of 361 whiting were collected for primary increment analysis. Six shrinkage experiments were initiated. The results of the daylight/darkness comparisons of whiting catch showed no obvious trends, not helped by the nil catch of haul 52, at station 10. However more sprat were caught during darkness (mean catch: $0.01mg/m^3$ whilst light, $10.70 mg/m^3$ whilst dark, at stations 4, 10, 12 and 22).

ACKNOWLEDGEMENTS

The work of the crew, the master, fishing skipper, and other officers is gratefully acknowledged. Their help, advice and enthusiasm ensured a very successful cruise. John Peel proved himself invaluable, his conscientious hard work, reliability and input were vital in the laboratory and on deck; picking out small fish from the tentacles of jellyfish is no pleasant task.

Signed:

Scientist in charge..... *M. Collos* date..... *9/8/93*

Ships master..... *Mitchell* date..... *9th August 1993*

Division Head..... *K. P. J. Khan* date..... *11 August 1993*

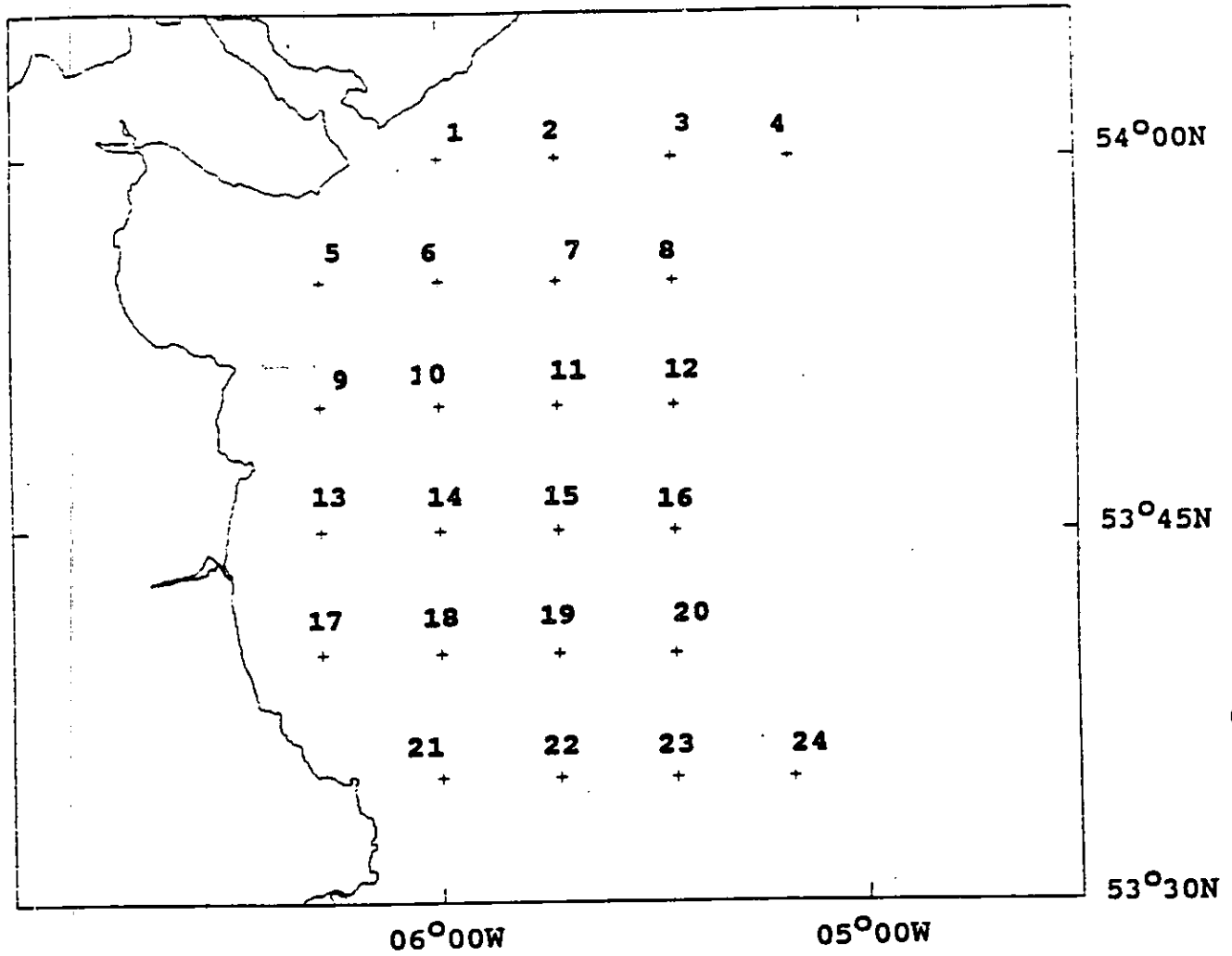
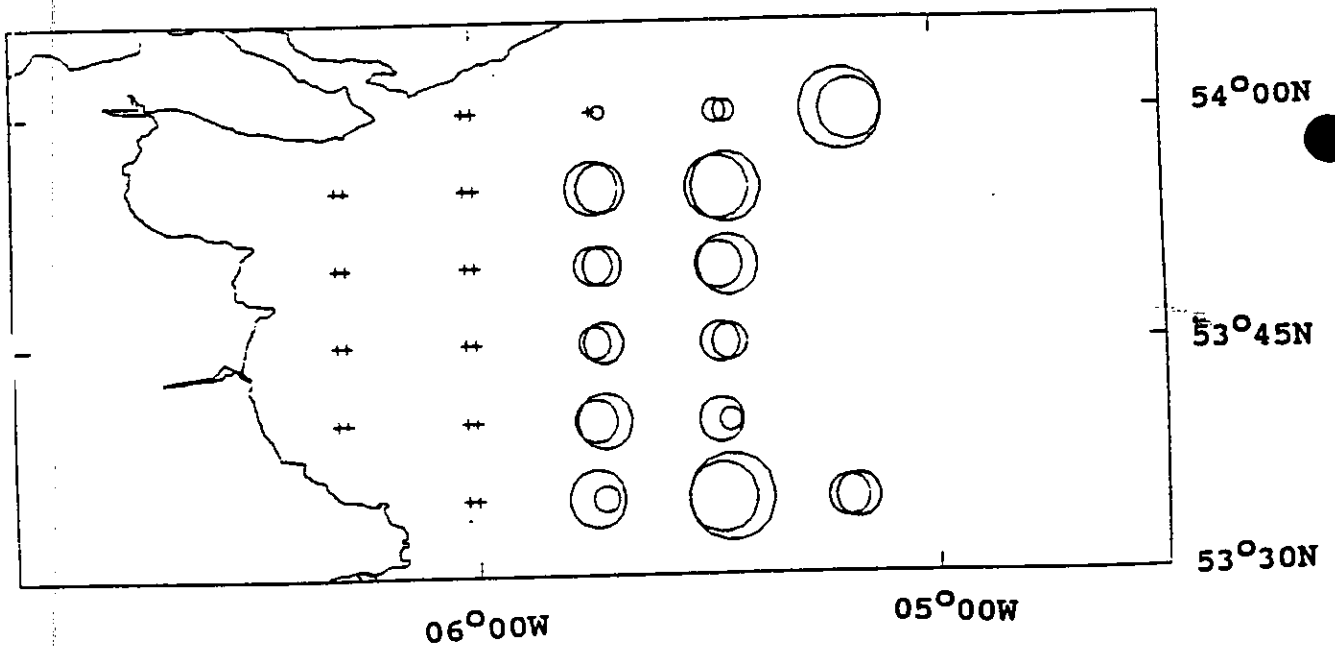


