

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

1996 RESEARCH VESSEL, PROGRAMME

REPORT: *RV CIROLANA*: CRUISE 6b/96

STAFF:

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M Waldock  
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DURATION:

28 June to 15 July 1996

LOCATION:

Milford Haven, Irish Sea and North Sea.

AIMS:

1. To collect samples of water and demersal fish for chemical analysis from the Irish Sea and North Sea in support of the UK National Monitoring Plan (NMP) and Environmental Quality Objective Programmes.
2. To collect samples of demersal fish for arsenic analysis in the vicinity of Beaufort Dyke, North Channel.
3. To carry out sediment, water and fish sampling for biological effects studies in relation to the Sea Empress oil spill in Milford Haven.
4. To collect fish samples at NMP sites for biological effects studies using biochemical techniques and genetic toxicological analysis. Appropriate water samples for chemical analysis to support this work will also be taken. To collect sediments for bioassay in support of the NMP.
5. Sediment sampling for a baseline study of contaminants around England and Wales.
6. Bathymetric survey of area 107 (an aggregate extraction area).
7. To deploy liquid/liquid extraction techniques on water samples from offshore and estuarine locations for chemical analysis and biological effects studies.

## ADDITIONAL AIMS:

8. To conduct a meiofauna survey of the Swansea Bay dredged material disposal site and at the NMP sites 605 (Celtic Deep) and 805 (SE Isle of Man) using the Bowers and Connelly mini multiple-corer.
9. To sample sediments and macrofauna at a proposed dredged material disposal site off Milford Haven using a Day grab.
10. To collect 2 m beam trawl samples at appropriate NMP and related sites for the identification and enumeration of epibenthos
11. To collect sediment samples from a grid of 16 stations in the vicinity of the Liverpool Bay sewage-sludge disposal site.
12. To collect sediment and/or macrofauna samples at aggregate extraction sites in Liverpool Bay, Area 107 and Race Bank using a Day grab and/or a Hamon grab.

## NARRATIVE: (all times are GMT)

Scientists from the Burnham-on-Crouch Laboratory boarded *CIROLANA* at Swansea on the morning of Friday 28 June and undertook the ship's safety induction course in conjunction with the Marine Safety Agency audit

*CIROLANA* sailed at approximately 1500 h on the afternoon tide of 28 June from Swansea and steamed overnight to a position 16 miles SW of Milford Haven and commenced fishing on the morning of 29 June. In the afternoon *CIROLANA* steamed to St Brides Bay and completed a further fishing station and four sediment and water sampling stations using a Reineck Box corer and churn sampler respectively under aim 3. On Sunday 30 June a further four fishing, water and sediment sampling stations were completed in Carmarthen Bay. Overnight *CIROLANA* sailed to Swansea Bay and deployed the Bowers and Connelly mini multiple-corer on a grid of six stations (aim 8). However, as the weather worsened to westerly winds, force 6-7, no successful cores were obtained and it became dangerous to work the gear and sampling was abandoned. On the afternoon of 1 July a fishing station was completed in Swansea Bay (aim 3).

On the morning of the 2 July the wind remained strong and westerly. *CIROLANA* was at a position 9 miles south of Milford Haven and commenced a Day grab survey on a grid of six stations (aim 9). This was completed by late morning and *CIROLANA* proceeded to Milford Haven and anchored at Dale Shelf Anchorage; the ships Searider was then deployed and water was sampled from six stations up to the bridge at Pembroke Dock (aims 3, 1 and 7). After leaving Milford Haven the wind decreased and *CIROLANA* returned to Swansea Bay to continue the multicore transect survey abandoned the previous day. This work was completed at 0200 h on 3 July and *CIROLANA* then steamed to the Celtic Deep.

