CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE LOWESTOFT LABORATORY, SUFFOLK, NR33 0HT

2000 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 3.

STAFF:

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M. Dunn
N. Bunn
M. Shaw
I. Holmes (5 - 17 April)
P. Welsby (5 - 17 April)
T. Dinmore (5 - 17 April)
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O. Heffernan (University College, Dublin) (19 - 27 April)

DURATION: 5 – 27 April 2000 (All times are GMT)

LOCATION: Irish Sea

AIMS:

1. To conduct a plankton survey using a 76cm Gulf VII plankton sampler to determine the distribution and abundance of cod (*Gadus morhua*) and plaice (*Pleuronectes platessa*) eggs.
2. To sort fresh plankton samples for fish eggs in the size range 1.1 – 2.0mm. The eggs are to be frozen individually for subsequent identification using iso-electric focusing.
3. To carry out a plaice and cod population survey using a Portuguese high-headline trawl (PHHT).
4. To collect biological information and samples of mature plaice and cod.
5. To continuously measure surface nutrients using an auto-analyser provided by DARD, Belfast.

Aims 1 – 4 are in support of project C0798: Irish Sea egg production and estimation of spawning stock biomass (SSB).

NARRATIVE:

RV CIROLANA sailed from Lowestoft at 09:30h on 5 April and proceeded to the Irish Sea to complete a grid of plankton stations in conjunction with RV CELTIC VOYAGER (Marine Institute, Dublin). Good progress was made in fine weather and sampling began south-west of Anglesey at 20:25h 7 April (Figure 1). Communication with RV CELTIC VOYAGER the next day revealed that she was plankton sampling, working north along the Irish coast. It was decided that RV CIROLANA would sample the plankton stations in the eastern Irish Sea and close contact was maintained with RV CELTIC VOYAGER to ensure that all 105 designated

plankton stations would be completed. RV CIROLANA continued sampling in fair weather, working north on east-west transects, until the last of 49 stations was completed at 14:30h, 10 April in the mouth of the Solway Firth.

The Portuguese High-headline trawl (PHHT) was then rigged with Scanmar sensors and tickler chains. Trawling began at 16:09h 10 April to sample fish for aims 3 and 4 (Figure 2). Three fishing stations were completed in the mouth of the Solway by 19:45h the same day. The following morning one trawl station was completed in Wigtown Bay. With light catches in all four tows it was decided that a fine mesh liner would be sewn into the cod-end of the trawl. A second tow on 11 April was completed in Luce Bay but during the third tow (Stn 55) the trawl came fast after just 3 minutes on the bottom. The doors and net were recovered, fortunately just before the port warp parted. On closer inspection it was discovered the eye splice on the starboard warp was also weakened and both warps required re-splicing before work could continue. RV CIROLANA steamed south-west to the next fishing position west of the Isle of Man while repairs were carried out. This station was successfully completed by 20:00h 11 April.

The following day (12 April), six PHHT stations were completed west and south of the Isle of Man in worsening weather. Strong north or north-east winds were forecast for the next few days and RV CIROLANA steamed overnight to more sheltered waters off the Cumbrian coast. Trawling continued over the next five days, with few problems except an intermittent fault with the headline Scanmar sensor. The final PHHT haul was made 15nml east of Dublin (Figure 2) at 16:30h 17 April with a good catch of small haddock. A course was then set for Dublin, where RV CIROLANA docked at 20:45h for a mid-cruise break and to exchange staff.

A reception was held aboard RV CIROLANA on the evening of 18 April for staff from the Marine Institute and University College, Dublin. The catering staff of RV CIROLANA provided an excellent buffet, and are to be congratulated for their efforts in helping to make the evening such a success.

RV CIROLANA sailed from Dublin at 09:45h 19 April and plankton sampling began about one hour later close to the Dublin pilot station (Figure 3). The second grid of 105 plankton stations was initially worked on short, east–west transects, northwards along the Irish coast. Progress was hampered by strong to gale force south-east winds during the next 48 hours which made it necessary to tow the sampler before the wind. The wind began to ease after daybreak 21 April enabling better progress around the plankton grid. One station in the entrance to Belfast Lough was not sampled to enable the sampling schedule to be maintained. The weather remained fair during the rest of the plankton grid and sampling was completed at a station south-west of Anglesey at 02:03h 25 April. One final trawl haul was completed at a position west of Milford Haven to try to resolve Scanmar problems before RV CIROLANA set course for Lowestoft, docking at 15:00h, 27 April.

