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

1992 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 10/92

STAFF: J Thain (SIC)
M Waldock
M Blackburn
M Kirby
S Bifield
J Jones
D Gore
V Dawes
W McMinn
C Stone, JNCC

DURATION: 24 September to 8 October 1992

LOCATION: NE Coast, Irish Sea and Channel

AIMS:

1. To collect samples of demersal fish for chemical analysis from the Irish Sea and English Channel in support of UK National Monitoring Plan (NMP) and Environmental Quality Objective Programmes.

2. To carry out an Anchor dredge survey from a licensed marine aggregate prospecting site in the Bristol Channel for the identification and enumeration of benthos.

3. To deploy liquid-liquid and solid-phase extraction techniques on water samples from offshore and estuarine locations for organic chemical analysis and biological effects studies.

4. To collect sediments from stations established under the UK NMP on estuaries of the NE Coast and offshore for on-board whole sediment bioassay.

5. To collect water samples for the analysis of volatile 'Red List' substances in coastal and estuarine waters.

6. To further investigate the use of biochemical techniques such as EROD in Dab liver in support of NMP.

7. To observe seabirds at sea, with specific interest in the Irish Sea and South Coast (JNCC).

NARRATIVE: (all times are GMT).

RV Cirolana left Lowestoft at 1800h on 24 September, and steamed to the River Humber. Estuarine sampling commenced at 0415 on 25 September in the Humber; water and sediments were collected from the ship and five estuarine stations using the Searider. A further five intermediate and offshore stations out to, and including the Dogger Bank were

sampled on the 25 and the morning of the 26 September. At approximately 1000h on 26 September whilst steaming towards the River Tees the ship answered a Mayday call from a small trawler on-fire and its crew adrift in life-rafts; assistance was given throughout the remainder of the day and evening. On the 27 to 29 September further water and sediment samples were taken from the ship and Searider on the Rivers Tees, Wear and Tyne. Progress in sampling was hindered on these NE coast estuaries by persistant dense fog with visibility down to zero at times. Sampling on the NE coast estuaries was completed at the mouth of the River Tweed at 2200h on the 29 September.

Cirolana then sailed north about to the Irish Sea collecting water and sediment samples en route at NMP stations 8, 2, 86 and 79 respectively and arrived at Morecombe Bay on the morning of 2 October. Fishing commenced at 0630h at NMP station 71 using a small Otter trawl. During the second of two, one hour tows, a fault developed on the trawl winch. Upon inspection by the Chief engineer, the fault was found to be caused by a fracture of the striker plates on the clutch and in addition the two faces of the sliding dog were badly worn. A decision was then made to stop the use of the starboard drum on safety grounds. Trawling continued using a 3m beam trawl operated from the port drum. This severely affected the work programme, in that it was difficult to catch sufficient numbers of the correct size groups of the different fish species required. During the 2 to 4 October NMP stations 71, 70, 68, 62, 61, 57 and 62 were fished and where possible samples of dab, sole, plaice and whiting were taken for chemical analysis. In addition selected fish were sampled for biochemical analysis; livers for EROD analysis and muscle and brain for acetylcholine esterase.

On the morning of 4 October the ship was fishing off Cardigan Bay when all power was lost to the trawl winch as a result of a recurring fault in the Main Loop Current Transfer Switch circuit. This terminated all fishing for the remainder of the cruise and severely affected the main aim of the cruise programme. After leaving Cardigan Bay Cirolana steamed to the Bristol Channel and carried out an Anchor dredge survey from a licensed marine aggregate prospecting site on the 5 October. Two water sampling stations were also worked, one in Swansea Bay and a second in the outer Bristol Channel. Cirolana then continued to steam south and arrived at Falmouth on the 6 October where sediment and water samples were taken from the Fal estuary using the ship and Searider. Further water samples were taken off Poole, in Poole Harbour and at South Varne on 7 October as Cirolana steamed for Lowestoft, docking at 0600h on 8 October.

RESULTS:

Aim 1. This work was severely affected by two failures of the ships trawl winch. Fourteen fish and shellfish samples were taken and frozen for chemical analysis at Burnham: NMP 71 - whiting, plaice and mackerel; NMP 70 - whelks; NMP 61 - whiting, sole, plaice and dab; EQS + Trend, Liverpool Bay - sole, dab and plaice; NMP 62 - sole; NMP 68 - none; NMP 57 - queens and whelks; NMP 56 - none.

Aim 2. The Anchor dredge survey in the Bristol Channel was successfully completed. Samples were sieved on-board for the enumeration and identification of benthos and preserved for identification at the laboratory. Sediment samples were also taken for particle size analysis.

Aim 3. Liquid-liquid extraction techniques were carried out on 60 litre bulk water samples at 24 stations at offshore, inshore, lower and upper estuarine sites. The solvent extraction procedure allows the concentration of non-polar organic contaminants by up to 1000 times

the environmental levels. The resultant concentrates from this technique were bioassayed on-board using the Tisbe bioassay. Threshold toxicity values in samples from open sea locations (eg Dogger Bank, Moray Firth and East of Isle of Man) were around 400-900 times; in inshore samples (eg Tees Bay and Humber) 100-300 times; and in estuarine samples below 100, eg River Wear 25 times and the River Tyne <10 times. Aliquots of each solvent extract were also taken for GCMS analysis at the laboratory. A similar contaminant extraction technique using XAD resin was also used at the above mentioned stations. These samples were not processed on-board but will be soxhlet extracted and bioassayed at the laboratory. Samples collected from 51 stations throughout the cruise were extracted with dichloromethane and will be used for organic chemical analysis by GCMS. The results produced by these techniques will for the first time provide qualitative and quantitative information on biological water qualitity and have identified sites such as Poole Harbour where water quality was unexpectedly poor.

Aim 4. Sediments were collected at NMP stations on the NE coast out to the Dogger Bank and in estuaries of the Humber, Tees, Wear and Tyne. On-board whole sediment bioassays using Corophium and Arenicola were performed on the sediments but the data has yet to be evaluated since the tests ended 12h before the ship docked.

Aim 5. Samples were collected from 51 stations throughout the cruise for laboratory GCMS analysis of volatile organics.

Aim 6. Further investigations on the use of EROD as a biochemical technique for use in the NMP were carried out. Livers from gurnards, plaice, dab and sole were bioassayed from NMP stations in and near Liverpool Bay and Cardigan Bay. No activity was measured in gurnard; a weak response was found in sole; a strong response was measured in dabs and plaice and was greatest at the inshore sampling sites in Liverpool Bay. A bioassay using the activity of the enzyme acetylcholine esterase was also used for the first time on the muscle of dabs and gurnard and the brain of gurnard. A measurable activity was found but the results await confimation in the laboratory after standard calibrations have been verified. This work was severely restricted due to the lack of fishing.

Aim 7. Throughout the cruise Carolyn Stone, JNCC, was observing seabirds.

J Thain
11 January 1993

SEEN IN DRAFT: B A Chapman Master
J Harper

INITIALLED: J E P, C E P

DISTRIBUTION
Basic list +
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