jh Indexed SAR PD

NB. Also see report for Part 1.

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1988 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 4/88 Parts 1 and 2.
(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

Part 1. K Brander SIC
D Conway)
A Lundley)
N Collins)
M Jordan) IMER
A Pomeroy)
N Halliday)
I Firkin)
S Milligan
R Flatt
C Hood to 15 April

Part 2. J H Nichols SIC
L E Woolner
A B Thompson
J T Addison
R P Flatt
G M Haynes
R T Harrop
R Chapman
K Winpenny
A Menz (O.D.A.)

DURATION

Part 1. Left Lowestoft 1230h 8 April
Arrived Holyhead 0930h 21 April

Part 2. Left Holyhead 1800h 21 April
Arrived Lowestoft 2305h 4 May

All times are Greenwich Mean Time

LOCALITY

Irish Sea

AIMS

The first part of the cruise was devoted to work by staff from IMER.

1. To determine the rates and processes of primary and secondary production in different regions of the Irish Sea.

2. To assess the vertical and horizontal availability of food for fish larvae in relation to hydrographic conditions.

3. To determine the nutritional status of fish larvae in relation to feeding conditions.

4. To determine particle size distribution in relation to hydrography and larval feeding.

5. To construct a C/N budget of the production transformation and fate of biogenic particulates.

6. To study predation on the larvae of fish.

NARRATIVE

The ship sailed from Lowestoft at 1230h GMT and steamed directly to Plymouth, docking at 1400h GMT on 9 April to pick up IMER staff and sailing again at 1700h GMT. Test deployments of the UOR rosette system and MIK net were carried out on 10 April and the first series of UOR tows and rosette samples across from Anglesey to the Irish coast commenced. The dual frequency integrator system was run continuously during this transect. The remainder of the first half of the cruise consisted of daily deployments of the light and primary production rig, UOR tows, acoustic transects, three day and night LHPR deployments, larval fish sampling with the HSTN and ring nets and numerous rosette samples for analysis of production and particles.
On 15 April C Hood was put ashore at Holyhead in order to attend a meeting in Ostend. The first part of the cruise ended on 21 April, when CIROLANA docked in Holyhead at 0930h GMT. CIROLANA sailed from Holyhead at 1800h GMT on the same day, after changing staff and off-loading the IMER equipment.

The second half of the cruise was dedicated to aims 2, 3, 4 and 6 and was directed principally at cod larvae. Sampling began on a coarse grid of HSTN stations in the western Irish Sea at 0520h 22 April (figure 2). This was completed at 1034h 24 April and was followed by finer scale sampling in the area where cod larvae had been located. The following five days were spent sampling both within and around the edges of this patch on the aetiology of the cod larvae distribution. Samples were taken using the standard HSTN, 2m ring net, Methot Isaacs Kidd midwater trawl and the CTD rosette sampler used for nutrient Chl 'a' and particle profiling. Five Engel midwater trawl hauls were done on 28/29 April to look for potential larvae predators.

On 29/30 April an exploratory grid of 29 HSTN stations was sampled to the east of the Isle of Man between latitudes 53°55'N and 54°35'N (figure 2). Larvae collecti tows and a CTD rosette deployment were subsequently made in an area just off the Cumbrian coast (latitude 54°18'N) where small cod larvae had been found. On route back to the western Irish Sea 'patch' a line of CTD and HSTN stations was sampled across latitude 54°05'N between the Isle of Man and the Irish coast. These samples were taken in relation to horizontal changes in salinity, to examine the resultant differences in plankton species distribution.

Further fine scale sampling with the HSTN in the cod larvae patch was done on 1/2 May. Larvae collection tows and CTD rosette deployments were also made during this period. Finally a transect of five HSTN stations southwards out of this patch was completed at position 53°16'N; 5°45'W by 2250h 2 May. Course was then set for Lowestoft with the work programme having been completed without interruption by the weather. After a fine passage CIROLANA docked in Lowestoft at 2305h 4 May.

RESULTS

Part 1.

1. A detailed cruise report will be written by D Conway, the IMER scientist in charge, covering the results from their work. The free floating light and primary production rigs were damaged twice. The first time in Dundalk Bay an

Irish fishing vessel hauled them out of the water just before CIROLANA returned in the evening and removed all the shackles, the weight and the VHF radio. The second time in the eastern Irish Sea a trawler towed through the rig in flat calm conditions and perfect visibility and damaged several sensors so that it could not be deployed again. Nevertheless prior to this the rig had been deployed successfully several times.

2. The dual frequency integrator system gave several very useful comparisons with UOR transects and with individual LHPR tows. Much of the data has been processed on board. It was very unfortunate that C Hood was called back to attend a meeting because the second long UOR transect from Anglesey to Ireland showed that the hydrographic regime and productivity had changed very greatly and a comparison of the acoustic properties would have been valuable. However since the 120 KHz transducer seemed to have developed a fault just prior to his leaving the ship he might not have been able to carry on in any case. The winch arrangement for deploying the towed body is still very unsatisfactory and caused damage to the transducer cover on almost every deployment, even in calm conditions. If no change can be made then a large rubber mat might help to prevent damage as it swings inboard.

