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FRV *Clupea*

Cruise 1603C

**REPORT**

27 September – 6 October 2003

**Personnel**

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**Cruise Objectives**

1. To conduct a hydrographic and plankton survey along a transect off Stonehaven.
2. To determine spatial variation in the water temperature, salinity, fluorometric, and turbidity profiles within the main Wee Bankie/Marr Bank study area by CTD-fluorometer-transmissometer dips.
3. To carry out a night-time grab survey to assess sandeel abundance and distribution in sediments previously determined as suitable sandeel habitat. The sediment samples collected during this survey will be used to assess the RoxAnn derived sandeel habitat map.
4. To obtain samples of sandeels for population age structure analysis at pre-determined stations on the Wee Bankie, Marr Bank and Berwick's Bank using a sandeel dredge.

**Out-turn Days Per Project:** 10 days MF0463

**Narrative**

The scientific equipment was loaded on board *Clupea* at Fraserburgh on 23 September. Scientists joined *Clupea* at Fraserburgh at 0900 h on 27 September and the vessel sailed at 0930 h. *Clupea* arrived at the Stonehaven transect at approximately 1500 h where it was discovered that the incorrect size of chlorophyll filters had been supplied. Work on the transect was immediately abandoned and the vessel sailed for Montrose so that this problem could be rectified. *Clupea* remained in Montrose for the following day, to switch over to a night-working regime, sailing at 1800 h on 25 September to commence nocturnal grab sampling, dredge sampling and hydrographic CTD survey work in the main study area. Over the following seven nights 212 grab stations and eight dredge stations were sampled, and 44 hydrographic dips were made.

The grab survey work involved sampling at 212 stations established over 13 earlier cruises carried out since 1998 (Fig. 1). At 35 of the grab stations no sediment sample was obtained. At a further two stations, sufficient material was obtained to allow a sediment sample to be taken (using a 32 mm internal diameter corer), but the penetration depth of the grab was such that the capture of sandeels, had any been present in the sediment, was deemed unlikely. In total, 175 valid sandeel assessment grab samples were obtained, of which 55 contained sandeels, providing a total catch of 362 sandeels. All sandeels caught were measured (to the half centimetre below) and weighed (to the nearest 0.1 g). Otoliths were removed from all fish to enable age determination back in the laboratory.

The modified sandeel dredge was deployed at each of the eight stations sampled previously in the preceding March and June 2003 cruises (Fig. 2). The purpose of these dredge samples was to collect sufficient sandeels for more accurate estimation of population age and length composition on the various sandbanks. At each location the dredge was towed twice along the seabed for 10 minutes, towing down the line in both directions. A Scanmar depth unit was attached to the dredge so that the precise time and position of touch-down on to, and lift-off from, the seabed could be determined. The total number of sandeels in each of the 16 catches was determined and a sub-sample from each was measured to the half-centimetre below. Ten sandeels from each half-centimetre size class were weighed to determine length-weight relationships. Otoliths were removed from these fish to establish age-length keys. In total 1874 sandeels were measured, weighed and otolith sampled.

As far as possible the CTD, fluorometer and transmissometer were deployed at convenient grab stations so as to obtain an even coverage across the study area. In parts of the study area where no grab stations were located, the vessel had to go "out of its way" specifically to deploy the instruments and collect data in these gaps. CTD/fluorometry/transmissometry data were collected at 44 locations across the study area (Fig. 3).

During the course of the nocturnal grab, dredge and CTD survey work, *Clupea* spent the daylight hours at anchor off St Andrews (29 and 30 September), St Abbs (1, 2 and 3 October) and Carnoustie (4 October). This part of the cruise's programme was completed by 2330 h on 4 October, whereupon *Clupea* sailed north to attempt hydrographic and plankton sampling along the Stonehaven transect in relatively poor sea conditions. *Clupea* arrived at the transect at 0200 h on 5 October. One station was sampled at the most sheltered, western end, of the transect, but conditions were considered too difficult to permit further sampling without serious risk of loss of, or damage to, equipment. A vertical dip was made with a dual bongo net fitted with 200  $\mu\text{m}$  and 95  $\mu\text{m}$  filters for phytoplankton and small zooplankton. Water samples were collected from approximately 5 m above the seabed and 20 m and 2 m below the water surface for chlorophyll, nutrient and salinity analysis, and the CTD, with its associated Fluorometer and Transmissometer, was deployed to obtain full water column profile. A 1 m net was deployed, using a single oblique tow, to sample larger zooplankton. At 0300 h *Clupea* then sailed for Fraserburgh, arriving at 0830 h.

