

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

1981 RESEARCH VESSEL PROGRAMME

REPORT: RV CORELLA : CRUISE 10

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF:

R J Wood

C R Hood

J Dann

T W Boone

S Warnes

DURATION:

Left Lowestoft 0720 h, 12 August

Arrived Lowestoft 0600 h, 26 August

(All times are Greenwich Mean Time)

LOCALITY:

Central North Sea

AIMS:

1. To make acoustic surveys of spawning herring concentrations off the Yorkshire coast and in the vicinity of the Farnes Islands, using a transducer mounted in a towed body in conjunction with the echo integrators.
2. To make in situ target strength measurements of herring.
3. To obtain samples of adult herring from the central North Sea for age analysis.
4. To assess the practicability of surveying herring at night with the transducer in the upward facing mode.

NARRATIVE:

CORELLA sailed from Lowestoft at 0720 h, 12 August and made passage northwards. Fairing was fitted to the towing cable and checks made on the acoustic equipment whilst on passage. An echo survey was commenced at 2024 h to the north of Flamborough Head and during the night 12/13 August an area was surveyed together with RV CLIONE, between latitudes 54°15'N-54°30'N and from some 5-20 miles off the coast. This initial survey was completed by 0628 h 13 August. An area where a small number of midwater to bottom echo traces had been seen during the night was again surveyed with closer grid lines from 0759-1540 h after which the towed body was launched and various calibrations made to the instruments. A midwater trawl haul, during which fish from several plume type traces were seen to enter the net, was next made within the centre of the patch of echo traces which had been located earlier in the day, and this yielded a catch of 3 baskets of sprats together with a few herring and whiting.

An integrator survey was carried out during the night of 13/14 August in the area where echo traces were distributed. A midwater trawl haul within this area from 0429-0645 h yielded only 1 herring, but no fish were observed to enter the net during this tow. The morning of 14 August was then spent in carrying out various checks on the acoustic equipment. The towed body was recovered and at 1330 h CORELLA commenced steaming northwards.

The towed body was relaunched off Blyth at 2000 h and a second integrator survey started at 2009 h. One leg was run to the Farne Islands and an area to the north of the Farnes then surveyed before daylight. The integrator survey was continued later, this time in conjunction with RV CLIONE, in the coastal zone between the Farne Islands and Blyth. This survey was completed by 2000 h. Nearly all the echo tracers observed were in water less than 30 metres depth between the Farnes and Dunstanburgh Castle.

An echo search for fishable shoals was made next morning 16 August from 0315-0700 h both over the Seahouses Bank and between the Bank and 25 metre depth contour without locating a single echo trace. The rest of the morning was spent in carrying out further checks on the acoustic equipment. In the afternoon another search for fishable shoals was carried out in the vicinity of, and to the south of, the Seahouses Bank. Two trawl hauls were made in the evening, the first on plume type traces in daylight and the second on an extensive midwater layer trace, extending further offshore after dark. Each haul yielded catches of several baskets of sprat together with a small number of adult herring. The latter were close to spawning being in maturity stage 6. A comparative integrator run was next made together with CLIONE. The offshore distribution of the extensive midwater trace was checked, little trace was seen beyond 5 miles from the coast.

Next day 17 August an integrator survey was carried out over part of the Farns Deeps where commercial trawlers were reporting considerable herring by-catches. A trawl haul in the evening on the best echo traces which had been located yielded  $7\frac{1}{2}$  baskets of mixed sprat and 0-group herring together with 31 larger herring. An avoidance run was made with CLIONE observing the behaviour of near surface fish (probably sprat) with the sector scanner.

Next day, 18 August, a joint integrator survey was made with CLIONE to the north and west of the Farns Deeps. A trawl haul on small plume type traces during the evening produced a catch of 12 baskets of mixed sprat and 0-group herring and 2 baskets of 1-group and older herring.

Another trawl haul was made in the same area next morning, 19 August from 0536-0732 h on a rather diffuse echo trace which extended from the seabed to about 4-5 metres above it. A catch of  $9\frac{1}{2}$  baskets of adult herring was obtained together with  $3\frac{1}{2}$  baskets mixed sprat and 0-group herring. The integrators were run on a straight track to Blyth where CORELLA docked at 1230 h. Water and stores were taken on board and plans for the second half of the cruise discussed with staff on CLIONE.

CORELLA sailed from Blyth at 0900 h 20 August. From 1301-1858 h an intensive integrator survey was carried out over the Seahouses Bank and the adjacent area but very few fish traces were detected. The midwater trawl was shot in this area at 1930 h but within a few minutes the headline transducer failed (due to a fault in the electric cable) when the net was close to the sea bed. Almost immediately the net was badly torn on what was thought to be a wreck. A new trawl was rigged and about 20 metres of very badly chafed cable had to be removed before the headline transducer fault was rectified. It was found that chafing was due to the cable occasionally running over a lever on the winch. A temporary modification was made to minimise this during the rest of the cruise. A small area approximately 6 miles due east of Seahouses was surveyed later and a line run to a position 12 miles east of Seahouses were "spawny" haddock had been reported.

