

**Department of Agriculture and Rural Development (Northern Ireland)**  
**Agriculture and Environmental Science Division**

**Cruise Report:** LF 4503

**Vessel:** RV *Lough Foyle*

**Dates:** 3<sup>rd</sup> – 7<sup>th</sup> & 10<sup>th</sup> -14<sup>th</sup> November 2003

**Area:** Irish Sea (north); ICES div. VIIa

**Survey Type:** Irish Sea Larval Herring

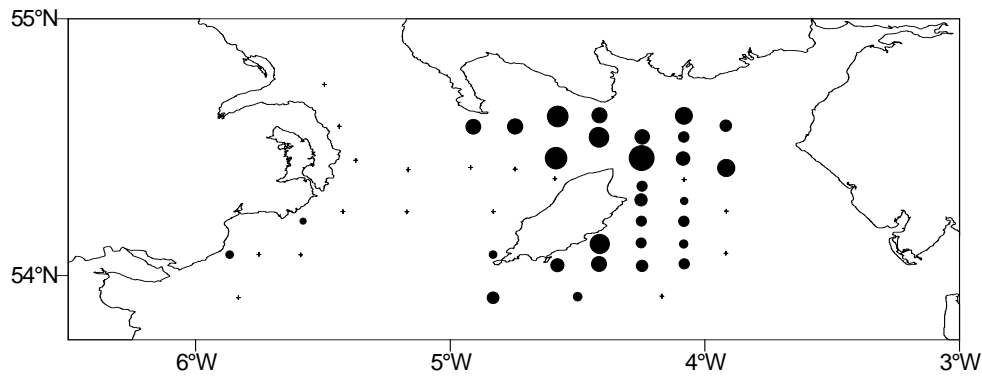
<b>Personnel:</b>	Michael McAliskey	DARD	SIC/SO
	Simon Bloomfield	DARD	SO
	John Peel	DARD	ASO
	Peter McCorrison	DARD	ASO
	Pieter Jan Schon		RA

**Objectives:**

- i. To estimate the production of larvae herring in the Irish Sea in 2003 as part of the time series of biomass indices used by ICES for the assessment of herring in VIIa (N).
- ii. To collect and fix larvae for otolith extraction and growth analysis.

**Cruise Narrative:**

The vessel sailed at 10:00 on 4 November, and upon leaving the mouth of Belfast Lough it soon became apparent that deployment of the sampler would be unsafe due to the sea state and gale force winds. The vessel then returned to Belfast and the survey was postponed for the remainder of the week, as severe gales were forecast. The vessel sailed again at 18:00 on the afternoon of the 9<sup>th</sup> November and the first station was sampled in marginal conditions, with each subsequent deployment carried out on the judgement of the watch leader and bridge officer. Deployments were irregular over the next three days with sampling halted on three occasions due to gale force winds. Fifty of sixty-two proposed stations were completed and the vessel returned to Belfast on the evening of the 12<sup>th</sup> November.



**Figure 1.** Stations sampled on LF4503 and the abundance of larval herring (per m<sup>2</sup>) on 9-12 November 2003. Areas of circles are proportional to larva abundance. (maximum = 65 per m<sup>2</sup>).

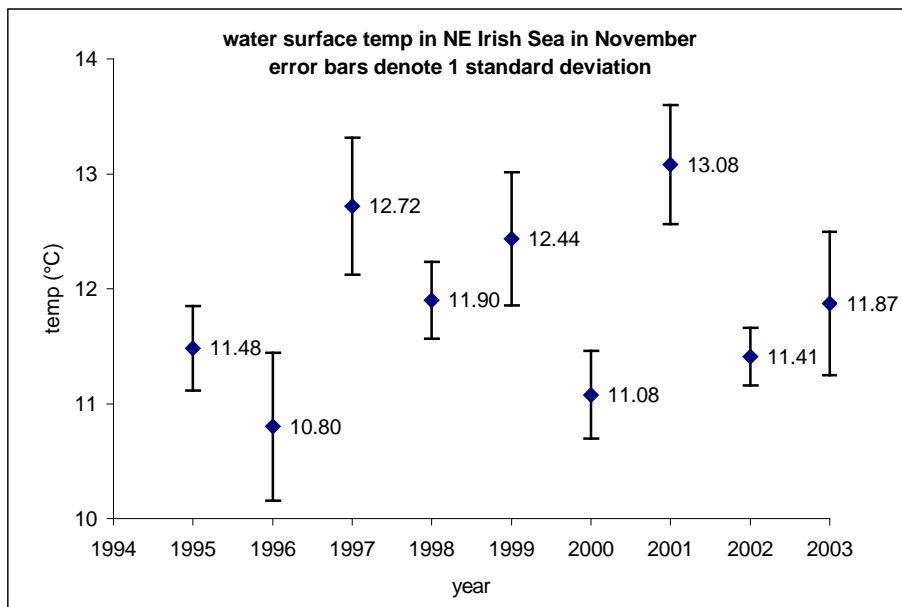
### Methods:

The grid of sampling station was predetermined and based on the spatial distribution of larval herring in the Irish Sea in the 1990s. The ichthyoplankton survey was carried out using the Gulf VII high speed plankton sampler, fitted with a 280µm net (Nash *et al.*, 1998). The sampler depth, temperature, salinity and flows were monitored using the Pronet sensor system. The onboard thermosalinograph was run throughout the cruise. This recorded the sea-surface temperature and salinity every 1 minute.

