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FRV *Clupea*

Cruise 1903C

## REPORT

17 November – 1 December 2003

**Loading:** Fraserburgh

**Unloading:** Fraserburgh

### Personnel

E Hatfield (In charge)

P Copland

J Donald

J Drewery

O Gaudie

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

### Sampling Gear and Equipment

Modified PT154 with 6 mm codend

Scanmar (height and spread units)

Simrad EK500/RoxAnn

Tide gauges

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 and RoxAnn 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 17 November 2003, and was delayed en route due to weather for some 36 hours. After 24 hours in Loch Eriboll she sailed to Kyle and arrived on 19 November where staff joined the ship at 1700. *Clupea* steamed to anchor in Loch na Béiste where the acoustic system was calibrated prior to the start of the survey. Acoustic transecting and pelagic trawling began the next day in Loch Hourn and continued there for two days. Transecting was carried out on the flood tide on both days in Loch Hourn. It became apparent that the CTD Seabird 911 plus was not communicating with the software so *Clupea* returned to Kyle on the evening of 21 November to pick up the Seabird 19 CTD that had been brought over to Kyle by a lab driver. Loch Kishorn was surveyed on 22 November and Loch Duich on 23 and 24 November. In each of these lochs it was possible to transect on both ebb and flood tides. In Loch Kishorn only one of each tides were covered whereas in Loch Duich transecting was able to be performed during two ebb and two flood tides. *Clupea* returned to Loch Hourn and worked there during 25 November, transecting and fishing this time during an ebb tide. Loch Nevis was surveyed during 26 and 27 November during the ebb tide. Loch Hourn was surveyed again on 28 November, again during the ebb tide, giving surveys across two ebb tides and two flood tides for both Loch Duich and Loch Hourn. 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 0900 on 29 November 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 five pelagic tows and six CTD deployments were carried out; in Loch Hourn six pelagic tows and four CTD deployments were carried out; in Loch Kishorn one pelagic tow and four CTD deployments were carried out; in Loch Nevis three pelagic tows and five 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.

