

RI/12

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FRV *SCOTIA*

Cruise 0994S

REPORT

7-27 June 1994

Personnel

N Bailey	SSO (in charge)
J A M Kinnear	HSO
C W Shand	HSO
D J Bova	SO
A R Weetman	ASO
M Afonso Dias	Visitor

Objectives

- a) To obtain estimates of distribution and abundance of *Nephrops* on the Fladen Ground, Firth of Forth, Moray Firth, North Minch and Noup using underwater television and trawling.
- b) To use the trawl caught samples to examine biological features of *Nephrops* at different sites throughout the survey area.
- c) To obtain samples of adult (and if possible larval/juvenile) squid for Aberdeen University; EC funded project.

Out-time days per project: 21 days FAAI

Narrative

Scotia sailed from Aberdeen at 1040 hours on Tuesday 7 June and proceeded to the Firth of Forth. Problems en route with the ships autopilot forced a return for a DECCA engineer to be brought aboard. Prior to the restart, a water sample was taken for caesium analysis. There was a further delay to put a sick crewman ashore at Montrose and work eventually commenced with the TV and new towing cable at 0500 hours on 8 June, 30 TV stations were covered (including 2 at which trawling took place); with a slight interruption was caused by damage to a lights' cable. *Scotia* steamed to Aberdeen (where the autopilot was again dealt with) before proceeding to the Fladen Ground which was reached at 2000 hours on 10 June.

Surveying continued with 27 TV stations (3 at which trawling took place) being completed before poor weather curtailed activity for 4 hours. A further 9 TV stations (3 with trawl) were covered before further deterioration in the weather. *Scotia* then steamed for the Moray Firth, arriving there at 1815 hours on 14 June where 28 TV stations (3 with trawl)

were completed. *Scotia* then steamed for Cape Wrath where a second water sample was taken on 16 June and then continued to Stornoway, arriving there on 17 June for the half landing.

TV observations commenced in the North Minch on 18 June and 36 stations (2 with trawl) were completed before unsuitable weather interrupted operations for 12 hours on 20 June. Work in the North Minch was completed with a further 5 TV stations and one trawl haul. *Scotia* next steamed for the Noup ground to the west of Orkney where 10 TV stations were completed on 21 June. A third water sample was taken near to Fair Isle on the steam east to complete operations at the Fladen Ground. Commencing on 22 June, television observations were made at a further 16 stations, before weather again affected proceedings on 24 June. The final 7 TV stations and 3 trawl hauls were completed on 25 June.

Sampling for squid paralarvae was carried out in the Moray Firth throughout 26 June before *Scotia* steamed for Aberdeen, where she docked at approximately 0630 hours on 27 June.

The sequence of stations is illustrated in the attached cruise track.

Data Collection

In each of the 5 areas surveyed, activity was restricted to areas of sea bed composed of muddy sediment within the statistical squares making up the different grounds (as described by the ICES *Nephrops* WG - see cruise programme P17/15).

Television sledge runs of 10 minutes duration were made at each station and camera observations were generally facilitated by good water clarity in all areas. An odometer was attached to the sledge in order to better estimate the distance travelled - this appeared to perform well. Distances were logged automatically along with information on height of camera off the bottom, this facilitated calculation of the area surveyed.

Sediment samples for size particle analysis were taken at each station using a Day Grab. These samples are presently being analysed in the laboratory (along with those collected during previous surveys).

Using a Scotnet 50 mm Prawn Trawl (headline 176'), 19 trawl hauls of 30 minutes duration were made at various stations throughout the survey areas. Data on sex ratio, size composition and ovary condition of *Nephrops* were collected from each haul. Attempts to sample squid paralarvae were made using 1 metre diameter circular plankton nets (mesh size 1.0 mm), but none were caught.

Water samples for caesium analysis were collected at stations off Aberdeen, Cape Wrath and Fair Isle.

Preliminary TV Survey Results

Fladen ground

The overall survey area was divided into 10 strata within each of which between 2 and 10 randomly positioned stations were worked. A total of 59 stations were visited in all.

Nephrops burrows were observed at all stations but counts suggested that density was very variable. Emergent *Nephrops* were also observed although counts were generally low. Preliminary estimates of mean burrow density in each strata (Table 1) were raised to the areas of the ground and summed to give total population size. Information from the 11 trawl hauls covering this area will be used to provide estimates of the weight composition of the *Nephrops* and lead to stock biomass estimates.

Moray Firth

In this area, 4 strata were used each sampled by between 2 and 11 stations (a total of 29 in all). Preliminary estimates of mean density are given in Table 2 indicating that burrow density is of a similar order of magnitude to that on the Fladen Ground. The 3 trawl hauls available will be used to provide catch composition data for use in biomass estimation.

Firth of Forth

A total of 30 stations in 3 strata were visited in the Firth of Forth. Compared with the other areas, burrow densities were generally much higher and emergent *Nephrops* more frequent. Table 3 shows preliminary estimates of mean burrow density in each strata with a highest value approaching 1 per m². Raised estimates of abundance suggest a stock size of about 713 millions which is similar to last year's TV estimate of 670 millions. Compared with the Moray Firth, this relatively smaller ground appears to support a larger stock. Data from 2 trawl hauls will provide some information on size composition and biomass.

North Minch

A stratified random survey design was also used in the North Minch to survey 41 stations covering 4 strata (Table 4). Burrow density varied markedly between the different strata with highest mean density approaching that in the Firth of Forth. Lower values were found on the areas of very fine mud sediment occurring between Skye and the mainland. As for other areas, trawl data will permit the calculation of biomass.

Noup

This ground, to the west of Orkney, was surveyed for the first time. A total of 10 stations were visited. Mean density was relatively high (0.562 burrows per m²). The overall area of the ground is yet to be established. There were no trawl hauls made here.

N Bailey
27 January 1995

TABLE 1. Fladen Ground TV Survey 1994: Summary of preliminary results

Stratum	A	B	C	D	E	F	G	H	I	J
No stations	4	7	10	5	7	4	8	2	8	4
Mean burrow density (m ⁻²)	0.171	0.154	0.283	0.52	0.557	0.462	0.401	0.371	0.26	0.12
Overall area	28151.6 km ²									
Total abundance	9359 millions									

TABLE 2. Moray Firth TV Survey 1994: Summary of preliminary results

Stratum	P	Q	R	S
No stations	11	7	9	2
Mean burrow density (m ⁻²)	0.543	0.343	0.229	0.089
Overall area	2915 km ²			
Total abundance	777.1 millions			

TABLE 3. Firth of Forth TV Survey 1994: Summary of preliminary results

Stratum	W	X	Y
No stations	10	15	5
Mean burrow density (m ⁻²)	0.675	0.873	0.756
Overall area	915.3 km ²		
Total abundance	713 millions		

TABLE 4. North Minch TV Survey 1994: Summary of preliminary results

Stratum	U	V	W	X
No stations	12	13	10	6
Mean burrow density (m ⁻²)	0.486	0.373	0.245	0.869
Overall area	Not available			
Total abundance	Not available			

Cruise Track - Scotia 0994s - 7th-27th June 1994