At the Celtic Deep (NMP Station 605) sediment samples were taken with the mini multiple-corer (aim 8) and Day Grab (aim 4). In addition, bulk 60 l water samples were taken with the churn sampler and fish were collected using the Granton trawl. After completing this station at 1330 h *CIROLANA* headed North and trawled for epibenthos using a 2 m beam trawl at a station in the south of St George's Channel (aim 10). Further north, at 2100 h (NMP 665, Cardigan Bay) samples of fish (Granton trawl), water and sediment were taken under aims 4 and 7.

On route to the Irish Sea the 2 m beam trawl was deployed at 0230 h on 4 July in west Caernarfon Bay to sample epibenthos under aim 10. *CIROLANA* then proceeded to Red Wharf Bay (NMP 775) and took samples of fish (Granton trawl), water and sediment. At 1200 h *CIROLANA* arrived at a position 53°26 00 N 03°36.00 W, north of Rhyl in Liverpool Bay and commenced Hamon grabbing on a grid of 6 stations under aim 12. A further two trawling stations were completed on the 4 July at the Trend site and NMP 715 (Liverpool Bay) under aims 1 and 4.

On the morning of the 5 July *CIROLANA* trawled at NMP 705 (Burbo Bight) and in addition took water and sediment samples under aim 4. A grid of 16 day grab samples was completed around the position 53°30.00 N 03°30.00 W by late afternoon (aim 11). *CIROLANA* then proceeded to Morecambe Bay (NMP 795) and completed a further trawling, water and sediment station on the evening of 5 July and on the morning of the 6 July at NMP 805 (SE Isle of Man). During the morning and afternoon a grid of 9 Day grab stations was worked at the same site before *CIROLANA* headed to NMP 25 (Solway Firth); at this station water samples were taken (aim 4) and the 2 m beam trawl was deployed for epibenthos (aim 10).

*CIROLANA* then steamed overnight to the North Channel and on the 7 July trawled at three locations close to Beaufort Dyke; to the south, middle and north respectively (aim 2). Although these were recognised tows and the ground was run over before trawling commenced, the belly and cod end of the Granton trawl was badly damaged on the mid tow and had to be replaced. Water and sediment samples were also taken (aim 4 and 7) at NMP 865 (North Channel). Before leaving the North Channel *CIROLANA* steamed to NMP 35 (Firth of Clyde) and sampled water and deployed the 2 m beam trawl for epibenthos. This was completed at 0100 h on the 8 July. *CIROLANA* then steamed north about to the north east coast arriving off Blyth on the morning of the 10 July; on route, water samples were taken at NMP stations 85 (Minches), 165 (Tay), and a 2 m beam trawl at NMP 155 (intermediate Tay).

On the morning of the 10 July water samples were taken at the mouth of the River Blyth from the ship and at one station using the ship's Searider. In the afternoon *CIROLANA* steamed to the River Tyne and the ship's Searider was used again to take water and sediment samples at six stations along the estuary (aims 4 and 7). During the evening *CIROLANA* trawled at NMP Station 245 (off the Tyne), before heading to a night anchor position off the mouth of the River Wear. Water samples were taken at low water at three stations on the Wear estuary with the Searider and also while the ship lay at anchor. During the afternoon of the 11 July *CIROLANA* steamed to the Dogger Bank and completed a fishing station at NMP 285. Overnight *CIROLANA* returned to the NE Coast and on the morning of the 12 July water samples were taken at three NMP stations on the River Tees and at high water and low water at the ships anchor position. After completing this work *CIROLANA* proceeded to the NMP station 295 (Off Tees) and sampled water and trawled under aim 4 and 7.

Overnight on the 12 July *CIROLANA* steamed south and on the 13 July trawled and took water samples at NMP stations 375 (Humber) and 385 (Wash). A sediment sample was also collected at Lynn Deeps in the Wash. At the NMP station 385 (previously trawled with no obstruction) the trawl wing was damaged and in order to complete the scientific work in the time available the trawl was replaced. On the evening of 13 July, six Day grab stations were completed at the Race Bank (aim 12). A further Day grab and Hamon grab station was worked the following morning. *CIROLANA* then sailed to the Leman Bank and trawled the Trend fish sampling station (aim 1) and proceeded overnight to dock at Lowestoft on the morning tide on the 15 July.