3. Several samples of cod larvae were picked out of ring net hauls close to positions where studies of particulates and primary production were being carried out. They were preserved for the analysis of condition factor and feeding.

Part 2.

1. (aim 2). A patch of 5-15mm cod larvae was located in the western Irish Sea, NE of Rockabill in association with thermally stratified water and in an area of high plankton biomass. Cod larvae abundance was low (max $5.6m^{-2}$) but there were large numbers of other larvae present including dab, witch, some sprat and Nephrops. This patch was sampled twice during the cruise with surveys seven days apart during which time the cod larvae appeared to have moved 10-15nml to the south. Cod larvae up to 20mm were found on the second survey, but such size differences between the two surveys seem unlikely to be due to growth. During the surveys surface temperature, salinity, chlorophyll 'a' and nutrients were monitored continuously together with V depth profiles of temperature, salinity incident light and chlorophyll 'a' from the HSTN. Fine mesh samples (30 micron aperture) were also taken from the auxilliary net on the HSTN. They will be used to quantify the abundance of potential food items in the area.

   A single series of similar observations were made in a patch of recently hatched cod larvae off the Cumbrian coast. These will be used to compare the larval environment in the two areas.

   The LHPR system failed with both the MAFF control and the IMER battery systems. As a compromise the vertical distribution of cod larvae in the western Irish Sea patch was examined using rapid deployment and recovery of the standard HSTN. Samples were taken from above the thermocline, within it and below it over a 24 hour period. Preliminary examination of the samples suggested that the fish larvae were found mainly within and above the thermocline.

2. (aim 3). Numerous collection tows, either with the 2m ring net or HSTN, directed at cod larvae were made in the western Irish Sea (25, 26, 29 April, 2 May) and off the Cumbrian coast and SE of the Isle of Man (30 April). On each occasion samples of approximately 30-50 larvae were measured and preserved frozen for condition analysis. Similar numbers were also measured and fixed in 90% alcohol for gut content analysis and age determination. All the cod larvae examined on board (western Irish Sea only) were feeding heavily on copepods and copepod nauplii.

3. (aim 4). A total of 10 profiles of particle size vs depth were taken in the western Irish Sea patch and across the boundary of the stratified water into the mixed area to the east. A single profile was also taken in the patch of young cod larvae off the Cumbrian coast. Samples were analysed on board using the MAFF Coulter counter and an Apple microcomputer and software kindly left on board by IMER staff. In the stratified water of the western Irish Sea particle size and abundance was greater above the thermocline. In the mixed water and off the Cumbrian coast particle size distribution and abundance was more evenly distributed with depth.

4. (aim 6). Two concerted attempts were made to tackle the problem of catching and identifying the predators on fish larvae, neither of them appearing to have yielded a major breakthrough at this stage of sample analysis. The Methot Isaacs Kidd trawl survey of 14 stations produced very small catches of fish and fish larvae.

   Five Engel trawl hauls, 3 in daylight, one in the dark and one at dawn, produced only small catches of less than 1 basket of sprat with a few whiting and sandeels. Samples were fixed in formalin for subsequent examination at the laboratory. The few sprat and small whiting examined on board were all feeding heavily on zooplankton but no recognisable remains of fish larvae were seen.

   The large numbers of small hydromedusae taken in the HSTN and ring net hauls must also be considered as potential larvae predators.

GENERAL

The plankton sampling systems on this cruise generally worked well. Some problems however did arise which should be recorded for the future

Salinity readings on the standard HSTN were suspiciously low and were calibrated against the rosette CTD on a number of profiles. This Guildline unit requires recalibration immediately on return to the laboratory. Any change in the calibration must be incorporated into the outputs from the logged files.

No further problems were experienced with the Scanmar depth recorder on the MIK net once the unit had been fully charged. The tube deployment of the receiver by the crew worked well. However it is advisable for the scientific staff to retain ultimate responsibility for checking that the receiver has been raised before the ship steams.

The failure of the MAFF modified LHPR system was entirely due to a faulty motor and was not related to the modifications which had been made.

Varying pressure on the clean sea water supply caused some problems with continuous monitoring systems in particular with the autoanalyser. The cause was never clearly identified and the problem may recur from time to time.

Once again shipboard modifications to computer software had to be made in order to achieve the same outputs that were available on previous cruises. This has become a niggling problem on recent plankton cruises in spite of clear specifications of the software required. Enhancements made on a particular cruise are not being satisfactorily documented and stored for future use. It was fortunate that staff on board (Woolner, Flatt and Thompson) were sufficiently experienced to make the modifications.

