

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

1996 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 12/96

STAFF: M J Kaiser (SIC)  
S D Utting  
T W Beard  
D B Edwards  
R P Flatt  
S Jennings (University of East Anglia)  
M Ramon (CSIC Barcelona)

DURATION: 20 September - 04 October

LOCALITY: Irish Sea, English Channel, North Sea

AIMS:

1. To compare the effects of beam trawling and scallop dredging on the benthic community found at the experimental site off Anglesey (ref. 53° 25.5' N; 04° 01.5' W).
2. To photograph scavenging animals attracted to baited cameras on the seabed using various components of the by-catch as a measure of the response of non-target species to damaged or discarded fish and invertebrates from trawl catches.
3. To estimate with baited traps, the effects of predator exclusion by starfish and hermit crabs.
4. To disturb an area of Red Wharf Bay using a 4 m beam trawl. Divers will be used to survey this line before and after fishing, operating from a shore based charter vessel.
5. To investigate benthic communities and fishing intensity at commercial fishing grounds in the English Channel and North Sea.
6. To undertake trials with a newly designed 2 m beam trawl to assess its performance on different sediment types and efficiency of sampling different benthic communities.
7. To collect live invertebrate scavenger species for experimental feeding and behavioural studies at Conwy as part of an EC collaborative programme to measure how fishing activities may change biodiversity and abundance of the benthic invertebrate communities of the North Sea and Irish Sea.

NARRATIVE:

With the exception of Dr Utting and Mr Beard, the scientific staff joined the ship at Lowestoft on 20 September. CORYSTES sailed at 14.00 h that afternoon and arrived off Anglesey late evening 22 September.

On 23 September, CORYSTES fished a 4 x 10 minute tows with a 4 m beam trawl fitted with a chain mat at an inshore site in Red Wharf Bay. During the last tow, a shore based dive team deployed an anchored Dahn bouy directly astern of the vessel. The dive team had surveyed this wayline and an adjacent control line the previous evening. These lines were then surveyed immediately after CORYSTES had completed fishing the line with the 4 m beam trawl. Divers surveyed the lines for the following 3 days in order to measure scavenger aggregation and feeding behaviour in the area disturbed by the trawl. With the trawling completed, CORYSTES positioned offshore and fished each of 3 waylines 6 times with a 3 m beam trawl, prior to fishing with a 4 m beam trawl and scallop dredges the following day. Camera frames, baited with dead dragonets and dead dabs were deployed inshore during the afternoon.

On 24 September, Dr Utting, Mr Beard and the ISM auditor were picked up by searider from Amlwch harbour. CORYSTES then proceeded to a site off Red Wharf Bay and began 4 m beam trawling to collect swimming crabs for use in later potting experiments. A comparison of the effects of beam trawls and scallop dredges fished over the same ground was then begun. The ship repositioned at the offshore site and fished a 1500 m line 5 times with the 4 m beam trawl. During slack water in the afternoon, a fleet of 10 pots were deployed approximately 1 km east of the experimental area. Pots were baited with swimming crabs, the preferred food of whelks. To determine the role of predators interfering in the feed behaviour of scavenging whelks, some pots also contained either live hermit crabs or live starfish (predators of the whelk) or no predators. After pot deployment, a line parallel to the beam trawl line, was fished 5 times with a gang of Newhaven scallop dredges.

On 25 September, 4 m beam trawling recommenced, completing the 10 tows on one wayline before completing the scallop dredging on the southerly line. The pots were then recovered, rebaited and redeployed. Later, the 2 treatment and the control waylines were resampled using the 3 m beam trawl (n = 18 tows).

On 26 September, sampling with the 3 m beam trawl was completed. In the afternoon, a wayline was fished 12 times alternating between the 4 m beam trawl and the scallop dredges, despite winds gusting to 50 knots.

