

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

1994 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 4/94

STAFF: B E Spencer (SIC)
W J Meadows (part time)
B Fogg (part time)
M J Kaiser
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R P Flatt
H Watkins
S Groenewold (Netherlands)

DURATION: 7-26 April 1994

LOCALITY: Irish Sea

AIMS:

1. To survey the sea bed and sample benthos at the experimental site off Anglesey (ref. 53.25.539N; 04.01.548W) fished intensively with a beam-trawl fitted with chain mat in October 1993.
2. To beam trawl and sample the experimental site along the four lines designated for frequent fishing disturbance (two times per year) using two intensities of fishing (x 10 and x 20 tows).
3. To estimate the survival of animals caught in the cod-end using the on-board survival system over a prolonged period.
4. To estimate presence and activity of predators over trawled tracks using diver observations.
5. To film predators attracted to a baited camera frame on the sea bed using various components of the by-catch.
6. To quantify the number of macroepibenthic animals moving onto trawled tracks by sampling with a 3-m beam trawl.
7. To measure the survival of animals which pass through the mesh of the beam trawl.
8. To measure the variance of sampling with the benthos dredge.

NARRATIVE:

The scientific staff joined the ship at Lowestoft on 7 April. CORYSTES sailed at 0915 h that morning. Gale force winds made progress along the Channel slow and eventually caused 24 h anchorage in Mount's Bay, off Newlyn. After an exchange of staff (Mr Fogg for Mr Meadows) on the evening of 10 April, CORYSTES left Newlyn and continued into the Irish Sea, arriving at the experimental site off the North Wales coast in the late afternoon of the 11 April. Side scan

sonar runs over the 4 m beam trawl tracks made in October, 1993 showed no evidence of their persistence.

On 12 April, Day grab and benthos dredge samples were taken from the 10 and 20 E/W lines prior to commencing beam trawling. On 13 April, the line 10E/W was trawled 10 times with catches of small plaice, sole, dogfish, gadoids (cod and pout), fairly common. The epibenthic community in general was similar to that seen in October, 1993. The line was sampled with side scan sonar, Day grab and benthos dredge. Clear images of tracks, occupying widths of 25 m in places were seen.

On 14 April, 20 beam trawl tows on 20 E/W were accomplished after ca. 15 h of fishing. Total catch averaged about 3 baskets per tow comprising small plaice, sole, gadoids, scallops and queen scallops. Survival experiments were set up in tanks of flowing sea water with plaice, dabs, hermit crabs, octopus (*Eledone cirrhosa*) whelks and scallops. Side scan images again showed clear trawl track marks

On 15 April, effort was concentrated on Day grabbing. Strong northerly winds and sea swell prevented use of the benthos dredge and as a consequence two stations were not sampled. In the late afternoon, a start was made on beam trawling line 10 N/S which was completed after 9 h of fishing. Side scan sonar produced clear images of the trawl tracks.

On 16 April, Day grab and benthos dredge sampling on the trawled line 10N/S and line 20N/S, prior to trawling, was completed in good weather. In the early evening, a start was made with trawling line 20 N/S which continued overnight to completion by late morning of 17 April. The rest of the day was spent completing side scan, Day grab and benthos dredge sampling on that line and in the exclusion zone last fished in April 1993.

On 18 April, the last grab and benthos dredge samples were collected from the four intersections of the fished lines, areas where the most intense (x 30 and x 40) trawling activity had occurred. A side scan sonar run over all the trawled lines provided good images of trawl tracks, the oldest of which had been made 5 days earlier. In mid-morning, a rendezvous with the diving team at the dive site, ca 1.5 km offshore off Red Wharf Bay, Anglesey, indicated that although water clarity had improved, it was not sufficiently good for SIT camera observations of invertebrates on the sea bed. The dive programme was, therefore, delayed by one day. Whilst at the dive site, loss of the DGPS navigational signal, probably due to microwave interference from local aerials, occurred. It was decided to alter the signal frequency. The divers inspected CORYSTES' hull and located a broken anode which had been causing some disturbance noise in some cabins.

