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

1994 RESEARCH VESSEL PROGRAMME

REPORT RV CIROLANA: CRUISE 1

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DURATION: Left Lowestoft 1600h 6 January
Arrived Lowestoft 1415h 19 January

LOCALITY: Eastern English Channel/Southern North Sea

AIMS:

1. To study the transport, feeding and condition of herring larvae in the eastern English Channel and southern North Sea.

2. To quantify the availability of food organisms for herring larvae.

3. To make continuous measurements of sub-surface chlorophyll 'a' fluorescence using the pumped seawater supply. To take discrete surface and sub-surface samples and do shipboard analysis of chlorophyll.

4. To trial the Focus Instruments Optical Plankton counter mounted on the dual LHPR and compare results from the two systems on horizontal tows within the study area.

5. To calibrate the external flowmeter in its new position against an external flowmeter in the old position on both the 76cm and 53cm HSTNs.

6. To make relevant observations and run the UCNW primary production model on a daily basis as a trial.

NARRATIVE:

RV CIROLANA sailed on the afternoon tide 6 January and started a plankton survey in the southern North Sea at 2150h. A cooling fan failure on the plankton sampler winch controls caused a four hour delay during the night and the five stations were not completed until 1000h 7 January. The plankton survey was continued in the Eastern Channel at 2200h and the

fourteen stations completed by 1530h on the following day. A finer grid of plankton sampling stations was then carried out in order to more clearly identify the extent and density of the herring larvae patch located to the SW of the Vergoyer Bank. The NORSWOP model was then used to select a part of this patch which would not drift into the shipping lanes.

Intensive sampling began in the selected patch at 1600h 9 January. During the recovery of a 76cm high speed plankton sampler, at 2000h, the towing wire parted and the sampler was lost. With increasing winds attempts to recover the sampler were postponed until daylight on the following day. A total of fifteen Granton trawl hauls was made, through the loss position, between 0830h 10 January and 0100h 11 January. The sampler was not recovered. The Simrad sonar was operated continuously throughout the search.

Detailed sampling in the herring larvae patch was re-started at 0600h 11 January using the CTD rosette, ring net, and 53cm plankton sampler. The 53cm sampler was deployed regularly, and the samples analysed for herring larvae, in order to maintain contact with the patch.

Two successful trial deployments of the Optical Plankton Counter mounted on a Longhurst Hardy plankton recorder (LHPR) were made on 12 January before work was abandoned in deteriorating weather at 1840h.

On 13 January the vessel steamed to the shelter of the Bay of the Seine where flowmeter calibrations were carried out. On arrival back in the vicinity of the herring larvae patch, 0200h 14 January, it was still not possible to deploy samplers. A grid of plankton sampling stations was started, in improving weather, at 0830h and completed at 0830h 15 January. By this time the original herring larvae patch had drifted to the north-east and appeared to have split. The two distinct patches, one on the Vergoyer Bank and the other 12nml to the south-west, were predicted by NORSWOP as not likely to drift into the shipping lanes over the next few days. The remainder of the cruise was spent in relatively good weather doing detailed sampling, with the CTD rosette, double Longhurst Hardy plankton recorder (LHPR), 60mpi ring net and 53cm sampler, in these two patches of herring larvae.

A further five Granton trawl hauls were made during the morning of 16 January in a final unsuccessful attempt to recover the lost 76cm plankton sampler. Three trial deployments, of the Lowestoft bongo net system, over the starboard quarter, were also made.

In deteriorating weather, plankton sampling had to be abandoned at 2230h 18 January and course was set for Lowestoft, arriving there at 1415h 19 January.

RESULTS:

1. On the initial grid of plankton sampling stations, concentrations of up to $18m^{-3}$ of recently hatched yolk sac herring larvae were found in the Eastern Channel. During a closer sampling grid on the following day their concentration had increased to $30m^{-3}$. On all subsequent samplings herring larvae concentrations decreased to a peak of $7m^{-3}$ on the Vergoyer Bank on the final day. No further new hatchings of herring larvae were recorded.

