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FRV *Clupea*

Cruise 1204C

PROGRAMME

11-30 August 2004

Loading: 11 August, Fraserburgh

Unloading: 20 August, Lochinver

30 August, Fraserburgh

***In setting the cruise programme and specific objectives, etc the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in FRS' Working Time Policy (which is published on the Intranet). In addition, the Scientist-in-Charge must formally review the risk assessments for the cruise with staff on-board before work is commenced.**

Personnel

*Matt Gubbins	In charge
Colin Sellar	Safety Officer
George Slesser	11-20 August
Jennifer Graham	11-20 August
John Beaton	20-30 August
Pippa Sammes	20-30 August

Equipment

SB15 (Sealogger) CTD/Rosette sampler
Day grab x 2
Zodiak inflatable and 2 outboard engines
Snella line
Reversing bottles/mini-logger
3 x Phytoplankton sampling hoses
>1,600 nutrient and silicate sample bottles
Second freezer for lab

Objectives

To conduct a 'late summer' survey of a suite of sea lochs/voes impacted to varying degrees by nutrient releases from fish farming activity. This survey forms part of an ongoing programme of work to assess the potential for eutrophication arising from nutrient 'hotspots' linked to aquaculture. This will be undertaken by measuring the following parameters at multiple stations in each loch:

1. CTD and dissolved oxygen
2. Nutrients (inc. silicates)
3. Chlorophyll a
4. Phytoplankton
5. Shoreline macroalgae
6. Organic carbon in sediments
7. Algal toxins in wild shoreline mussels

These determinands will be assessed against criteria as defined by the OSPAR Eutrophication Task Group and used for future eutrophication assessment of Scottish coastal waters. Data will also be compared to that collected during previous cruises and will be used to inform estimates of internal mixing within sea lochs/voes to improve laboratory models to predict nutrient enhancement from aquaculture.

Procedure

Scientific staff will board on 11 August and *Clupea* will be taken to the West coast to commence survey work in this area. The survey will try to cover a total of 14 sea lochs and voes. Target areas are given below, but may require amendment subject to weather considerations or the absence of fish from farms due to the unpredictable nature of aquaculture production.

Badcall Bay
Loch Ewe
Loch Torridon
Loch Skipport
Loch Shell
Loch Greshornish
Loch Snizort Beg, Skye (control, no fish)

Sandsound Voe
Gruting Voe
Basta Voe
Mid Yell Voe
Baltasound
Whalefirth Voe, Shetland (control, no fish)
Sullom Voe, Shetland (control, no fish)

At each survey area, CTD and dissolved oxygen profiles, water samples (from 4-6 depths) and sediment samples by Day grab will be taken at a maximum of 10 stations up each loch/voe. At a minimum of 4 of these stations in each loch/voe, surface phytoplankton samples will also be taken by integrated hose. In addition, CTD profiles, water and sediment samples will be taken from 4 stations at: 10, 25, 50 and 100 m distant, in a downstream direction, from a single active fish farm in each loch (excluding Snizort Beg, Sullom Voe and Whalefirth Voe). Weather permitting, sampling of stations close to individual fish farms will be undertaken by reversing bottles/minilogger on the Snella line and hand held grab from the small zodiac launched from *Clupea*. When the zodiac is launched for water and sediment sampling during periods of low tide, the opportunity will be taken to collect shoreline samples of macroalgae (for nitrogen isotope analysis) and wild mussels (for algal toxin analysis) to complement the survey. Intertidal shorelines will also be surveyed for the presence/absence of nuisance green macroalgae.

Clupea will be unable to enter some of the lochs to be surveyed. These areas will therefore also be surveyed by scientific staff aboard the Zodiac inflatable, launched from *Clupea*.

Due to the overall length of the cruise, a rest day is scheduled for 20 August. It is expected that all the lochs on the West coast and Western Isles will have been surveyed by this time. Due to insufficient freezer space aboard *Clupea* for storage of water samples from the entire cruise, an unloading of samples from the first half of the cruise will also be required on this date. It is envisaged that the 20 August will be spent at Lochinver and during this time, samples will be unloaded and two members of scientific staff will be changed.

On 21 August, *Clupea* will be taken to Shetland to complete the survey of Shetland voes before returning to Fraserburgh for unloading on 30 August.

Normal contacts will be maintained with the Laboratory.

J A Morrison
27 July 2004

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

Lab staff

Mr J T M Hunter
Mr T Reid
Mr P J Copland
Mr J Dunn
Mr A Beaton
J Petrie
Security

Non-lab staff

~~Island Cmdr Faroes (Faroes only)~~
~~Flag Officer, Denmark (Danish part of N Sea only)~~
Coastguard
G Lees

PROGRAMMES AND REPORTS

Lab staff

Mr J A Morrison
Capt R Denholm
Mr R S T Ferre) Fish Man team
Mr C Hall) progs only
Dr R M Stagg
Dr C Moffat
Mr M R Heath
Mr A Macdonald
D Lichtman (+ additional copy of track chart
of reports only)
Mrs E Morrison
CO/OIC of Vessel (*Scotia*) (to be faxed)
Library (2)
File

Non-lab staff

Library, Danmarks Fisk (reports only)
~~Mr J Mortensen (Faroes only)~~
~~Mr A Souplet (Fishing Cruises only)~~
~~Dr S Ehrich (Entering German Waters) (reports only)~~
W J McCurdy, Belfast
Technical Director, SFIA (J E Tumilty)
Dr L Rickards
Dr I Joint
Director – Havfor Inst, Norway
Dr S Ehrich
Monsieur le Chef du dépt, Nantes
Mr J C Brabant
Mrs van Duyvenvoorde
Dr J G Gordon
G Kane
R de Clerck
Mr B Stewart
Capt J Cannan (*Scotia* and *Clupea* only)
Controller Coastal Ops - A Stewart
Dr P Grieg-Smith
Mr H C Boyar
Dr R J A Atkinson
Mr H i Jákupsstovu
Mr C Bullimore (To be faxed: 01923 846392)

Laboratory Personnel on Vessel

M Gubbins J Graham
C Sellar J Beaton
G Slesser P Sammes

Fishery Officers at

Fraserburgh
Lochinver
Shetland
Ullapool