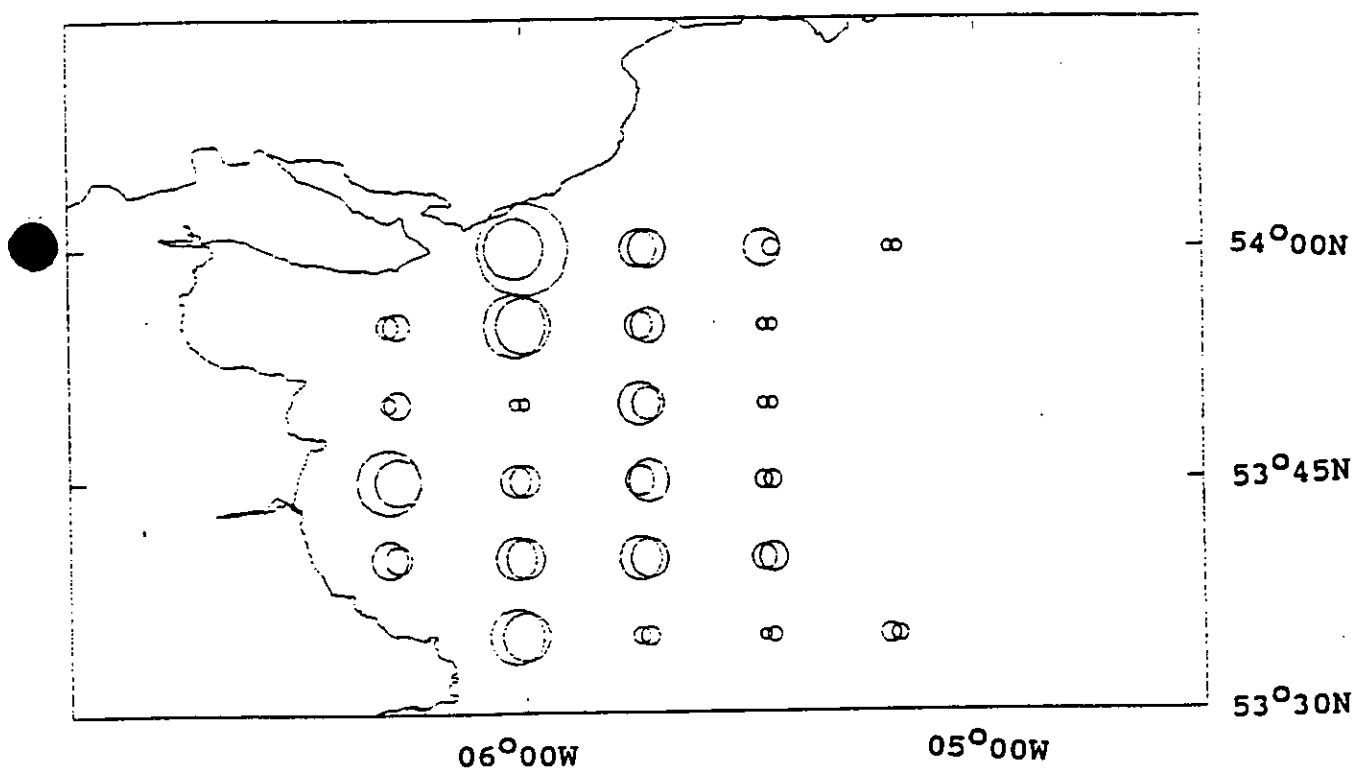
Figure 2
mg of euphausiid per m³ caught on LF2093



