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

1992 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 3/92

STAFF:

P J Bromley (SIC)
T J Hulme
T Watson
J Dann
B D Rackham
D J Brown
M R Allison
P J Welsby
I Staniland (CASE)

DURATION:

Left Lowestoft 0945h 19 February
Arrived Lowestoft 0030h 10 March

LOCATION:

North Sea

AIMS:

1) Trawling on rough and smooth grounds will be undertaken to investigate the extent to which the substratum influences the amount of fish prey consumed.

2) Twenty-four hour trawling using a Portuguese high-headline trawl to investigate diurnal periodicity in the consumption of fish prey by cod and whiting and other predatory species. The objective is to establish an estimate of gastric evacuation rate *in situ*.

3) Trawling with and without liner/top cover will be undertaken to investigate the incidence of fish predators feeding in the trawl.

4) Sampling of the stomach contents of the cod, whiting and other predators along with the preliminary identification and staging of prey will be undertaken and material for analysis in the laboratory will be preserved frozen. The species composition and size distribution of the catch will be determined using standard groundfish survey procedures and the data logged using the SAS micro version of the GFS suite. Temperature and salinity profiles and surface light measurements will be determined at each fishing site.

5) Collection of herring hearts and whole fish to investigate the incidence of infection with the fungal disease *Ichthyophonus* (D Bucke).

6) Collection of fish for the ID Course (A Watson) and for J Horwood.

7) Collection of whiting to investigate the incidence of gill fluke (B Williams, National Museum of Wales).

8) Collection of plaice for the National monitoring programme (A Franklin).

9) Collection of fish and other organisms as food for laboratory feeding experiments.

NARRATIVE:

The ship sailed from Lowestoft at 0945h on Wednesday 19 February and commenced fishing that afternoon at Smiths Knoll using a Portuguese High Headline trawl rigged for rough ground with 14 inch rubber bobbins running the full length of the 60' footrope and with 53' of chain along each wing. The cod end was lined with a shrimp mesh liner with a 20 mm stretch mesh. Nansen surface and bottom water samples were taken for comparison with the CTD profile of temperature and salinity at the various fishing locations.

The ship then worked northwards undertaking rough and smooth ground comparisons at the SW Dogger and Middle Rough grounds. Worsening weather forced the passage westwards and for two days work was undertaken off Holy Island, including the first attempt at 24h fishing. Taking advantage of improved weather, rough/smooth ground comparisons were completed at the Coal Pit and Coral Bank before worsening weather again forced the ship to work northwards in the lea of the east coast of Scotland and rough/smooth ground comparisons were made east of the Orkneys. On arriving at the Shetlands on 27 February it was possible to run over some potential tows with the echo-sounder, but too rough to fish until the following day. Two 24h fishing cycles were successfully completed on a patch of mixed large gadoids which were feeding heavily on sandeels. With westerly gales forecast and little chance of working to the east, CIROLANA started working southwards undertaking rough/smooth comparisons at the Halibut Bank, Hartlepool Ground, the Silver Pit and Off Ground. Twenty-four hour fishing cycles were completed SW of the Farne Deeps and at the Off Ground CIROLANA docked at 0030h on Tuesday 10 March.

RESULTS:

1) Comparisons of feeding on rough and smooth grounds were attempted at 11 sites (Table a). Only at the Hartlepool ground was it not possible to make a comparison due to net damage. At least two tows were made on each ground except in the case of the Bittockie and Mithcowie banks where the start was delayed due to the weather.

a) Summary of the number of tows on rough and smooth grounds.

Fishing Ground	Number of Tows	
	Smooth Ground	Rough Ground
SW Dogger	2	2
Middle Rough	2	2
Holy Island	4	2
Coal Pit	3	2
Coral Bank	1	2
Bittockie and Mithcowie Bank	1	1
East of Orkneys	2	2
SE Muckle Flugga	2	2
Halibut Bank	2	2
Hartlepool Ground	1	-
Off Ground	2	2

2) 24h trawling cycles were undertaken at three sites. In the first, off the Shetlands, the predators were feeding heavily on sandeels. At the second site at the Farne deeps they were feeding mainly on Nephrops and Pandalus and at the site on the Off Ground the predators, mainly whiting, were eating mainly Clupeids. All these prey show diurnal behaviour patterns and offer a good opportunity of picking up a cyclical feeding pattern in the predators.

3) There was a general paucity of larger predators, particularly of cod, over most of the area sampled and only off the Shetlands was there sufficient fish to make a valid estimate of the extent to which feeding in the trawl is a problem. However, the cod, along with practically all the main predators were feeding predominantly on sandeels, which were too small to be retained by the cover/liner attached to the cod end.

4) 71 valid hauls of 0.5-2h duration were undertaken and the catches were analysed and logged successfully to the SAS version of the GFS suite on a micro. Over 10,000 stomachs were examined and the state of the stomachs are summarised below.

b) Summary of stomachs sampled during the Cruise

Species	Number Feeding	Number Regurgitated	Number Part Regurgitated	Number Empty	Number Examined
Cod	292	129	274	4	699
Whiting	846	5014	1246	174	7280
Haddock	619	632	612	13	1876
Others	182	194	122	0	498
Total	1939	5696	2254	191	10353

Several hundred small whiting were frozen whole for stomach analysis in the Laboratory.

