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FRV *Clupea*

Cruise 1604C

REPORT

27 October – 12 November 2004

Loading Port: Fraserburgh

Unloading Port: Fraserburgh

Personnel

Alistair McIntosh (In Charge)
Clare Greathead
Margaret McKenzie
Gill Packer
Abdul Ahmed (1 day)

Fishing Gear: BT 158; beam trawl; Agassiz trawl

Out-turn Days per project: 17 days AE11p

Objectives

1. To undertake fish and sediment sampling in the Clyde and Minch areas in support of the temporal trend and biomarker monitoring studies.
2. To undertake sampling of flounder in St Andrews Bay and the upper Firth of Forth.
3. To sample *Buccinum* in support of the DEFRA TBT effects survey.
4. To undertake sampling of flounder from the upper Clyde on behalf of SEPA West.
5. To sample fish livers for Glasgow Caledonian University macroarray assay.
6. To investigate potential fish sampling areas around south Arran.
7. To collect bulk sediment in Kilbrannan Sound on behalf of QUASIMEME.
8. To collect sediment samples from outer Forth and Clyde estuaries.

Narrative

Scientific equipment and personnel joined the vessel on 27 October and all setting up and securing of equipment was completed prior to sailing. Due to increasingly inclement weather forecast for the east coast, it was decided to sail for the west coast. *Clupea* departed from Fraserburgh at 1700 and made passage north, arriving in the Summer Isles at 1100 on 28 October. Sediment was collected from seven locations associated with the de-watering site used during the post *Jambo* grounding exercise. Passage was continued south, anchoring overnight in Applecross Bay and arriving off Colonsay at 1800 on 29 October. After successfully completing the fishing and sediment sampling, *Clupea* anchored overnight in Tarbert Bay, sailing the next morning for the outer Clyde estuary. A potential fishing site, south east of the Kintyre peninsula was investigated. No plaice were found on this site but sufficient plaice were caught at a previously used site west of Pladda. On 31 October, after berthing overnight in Campbeltown, passage was made to Kilbrannan Sound where sufficient bulk sediment was collected for QUASIMEME before heading for Garroch Head where all sample requirements were fulfilled. During 1 and 2 November, fish and sediment

sampling was completed at Irvine Bay, Hunterston and Skelmorlie with mollusc collection being carried out in the Clyde shipping channel. On 3 November, two staff joined the vessel in Ardrrossan and a stratified random sediment sampling programme was conducted east of Arran before disembarking the staff again in Ardrrossan. The Cloch Point sampling area was completed on 4 November. Under the WTD, a rest day was taken on 5 November before sailing from the Clyde north to Broad Bay where fish sampling was completed by 1400 hours on 7 November. Passage was then made to the east coast. Flounder and sediment were sampled at Blackness in the Firth of Forth on 9 November. After anchoring overnight in Largo Bay, a random stratified sediment sampling exercise was conducted in the outer Forth estuary during the morning of 10 November. *Clupea* then made passage for St Andrews Bay where sampling of flounder and sediment was completed by 1700 hours after which *Clupea* headed north to anchor overnight in Montrose Bay. Passage was continued north on 11 November where berthing in Fraserburgh was completed by 1400 hours.

Results

A total of 13 trawls were taken covering 10 sites and three sediment samples were taken in association with each trawl site. A total of 160 plaice and 50 flounder were processed for the parameters listed below (Table 1). The protein fraction of the homogenised liver sample was assayed on board together with a number of samples for validation purpose.

Table 1

Location	Samples taken:		
Summer Isles	Sediment for metals analysis at 7 sites Samples of <i>Nephrops</i> , <i>Pandalus</i> , <i>Gonoplex rhomboides</i> and <i>Glossus humanus</i>		
South Minch Colonsay	Samples taken for:	Male plaice	Female plaice
	Hepatic EROD and protein	10	10
	Hepatic macro array assay (Glasgow Caledonian University)	10	10
	PAH Bile metabolites	10	10
	Plasma for Vtg assay (males only)	10	-
	Pooled liver for PAH and CB chemistry	2 pools of 5 fish	2 pools of 5 fish
	Pooled flesh for PAH and CB chemistry	2 pools of 5 fish	2 pools of 5 fish
Kilbrannan Sound	Sediment for PAH & CB chemistry; PSA 3 samples from trawl track		
Kilbrannan Sound	~ 50 kg wet sediment for QUASIMEME		
South Clyde Pladda	All samples taken as above		
Garroch Head	All samples taken as above		
Irvine Bay	All samples taken as above		
Hunterston	All samples taken as above		
Skelmorlie	All samples taken as above		
Cloch Point	All samples taken as above		
North Minch Broad Bay	All samples taken as above		
St Andrews Bay	All samples taken as above; in addition: 5 pools of 5 liver and 5 flesh for HM	Male flounder	Female flounder
		19	6
Firth of Forth Blackness	All samples taken as above; in addition: 5 pools of 5 liver and 5 flesh for HM	Male flounder	Female flounder
		10	15
Outer Clyde	Sediments for PAH and PSA	25 samples	
Outer Firth of Forth	Sediments for PAH and PSA	25 samples	

It was not possible to collect flounder from the upper Clyde during the period *Clupea* was working in the area as the SEPA RV *Sir John Murray* was conducting other environmental duties. The collection of flounder from the upper Clyde, by SEPA west, and the subsequent processing will be scheduled for another mutually convenient time.

A potential fish site, south west of Arran was investigated but this proved unproductive.

Buccinum were obtained from the bottom trawl where available and by Agassiz and beam trawls at 5 sites, within the Firth of Clyde. The *Neptunea* caught at each site were frozen whole (up to 40 animals). The sex of the *Buccinum* was determined and the females sacrificed to determine the level of imposex. The males were returned to the sea. The females were divided into the foot and the tails and stored frozen for subsequent TBT analysis. At all sites except the Mid Clyde Channel site there were improvements to the percentage of imposex recorded; the Mid Clyde Channel increased from 0 to 13.6%. The mean penis classification index (PCI) levels exhibited an increase in 2004 at all the sites sampled. The results are recorded in Table 2. However all of these except the Mid Clyde Channel site could be within the standard errors.

Table 2

Site	No <i>Neptunea</i>	No <i>Buccinum</i>	% Imposex Nov 2003	% Imposex Nov 2004	Mean PCI Nov 2003	Mean PCI Nov 2004	Sex ratio F/M
Anchorage A4, A5 and A7 (4 Agassiz trawls)	6	100	83.2	68.2	1.12 ± 0.22	1.52	0.8
Upper Clyde Channel (1 beam trawl)	105	34	16.7	6.7	0.08 ± 0.08	1.00	0.9
Mid Clyde Channel (from BT and 3 Agassiz trawls)	46	36	0.0	13.6	0.0	1.16	1.7
Cloch Point (from BT and 3 Agassiz trawls)	30	5	100.0	50.0	0.67 ± 0.17	1.25	4.0

A McIntosh
12 November 2004

Seen in draft: A Simpson OIC