The initial patch of larvae selected for study was located 10nml south-west of the Vergoyer Bank (latitude 50° 20'N; longitude 00° 50'E). This patch was only sampled for 24 hours before a break in sampling of 30 hours when the plankton sampler was lost. A further 30 hours of sampling was followed by another 36 hour break for bad weather. Subsequent sampling showed that there were two distinct patches of herring larvae south of the shipping lanes, one on the Vergoyer Bank and the other 12nml to the south-west. Both patches were tracked and sampled over the following five days. Regular samples of herring larvae and potential food organisms were taken for subsequent laboratory analysis. A total of 484 individual larvae were freeze dried for length/weight studies, 200 individual larvae were fixed in chloroform/methanol for triacylglyceride analysis, 180 individual larvae were fixed in alcohol (IMS) for otolith studies and bulk samples of larvae, taken in daylight, were fixed in formalin for gut content analysis.

2. The fine mesh (35 micron aperture) auxiliary net was fitted to the 76cm plankton sampler and used to take 31 samples for analysis of potential food organisms for herring larvae. However, this sampler was lost on 9 January. Thereafter, quantitative sampling of potential food organism was achieved with the dual LHPR system (270/20 micron aperture mesh). This was deployed a total of fourteen times in the two patches. Three deployments were a complete failure, two deployments provided fine mesh samples only and the remaining nine were successful. (Problems with the LHPR coarse mesh system were eventually identified and rectified). Twenty-three 250ml water samples, fixed in Lugols iodine, were taken from deployments of Niskin bottles on the CTD rosette. They were taken at the surface, 20 metres depth and near bottom and will be analysed for microzooplankton.

3. Sub-surface sea-water from the ship's clean water supply was pumped continuously through a Turner Design flowmeter throughout the cruise. Chlorophyll 'a' fluorescence was logged at 5 minute intervals via a micro-link to the shipboard VAX computer. Discrete samples for acetone extraction of chlorophyll and phaeopigments were taken from the CTD rosette sampling in the herring larvae patches. The samples were taken at the surface, 20 metres depth and near bottom. They were stored and analysed on board on the last day of the cruise. Chlorophyll 'a' fluorescence and transmissometer profiles were also taken on the 10 rosette deployments.

4. The Focal Technology Optical Plankton Counter was fitted on the LHPR body in place of the fine mesh sampling system for trials. It was deployed successfully on three occasions and operated in full accordance with the manufacturers manual. Two concurrent samples were taken, in the herring larvae patch, with the LHPR coarse mesh system for comparison. The OPC data was stored on disk. The need to manually update the size spectrum display was noted as a serious weakness. However, it may be possible to overcome this within the existing software.

5. Comparisons of the performance of the external flowmeters, fitted in the 'old' and 'new' positions on both the 76cm and 53cm plankton samplers were made. Deployments were made at 4, 5 and 6 knots. The results show a reduction of ca. 5% in the revolution per metre for the external flowmeters fitted in the 'new' positions on both samplers. The implications of this for present and recent past calculation of volume filtered will be assessed and discussed.

6. The UCNW primary production model was not run during the cruise. However, data to run the model retrospectively was collected. In addition to the data collection described in 3 above, regular observations of the daily weather pattern were recorded. Solar irradiance, at deck level, was monitored continuously and logged at 10 minute intervals throughout the cruise. Notable blooms of the diatom *Coscinodiscus concummus* were recorded during two periods of sunny weather, in the Vergoyer Bank area.

7. A paired 30cm diameter towed net (Bongo style) was tested during the cruise. One side was a straight tube mouth opening whilst the other had a nose cone reducing the opening to 20cm diameter. It was successfully deployed four times on a cored cable, over the starboard quarter, using the ships derrick. The non-quantitative samples, taken in the herring larvae patch will be analysed at a later date. Preliminary examination of the herring larvae suggests that their condition, from net damage, was poor.

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Scientist-in-Charge

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