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FRV *Clupea*

Cruise 1704C

REPORT

17 November - 1 December 2004 (extended to 2 December 2004)

Ports

Loading: Fraserburgh
Unloading: Fraserburgh

Personnel

E Hatfield	(In charge to 30 November)
P Copland	(In charge 1 and 2 December)
J Drewery	
O Goudie	
M Stewart	
C Wylie	

Out-turn days: 16 days - MF0465

Sampling Gear and Equipment

Modified PT154 with 6 mm codend
Scanmar (height and spread units)
Simrad EK500
Minilogger – temperature and depth
LiCor Light Data logger
CTD – Seabird 911 plus

Objectives

1. To carry out detailed acoustic surveys in selected lochs and the 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, to establish length-weight relationships, and otolithed. Herring samples will be analysed for sex, maturity and *Ichthyophonus* infection. Stomach, gonad and DNA samples will also be taken. Herring and sprat will be examined for *Cryptocotyle lingua* infection. Sprat will also be examined for *Lernaeenicus sprattae* and *L. encrasicoli* infection.

2. A line of CTDs will be done through each loch.

Survey Areas

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

Narrative

Clupea sailed from Fraserburgh on 20 November 2004, after a 72 hour delay due to bad weather. She arrived in Kyle on 21 November where staff joined the ship at 1630 h. She remained tied up alongside at Kyle until the morning of 22 November due to further bad weather. The usual acoustic calibration performed prior to transecting was unable to be performed due to the weather. *Clupea* steamed to Loch Hourn on the morning of 22 November to begin acoustic transecting and pelagic trawling. Very low concentrations of fish prompted the decision to transect in Loch Nevis on 23 November, and Loch Hourn was returned to and surveyed again on 24 November. Transecting was carried out on the flood tide on both days in Loch Hourn and in Loch Nevis. Loch Duich was surveyed on 25 November and 27 November, and Loch Carron on 26 November. In these two lochs it was possible to transect on both ebb and flood tides, and over the two days in Loch Duich, and one day in Loch Carron, transecting was able to be performed during two ebb and two flood tides. *Clupea* then returned to Loch Nevis and worked there during on 28 November, transecting and fishing this time during an ebb tide. On 29 November *Clupea* returned to Loch Hourn to carry out a third day of transecting there, this time during an ebb tide. This gave surveys across one ebb tide and two flood tides for Loch Hourn and two of each for Loch Duich. *Clupea* then steamed to Loch na Dal in the late afternoon of 29 November where the acoustic system was calibrated. A fourth day of work had originally been planned for Loch Hourn was dropped, due to the unusually low concentrations of fish there. A good weather forecast was given for the last couple of days of the survey. This, coupled with the extra day available due to dropping the fourth day in Loch Hourn, gave the first opportunity to work in the North Minch. *Clupea* called briefly at Kyle on the early morning of 30 November, where E Hatfield and C Wylie disembarked. She then sailed up through Raasay Sound and transected across the North Minch and back to Loch Broom and tied up alongside at Gairloch overnight. Four further transects were performed on 1 December, ending at Cape Wrath. *Clupea* then returned to Fraserburgh overnight, arriving on the morning of 2 December, when the scientists disembarked.

The light gauge recorded data throughout the cruise to determine ambient light levels. 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 Carron two pelagic tows and four CTD deployments were carried out; in Loch Duich five pelagic tows and five CTD deployments were carried out; in Loch Hourn three pelagic tows and five CTD deployments were carried out; in Loch Nevis three pelagic tows and seven CTD deployments were carried out. No pelagic tows or CTD deployments were carried out in the North Minch. The time and position data for these tows and CTDs are in Tables 1 and 2 respectively.

Samples for the WESTHER project were taken in Loch Carron (due to the lack of fish in Loch Hourn – the usual sampling area).

Biological data on length-frequency, length-weight relationships and condition indices (calculated as (weight/length^3)*1,000,000) are shown as plots in Figure 1.

E Hatfield
21 January 2005

Seen in draft: A Nicol, OIC *Clupea*

Table 1. Haul data for each pelagic tow (PT154) carried out during *Clupea* cruise 1704.