## RESULTS:

Aim 1. Samples of whiting, plaice and dab in five consecutive length stratified groups were collected for Trend purposes from Liverpool Bay. These were stored at  $-20^{\circ}\text{C}$  for chemical analysis at Burnham. Eighty-four 2.5 l and twenty-four 25 l water samples were taken and extracted on-board for TBT analysis at Burnham.

Aim 2. Nine samples of fish were collected from South, mid and North locations close to Beauforts Dyke. No flatfish were caught at any of the stations - the hauls contained mostly gadoids. These were stored at  $-20^{\circ}\text{C}$  for chemical analysis at Burnham.

Aim 3. This work was carried out as a follow up to the work previously carried out on *CORYSTES* 3b/96 following the *SEA EMPRESS* oil spill. Dab and plaice livers were collected from fish caught at 7 stations, in St Brides Bay, off Milford Haven, Carmarthen Bay and Swansea Bay. The tissues were prepared on-board and stored in liquid nitrogen for genetic toxicological and biomarker (EROD) analysis. Sediment and pore water samples were also collected for bioassay at the laboratory.

Aim 4. Fish tissue was collected from dab and plaice at 12 NMP stations for biological effects investigations using biomarkers and fish disease (liver pathology): dab livers were collected and stored in liquid nitrogen for measurement of EROD activity; accompanying bile was collected for PAH analysis; livers were also collected from 11 sites and stored in buffered formalin for liver pathology; dab muscle and brain were collected from 12 sites and stored in liquid nitrogen for AChE activity. Seventy four water samples for and carbamates were taken from NMP and selected estuarine sites and subjected to solid phase extraction for GCMS analysis at the Burnham Laboratory.

Aim 5 and 6. Deferred before the start of the cruise and will be carried out at a later date. Replaced by additional aims.

Aim 7. Thirty two 60 l bulk water samples were taken from NMP sites and estuarine locations. The solvent extraction concentrates were prepared on-board for *Tisbe* bioassay at Burnham-on-Crouch. The results will be compared to previous water quality mapping data for the UK NMP.

Aim 8. The Bowers and Connelly mini multiple-corer was successfully deployed at 5 stations in Swansea Bay, one station in the Celtic Deep and 5 stations at NMP 805 (SE Isle of Man). Replicate core samples were taken at each station for PSA and meiofauna analysis and these will be analysed at the Burnham laboratory.

Aim 9. A Day grab survey was successfully completed at the proposed dredged material disposal site off Milford Haven. Samples were sieved on-board and preserved in formalin for the enumeration and identification of benthos at the laboratory.

Aim 10. 2 m beam trawls were carried out at the south end of St George's Channel, NW Caernarfon Bay, NMP sites 25, 35 and 155. The samples were sorted on-board for species abundance and diversity and representative sub samples were taken and stored in formalin for confirmatory identification at the laboratory.

Aim 11. Sediment samples were successfully taken using a Day grab from 16 stations in the vicinity of the Liverpool Bay sewage-sludge disposal site. The samples were stored at -20° C for PSA and PCB plus metals analysis at the Burnham Laboratory.

Aim 12. A Day grab and Hamon grab survey was successfully completed at Area 107 and the Race Bank. Samples of sediment were taken, sieved on-board and preserved in formalin for further analysis.

Acknowledgement: I should like to acknowledge the support and help of the ship's officers and crew in completing the above programme.

**J Thain**  
15 July 1996

**SEEN IN DRAFT:** Capt. Don McDarren (Master)  
M Reynolds (SFM)

**INITIALLED:** JEP

**DISTRIBUTION:**

Basic List+  
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RV CIROLANA CRUISE 6b/96 Cruise Track 28 June - 15 July 1996