RESULTS

Aim 1. Plankton sampling

RV CIROLANA completed 49 of the 105 stations on the first plankton grid (Figure 1) during the period 7-10 April. RV CELTIC VOYAGER successfully completed the remainder of this grid, mainly in the western Irish Sea. The Gulf VII plankton samplers used by both vessels were fitted with 280μm mesh nets and auxiliary, fine mesh (64μm) 'pup' nets were attached to the frames. Two plankton samples were collected on each sampling position following agreed

sampling protocols. The Guildline CTD used by RV CIROLANA provided flowmeter readings as well as salinity and temperature profiles for each double oblique plankton station. RV CIROLANA completed a second grid of 104 plankton stations during the period 19-25 April (Figure 3).

The plankton sampling indicated that plaice spawning was nearly over, with low densities of mainly late stage eggs in Liverpool Bay and off the Irish coast. Cod size eggs were also found in low concentrations indicating that spawning was also near completion. Few sampling problems were encountered on either grid except clogging of the nets on stations close to the coasts of North Wales and Ireland. The abundance of phytoplankton on some stations was enough to prevent the sorting of eggs for the iso-electric focusing work.

A Chelsea Instruments CTD continuously logged sea surface temperature and salinity throughout the cruise. Unfortunately, a temporary fault (subsequently thought to be caused by aeration) may mean that about two days of salinity data is unreliable. Discrete surface seawater samples were taken at alternate plankton stations and at least once a day when trawling to provide a salinity calibration for both the Guildline and Chelsea CTDs.

Aim 2. Sampling eggs for Iso-Electric Focusing.

Samples of fish eggs from the 280μm mesh plankton nets were removed from each plankton sample before preservation. Eggs in the size range 1.1 – 2.0mm were sorted, measured and staged before being individually frozen for subsequent identification using iso-electric focusing. Samples were collected from 34 stations on the first grid.

A member of staff from University College, Dublin joined RV CIROLANA at the mid-cruise break. This enabled some eggs collected on the second grid to be processed whilst still fresh using the iso-electric focusing technique. Unfortunately, problems with the homogenising agent meant that the resulting gels did not stain sufficiently to enable the species of eggs to be determined. Samples of eggs were collected from 65 stations on the second grid and most will be returned to Dublin to be analysed.

Aim 3. Plaice and cod population survey.

The Portuguese high-headline trawl (PHHT) was fitted with Scanmar door/distance and headline height sensors, which were logged to a PC, every station. The trawl was towed for 30 minutes at all stations, except where the Scanmar readings indicated a problem, in which case the trawl was hauled early. The PHHT was deployed at 51 stations (Figure 2), only one of which (stn 55) was invalid.

Catches were processed as standard Groundfish survey hauls, with total weight and length composition for every fish species, being recorded. At each station all plaice caught were sorted by sex, categorised as immature or mature, weighed and measured. Length stratified samples of plaice otoliths were collected (see text table below). Otoliths were also collected from mature female haddock and from all cod, sole and monk. All otolithed fish were measured, weighed individually, sexed and assigned a maturity stage.

Station details, together with catch, length and biological data were input to the Fishing Survey Suite (FSS). Catches were generally light except on two occasions (stns 62 and 85) when over 1.3 tonnes of herring were caught and on the last trawl haul (stn 100) where nearly 0.5 tonne of small haddock were captured.

Text table showing number of valid trawl hauls and number of otoliths taken by stratum.

Stratum	1	2	3	4	5	6	7	Total
No. of PHHT hauls	1	6	3	2	9	14	15	50
No. of otoliths taken. Plaice (female)	2	125	55	2	41	77	199	501
Plaice (male)	5	106	17	0	3	75	143	349
Cod (female)	0	4	2	0	4	28	1	39
Cod (male)	0	6	10	1	6	48	2	73
Haddock	0	9	0	3	28	9	0	49
Sole	0	0	2	0	0	1	0	3
Monk	0	0	0	0	2	0	0	2

Aim 4. Biological samples from mature plaice and cod.
Ovaries were collected from all mature plaice, cod and haddock for subsequent assessment of fecundity and atresia rates. Only 14 plaice ovary samples were collected as all except nine fish (all from the Cumbrian coast) had finished spawning.

A total of 112 cod were caught, of these only 39 were female, and most of these were either immature or spent. Four cod ovaries were collected. Haddock ovaries were collected from 45 mature fish to provide fecundity data for this species in the Irish Sea. Haddock are appearing more frequently in commercial catches in the Irish Sea and it may be possible to estimate the Spawning Stock Biomass (SSB) from the year 2000 egg surveys if fecundity data are available.

