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

2003 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 4/03

STAFF: Simon Jennings (SIC)
Dave Carlin
Nick Dulvy
Chris Firmin
Paul Hudson
Michaela Schratzberger
Karema Warr
Jan Hiddink (University of Wales)

DURATION: 19 March – 28 March

LOCALITY: North Sea (IVa and IVb)

AIMS:

The aims of this cruise were to (1) describe the impacts of trawling disturbance on the structure and productivity of benthic communities (2) examine the effects of fishing on the trophic structure of fish communities and (3) identify new sites in the central and northern North Sea for assessing the effects of fishing on the environment.

The specific objectives of the cruise were to:

1. To sample infaunal and epifaunal invertebrates at a series of sites subject to different levels of trawling disturbance for production studies.

2. To sample infaunal and epifaunal invertebrates and fish at a series of sites subject to different levels of trawling disturbance for food web studies.

3. To survey sites in the central and northern North Sea with side scan sonar in an attempt to locate new areas for the study of fishing impacts.

4. To collect fish and benthic invertebrate species for stable isotope analysis

NARRATIVE: (all times are GMT)

Corystes sailed from Lowestoft at 0915h on 19 March. She proceeded to the Fladen Ground to conduct a side-scan sonar survey of sites for fishing impact studies. Corystes arrived at the Fladen Ground for 1855h on Thursday 20 March and seven sites were surveyed with side-scan sonar. In very calm seas, the images obtained were of excellent quality and the side-scan survey was completed by 0404h.

Following the side-scan sonar survey, we began to sample the fauna at seven sites on the Fladen ground that were subject to different fishing intensities. Epifauna were sampled with a 2-m beam trawl and infauna with a NIOZ corer. We began beam trawling at the first site at 0601h on 20 March and completed 3 replicate tows at a depth of 146m with a warp: depth ratio of 3:1. At 0912h, the beam trawling was complete and we began to sample the first site with a NIOZ corer, completing 5 replicate samples by 1119h. We then steamed to the next site to begin NIOZ coring.

We had completed 3 successful drops with the NIOZ corer at the second site by 1223h. At 1245h, we made the fourth drop with the corer to a depth of 146m at approximately 58 17.5N, 01 22.0 E. Corystes was laying, but the entire 200m wire was allowed to run from the winch drum, either because the ship was drifting away from the site where the corer had entered the water or the arrival of the corer on the seabed was not noted. With all the wire run out, the termination of the wire at the winch drum parted and both the NIOZ corer and the entire coring wire were lost. No suitable replacement wire was available and the planned work at the Fladen Ground had to be abandoned.

Corystes left the Fladen Ground and steamed south to the North West Rough, where a second series of seven sites had been selected for a fishing impact study. Since these sites were shallower (typically 45-70m), it was possible to cut the 600m 14mm wire used for fishing the 2-m beam to lengths of 200m and 400m and to use both the replacement NIOZ corer for infauna sampling and the 2-m beam trawl for epifauna sampling. A 200m length of wire was removed from the net drum, cut away, and wound onto the drum of the coring winch.

We began NIOZ coring at the first North West Rough site at 1105 on Saturday 22 March. We made three drops with the replacement NIOZ corer, but it did not work correctly because the plate did not seal the base of the core tube. NIOZ coring was abandoned pending further investigation of corer problems and we proceeded to sample epifauna at the fishing impact sites with a 2-m beam trawl. We completed 3 replicate 2-m beam trawl tows at each of four sites by 1916h, and at 1939h we began to side-scan the seven sites to locate trawling impacts. The side-scan grid was completed successfully in a very calm sea by 0143 on Sunday 23 March and we resumed 2-m beam trawling at 0330h. Three beam trawl tows at each of the remaining three study sites were completed by 0749h, and we began to sample the same series of sites with the benthic (sandeel) dredge. After three successful tows with the dredge at the first of the sites, we decided to test the inoperative NIOZ corer again. This had now been modified in an attempt to improve the seal between the core tube and core shoe. Three unsuccessful attempts at coring were completed between 1032h and 1054h. It was clear that the NIOZ was not working correctly and we decided to abandon coring rather than waste further time attempting to modify the corer.

Benthic dredging resumed at 1132h, and the dredging grid of three replicates at seven sites was completed by 2034h on 23 March. From 2121 to 2149h, we then tested a new design of benthos dredge and concluded that modifications would be needed to make it operate more effectively.