J H Nichols
K Brander
16 May 1988

SEEN IN DRAFT: Master, G Sinclair
Fishing Skipper, R C Newrick

INITIALLED: DJG

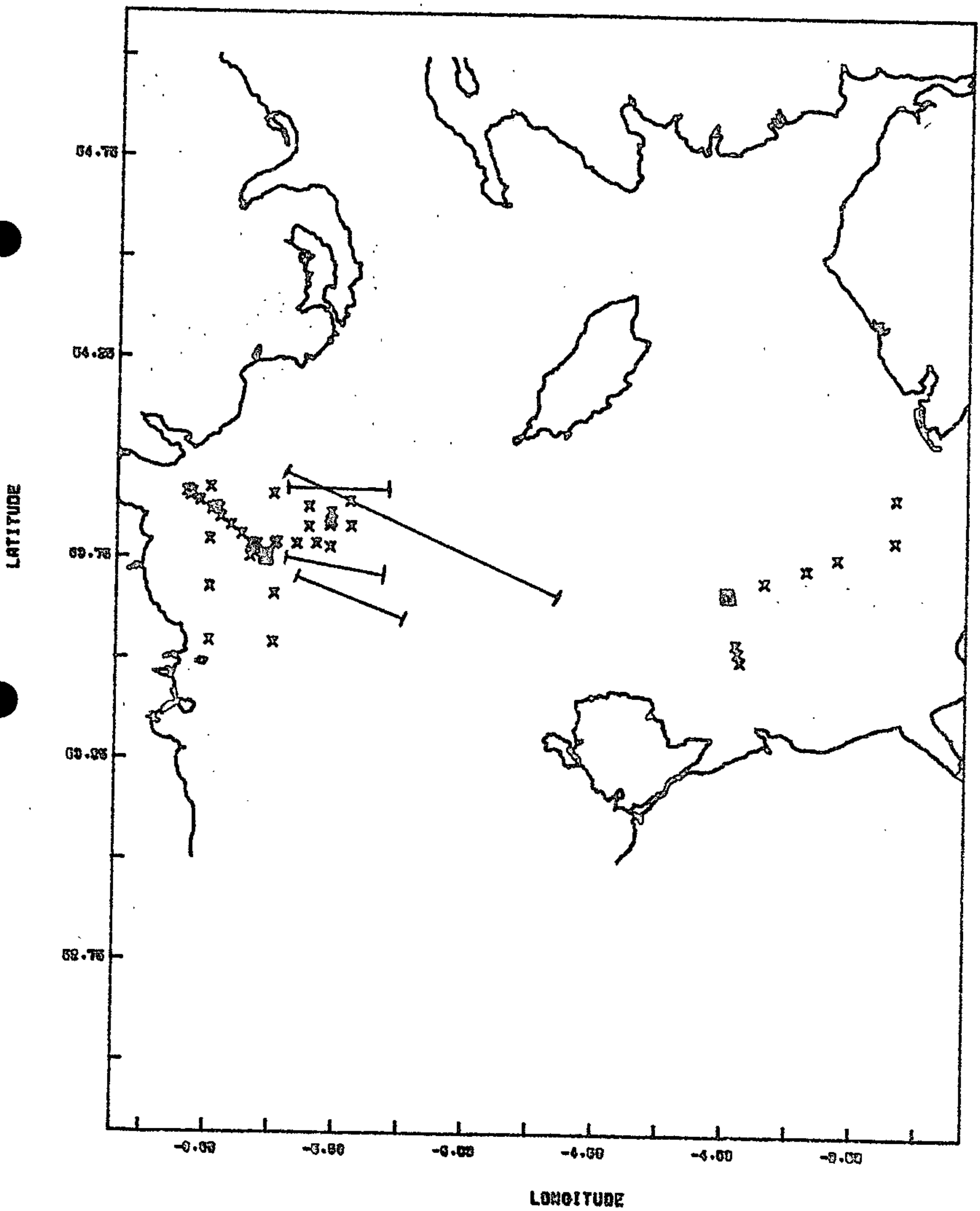
DISTRIBUTION:

Basic List +
K Brander
D Conway)
A Lundley)
N Collins) IMER
M Jordan)
A Pomeroy)
N Halliday)
I Firkin)
S Milligan
R Flatt
C Hood
J Nichols
L E Woolner
A B Thompson
J T Addison
R P Flatt
G M Haynes
R T Harrop
R Chapman
K Winpenny
A Menz (O.D.A.)

Fig 1

CRUISE TRACK FOR CI4

SHOWING :
STATION POSITION
COASTLINE
▩ PRODUCTIVITY STUDIES.
× H.S.T.N. STATIONS
|———| U.O.R. TOWS



CRUISE TRACK FOR CI4

SHOWING :
STATION NUMBER
COASTLINE