On 19 April, Mr Fogg went ashore at Amlwch, to meet with Conwy Laboratory staff, for transfer to Gt Orme to alter the frequency of the transmitting aerial. This was completed successfully with a strong signal operating by late morning. Work continued at the dive site with a pre-trawl sampling of the epibenthos using the 3 m beam trawl (6 x 10 min. tows) and dive surveys along a leaded line. CORYSTES then returned to the offshore experimental site and made two tows to catch whiting and cod to determine their diet composition, and sole for eventual transfer to Conwy as broodstock.

On 20 April, a line at the dive site was trawled three times with the 4 m beam trawl to create an impact on the sea bed. Within an hour, a dive survey was completed and a good video camera record of the disturbed sea bed and invertebrate scavengers feeding on the trawl track obtained. Two stills cameras fixed to weighted frames and baited with either broken scallops or plaice discards were deployed on the fished line for 24 h. Mr Fogg returned to CORYSTES via the dive boat and broodstock sole were offloaded for transfer to Conwy. The 3 m beam trawl was used to obtain post-trawl samples of the epi-benthos (6 x 10 minute tows). CORYSTES then returned to the offshore experimental site and made five tows to catch whiting and cod to determine their diet composition.

On 21 April, the fished line at the dive site was again sampled with the 3 m beam trawl. The still cameras were recovered and had apparently shot ca. 300 frames during the 24 h period of deployment. The divers completed their survey having obtained good video coverage of the fished line. A side scan survey of the offshore experimental site showed that the first tracks which were 7 days old were still visible. In the evening, 10 replicate tows were made with the benthos dredge to obtain an estimate of variance of the catch rate of invertebrates in 1 and 2 min. tows.

On 22 April, a final sampling of the trawled line with the 3 m beam trawl at the dive site was made. A final survey at the offshore experimental site showed that the trawl tracks were still visible.

With the major aims of the programme completed, CORYSTES set sail at 1000 h on the 22 April and docked at Lowestoft on the morning tide of 25 April.

RESULTS

1. *Sextant* survey software continued to provide accurate position lines and sampling points. Occasional problems were experienced with Sercel DGPS close inshore near to radio masts on Anglesey. This was resolved by altering the frequency of transmission of the Sercel equipment on the ship and on the Gt Orme. A keyboard on the Bridge proved a useful feature for the helmsman to quickly access the *Sextant* controls. RoXann continued to provide useful information on bottom sediment type and for logging ship position over the experimental site.
2. All the four lines were beam trawled to the required intensity and sampled with the Day grab and benthos dredge. A preliminary assessment suggests that the composition of the main epibenthos species remains similar to samplings on previous cruises. Side scan sonar showed clear images of the beam trawl tracks which were still visible 8 days after trawling.
3. Survival of plaice and dabs after 72 h in tanks of running sea water was relatively poor at ca. 50%. The hermit crabs, whelks, scallops and octopus were quite hardy with survival >90%.
4. Dive surveys were conducted on the sea bed before and after fishing with the 4 m beam trawl. Visual and video records of the physical and biological changes due to fishing were recorded. Scavengers feeding activity on damaged and killed invertebrates were apparent within hours of completion of trawling. Useful observations on the feeding activity of starfish (*Asterias rubens*) on broken *Arctica islandica* (arctic clam; which were not caught by any of the sampling tools used) and hermit crabs on *Corystes* (masked crab) and *Ophiura* (brittle star) were made.
5. Two stills cameras baited with plaice or broken scallops were deployed on the trawled track at the dive site for 24 h. Over 300 frames of film were shot which will be developed ashore.
6. The 3 m beam trawl was used to assess changes in epibenthos composition and biomass before and after fishing the trawled line at the dive site. A significant increase in the density of scavengers, notably, swimming crabs, hermit crabs, dabs and gurnards, were seen on the trawl tracks during the few days following fishing.
7. Not done due to lack of time.

8. A measure of the variance of sampling of the benthos dredge was obtained with 10 replicate tows of 1 and 2 minute duration.

B E Spencer, SIC
26 April 1994

SEEN IN DRAFT:

M J Willcock, Master
R Graham, Senior Fishing Mate

INITIALLED: *gh*

DISTRIBUTION:

Basic list +
B E Spencer
M J Kaiser
W J Meadows
P F Millican
R P Flatt
B Fogg
H Watkins
S Groenewold
Chief Fishery Officer, NWNW SFC