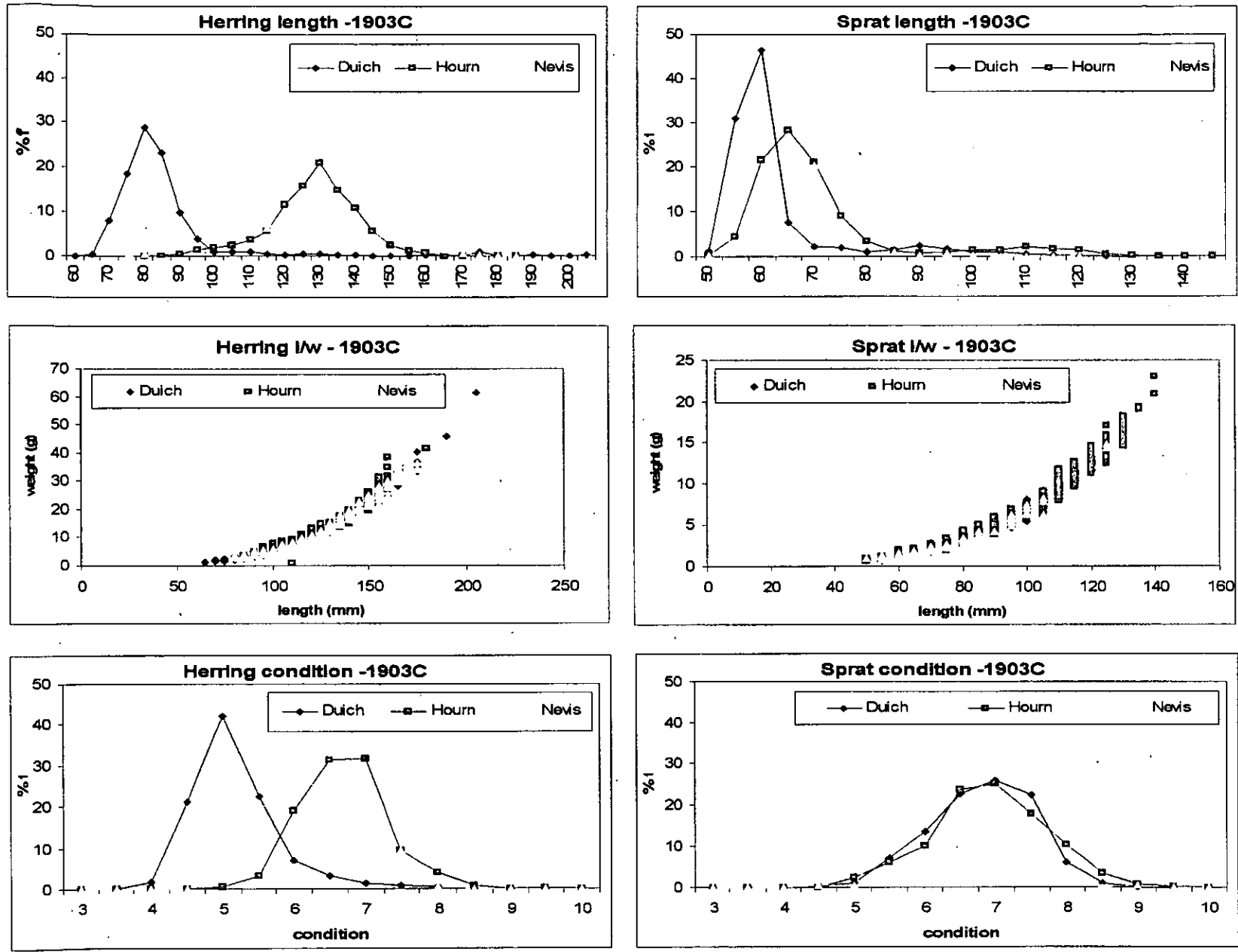
E Hatfield  
8 March 2004

**Table 1.** Haul data for each pelagic tow (PT154) carried out during *Clupea* cruise 1903.

LOCH	HAUL	YEAR	MONTH	DAY	HOUR	MIN	DURATION	WATER DEPTH	HEADLINE DEPTH	LAT DEG	LAT MIN	LONG DEG	LONG MIN	NO. BASKETS
Hourn	C03/467	2003	11	20	16	8	30	120	89	57	7	-5	34	8
Hourn	C03/468	2003	11	21	12	24	35	134	80	57	7	-5	36	0.33
Hourn	C03/469	2003	11	21	15	25	15	100	90	57	7	-5	34	4
Kishorn	C03/470	2003	11	22	13	19	22	63	30	57	23	-5	10	1.5
Duich	C03/471	2003	11	23	10	50	14	88	60	57	14	-5	27	0.5
Duich	C03/472	2003	11	23	14	24	35	65	15	57	13.5	-5	27	1.5
Duich	C03/473	2003	11	23	15	45	31	67	40	57	13	-5	26	0.67
Duich	C03/474	2003	11	24	12	40	31	95	48-60	57	14	-5	27	15.9
Duich	C03/475	2003	11	24	16	7	31	71	40-55	57	13.5	-5	26.4	1
Hourn	C03/476	2003	11	25	13	8	54	122	80-95	57	7.6	-5	34.8	2
Hourn	C03/477	2003	11	25	16	13	41	120	65	57	8.2	-5	36.2	0.75
Nevis	C03/478	2003	11	26	16	29	30	87	39-45	56	59	-5	38.9	3.33
Nevis	C03/479	2003	11	27	10	51	19	110	95	57	0.3	-5	41.4	2
Nevis	C03/480	2003	11	27	13	53	35	93	68-75	56	59.2	-5	39.8	3
Hourn	C03/481	2003	11	28	11	0	33	100	73-76	57	8.4	-5	37.8	0.75
Hourn	C03/482	2003	11	28	12	42	29	112	90-99	57	8.1	-5	36.9	2

**Table 2.** CTD deployment data for each CTD deployed using the "SEABIRD 19" during *Clupea* cruise 1903.

CRUISE No	HYDRO STA No	ASSOC HAUL NO	LOCH	YEAR	MONTH	DAY	TIME	DEPTH	SAMPLER DEPTH	LAT DEG	LAT MIN	LONG DEG	LONG MIN
1903C	C03/190	-	Kishorn	2003	11	22	16:19	31	26	57	23.2	-5	37
1903C	C03/191	C03/470	Kishorn	2003	11	22	16:42	82	77	57	22.3	-5	40
1903C	C03/192	-	Kishorn	2003	11	22	17:00	89	84	57	21.1	-5	42
1903C	C03/193	-	Kishorn	2003	11	22	17:19	96	91	57	19.9	-5	45
1903C	C03/194	-	Duich	2003	11	24	09:09	60	55	57	13.6	-5	26
1903C	C03/195	C03/473	Duich	2003	11	24	09:22	87	82	57	14.0	-5	27
1903C	C03/196	C03/471	Duich	2003	11	24	09:32	65	60	57	13.9	-5	27
1903C	C03/197	C03/474	Duich	2003	11	24	09:47	105	100	57	14.8	-5	28
1903C	C03/198	-	Duich	2003	11	24	13:38	72	67	57	15.5	-5	30
1903C	C03/199	-	Duich	2003	11	24	13:49	80	75	57	16.1	-5	30
1903C	C03/200	-	Hourn	2003	11	25	15:23	58	53	57	5.9	-5	32
1903C	C03/201	C03/467	Hourn	2003	11	25	15:50	118	113	57	7.3	-5	34
1903C	C03/202	C03/468&469&476	Hourn	2003	11	25	16:01	124	119	57	8.1	-5	37
1903C	C03/203	C03/477	Hourn	2003	11	25	17:23	180	175	57	8.1	-5	39
1903C	C03/204	C03/479	Nevis	2003	11	27	15:00	100	95	57	0.8	-5	41
1903C	C03/205	C03/478 & 480	Nevis	2003	11	27	15:15	98	93	56	59.7	-5	40
1903C	C03/206	-	Nevis	2003	11	27	15:30	85	80	56	59.1	-5	39
1903C	C03/207	-	Nevis	2003	11	27	15:56	126	121	57	0.2	-5	43
1903C	C03/208	-	Nevis	2003	11	27	16:14	79	74	57	0.2	-5	43
1903C	C03/209	-	Nevis	2003	11	27	16:32	47	42	57	1.6	-5	42



**Figure 1.** Length-frequency, length-weight and condition of herring and sprat sampled from pelagic tows during *Clupea* cruise 1903.