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FRV *Clupea*

Cruise 0104C

## REPORT

8-22 January 2004

### Ports

**Loading:** Fraserburgh

**Unloading:** Fraserburgh

### Personnel

E Hatfield	(In charge)
R Campbell	8-15 January
J Mills	
P Copland	
J Drewery	
A Weetman	15-22 January

**Out-turn days:** 15 days - MF0465

### Sampling Gear and Equipment

Modified PT154 with 6 mm codend  
Scanmar (height and spread units)  
Simrad EK500  
Tide guages  
CTD

### Objectives

1. To carry out detailed acoustic surveys in selected lochs, the Sound of Sleat and North Minch (if time allows) using the EK 500 to determine the distribution of herring and sprat. Concentrations of pelagic fish will be sampled using the PT154. Species composition and length-frequency distributions of the fish caught will be determined. Sub-samples will be weighed and otolithed to establish length-weight relationships. Herring samples will be analysed for sex, maturity and Ichthyophonus infection. Stomach, gonad and DNA samples will also be taken.
2. A line of CTDs will be done through each loch.

### Survey Areas

Main survey areas - Loch Kishorn, Loch Alsh, Loch Duich, Loch Hourn, Loch Nevis.  
Secondary survey areas - Sound of Sleat, North Minch.

## Narrative

*Clupea* sailed from Fraserburgh on 9 January 2004, after a 24 hour delay due to bad weather. She arrived in Kyle on 10 January where staff joined the ship at 1400. She remained tied up alongside at Kyle until the morning of 11 January due to further bad weather. The usual acoustic calibration required prior to transecting was unable to be performed due to the weather. *Clupea* steamed to Loch Hourn on the morning of 11 January to begin acoustic transecting and pelagic trawling. The poor weather state meant that the first (outermost) leg of the transect had to be dropped. Transecting and trawling continued the next day in Loch Hourn. Transecting was carried out on the ebb tide on both days in Loch Hourn. Loch Nevis was surveyed during 13 and 14 January during the ebb tide. Loch Duich was surveyed on 15 and 16 January. In this loch it was possible to transect on both ebb and flood tides, and over the two days in Loch Duich transecting was able to be performed during two ebb and two flood tides. *Clupea* returned to Kyle on the evening of 15 January for a staff changeover. Rory Campbell disembarked and Adrian Weetman joined the ship. *Clupea* remained in Kyle overnight and steamed to Loch Duich to begin the second day of transecting there at 0900. *Clupea* then returned to Loch Hourn and worked there during 17 and 18 January, transecting and fishing this time during a flood tide. On 19 January the weather was too poor to enable work to be carried out in Loch Kishorn so *Clupea* returned to Loch Duich to carry out a third day of transecting there. This gave surveys across two ebb tides and two flood tides for Loch Hourn and three of each for Loch Duich. *Clupea* then steamed to Loch na Béiste in the early evening of 19 January where the acoustic system was calibrated. The work that had been planned in the North Minch, comprising a couple of acoustic transects, from Skye across to Lewis and then to Cape Wrath, and some target fishing was unable to be carried out at the end of the survey due to bad weather. Staff therefore disembarked at Kyle at 1100 on 20 January and returned to Aberdeen by minibus.

During each survey period in each loch the tide gauge was deployed prior to the start of transecting and retrieved when work was finished in that loch, prior to moving to the next site. The light gauge recorded data throughout the cruise to determine ambient light levels and worked for more than half of the trip. The mini-logger was deployed on the headline during each trawl, along with the Scanmar sensors. In each loch a CTD was carried out at the centre point of each tow (unless several tows covered the same area in which case one CTD was used to provide data for the different tows). A number of CTD dips were then carried out through the rest of each loch to determine vertical structure throughout.

In Loch Duich three pelagic tows and 5 CTD deployments were carried out; in Loch Hourn five pelagic tows and seven CTD deployments were carried out; in Loch Nevis three pelagic tows and six CTD deployments were carried out. The time and position data for these tows and CTDs are in Tables 1 and 2 respectively.

Samples for the herring genetics component of the ROAME (in conjunction with the University of Hull) were taken in Lochs Duich and Nevis. Samples for the WESTHER project were taken in Loch Hourn.

