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

2000 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 6

STAFF:

Part A	Part B
T W Boon (SIC)	T W Boon (SIC)
R A Ayers (2 SIC)	R A Ayers (2 SIC)
G Course	G Course
R Zuhlke	R Zuhlke
R Flatt	R Flatt
N Bunn (joined 19 August)	N Bunn
B Rackham	D Brown
M Etherton	S Jennings
D Maxwell	C Stewart
R Taylor	K Sullivan
R Hillier (EG)	B Taylor (EG)
A Ford (Swansea University)	

F Normandale (NFFO observer) 14 August – 19 August

DURATION: Part A: 10 August – 25 August
Part B: 25 August – 08 September

LOCATION: North Sea

AIMS:

1. To carry out a groundfish survey of the North Sea using a standard GOV trawl in order to obtain information on:

    a) Distribution, size composition and abundance of all fish species caught.
    b) Age - length distribution of selected species.
    c) Distribution of fish in relation to their environment
    d) Distribution of macrobenthos and anthropogenic debris
    e) Surface and bottom temperature and salinity data using CTD
    f) Length-weight information using individual fish measurements

2. To collect material for fish identification courses (T Watson, CEFAS Lowestoft)

3. To preserve material from diseased fish (S Feist, CEFAS, Weymouth)

4. To investigate starfish (Asterias) damage as an indicator of trawling intensity (J Ellis, CEFAS Lowestoft)

5. To monitor epibenthic diversity, using a fine mesh 2m beam trawl.

6. To investigate the practicalities of recording acoustic measurements during the standard GFS using the dual frequency Simrad EK500 echo-sounder.

7. To collect tissue samples from a wide range of species for stable isotope analysis (S Jennings, CEFAS Lowestoft)

8. To collect gill arch samples from 50 each of cod (Gadus morhua), haddock (Melanogrammus aeglefinus) and whiting (Merlangius merlangus) for the identification of species-specific DNA markers (C Fox, CEFAS Lowestoft)

9. To continue the cod (Gadus morhua) tagging experiments begun during Ciro 1/00 (J Casey, CEFAS Lowestoft)

10. To obtain water samples over the whole survey area for the analysis of Caesium 137.

NARRATIVE:
(all times are GMT)

RV CIROLANA sailed from Lowestoft at 1812h 10 August and steamed slowly south to begin the survey east of the Thames estuary, Lat. 51°43.4'N; Long. 01°43.9'E; at 0525h on the following day. Sampling at each primary station consisted of one thirty-minute tow with the GOV trawl, one 200m drift with the two metre beam trawl, deployment of the Day grab and one surface and bottom Niskin bottle cast. Sampling at three primary stations was completed on each of the first four days, working northwards through the southern Bight of the North Sea up to Lat.54°N; by 14 August. The vessel then steamed to Bridlington Bay where Fred Normandale (NFFO observer) was embarked by ship's workboat at 1830h. A further 15 primary stations were completed during the next five days before Fred Normandale was disembarked by ship's workboat off Whitby (1215h 19 August) and N Bunn was embarked. The survey was progressed north and then eastwards, north again then westwards over the following five days, sampling at three or four primary stations per day. Two more primary stations were worked on the morning of 25 August before steaming to the Tyne to disembark Part A staff and to embark Part B staff. The staff changeover was made by ship's workboat to North Shields and was completed by 1645h. RV Cirolana then steamed overnight to restart the survey at 0500h on the following day at Lat. 56°32.6'N; Long. 00°22.8'W. A further 11 primary stations were completed in the north-western part of the survey area by 29 August when the ship made for Lerwick to take a mid trip break.
RV Cirolana departed Lerwick 0830h 31 August and steamed to a position, in the adjacent rectangle 49E9, where local pair trawlers had been observed working. Attempts to complete primary station 66 in this rectangle had been abandoned some years ago due to continued severe gear damage. The senior and junior fishing mates had used the Transas equipment to plot the tows of the pair trawlers and, on inspection, the ground in the area appeared clear. A GOV tow was completed successfully. In addition that day a series of replicate hauls were made with the 2m beam trawl. The regular daily pattern re-commenced the following day on the northern most line. Over the next six days all outstanding primary stations were picked up by zigzagging east and west in a southerly direction, the last one at Lat. 57°50.8'N; Long. 01°29.2'E; being completed by 1515h 6 September. Poor weather conditions at primary

station 70 prevented the use of the beam trawl, Day grab and Niskin bottles. The survey was completed without any gear damage being sustained during fishing operations.
During emergency drill on the afternoon of 3 September it was discovered that the ship was without emergency power supply. Attempts to rectify this problem were unsuccessful so, on completion of the primary aim, course was set for Lowestoft Roads. The vessel dock at 0442h 8 September.

