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FRV *Clupea*

Cruise 1304C

## **REPORT**

3–22 September 2004

### **Ports**

**Start point:** Fraserburgh

**Personnel changeover and rest day (12 September):** Fraserburgh

**End point:** Fraserburgh

### **Personnel**

F Neat	In charge
M O'Sullivan	
J Dunn	3-12 September
E Galley	12-22 September
C Pert	12-22 September

### **Gear**

Jackson rockhopper Trawl BT 158 with live fish liner, 3 m beam trawl, hand lines.

### **Other Equipment**

Scanmar  
CTD  
Minilogger  
Live fish tanks (x3)  
Data storage tags and T-bar external tags

**Project out-turn:** 20 days (MF 0756)

### **Objectives**

1. To externally tag recently settled juvenile cod (*Gadus morhua*) for investigations of their movements.
2. To internally tag adult cod with data storage tags (DSTs) for investigations of movement and temperature experience.
3. To collect samples of 0-group cod, haddock and whiting for otolith studies and genetic analysis.

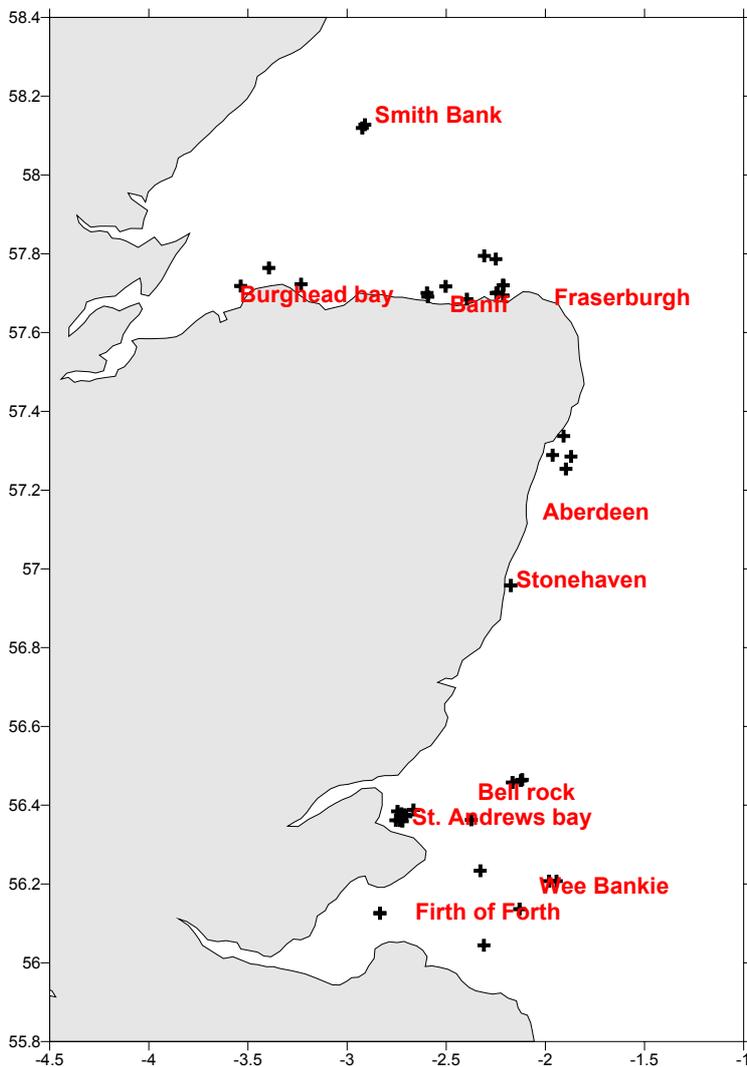
4. To take samples of gill, fins, kidney, heart and spleen from cod and haddock for subsequent disease screening.

## Report

Scientific equipment was loaded onto the vessel on 30 August. Staff joined the vessel on the morning of Friday 3 September. It was decided beforehand that the first half of the cruise would be spent in waters south of Fraserburgh. The aim for the second half was to survey areas to the North of Fraserburgh and Shetland. A strong southerly wind on 3 September, however, meant that the first day was spent towing in the Moray Firth. The next morning *Clupea* steamed south in favourable weather, but ran into mechanical problems approximately 1 hour out of Fraserburgh and returned. A cracked cylinder liner was identified and repairs undertaken. *Clupea* remained in dock until 1900 on September 5 when she steamed south. Further mechanical problems were encountered just North of Peterhead where she berthed and underwent repair the following morning. At 1630 on 6 September *Clupea* steamed south without further delay. From then on a series of 30 min live fish tows were made in the Bell rock area, the Wee Bankie, Firth of Forth and St Andrews bay. A minilog attached to the net headline recorded temperature and depth of each tow. Due to the large number of 0-group cod encountered in St Andrews bay, approximately 200 were maintained alive on board for experimental use in the Laboratory. On the morning of 11 September *Clupea* headed North for Fraserburgh, putting in a tow at Stonehaven on the way. At 1800 *Clupea* docked in Fraserburgh. Live fish were transported back to the Laboratory. Sunday 12 was a rest day and saw the changeover of scientific personnel.