Biological data on length-frequency, length-weight relationships and condition indices (calculated as  $(\text{weight}/\text{length}^3) \times 1,000,000$ ) are shown as plots in Figure 1.

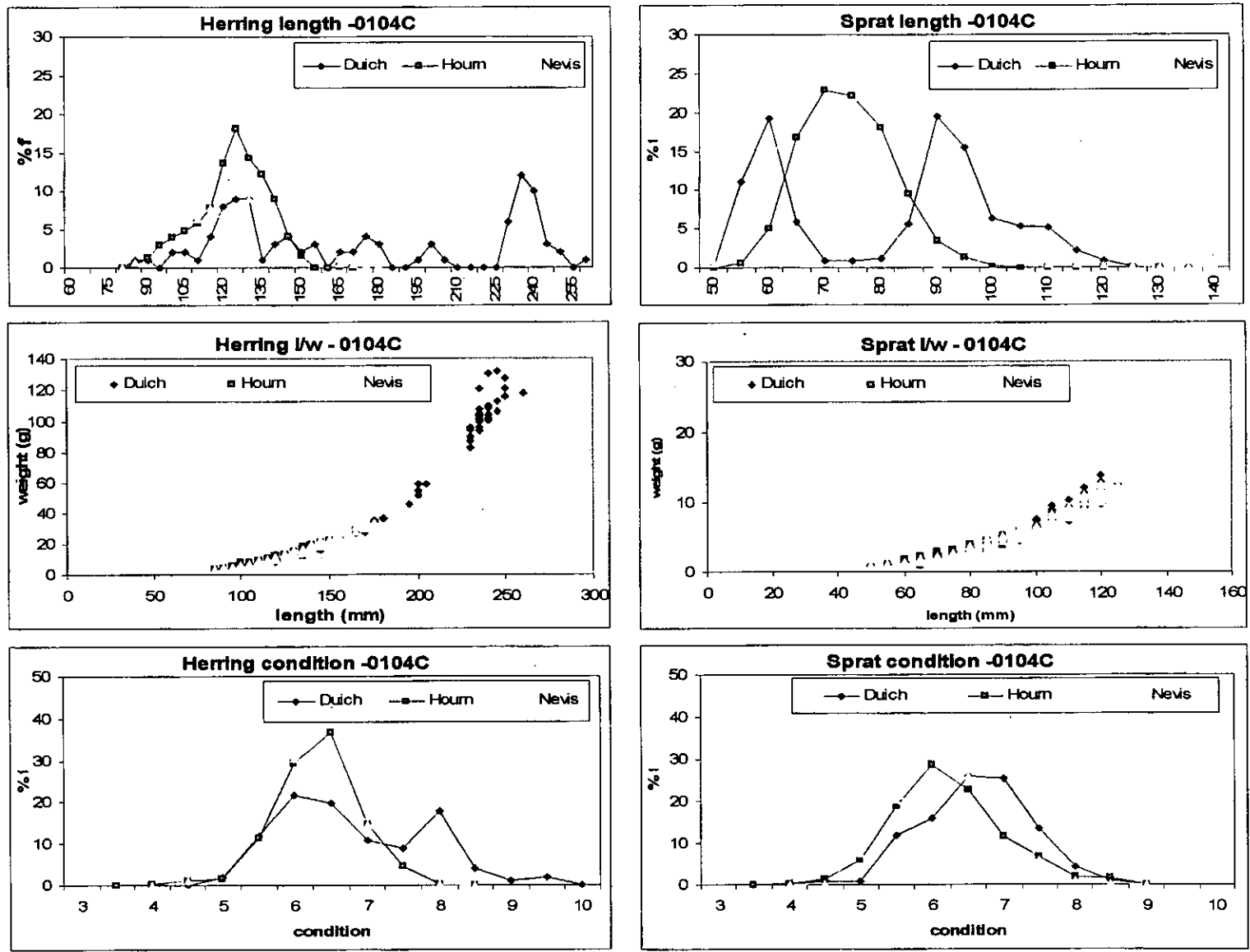
E Hatfield  
8 March 2004

**Table 1.** Haul data for each pelagic tow (PT154) carried out during *Clupea* cruise 0104.

LOCH	HAUL	YEAR	MONTH	DAY	HOUR	MIN	DURATION	WATER DEPTH	HEADLINE DEPTH	LAT DEG	LAT MIN	LONG DEG	LONG MIN	NO. BASKETS
HOURN	C04/001	2004	1	11	14	12	32	127	75-84	57	7.36	-5	34.32	2.1
HOURN	C04/002	2004	1	12	10	55	30	128	82-86	57	7.43	-5	35.78	1.1
HOURN	C04/003	2004	1	12	15	22	37	128	74-84	57	7.42	-5	34.51	2.1
NEVIS	C04/004	2004	1	13	14	40	24	111	90-102	56	59.65	-5	40.76	1.1
NEVIS	C04/005	2004	1	13	15	50	25	108	67-70	56	59.46	-5	40.47	0.4
NEVIS	C04/006	2004	1	14	15	46	40	95	70-76	57	0.34	-5	41.42	0.3
DUICH	C04/007	2004	1	15	12	1	20	80	47-59	57	13.6	-5	26.94	1.1
DUICH	C04/008	2004	1	15	14	59	27	69	35-44	57	13.66	-5	26.64	1.1
HOURN	C04/009	2004	1	17	10	13	15	174	80-82	57	8.12	-5	39.53	5.1
HOURN	C04/010	2004	1	18	10	50	30	160	130-140	57	8.21	-5	8.69	2.1
DUICH	C04/011	2004	1	19	12	16	26	60	35-40	57	13.62	-5	26.3	1.1

**Table 2.** CTD deployment data for each CTD deployed using the "SEABIRD 911plus" during *Clupea* cruise 0104.

CRUISE No	HYDRO STA No	ASSOC HAUL NO	LOCH	YEAR	MONTH	DAY	TIME	DEPTH	SAMPLER DEPTH	LAT DEG	LAT MIN	LONG DEG	LONG MIN