Aim 5. Measurement of surface nutrients.
An automatic nitrate analyser was installed aboard RV CIROLANA before sailing, by staff from DARD, Belfast and SOC, Southampton. The equipment was plumbed into the surface seawater supply and left running. Two surface seawater samples were collected and frozen every plankton station to provide a check on the automatic system. One sample will be sent to DARD and the other will be analysed at CEFAS to provide information on the concentration of nitrates in surface seawater across the Irish Sea. The auto-analyser was removed by DARD staff whilst RV CIROLANA was in Dublin, to enable its preparation for a following cruise.

Aim 6. Addition aim: Collection of phytoplankton samples.
Surface seawater samples were collected from 19 plankton sampling stations and preserved in Lugols Iodine. These samples were collected for DARD, Belfast and it is hoped that funds will become available for these samples to be analysed by the CEFAS plankton laboratory.

S. Milligan (SIC)
26 April 2000

SEEN IN DRAFT
Master:
Senior Fishing Mate:

INITIALLED

DISTRIBUTION

Basic list
Staff on cruise
M Pawson
M Armstrong (DARD, Belfast)
R Gowan (DARD, Belfast)
P Connolly (Marine Institute, Dublin)
B Danilowicz (University College, Dublin)
R Nash (PEML, Port Erin, Isle of Man)
P Witthames
FCO (for Republic of Ireland)
Sea Fisheries Committees:
Cumbria
North Western and North Wales