The Gulf VII was deployed in a double oblique manner from the sea-surface to 2m off the seabed. It was lowered at approximately 10 seconds m<sup>-1</sup> and the ship steamed at approximately 3 knots through the water. Sampling occurred around the clock. All nets were washed upon recovery and the samples fixed in 4% formaldehyde solution buffered with sodium acetate trihydrate. Prior to fixing, the samples were sorted for fish larvae. The herring larvae were fixed in 99% ethanol. Sampling and preservation followed DARD standard operating procedures.

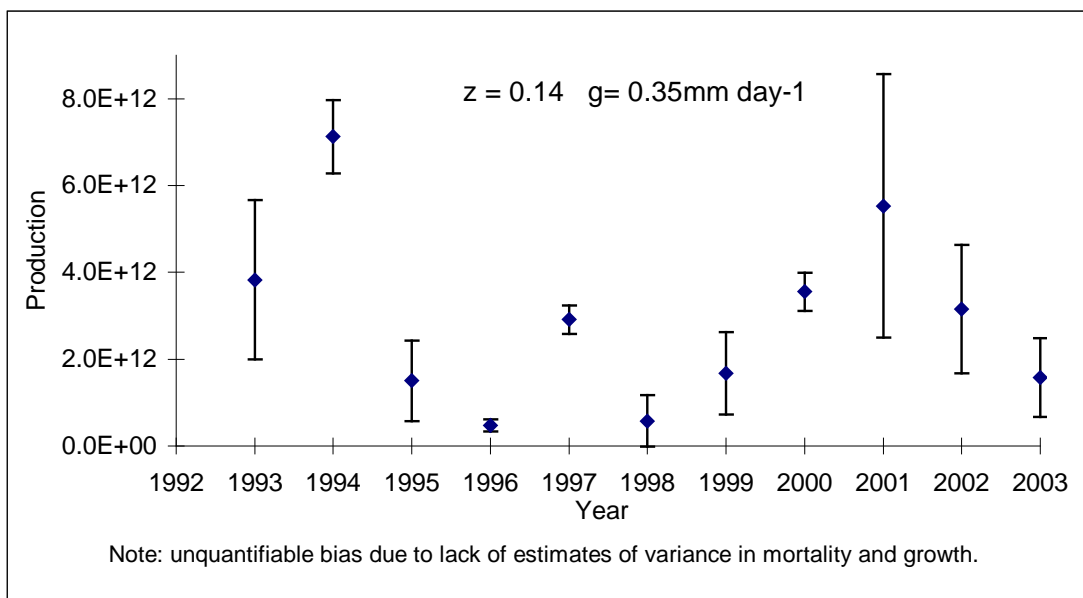
### Results:

Over  $2.5 \times 10^6$  liters of water were filtered with the Gulf VII sampler. A total of 583 larvae were caught, mainly from the north-eastern Irish Sea (Figure1). Mean sea surface temperature in the north-eastern Irish Sea was close to the average for the survey series (Figure 2).



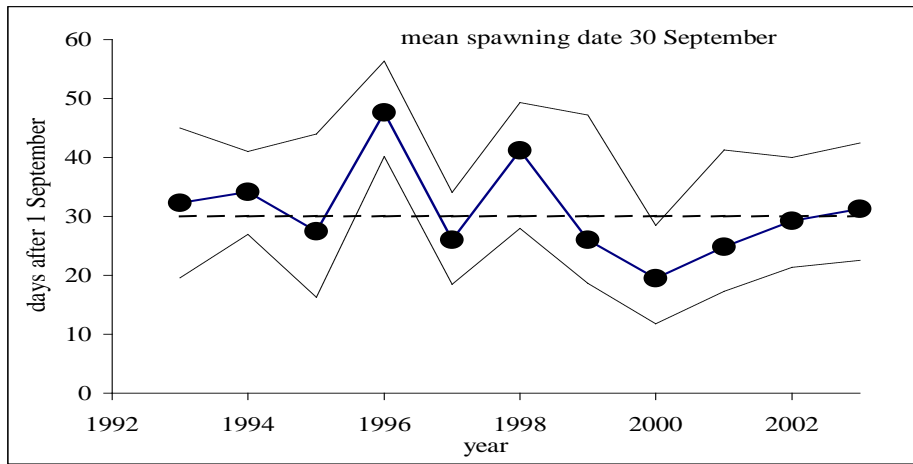
**Figure 2.** Mean sea surface temperature of north eastern Irish Sea during the first week in November from 1994 to 2003.

Total larval production in the NE Irish Sea was calculated from abundance of larvae in different size classes, taking into account the expected rates of mortality and growth obtained during surveys in 1993 and 1997. The point estimate of larval production for cruise LF4503 was below the series average of  $2.9 \times 10^{12}$  larvae (Figure 3), although the confidence limits for the surveys tend to be quite wide.



**Figure 3.** Estimates of larval herring production in the NE Irish Sea from 1993 to 2003. Error bars denote 1 standard error in the estimation of abundance.

The estimated mean spawning time for larvae caught during LF4503 was very close to 30 September, the average of the series (Figure 4). Ninety percent of the spawning took place over a 20-day period.



**Figure 4.** Central spawning date of Irish Sea herring estimated from larval herring catches. Dotted lines denote the period over which 90% of the larvae caught during the survey were produced.

**Acknowledgments:**

The scientists, officers and crew are thanked for their hard work and cooperation during the cruise.

**Signed:**

SIC:

Master:

Aquatics:

Date:

Date:

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