We abandoned studies of the effects of fishing on benthic communities at 2150 on 23 March as it was clear that the work could not proceed following the loss of the working NIOZ corer and the failure of the alternative corer to operate. From this stage of the cruise we focused on secondary aims: to assess the effects of fishing on central and southern North Sea food webs

and to collect samples of stable isotope analysis. However, this aim was also compromised because the Bridge Unit for the Scanmar system had failed prior to sailing and had to be removed from the ship, making it impossible to fish the young gadoid pelagic trawl.

We studied benthic food webs in five boxes, sampling the community in each with four tows of the 4-m beam trawl and six tows of the 2-m beam trawl. The boxes were in the following locations:

Devils Hole	56° 05' N - 56° 10' N	00° 10' E - 00° 20' E
North West Rough	55° 00' N - 55° 05' N	01° 10' E - 01° 20' E
Barmade Bank	54° 50' N - 54° 55' N	00° 10' E - 00° 20' E
The Hills	54° 20' N - 54° 25' N	01° 00' E - 01° 10' E
Indefatigable	53° 45' N - 53° 50' N	02° 10' E - 02° 20' E

We began work in the Devils Hole box at 0748h on Monday 24 March, and completed the trawling and a side-scan survey by 1819h. We steamed to the North West Rough box, beginning work at 0558h on Tuesday 25 March and completing the work at 1357h, before steaming to the Barmade Bank box. The Barmade Bank survey began at 1739h and was completed at 0122h on Wednesday 26 March. The sea had been very calm throughout, so work proceeded quickly and the quality of side-scan records was excellent. From Barmade Bank, Corystes steamed to the Hills box. Work at the Hills began at 0629h and was completed at 1330h. From the Hills we steamed south towards the Indefatigable Box (close to the Inner Rough). Work in this box began at 1914h and was completed at 0211h on Thursday 27 March.

With conditions still calm, food web studies were completed well ahead of schedule and we decided to take the opportunity to steam North to the Silver Pit and test the NIOZ corer in a region where we had successfully taken 270 cores in 2000 and 2001. We began testing the corer at 0606h on Thursday 27 March and tried all combinations of shoes and core tubes at a soft sediment site (a 1 n mile^2 box) where we had taken 10 cores on Cory 3/01. After eight failed drops and with no obvious improvement in the operation of the corer following various modifications we abandoned coring at 0720. We departed the Silver Pit at 0815h on 27 March to return to Lowestoft.

Corystes docked at 0715h on Friday 28 March.

The following progress was made in relation to our objectives:

1. To sample infaunal and epifaunal invertebrates at a series of sites subject to different levels of trawling disturbance for production studies.

This objective was not met in full because the NIOZ corer and coring wire were lost and because the replacement corer was inoperative.

2. To sample infaunal and epifaunal invertebrates and fish at a series of sites subject to different levels of trawling disturbance for food web studies.

This objective was met for invertebrates and fish in the North West Rough area and for fish in four additional boxes at Devils Hole, the Hills, Barmade Bank and Indefatigable. The work in the Fladen Ground was not progressed due to the loss of the NIOZ corer and the absence of a replacement coring wire.

3. To survey sites in the central and northern North Sea with side scan sonar in an attempt to locate new areas for the study of fishing impacts.

This objective was met in full and the quality of side-scan sonar records was outstanding given the calm seas throughout this cruise.

4. To collect fish and benthic invertebrate species for stable isotope analysis

This objective was largely met and many additional fish samples were collected in the five boxes used for food web studies. However, the failure of the Bridge Unit for the Scanmar system prior to sailing made it impossible to fish the young gadoid pelagic trawl and collect relevant data on the pelagic portion of the fish community.

MISCELLANEOUS:

1. *Arctica islandica* shells were collected from the Fladen Ground, NW Rough and Devils Hole areas (Chris Richardson, University of Wales, Bangor).

Simon Jennings
Scientist in Charge
28 March 2003

SEEN IN DRAFT: M. Elliott (Master)

DISTRIBUTION:
Basic List +
Dave Carlin
Nick Dulvy
Chris Firmin
Paul Hudson
Michaela Schratzberger
Karema Warr
Jan Hiddink (University of Wales)
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