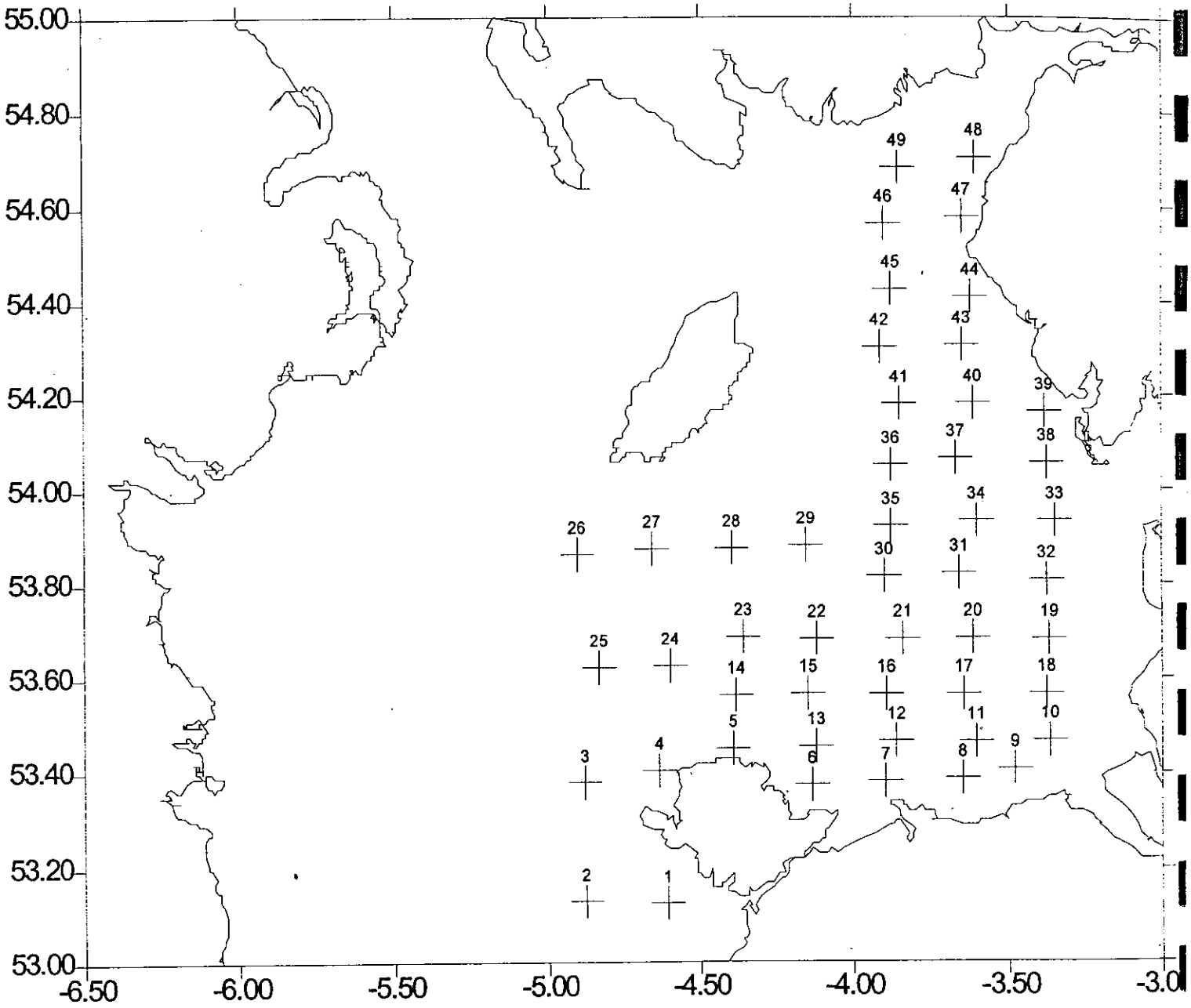

Figure 1 : Cirolana 3/2000 Grid 1 Plankton station positions

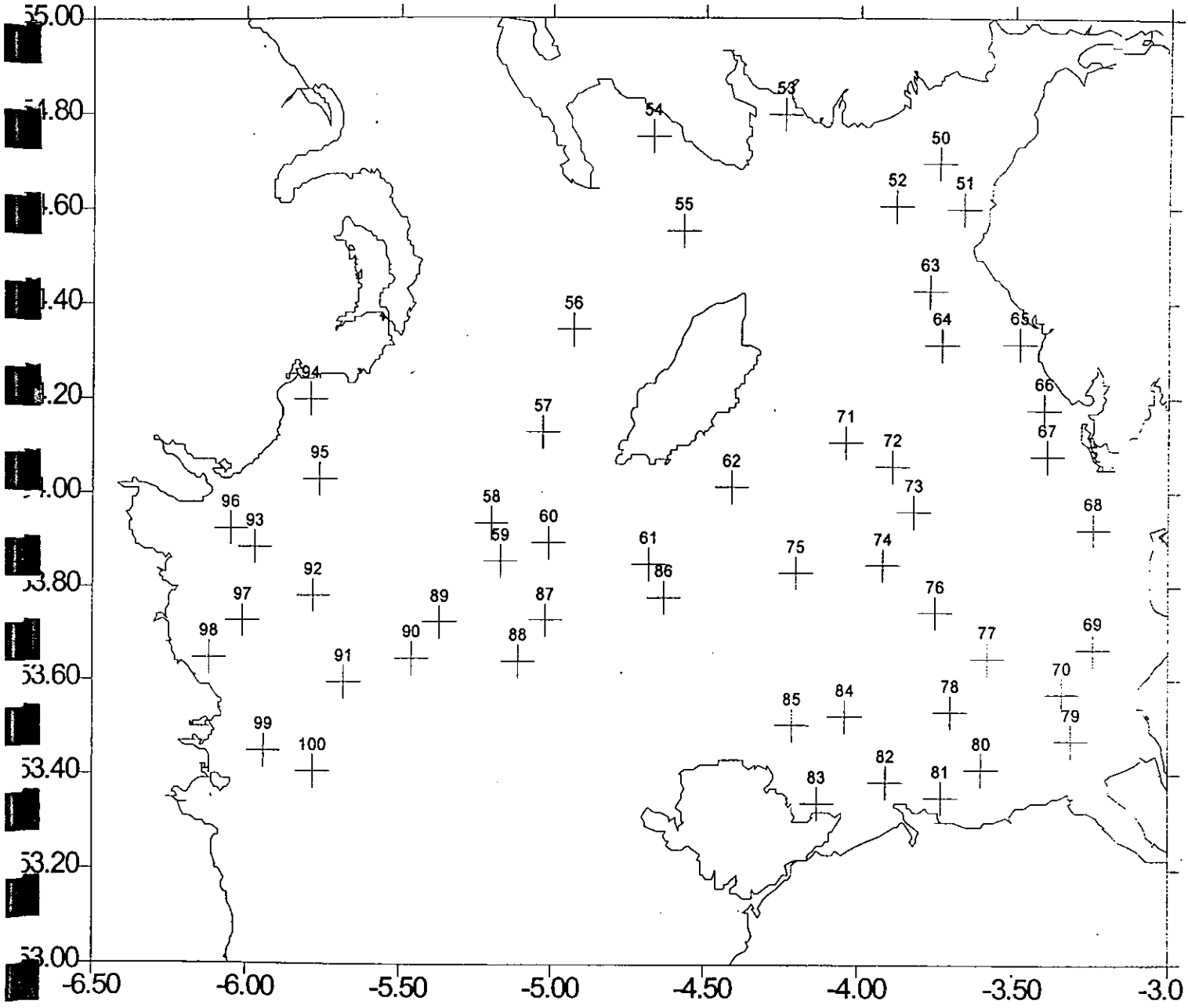