Loch	Haul	YEAR	MONTH	DAY	Hour	Min	Duration	WATER DEPTH	HEADLINE DEPTH	LAT DEG	LAT MIN	LONG DEG	LONG MIN	No. Baskets
HOURN	C04/412	2004	11	22	14	35	30	134	73-88	57	7.52	-5	34.88	3.5
HOURN	C04/413	2004	11	22	15	56	20	136	130-132	57	7.59	-5	35.67	1.25
NEVIS	C04/414	2004	11	23	14	15	15	114	32	56	59.53	-5	40.69	0
NEVIS	C04/415	2004	11	23	15	8	37	115	45-51	56	59.35	-5	40.4	0.03
HOURN	C04/416	2004	11	24	14	46	20	135	61-68	57	7.52	-5	34.98	0.2
DUICH	C04/417	2004	11	25	11	15	25	95	11	57	14.43	-5	28.47	0.2
DUICH	C04/418	2004	11	25	12	50	25	86	35-43	57	15.78	-5	30.47	0.3
DUICH	C04/419	2004	11	25	15	41	26	99	31-42	57	14.56	-5	28.6	0.3
CARRON	C04/420	2004	11	26	10	43	24	71	39-51	57	22.96	-5	29.29	0.01
CARRON	C04/421	2004	11	26	12	15	25	72	47-68	57	23.01	-5	29.35	0.1
DUICH	C04/422	2004	11	27	12	42	25	89	9 (est.)	57	15.93	-5	30.58	0.01
DUICH	C04/423	2004	11	27	15	45	8	93	36-42	57	15.39	-5	29.67	0.15
NEVIS	C04/424	2004	11	28	13	44	48	75	49-64	56	58.9	-5	38.84	

Table 2. CTD deployment data for each CTD deployed using the “SEABIRD 911plus” during *Clupea* cruise 1704.

CRUISE NO	HYDRO STA NO	ASSOC HAUL NO	LOCH	DATE	TIME	DEPTH	SAMPLER DEPTH	LAT DEG	LAT MIN	LONG DEG	LONG MIN
1704C	C04/402	NIL	NEVIS	24-Nov-04	09:07	84	79	56	59.25	5	39.74
1704C	C04/403	C04/415	NEVIS	24-Nov-04	09:29	84	79	56	59.91	-5	41.71
1704C	C04/404	NIL	NEVIS	24-Nov-04	09:43	95	90	57	0.09	-5	41.10
1704C	C04/405	NIL	NEVIS	24-Nov-04	10:04	52	47	57	1.14	-5	42.44
1704C	C04/406	INVERIE BAY	NEVIS	24-Nov-04	10:19	47	42	57	1.91	-5	42.14
1704C	C04/407	INNER ENTRANCE	NEVIS	24-Nov-04	10:38	130	125	57	1.38	-5	43.75
1704C	C04/408	OUTER ENTRANCE	NEVIS	24-Nov-04	11:00	53	48	57	1.37	-5	45.79
1704C	C04/409	UPPER LOCH	CARRON	26-Nov-04	14:26	72	67	57	23.12	-5	29.19
1704C	C04/410	C04/420, 421	CARRON	26-Nov-04	14:45	77	71	57	22.61	-5	30.36
1704C	C04/411	NIL	CARRON	26-Nov-04	15:01	103	98	57	22.14	-5	31.19
1704C	C04/412	ENTRANCE	CARRON	26-Nov-04	15:19	89	84	57	21.72	-5	31.99
1704C	C04/413	UPPER LOCH	DUICH	27-Nov-04	11:10	60	55	57	13.61	-5	26.07
1704C	C04/414	NIL	DUICH	28-Nov-04	11:30	85	80	57	14.11	-5	27.72
1704C	C04/415	NIL	DUICH	28-Nov-04	11:51	98	93	57	14.88	-5	28.98
1704C	C04/416	NIL	DUICH	28-Nov-04	12:09	87	82	57	15.48	-5	29.88
1704C	C04/417	ENTRANCE	DUICH	28-Nov-04	12:26	85	80	57	16.00	-5	30.69
1704C	C04/418	UPPER LOCH	HOURN	29-Nov-04	12:54	56	51	57	5.81	-5	32.60
1704C	C04/419	NIL	HOURN	29-Nov-04	13:10	88	83	57	6.59	-5	33.91
1704C	C04/420	NIL	HOURN	29-Nov-04	13:28	131	126	57	7.49	-5	35.18
1704C	C04/421	NIL	HOURN	29-Nov-04	13:51	107	102	57	7.92	-5	36.76
1704C	C04/422	ENTRANCE	HOURN	29-Nov-04	14:15	175	170	57	8.1	-5	39.7