0104C	C04/001	NIL	HOURN	2004	1	12	14:45	57	52	57	5.8	5	32
0104C	C04/002	NIL	HOURN	2004	1	12	15:02	88	83	57	6.6	5	33
0104C	C04/003	C04/001&C04/003	HOURN	2004	1	12	16:29	130	125	57	7.5	5	35
0104C	C04/004	C04/002	HOURN	2004	1	12	16:49	127	122	57	7.8	5	37
0104C	C04/005	NIL	HOURN	2004	1	12	17:06	177	172	57	8.1	5	39
0104C	C04/006	NIL	NEVIS	2004	1	14	09:14	94	89	56	59.2	5	39
0104C	C04/007	C04/004 &005	NEVIS	2004	1	14	09:34	99	94	57	0.1	5	41
0104C	C04/008	NIL	NEVIS	2004	1	14	09:52	68	63	57	1.2	5	42
0104C	C04/009	INVERIE	NEVIS	2004	1	14	10:06	57	52	57	1.9	5	42
0104C	C04/010	ENTRANCE	NEVIS	2004	1	14	10:21	112	97	57	1.4	5	43
0104C	C04/011	ENTRANCE	NEVIS	2004	1	14	10:38	41	36	57	1.4	5	45
0104C	C04/012	HEAD	DUICH	2004	1	15	16:03	65	60	57	13.6	5	26
0104C	C04/013	C04/007	DUICH	2004	1	15	16:16	67	62	57	13.9	5	27
0104C	C04/014	C04/008&C04/011	DUICH	2004	1	15	16:26	85	80	57	14.1	5	27
0104C	C04/015	MID	DUICH	2004	1	15	16:41	105	100	57	14.9	5	29
0104C	C04/016	ENTRANCE	DUICH	2004	1	15	16:56	73	68	57	19.1	5	30
0104C	C04/017	C04/005 REP 1	HOURN	2004	1	17	15:28	150	145	57	8.0	5	40
0104C	C04/018	C04/005 REP 2	HOURN	2004	1	18	15:30	160	155	57	8.0	5	40



**Figure 1.** Length-frequency, length-weight and condition of herring and sprat sampled from pelagic tows during *Clupea* cruise 0104.