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Biological Oceanography Cruise : LF3397

Cruise Report

(August 06 - 13)

Personnel

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Cruise Objectives

The objectives of this cruise were to estimate phytoplankton production and copepod grazing and undertake mooring recovery and servicing. Detailed objectives were to:

1. quantify phytoplankton production in two size fractions (whole and < 5.0 μm).
2. estimate copepod grazing.
3. collect samples of phytoplankton and zooplankton for species identification and enumeration.
4. collect sediment samples for the determination of sediment pigment concentration.
5. collect water samples for the determination of particulate aluminium, particulate organic carbon and nitrogen and dissolved inorganic nutrients.
6. recover the CEFAS Liverpool Bay moorings, recover the DANI particle trap mooring and biological sampler and service the automated sampler mooring.

Cruise Narrative

R.V. Lough Foyle departed Belfast at 2000 h on Wednesday August 06 and sailed for the process station in Liverpool Bay (Figure 1). During Thursday August 07 the CEFAS moorings were recovered, offloaded in Liverpool and the ship returned to the process station to commence sampling for zooplankton over twenty four hours. Productivity and zooplankton grazing experiments were carried out on Friday August 08. Lough Foyle worked a line of stations between the process station in Liverpool Bay and the DANI mooring station (38A) in the stratified region during Saturday August 09. Process studies and mooring work were carried out on Sunday August 10. A line of stations was worked from the mooring station to Station 47 in Irish coastal waters on Monday August 11. Sampling for zooplankton over 24 hours at S47 began at 1500 on the same day. Process studies at this station were carried out on Tuesday August 12. On completion of the work at 2300, Lough Foyle steamed for Belfast and docked at 0800 on Wednesday August 13.

Preliminary Results

All of the process studies and mooring work was completed successfully.

At the time of the cruise, near surface water in Liverpool Bay had a temperature of 18.6° C, compared to temperatures of 15.8 and 15.3° C at station 38A and 47 respectively. The coldest water 11.8° C was located at depth in the stratified region. There was little evidence of saline or thermal stratification in Liverpool Bay. Weak thermal stratification was observed at station 47, where the surface to bottom difference in temperature was ≈ 1.0° C. In the stratified region the surface to bottom difference in temperature was ≈ 4.0° C, the surface mixed layer was approximately 15 m deep and the thermocline extended to a depth of 40 m.

The concentration of nitrate (m mol m^{-3}) along the section from LBP in Liverpool Bay through S38A to station 47 is shown in Figure 2A. Near surface waters of the stratified region were depleted in nitrate (< 0.2 m mol m^{-3}) compared to isothermal waters to the east of the stratified region where the near surface concentration was up to 2.0 m mol m^{-3}. Maximum concentrations of nitrate (6.8 m mol m^{-3}) were measured in bottom water in the stratified region. The distribution of chlorophyll along the section is shown in Figure 2B. Maximum concentrations of chlorophyll up to 9.5 mg m^{-3} were measured in Liverpool Bay. In Irish coastal waters and in the stratified region chlorophyll did not exceed 2.5 mg m^{-3}.

At each of the three process stations the copepod population was dominated by small coastal species (Table I). Of these *Oithona similis* was the most abundant. The two calanoid copepods *Calanus finmarchicus* and *Calanus helgolandicus* were not present at the two coastal stations and contributed < 2% to total copepod abundance in the stratified region.

Acknowledgements

I wish to express my thanks to the captain, officers and crew of the R.V. Lough Foyle for their assistance during the cruise. I would also like to thank all of the scientific staff DANI and CEFAS who participated in the cruises.

R.J. Gowen

September 11, 1997

Table I. Abundance of dominant copepod species at the three process stations

Species	Abundance (x 10^3 ind m^{-2})			Percentage contribution to total abundance		
	LBP	S38A	S47	LBP	S38A	S47
Oithona similis	27.68	109.2	7.95	42.7 %	66.0 %	38.0 %
Acartia clausi	7.07	37.40	7.77	10.9 %	22.6 %	37.2 %
Temora longicornis	7.66	0.00	3.48	11.8 %		16.6 %

Figure 1.

A map of the Irish Sea showing the positions of the three process stations. The DANI mooring is located at station 38A

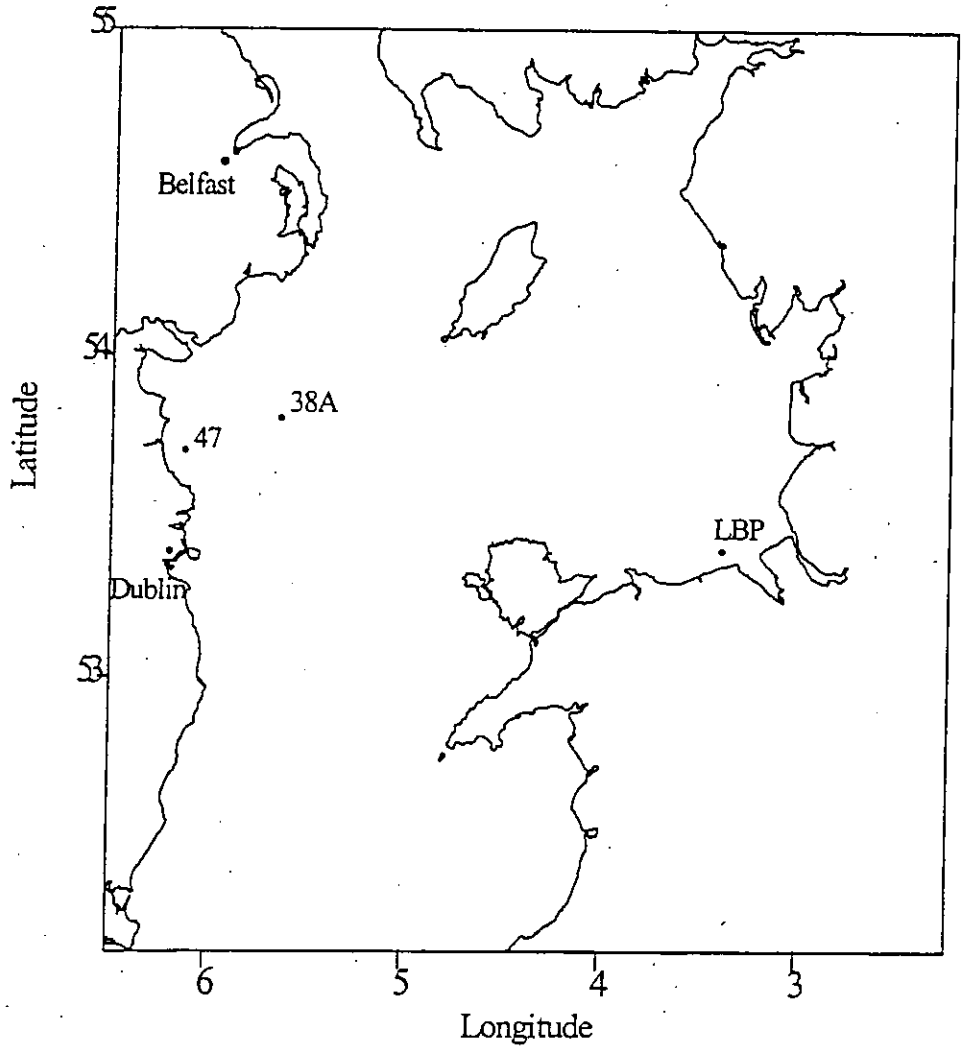

Figure 2. The distribution of Nitrate and Chlorophyll