- KEY**
- + = 0 mg per m³
 - = 200 mg per m³
 - = 1000 mg per m³

Figure 3

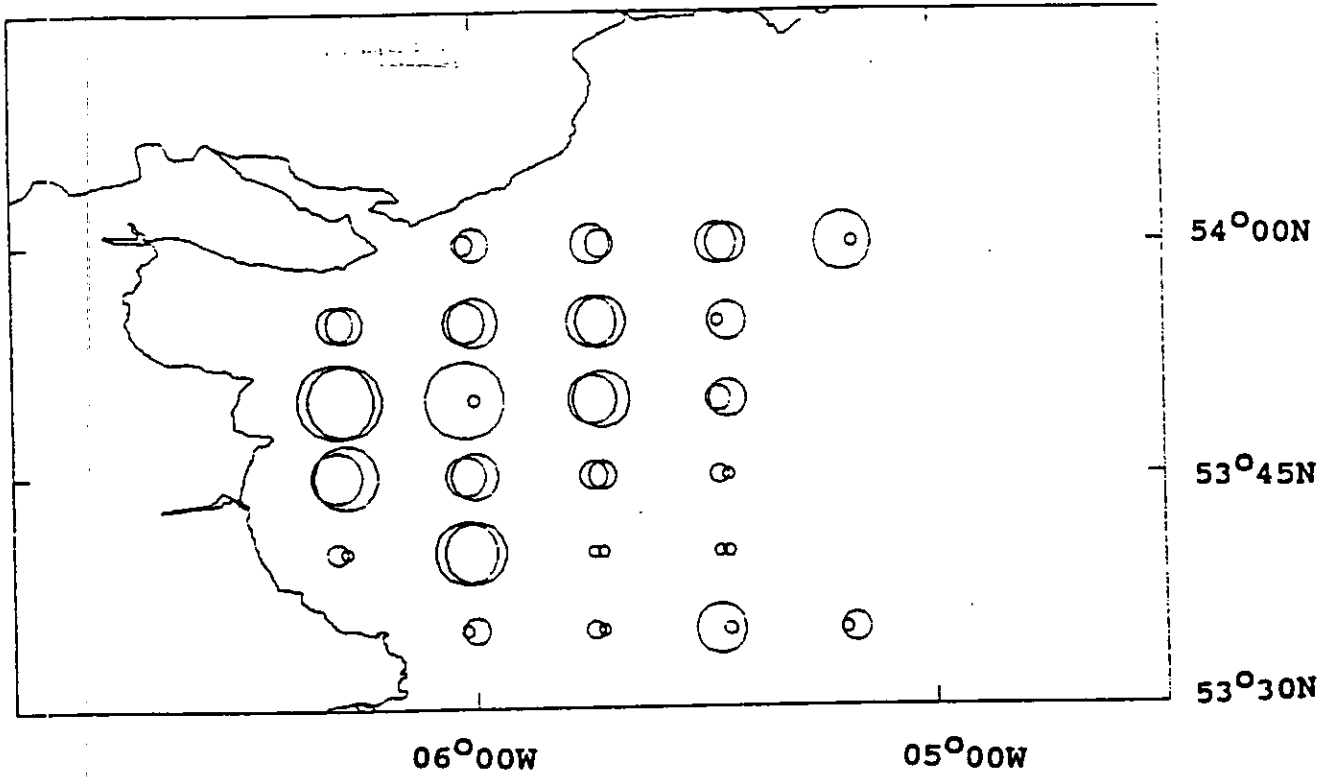
mg of O-group spores per m³ caught on LF2093