The scientific equipment was off-loaded and scientists left the vessel by 1015 h on 6 October.

S P R Greenstreet  
13 October 2003

Seen in draft: Alex H Nicol (IPO A Simpson)

Figure 1. Grab stations sampled.

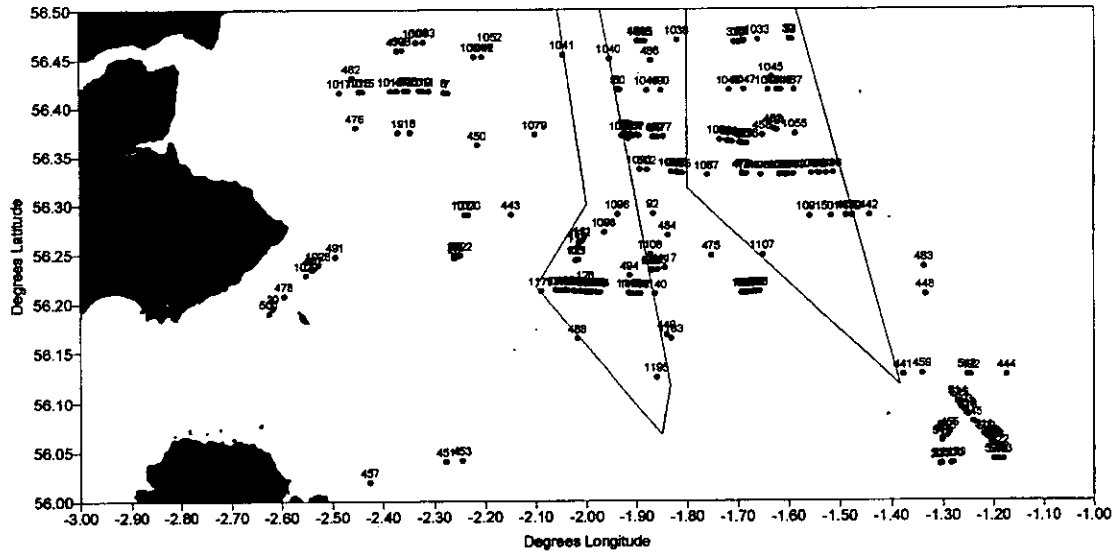


Figure 2. Dredge stations sampled. Each station was sampled twice.

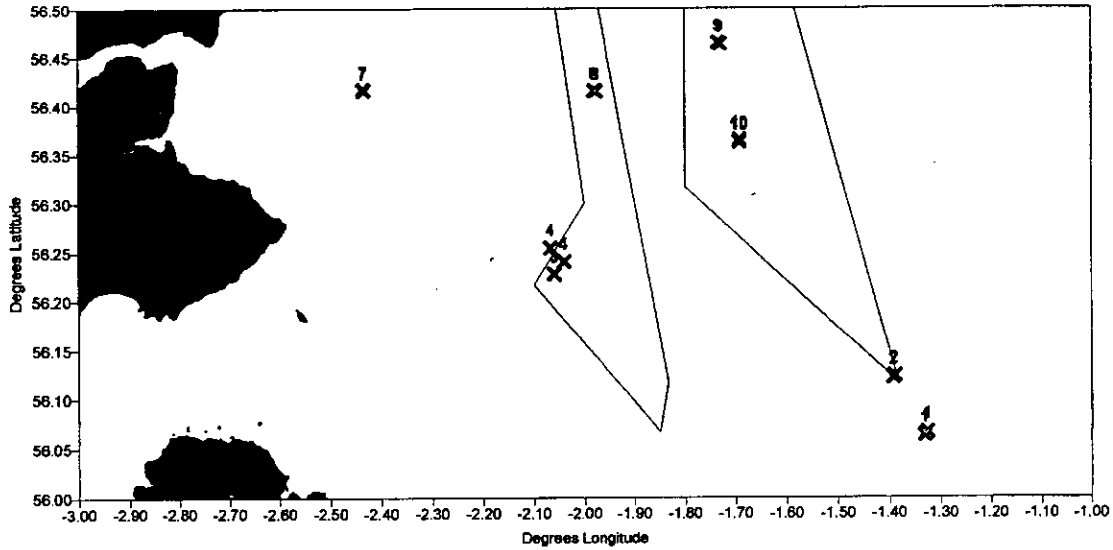


Figure 3. Location of CTD/Fluorometer/Transmissometer hydrography casts.