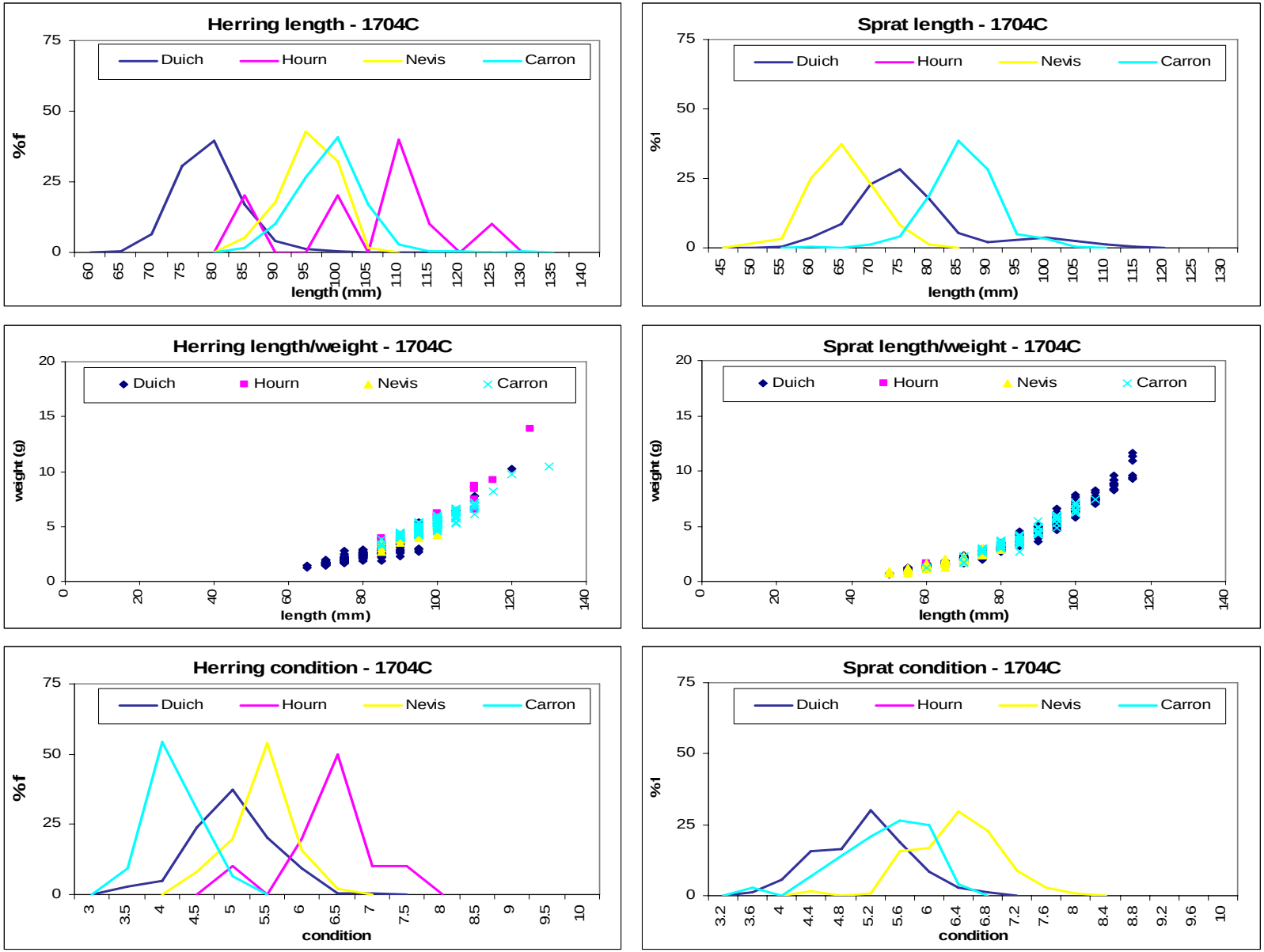

Figure 1. Length-frequency, length-weight and condition of herring and sprat sampled from pelagic tows during *Clupea* cruise 0104.

Circulation List: Cruise Programmes and Reports

CLUPEA VESSEL

Programmes - Mr J A Morrison for approval. Reports - Mr J A Morrison for approval.
Issue two copies of Record of Haul and Station Numbers pro-forma with Scientist-in-Charge's copy of *Scotia* and *Clupea* programmes.
Two xerox copies of track chart for reports to be sent to Dr L Rickards.

PROGRAMMES ONLY

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~~Mr P J Copland~~
~~Mr J Dunn~~
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Laboratory Personnel on Vessel

*E Hatfield
P Copland
J Drewery
O Gaudie
M Stewart
A Weetman
C Wylie

Fishery Officers at

Fraserburgh