A trawl haul in this area next morning on some dense bottom traces from 0530-0730 h produced a catch of 9 baskets of good sized herring, 4 baskets of 0-group herring and 3 baskets of horse mackerel. An integrator survey in the area containing these dense traces was worked from 0944-1238 h. CORELLA then moved westwards and a further survey was carried out off the Faine Islands from 1314-1650 h. A trawl haul at dusk 6 miles east of Seahouses produced a catch of 2 baskets of mixed whiting, herring, sprat and gurnards. Course was set at 2145 h for the Robin Hood's Bay ground which was reached at 0400 h next morning 22 August. An echo survey was made in poor weather conditions from 0400-0910 h. An improvement in sea conditions allowed the towed body to be launched at 0920 h and an integrator survey was then made in an area where herring had been reported by local fishing vessels, NESE of Seahouses. Eventually a small patch of dense plume traces close to the seabed was located at dusk about 8 miles to the eastwards of Robin Hood's Bay. A trawl haul from 2000-2030 h produced a catch of approximately 5 tonnes of spawning herring, most of the fish being seen to enter the net over a period of only 5-6 minutes. The herring were in late maturity stage 6 and had a length range from 25-34 cm. Within approximately 2 hours herring in this patch were distributed between surface and seabed. Conditions appeared to be ideal for in situ target strength measurements to be made and between 2200-0107 h 22/23 August 2 hours of centre line recordings on tape were obtained of single fish targets while CORELLA remained over the herring concentration for 3 hours.

Course was then set for a position some 23 miles east of Flamborough Head where a new integrator survey was commenced at 0530 h 23 August. This was completed by 1930 h after which the area off Robin Hood's Bay, where herring had been located the previous night, was again covered and later the spawning area with centre some 8 miles NE of Whitby. A trawl haul in the latter position, on a dense near surface trace, from 0544-0730 h was blank and it was concluded that this was a scattering layer composed of small planktonic organisms. Tests were next made with the upward facing transducer in the towed body at various speeds. Only 12 metres range, from the hull echo downwards, was clear of all acoustic interference. Very considerable interference occurred in bands from the transducer outwards for 22 metres. Some of this obviously came from the towing cable and fainting and some from reverberation within the transducer housing, because this disappeared once the towed body was lifted out of the water. The bottom stop on the integrators did not operate on the echo from the hull of the ship.

From 1703-2105 h an intensive search was carried out in the area where spawning herring shoals had been located during the previous two nights but virtually nothing of any significance was seen. It was concluded that spawning had already been completed by fish in that particular concentration and that they had dispersed. A search in adjacent areas proved equally fruitless and so course was set at 2330 h for position  $54^{\circ}11'N$   $01^{\circ}10'E$ , at the western end of the Outer Silver Pit.

An integrator survey was commenced at 0335 h 25 August. A trawl haul on plume type traces from 0550-0730 h yielded a catch of 4 baskets of sprat and  $\frac{1}{3}$  basket of mainly 1-group juvenile herring. The survey was restarted at 0857 h and a comparison of integrator outputs made with CLIONE for a few miles. The survey was continued until 1600 h at position  $53^{\circ}59'N$   $02^{\circ}07'E$ . A further comparative run was made with CLIONE after which the towed body was recovered, fairing removed from the cable, and course set for Lowestoft at 2000 h. CORELLA docked in Lowestoft at 0600 h 26 August.

RESULTS:

Aim 1. Although a few ripe herring were caught in trawl hauls in the Longstone area no spawning concentration was located. One small spawning concentration was found off the Yorkshire coast, about 9 miles east of Robin Hood's Bay, on 22 August, but spawning had commenced a few days earlier according to information given by local fishing boats. A 5 tonne catch confirmed the herring were in spawning condition and that the 1974 year-class was still the major component of the age distribution. It is hoped that a biomass estimate will be possible from the results of integrator surveys by both CORELLA and CLIONE over this concentration of herring for fish 25-34 cms in length.

Aim 2. In situ target strength measurements were made off Robin Hood's Bay while CORELLA lay over the spawning concentration for 3 hours. It is hoped that sufficient single targets were recorded to give a reasonable estimate of target strength.

Aim 3. A total of 591 herring were examined biologically during the cruise and most of these were adults, the smaller immatures being frozen for subsequent examination at Lowestoft. Herring examined from trawl hauls in the Farne Deeps included a considerable component of Downs stock recruits, confirming the abundance of the 1978 year-class.

Aim 4. Tests with the transducer in the upward facing mode indicated that modifications are required before this can satisfactorily be used for surveying fish distributed close to the surface of the sea.

Miscellaneous. 3 samples of sprat were deep frozen for Dr Johnson and 1 of horse mackerel for Mr Eaton.

R J Wood  
18 September 1981

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INITIALLED:

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R J Wood  
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