RESULTS:

Aim 1. All 74 standard 30 minute GOV trawl stations were successfully completed and the long abandoned 75th primary station was successfully resurrected. No damage was sustained during fishing operations. Trawling was carried out using the standard specification for International Young Fish Surveys. At all bar one trawling positions a surface and bottom Niskin bottle cast was made to obtain temperature and salinity data. A chart indicating the position of each valid trawl station is attached (Figure 1). Scanmar equipment was used to monitor headline height and door spread. At each station, the catch of each species was weighed and all fish, or representative samples, were measured. Samples of otoliths for age determination were taken as specified in standard instructions. Benthos and crustacea were identified to the species wherever possible and recorded as weight and number. Any anthropogenic waste material was recorded and weighed. The resultant data were input to computer database using the CEFAS Electronic Data Capture System. These data will be analysed at CEFAS Lowestoft and will provide a major input to the ICES assessment of North Sea gadoids.

Aim 2. Specimens of a number of different species were preserved for the Laboratory's fish identification courses.

Aim 3. No unusual occurrences of diseased fish were encountered on the survey.

Aim 4. Either total catch or a sub-sample of starfish (Asterias) were inspected for damage from each trawl haul and results recorded (J Ellis, CEFAS Lowestoft).

Aim 5. The 2m beam trawl was drifted over a target distance of 200m at 74 of the 75 primary station positions to sample the epibenthic community. One haul was abandoned due to poor weather conditions and safety considerations. The majority of catches were sorted and identified on board but some material was preserved for future processing. A series of six replicate hauls was made at a position prescribed by the co-ordinated epibenthos diversity project and two replicates were made at the position prescribed for the Norwegian participants. Sediment samples were taken with a Day grab in similar positions to the beam trawl drifts. A few stations could not be sampled due to hard ground.

Aim 6. The dual frequency (38 kHz and 120 kHz) EK500 scientific echo sounder was run throughout the cruise to gather data for all trawl stations and inter-station transects. Provisional post processing was carried out for all GOV trawl stations using SonarData Echoview software. Best methods for further analysis will be discussed by the CEFAS acoustic group following consultation with the Marine Laboratory Aberdeen (as part of the CFRD acoustic working group), and IMR Bergen; both of whom have a strong interest in combined acoustic and bottom trawl surveys. A full report with results and recommendations will then follow.

Aim 7. Fish were sampled from catches in the GOV trawl. Tissue samples for stable isotope analyses were collected from 40 species. In addition, at 14 stations in the northern North Sea, subsamples of the GOV catches were divided into body mass classes and tissue from fish in those classes was macerated for a size-based isotopic analysis. Invertebrates were sampled from the catches taken in the GOV and 2m beam trawl. Tissue was dissected from 114 species for stable isotope analysis. In addition, for two species, tissue samples were taken from numerous individuals across body mass ranges of at least two orders of magnitude. The maximum body sizes, and some information on size-frequency distributions, of free-living invertebrate species taken in catches were also recorded. All the main aims of the work were met.

Aim 8. Gill arch sections from each of 50 haddock (*Melanogrammus aeglefinus*), 50 whiting (*Merlangius merlangus*) and 50 cod (*Gadus morhua*) were preserved in methanol for DNA analysis (C Fox, CEFAS, Lowestoft).

Aim 9. This aim was abandoned due to the early termination of the cruise.

Aim 10. Surface water samples were obtained at 44 positions for the analysis of Caesium 137 and Tritium (B Smith, CEFAS, Lowestoft)

MISCELLANEOUS:
A 3kg sample of *Nephrops norvegicus* from each of two positions was deep frozen. This request was received after the programme was released (A Young, CEFAS, Lowestoft).

T W Boon
8 September 2000

SEEN IN DRAFT:

Master	R J McCurry
Senior Fishing Mate	A G Lincoln

INITIALLED:

Surveys Contract Manager	R Millner

DISTRIBUTION:
Basic list +

T W Boon	B Rackham	D Brown
R A Ayers	M Etherton	S Jennings
G Course	D Maxwell	C Stewart
R Zuhlke	R Taylor	K Sullivan
R Flatt	R Hillier	B Taylor
N Bunn		

Cirolana 6 2000 Valid GOV stations