On 27 September, an inshore site was surveyed for obstructions such as fixed gear. Gear trials with the 2 m beam trawl mounted with the still camera began at a site approximately 10 n miles offshore in an area with uniform depth. In the afternoon, 3 samples were collected from a grid of 12 stations. Each sample took approximately 2 h to process after appropriate sub-sampling. In the afternoon, the pots were retrieved for the last time.

On 28 September, the grid of 12 stations was completed. RoxAnn readings and sediment samples were also collected at each station. Catches were sorted to species level on deck.

On 29 September, another grid inshore off Red Wharf Bay was trawled alternately with either the 2 m beam trawl mounted with the still camera or an unmodified trawl. Sediment and RoxAnn samples were again collected at each station. Once the survey was completed, CORYSTES sailed for the Fowey - Eddystone scallop grounds arriving at 0600 h on 01 October.

On 01 October, 3 waylines were surveyed for trawl and dredge tracks using the side-scan sonar. The benthic community within a 2 nautical mile square box was then surveyed alternately using the modified 2 m beam trawl or the unmodified beam trawl. A total of 12 stations were sampled, collecting Day grabs samples of the surface sediment and RoxAnn readings at each. With the sampling completed, CORYSTES sailed for the Smith's Knoll area in the North Sea arriving on the morning of 03 October.

On 03 October, a 2 nautical miles square area was surveyed using the side-scan sonar. Twelve 15 minute tows with the 3 m beam trawl were then carried out. Starfishes in the catches were scored for damage (missing or regenerating arms). Bivalves in the catches were retained for shell sectioning in the laboratory.

With the work programme complete, CORYSTES sailed for Lowestoft, docking at 0400 h on 04 October.

#### RESULTS:

1. Preliminary analyses using multivariate techniques indicated that beam trawling and scallop dredging affected the benthic community in a similar fashion. Similar results were found during a previous investigation off the Isle of Man.
2. Two camera frames, baited with either dragonets or dabs, were left on the seabed for 5 days. On retrieval all the bait had been consumed. Results will be available once the films have been developed.
3. Pots were deployed for two 24 h periods. Whelks were the most common scavenger attracted to all pots regardless of the presence of whelk predators. Few hermit crabs were caught in the traps, whereas large numbers were caught previously when fish bait was used. This indicates that hermit crabs are deterred from entering traps baited with dead crab.
4. A wayline off Red Wharf Bay was trawled 4 times with a 4 m beam trawl. The disturbed area was successfully located by divers immediately after the passage of the trawl. Preliminary observations indicate that the scallop dredge used previously in the same area damaged more animals than the beam trawl.
5. A heavily fished scallop/beam trawl ground was surveyed with a side-scan sonar in the Fowey - Eddystone ground. Dredge and beam trawl tracks were clearly visible on the seabed and were patchy in their distribution. A survey of the local benthic

communities indicated that some areas were impoverished whereas others had rich epifaunal communities. This survey was carried out in a 2 x 2 nautical mile area, which indicates the highly patchy distribution of fishing effort within small areas. The Smith's Knoll area in the North Sea was also surveyed with the side-scan sonar revealing large numbers of beam trawl marks. A survey of epibenthic predators was carried out, however the results await analysis.

6. Extensive trials with a new 2 m beam trawl designed to monitor biodiversity in the North Sea were carried out successfully. Twelve replicate tows were carried out at each site, samples appeared to be very similar. Comparisons with a trawl mounted with a still camera were also conducted to ascertain trawl efficiency and behaviour. RoxAnn data were also collected with the intention of relating community type, the appearance of surficial sediments, and granulometry of the top 1 cm of sediment collected for ground-truthing.

7. Whelks, starfish and hermit crabs were collected for experiments at Conwy.

M J Kaiser  
04 October 1996

SEEN IN DRAFT:

R Jolliffe, Master  
L Shillings, Senior Fishing Mate

INITIALLED:

DISTRIBUTION:

Basic list +  
M J Kaiser  
W J Meadows  
S D Utting  
T W Beard  
D B Edwards  
R P Flatt  
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