KEY
○ = 0 mg per m³
○ = 20 mg per m³
○ = 100 mg per m³

Figure 4

No. of 0-group whiting per m³ caught on Lf2093

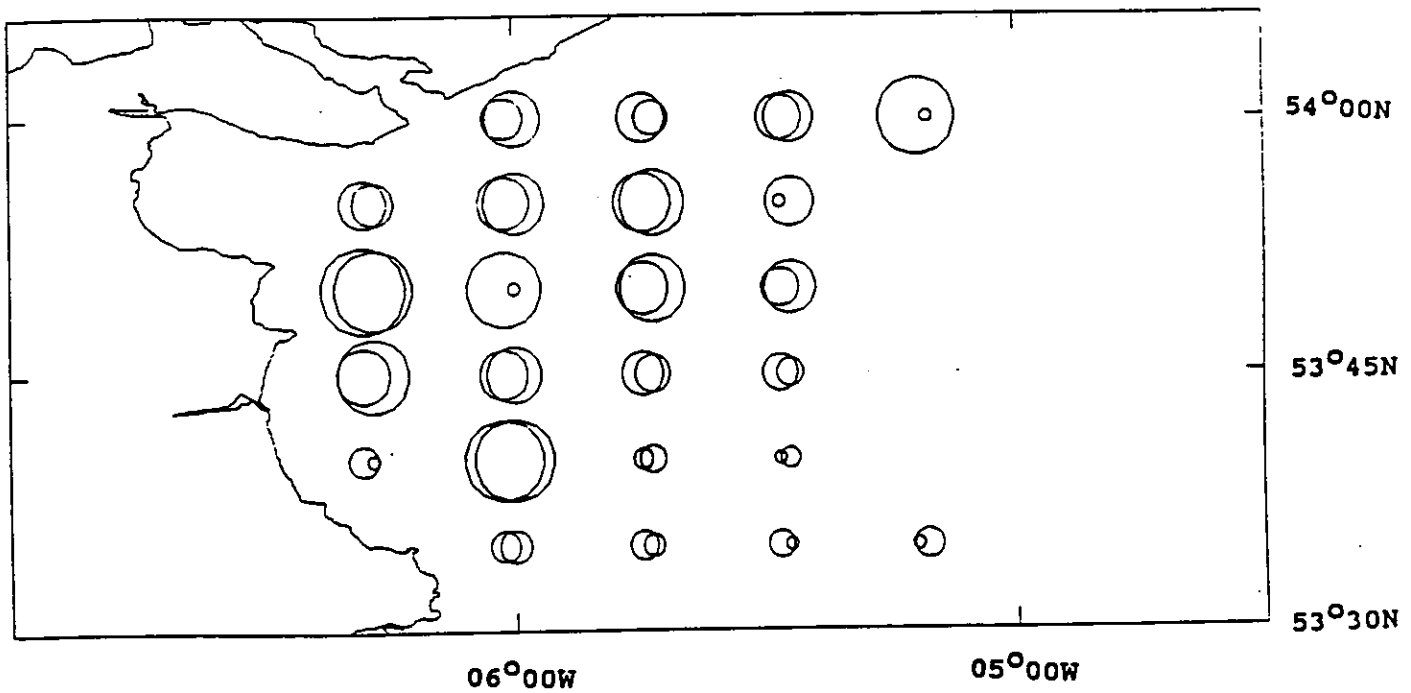


KEY

- = 0 per m³
- ◐ = 5 x 10⁻³ per m³
- ◑ = 10 x 10⁻³ per m³

Figure 5

Mg of O-group whiting per m³ caught on LF20⁰³



KEY
○ = 0 mg per m³
○ = 20 mg per m³
○ = 40 mg per m³