The cruise recommenced at 0700 on 13 September. Strong winds prevented departure for Shetland. Inshore tows were made along the south coast of the Moray Firth from Aberdour bay to Burghead bay. Tows were also made further offshore on Smith bank. Deeper water tows were made in the Moray Firth with the aim of obtaining large cod and haddock for DST tagging. On 15 September the wind swung around the NW and a day was spent towing in Aberdeen bay. Severe southerly gales restricted efforts from 16–18 September and prevented passage to Shetland. Downtime was spent working up previously frozen 0-group cod for biological data. Weather forced the plan for Shetland to be abandoned. On 19 September *Clupea* returned south to St Andrews bay to take advantage of the large number of 0-group cod previously found in this location. A further 400 cod were tagged and released bringing the total over the target figure of 1000. *Clupea* docked in Fraserburgh on 21 September and was unloaded the following morning. In total 42 tows were deployed, the locations of which are shown in Figure 1.

Figure 1 – Tow locations and areas sampled



### Fish Tagging

Tow positions were determined from previous records favourable for O-group cod ground. Exploratory tows were made in consultation with the skipper. When time and weather permitted several tows were made in the same area at different depths and distance offshore. In all tows, cod were prioritised for tagging. If cod were encountered in high number, effort was concentrated in this area to maximise the number of releases. If all cod were processed and time permitted, or no cod were captured, haddock and then whiting were tagged. 0-group and 1+ cod were tagged with external T-bars. The numbers of cod that were successfully tagged and released in each area are given in Table 1. Fin clips for subsequent genetic analyses were collected from all tagged fish. The number of haddock and whiting successfully tagged and released in each area is given in Table 2. Only one cod of suitable size for DST implantation was captured, but it was not in a good enough condition to warrant tagging. A number of suitable-sized haddock for DST implantation were captured from the deep water in the Moray firth, however, most suffered decompression problems due to the depth from which they were

trawled. Only one was considered fit to tag and was released successfully into the Southern trench. Bad weather in the latter half of the cruise prevented further attempts to trawl in deeper waters. Due to the failure to capture fish for DST implantation, CTD data were not collected. Table 1. Number of cod tagged with external T-bars per area.

Area and (number of tows)	O-group	1+
South-East Moray (10)	8	0
South-West Moray (3)	0	0
Smith Bank (2)	0	0
Southern trench (2)	0	0
Aberdeen Bay (4)	10	0
Stonehaven (1)	3	0
Bell rock (4)	0	15
Firth of Forth (4)	3	0
Wee Bankie (3)	13	3
St Andrews (8)	1092	0
Grand total	1129	18

Table 2. Number of haddock and whiting tagged per area.

Area and (number of tows)	Haddock O-group (T-bar)	Whiting O-group (T-bar)
South-East Moray (10)	216	11
South-West Moray (3)	90	0
Smith Bank (2)	0	0
Southern trench (2)	0	0
Aberdeen Bay (4)	50	0
Stonehaven (1)	0	0
Bell rock (4)	114	0
Firth of Forth (4)	24	25
Wee Bankie (3)	133	0
St Andrews (8)	0	0
Grand Total	617	36

### Biological and Genetic Sampling

A total of 340 cod that either died or were considered unfit for tagging were sampled for biological, otolith (sagittae and lapilli) and genetic studies. The majority were from St Andrews bay. In required areas, the aim was to collect 100 O-group haddock and whiting. The fish were weighed, measured and a sample of gill or fin tissue taken for genetic analyses. Sample numbers per area are given in Table 3.

Table 3. Number of 0-group haddock and whiting samples taken for genetic analysis.

Area	Number haddock	Number whiting
Moray Firth - East	108	15
Moray Firth - West	100	
Moray Firth - Knockhead	112	
Moray Firth - Southern Trench		100
Wee Bankie	101	100
Firth of Forth - Torness	100	100
Firth of Forth - Elie	73	
Firth of Forth - Isle of May	27	87
St Andrews bay		100
Aberdeen bay	56	
Stonehaven	100	100
Bell rock – Bell rock		2
Bell rock - Fife Ness	100	
Grand total	877	704

### Disease Screening

Between 60–100 haddock, whiting and cod (if available) from the Moray Firth and St Andrews bay were sampled for disease causing agents. All fish were weighed and measured and gill and pectoral fin samples taken for parasitology, kidney loop for bacteriology and samples of kidney, spleen and brain taken for virology screening. Weather conditions prevented collection of samples from a Northern location i.e. the Orkneys and/or Shetland.

F Neat  
6 October 2004

Seen in draft: A Nicol, OIC *Clupea*