A selection of otoliths was collected to enable the length based results to be converted to provide estimates of food consumption on an age basis.

c) Summary of otoliths collected

	ICES AREA			
SPECIES	104A	104B	104C	TOTAL
Cod	214	259	6	479
Haddock	280	147	0	427
Whiting	165	275	5	445
Saithe	31	0	0	31
Herring	247	262	5	514
Sprat	97	247	54	398
Total	1034	1190	70	2294

CTD Profiles were taken at all 13 sites fished and the data was also logged to a micro, as were the Scanmar recordings of headline height and door spread. A recording of the bottom profile of each tow was made using the Simrad colour sounder and printer and surface light levels were recorded manually.

5) Summary of herring collected and preserved frozen to assess the level of *Ichthiophonus* infection

Rectangle	Number of hearts	Number whole fish
50E9	-	48
46E8	50	1
45E7	50	-
44E9	50	-
40E8	50	-
39E8	50	-
38E9	50	-
37F2	50	-
36F0	50	-
Total	390	49

6) Samples of 43 species of fish were frozen down for the fish ID course and 25 species were preserved for J Horwood.

7) Seven samples of whiting were collected for the survey of the incidence of gill fluke infection.

8) Most of the quota of plaice requested from the Smiths Knoll area were collected.

9) A variety of fish and invertebrate samples were frozen for laboratory feeding experiments.

P J Bromley
(Scientist-in-Charge)
16 March 1992

SEEN IN DRAFT: B Chapman (Master)
J B W Harper (Senior Fishing Mate)

INITIALLED:

DISTRIBUTION:

Basic list +

P J Bromley
T J Hulme
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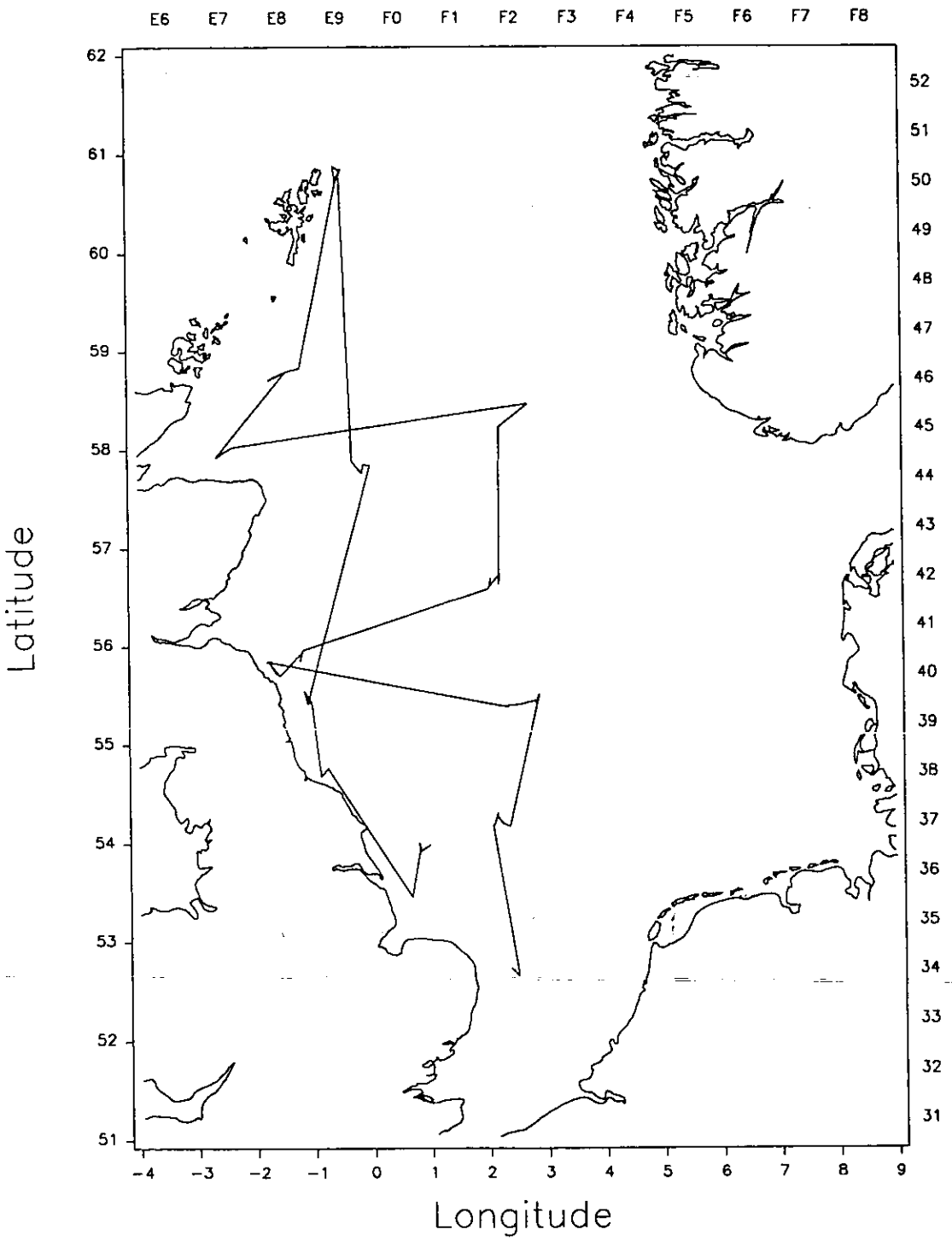
Cruise Track Cirolana 3/92



24 hr Stomach Sampling Sites Cirolana 3/92