Figure 2 : Cirolana 3/2000 PHHT station positions

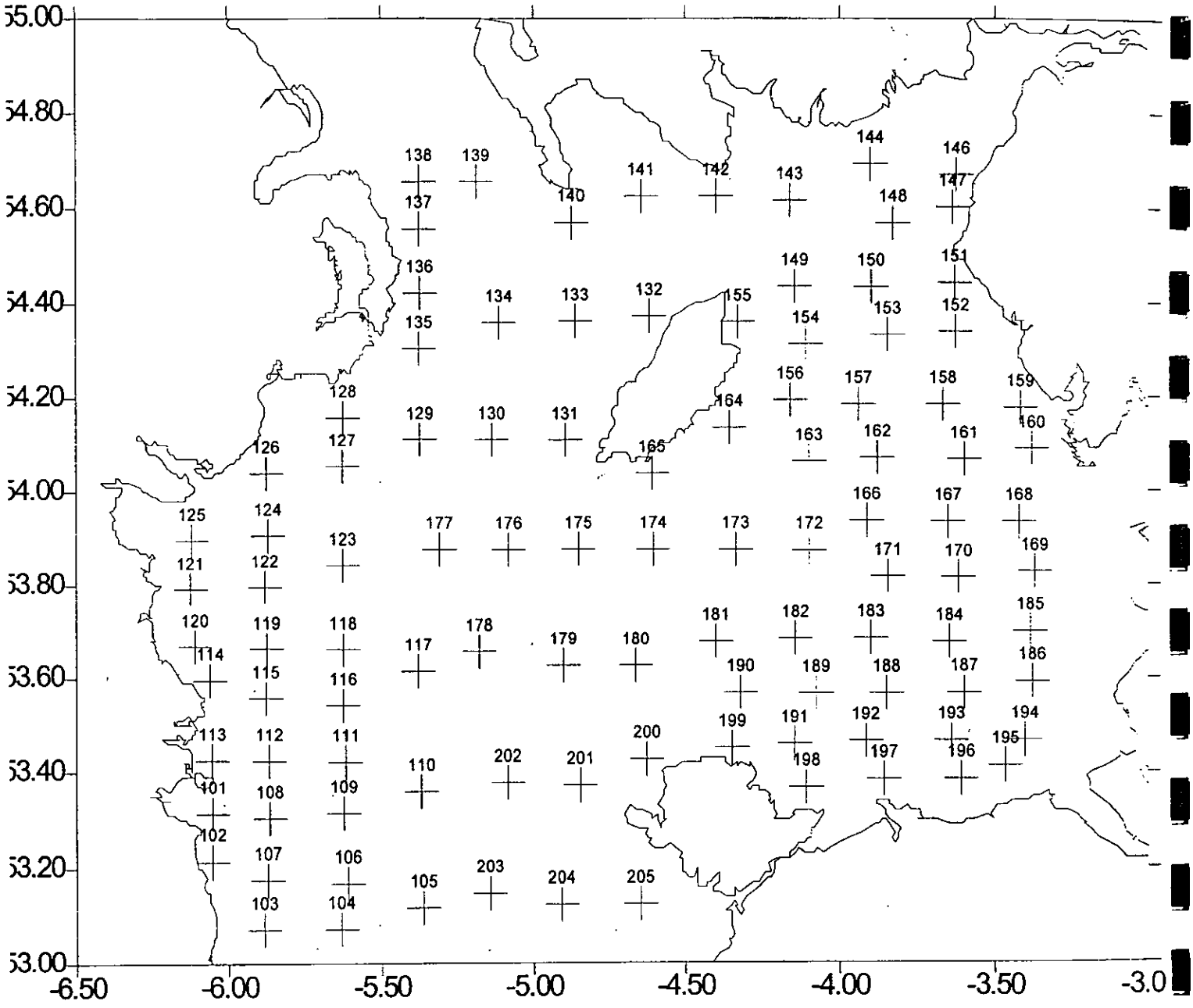

Figure 3 : Cirolana 3/2000 Grid 2 Plankton station positions